

Chapter-4

Results

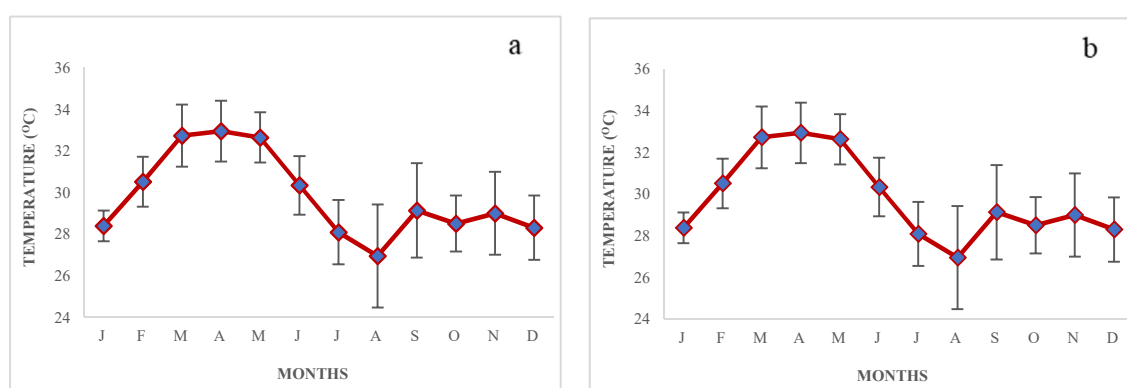
4.1 Physico chemical parameters

The monthly values of selected hydrographic parameters from the rivers of Palakkad district were collected from ten stations during November 2018 to October 2019. As a result, the data was collected and an average for various parameters was calculated.

4.1.1 Temperature

The monthly temperature variations of the surface water at the ten study stations are depicted in figures 3 a&b. The mean temperature values month wise ranged from 26.93 ± 2.47 °C (August) to 32.93 ± 1.45 °C (April). Minimum value observed in monsoon season and maximum value in pre monsoon. Water temperature fluctuated from a minimum of 27.96 ± 2.98 °C at station 10 to a maximum of 31.95 ± 2.29 °C at station 7. The ANOVA of the monthly variation of temperature showed significant difference between months ($P < 0.001$) and sites ($P < 0.001$). The coefficient of correlation illustrated significant negative correlation with DO and positive correlation with all other parameters.

Figure 3. Graphs showing monthly and spatial variation of Temperature (a&b)

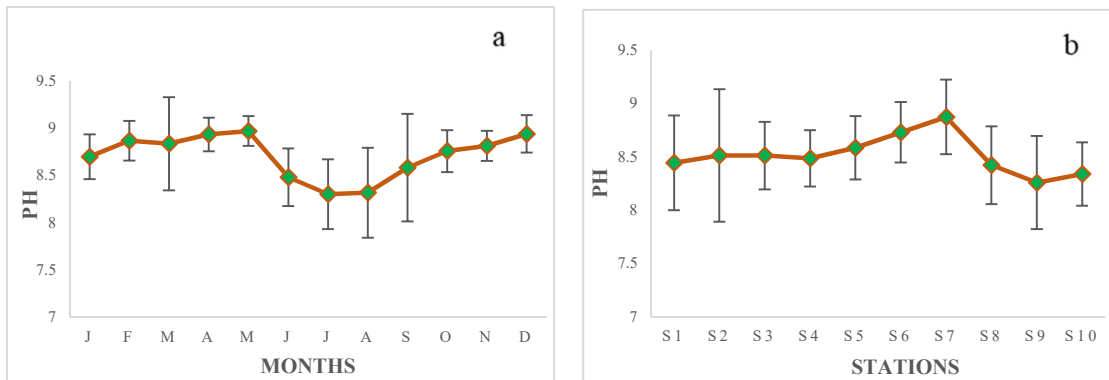


4.1.2 pH

Monthly the mean pH values ranged from 8.3 ± 0.36 (July) to 8.96 ± 0.15 (May) presented in figures 4 a&b. Minimum value observed in monsoon season and maximum value in pre monsoon. pH value fluctuated from a minimum of 8.2 ± 0.43 at

station 9 to a maximum of 8.87 ± 0.35 at station 7. The ANOVA of the monthly variation of pH showed significant difference between months ($P < 0.001$). The results showed significant negative correlation with silicate and DO positively correlation with all other parameters.

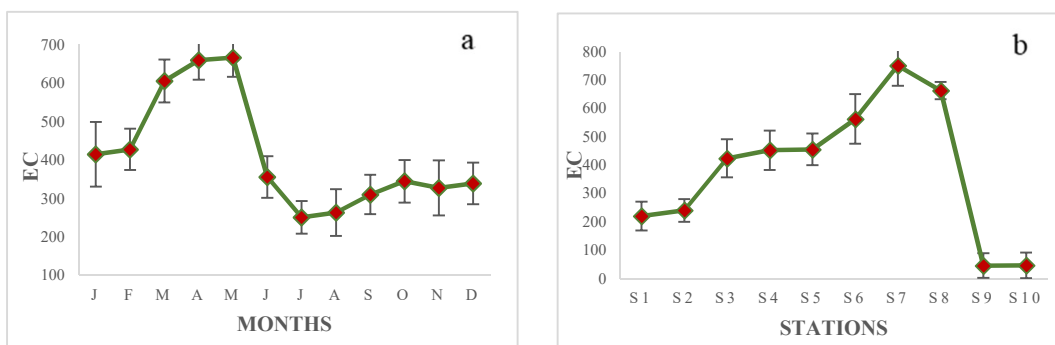
Figure 4. Graphs showing monthly and spatial variation of pH (a&b)



4.1.3 Electrical Conductivity (EC)

The mean value of the conductivity for the entire period of observation are depicted in figures 5 a&b. The highest average value recorded in the study area during the month of May (666.16 ± 49.86) at station 7 (750.35 ± 71.68) and the minimum conductivity was recorded from station 9 (46.03 ± 43.51) during the month of July (250.53 ± 42.49). The ANOVA of the monthly variation of electrical conductivity showed significant difference between months ($P < 0.001$). The findings revealed that significant negative correlation with phosphate and nitrate.

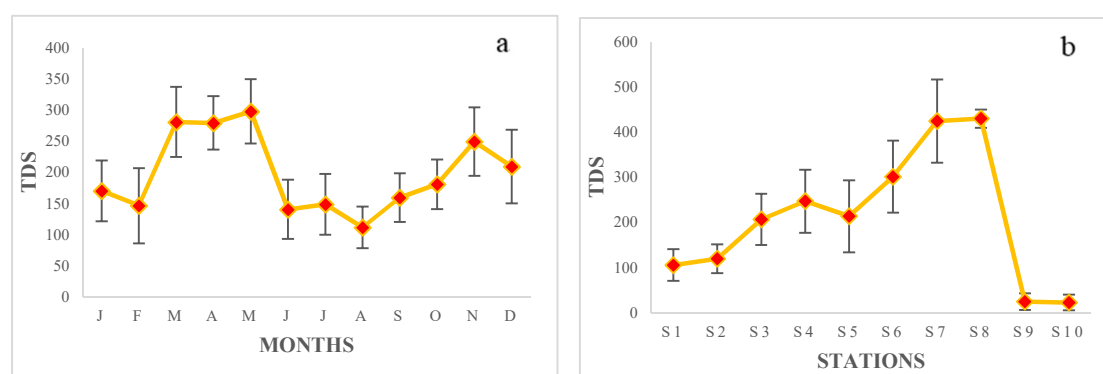
Figure 5. Graphs showing monthly and spatial variation of EC (a&b)



4.1.4 Total Dissolved Solids (TDS)

The mean value of the total dissolved solids for the entire period of study are illustrated in figures 6 a&b. In general, highest TDS was observed in May (297.96 \pm 51.75) at station 8 (429.93 \pm 20.38). The lowest value observed in the month of August (111.21 \pm 33.37) at station 10 (22.36 \pm 17.1). Analysis of variance showed no significant relation between months ($P > 0.001$). The coefficient of correlation illustrated significant negative correlation with nitrate, phosphate and DO.

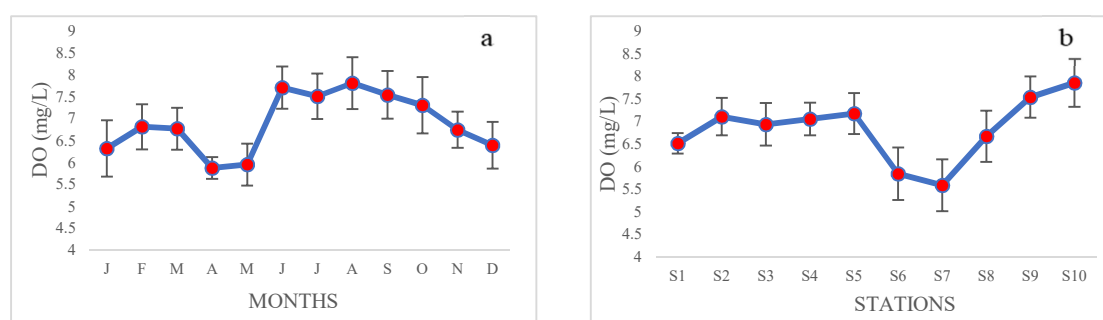
Figure 6. Graphs showing monthly and spatial variation of TDS (a&b)



4.1.5 Dissolved Oxygen (DO)

The monthly average values of DO in the study area ranged between 7.8 \pm 0.71 mg/L during August to 5.87 \pm 0.54 mg/L during April shown in figures 7 a&b. The mean value ranged between 7.85 \pm 0.91 mg/L at station 10 to 5.58 \pm 0.62 mg/L at station 7. Univariate analysis showed that sufficient variance occurs with DO in months ($P < 0.001$). The correlation results revealed significant positive correlation with EC and silicate.

Figure 7. Graphs showing monthly and spatial variation of DO (a&b)



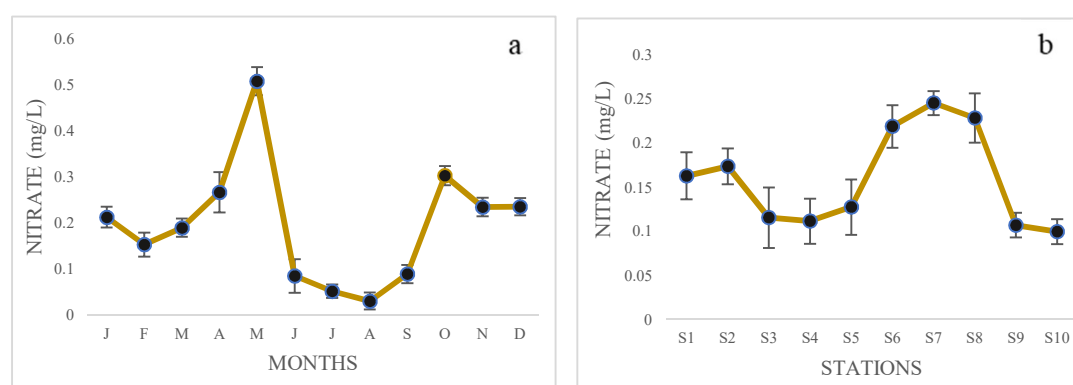
4.2 Nutrients

Nutrients like nitrate, phosphate and silicate concentration in the river ecosystem were observed during the present study. The ratio of nutrient concentration fluctuates according to the physiological and biological state of phytoplankton (Balzano et al. 2015). Growth of phytoplankton depends on the availability of nutrients.

4.2.1 Nitrate

Analysis of variance in nitrate showed that significant differences ($P < 0.001$) observed with the mean temporal variation of nitrate in the study area (Figures 8 a&b) ranged from 0.03 ± 0.0 mg/L in August and 0.508 ± 0.03 mg/L in May. This range of difference in various stations recorded between 0.09 ± 0.01 mg/L at station 10 and 0.245 ± 0.013 mg/L at station 7. The correlation coefficient showed positive correlation with temperature, pH and phosphate. The variations in nitrate concentration are directly related with the growth of phytoplankton in river water because their biological processes determine the N cycling in ecosystem.

Figure 8. Graphs showing monthly and spatial variation of Nitrate (a&b)

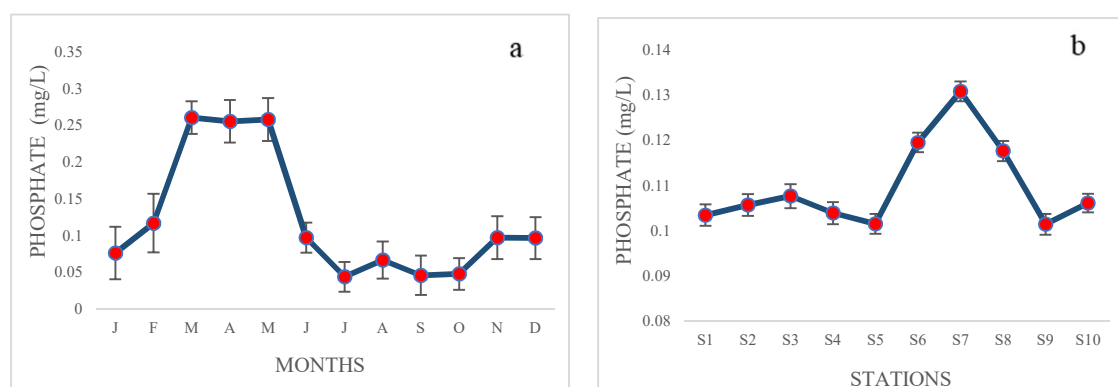


4.2.2 Phosphate

The average values of phosphate are given in the figures 9 a&b. The monthly range of phosphate was from 0.044 ± 0.02 mg/L (September) to 0.26 ± 0.02 mg/L (May). The least mean values were recorded from the Stations 9 (0.10 ± 0.002 mg/L) and highest

mean value was from station 7 (0.131 ± 0.002 mg/L). Comparatively low amount of phosphate concentration observed throughout the study period. Analysis of variance showed that significant variance between months ($P < 0.001$). The coefficient of correlation illustrated significant positive correlation with temperature, nitrate and phosphate.

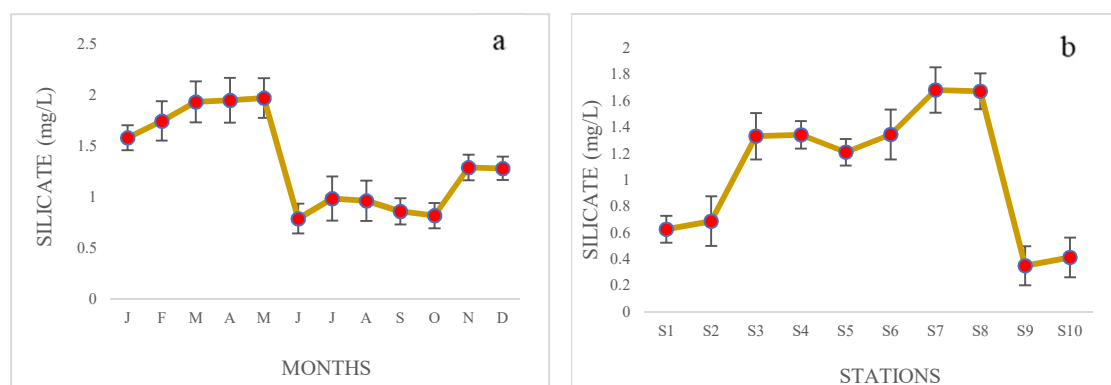
Figure 9. Graphs showing monthly and spatial variation of Phosphate (a&b)



4.2.3 Silicate

The monthly average values of silicate in the study area ranged from 0.96 ± 0.56 mg/L during June to 1.97 ± 0.79 mg/L during May. In the present study, the silicate concentration was found to fluctuate from 0.347 ± 0.48 mg/L at station 9 to 1.67 ± 0.40 mg/L at station 7 (Figures 10 a&b). The ANOVA of the monthly change of temperature showed significant difference between months ($P < 0.001$). The correlation results showed significant negative relation with pH, nitrate and phosphate.

Figure 10. Graphs showing monthly and spatial variation of Silicate (a&b)



4.3 Algal taxonomy

The algal taxa recorded from the study area given in (Table 2). Phytoplankton belonging to 257 taxa under seven classes from six divisions namely Chlorophyta, Bacillariophyta, Chrysophyta, Pyrrhophyta, Euglenophyta and Cyanophyta were identified from the 10 stations studied. Out of the 257 algal taxa recorded, 88 belong to class chlorophyceae, 74 to bacillariophyceae, 69 to euglenophyceae, 24 to cyanophyceae, 1 to dinophyceae, 1 to xanthophyceae.

Algal classification mainly based on their morphological and physiological characters, pigment composition and cellular structure. According to Fritsch (1945a), algae classified into eleven classes: Chlorophyceae, Xanthophyceae, Chrysophyceae, Bacillariophyceae, Cryptophyceae, Dinophyceae, Chloromonodineae, Euglineneae, Phaeophyceae, Rhodophyceae and Cyanophyceae (Myxophyceae). In the present study, systematic positions of algae were arranged in accordance with (Prescott 1982; Desikachary 1959; Philipose 1967; Scott and Prescott 1961; Sarode and Kamat 1984) respectively. The taxa within genera were arranged in alphabetical order. The details of collections were given in appendix. The algal taxa were arranged in the following order.

Division - Chlorophyta (Class - Chlorophyceae)

Division - Chrysophyta (Class - Xanthophyceae & Chrysophyceae)

Division - Bacillariophyta (Class - Bacillariophyceae)

Division - Euglenophyta (Class - Euglenophyceae)

Division - Pyrrhophyta (Class - Dinophyceae)

Division - Cyanophyta (Class - Cyanophyceae)

Table 2. The Number of phytoplankton taxa collected from the study area

Class	Order	Family	Genus	Species	%
Chlorophyceae	2	10	26	88	34
Xanthophyceae	1	1	1	1	1
Bacillariophyceae	2	9	24	74	29
Euglenophyceae	1	1	5	69	26
Dinophyceae	1	1	1	1	1
Cyanophyceae	2	4	13	24	9
Total	9	26	70	257	100

Table 3. List of new reports of phytoplankton from India and Kerala

New report to India			
1	<i>Micrasterias laticeps</i> var. <i>acuminata</i>		
New reports to Kerala			
1	<i>Navicula constans</i> var. <i>symmetrica</i>	8	<i>Euglena oxyuris</i> var. <i>minor</i>
2	<i>Navicula gastrum</i>	9	<i>Phacus viguieri</i>
3	<i>Navicula pusilla</i>	10	<i>Phacus pseudoswirenkoi</i>
4	<i>Cymbella signata</i>	11	<i>Trachelomonas planctonica</i> f. <i>ornata</i>
5	<i>Surirella tenera</i> var. <i>ambigua</i>	12	<i>Strombomonas gibberosa</i>
6	<i>Euglena chlamydophora</i>	13	<i>Peridiniopsis quadridens</i>
7	<i>Euglena fusca</i>	14	<i>Pseudoanabaena galeata</i>

Table 4. The checklist of taxa recorded from the study area

Division	Class	order	Family	Species		
Chlorophyta	Chlorophyceae	Volvocales	Volvocaceae	<i>Pandorina morum</i> (Mull.) Bory <i>Pandorina morum</i> (Mull.) Bory var. <i>major</i> Iyengar		
			Micractiniaceae	<i>Golenkinia paucispina</i> W. & G.S.West <i>Golenkiniopsis minutissima</i> (Iyengar et Balkr.)		
			Chlorococcales	Hydrodictyceae	<i>Pediastrum biradiatum</i> Meyen <i>Pediastrum boryanum</i> (Turp.) Menegh. var. <i>longicorne</i> Reinsch <i>Pediastrum simplex</i> Meyen <i>Pediastrum simplex</i> Meyen var. <i>duodenarium</i> (Bailey) Rabenhorst <i>Pediastrum tetras</i> (Ehr.) Ralfs <i>Tetraedron gracile</i> (Reinsch) Hansgirg <i>Tetraedron proteiforme</i> (Turn.) Brunnthaler <i>Tetraedron regulare</i> Kuetzing var. <i>granulata</i> Prescott <i>Tetraedron regulare</i> Kuetzing var. <i>minus</i> (Reinsch) De Toni <i>Tetraedron trigonum</i> (Naegeli) Hansgirg <i>Tetraedron trigonum</i> (Nag.) Hansgirg fa. <i>crassum</i> (Reinsch) De Toni <i>Tetraedron trigonum</i> (Nag.) Hansgirg var. <i>verrucosum</i> Jao	
		Oocystaceae			<i>Oocystis borgei</i> Snow	
		Dictyosphaeriaceae			<i>Dictyosphaerium ehrenbergianum</i> Nag.	
		Selenastraceae			<i>Ankistrodesmus convolutus</i> (Corda) <i>Ankistrodesmus falcatus</i> (Corda) Ralfs <i>Actinastrum hantzschii</i> Lagerheim var. <i>elongatum</i> G.M.Smith <i>Micratinium pusillum</i> Fresenius var. <i>elegans</i> G.M.Smith <i>Selenastrum gracile</i> Reinsch	
					Coelastraceae	<i>Coelastrum microporum</i> Naegeli <i>Coelastrum proboscideum</i> Bohlin <i>Coelastrum sphaericum</i> Nag.
						Scenedesmaceae

Division	Class	order	Family	Species
				<i>Scenedesmus bijugatus</i> (Turp.) Kuetz. var. <i>graevenitzii</i> (Bernard)
				<i>Scenedesmus dimorphus</i> (Turp.) Kuetz.
				<i>Scenedesmus longus</i> Meyen
				<i>Scenedesmus perforatus</i> Lemm.
				<i>Scenedesmus perforatus</i> Lemm. var. <i>major</i> (Turn.) Philipose
				<i>Scenedesmus quadricauda</i> (Turp.) Breb.
				<i>Scenedesmus quadricauda</i> (Turp.) Breb. var. <i>bicaudatus</i> Hansgirg
				<i>Scenedesmus quadricauda</i> (Turp.) Breb. var. <i>quadrispina</i> (Chodat) G. M. Smith
			Gonatozygaceae	<i>Cylindrocystis brebissonii</i> Menegh
			Desmidiaceae	<i>Closterium diana</i> Ehr. var. <i>minus</i> (Wille) Schroder
				<i>Closterium ehrenbergii</i> Menegh
				<i>Closterium kuetzingii</i> Breb.
				<i>Closterium lagoense</i> Nordst.
				<i>Closterium moniliferum</i> (Bory) Ehr.
				<i>Closterium navicula</i> Breb.
				<i>Closterium peracerosum</i> Gay
				<i>Pleurotaenium ovatum</i> Nordst
				<i>Pleurotaenium trabecula</i> (Ehr.) Nag. var. <i>rectum</i> (Delp.) West et West
				<i>Triploceras gracile</i> Bail. var. <i>undulatum</i> Scott & Prescott
				<i>Euastrum gayanum</i> De Toni
				<i>Euastrum sinuosum</i> Lenorm.
				<i>Euastrum spinulosum</i> Delp.
				<i>Micrasterias foliacea</i> Bail.
				<i>Micrasterias laticeps</i> Nordstedt var. <i>acuminata</i> W.Krieger
				<i>Micrasterias pinnatifida</i> (Kuetz.) Ralfs
				<i>Cosmarium auriculatum</i> Reinsch
				<i>Cosmarium binum</i> Nordst.
				<i>Cosmarium blyttii</i> Wille
				<i>Cosmarium depressum</i> (Nag.) Lund.
				<i>Cosmarium depressum</i> (Nag.) Lund. var. <i>apertum</i> (Turn.) Hirano

Division	Class	order	Family	Species
				<i>Cosmarium granatum</i> Breb.
				<i>Cosmarium granatum</i> Breb. var. <i>rotundatum</i> Krieg.
				<i>Cosmarium lundellii</i> Delp.
				<i>Cosmarium lundellii</i> Delp. Var. <i>circularis</i> (Reinsch) Krieg.
				<i>Cosmarium lundellii</i> Delp. Var. <i>corruptum</i> (Turn.) West & West
				<i>Cosmarium galeritum</i> Nordst.
				<i>Cosmarium maculatum</i> Turn.
				<i>Cosmarium margaritatum</i> (Lund.) Roy & Biss. var. <i>sublatum</i> (Nordst.) Krieg.
				<i>Cosmarium medioscrobiculatum</i> West & West var. <i>egranulatum</i> Gutw.
				<i>Cosmarium obsoletum</i> (Hantzsch) Reinsch
				<i>Cosmarium pseudoconnatum</i> Nordst.
				<i>Cosmarium punctulatum</i> Breb. var. <i>subpunctulatum</i> (Nordst.) Borg.
				<i>Cosmarium quadrum</i> Lund.
				<i>Cosmarium quadrifarium</i> Lund.
				<i>Cosmarium scabrum</i> Turn.
				<i>Cosmarium sexangulare</i> Lund. fa. <i>minimum</i> Nordst.
				<i>Cosmarium subspeciosum</i> Nordst. var. <i>validius</i> Nordst.
				<i>Cosmarium subundulatum</i> Wille.
				<i>Cosmarium turgidum</i> Breb.
				<i>Arthrodesmus curvatus</i> Turn. var. <i>latus</i> Scott and Prescott
				<i>Xanthidium sexmamillatum</i> West & West var. <i>pulneyense</i> Iyengar & Bai
				<i>Xanthidium subtrilobum</i> West & West var. <i>inornatum</i> Skuja
				<i>Staurastrum crenulatum</i> (Nag.) Delp.
				<i>Staurastrum glabrum</i> (Ehr.) Ralfs.
				<i>Staurastrum proboscidium</i> (Breb) Arch.
				<i>Staurastrum saltans</i> Josh. var. <i>polycharax</i> Scott & Prescott
				<i>Staurastrum</i> sp. 1
				<i>Onychonema laeve</i> Nordst. var. <i>micracanthum</i> Nordst.
Chrysophyta	Xanthophyceae	Heterococcales	Centrtractaceae	<i>Centrtractus belanophorus</i> Lemm.
Bacillariophyta	Bacillariophyceae	Centrales	Coscinodiscaceae	<i>Aulacoseira granulata</i> (Ehr.) Simonsen
				<i>Aulacoseira granulata</i> (Ehr.) Simonsen var. <i>Angustissima</i> (O.Muell) Simonsen

Division	Class	order	Family	Species
		Pennales	Fragilariaceae	<i>Actinocyclus normanii</i> (Gregory) Hustedt <i>Cyclotella meneghiniana</i> Kuetz. <i>Cyclotella striata</i> (Kuetz.) Graun. <i>Tabellaria fenestrata</i> (Lyngbye) Kuetz. <i>Fragilaria construens</i> (ehr.) Grun. V. Venter grun. <i>Fragilaria intermedia</i> Grun. <i>Fragilaria rumpens</i> (Kuetz.) Carl. v. <i>familiaris</i> (Kuetz.) A.Cl. <i>Synedra acus</i> Kuetz. <i>Synedra ulna</i> (Nitz.) Ehr. <i>Synedra ulna</i> (Nitz.) Ehr. var. <i>subaequalis</i> Grun.
			Eunotiaceae	<i>Eunotia lunaris</i> (Ehr.) Gurnow
			Achnanthaceae	<i>Cocconeis placentula</i> Ehr. <i>Achnanthes exigua</i> Grun.
			Naviculaceae	<i>Gyrosigma distortum</i> (W. Smith) Cleve v. <i>parkeri</i> Harrison <i>Gyrosigma kuetzingii</i> (Grun) Cleve <i>Pleurosigma salinarum</i> Grun <i>Pleurosigma elongatum</i> W. Smith var. <i>karianum</i> (Grun.) Cleve <i>Caloneis permagna</i> (Bail.) Cleve <i>Neidium productum</i> (W. Smith) Cleve v. <i>bombayensis</i> Gonzalves <i>Diploneis ovalis</i> (Bail.) Cleve <i>Stauroneis anceps</i> Ehr. <i>Stauroneis anceps</i> Ehr. fo. <i>gracilis</i> (Ehr.) Cleve <i>Stauroneis phoenicenteron</i> Ehr. fa. <i>capitata</i> Gonzalves et Gandhi <i>Stauroneis phoenicenteron</i> Ehr. fa. <i>producta</i> Gandhi <i>Navicula constans</i> Hustedt var. <i>symmetrica</i> Hustedt <i>Navicula cuspidata</i> Kuetz. <i>Navicula gsatrum</i> Ehr. <i>Navicula gracilis</i> Ehr. <i>Navicula laterostrata</i> Hustedt <i>Navicula mutica</i> Kuetz. v. <i>linearis</i> Gonzalves et Gandhi <i>Navicula pygmaea</i> Kuetz.

Division	Class	order	Family	Species
				<i>Navicula pupula</i> Kuetz.
				<i>Navicula pusilla</i> W. Smith
				<i>Pinnularia acrosphaeria</i> (Breb.) W. Smith
				<i>Pinnularia divergens</i> W. Smith v. <i>elliptica</i> Grun.
				<i>Pinnularia interrupta</i> W. Smith var. <i>minor</i> Boye Pet.
				<i>Pinnularia lundii</i> Hustedt
				<i>Pinnularia major</i> (Kuetz.) Cleve var. <i>linearis</i> Cleve
				<i>Pinnularia panhalgarhensis</i> Gandhi
				<i>Pinnularia stomatophoroides</i> Mayer v. <i>ornata</i> (Ehr.) A. Cl.
				<i>Pinnularia termis</i> Ehr. v. <i>termitiana</i> (Ehr.) A. Cl.
				<i>Amphora ovalis</i> Kuetz. var. <i>gracilis</i> (Ehr.) Cleve
				<i>Cymbella bengalensis</i> Grun.
				<i>Cymbella hungarica</i> (Graun.) Pant. v. <i>sigmata</i> (Pant.) A.Cl.
				<i>Cymbella laevis</i> Naeg.
				<i>Cymbella tumida</i> (Breb.) Van Heurek.
				<i>Cymbella turgida</i> (Greg.) Cleve
				<i>Cymbella ventricosa</i> Kuetz.
			Gomphonemaceae	<i>Gomphonema aequatoriale</i> Hustedt
				<i>Gomphonema gracile</i> Ehr. v. <i>intricatiforme</i> Mayer
				<i>Gomphonema gracile</i> Ehr. v. <i>frickei</i> Gandhi
				<i>Gomphonema lacus-rankala</i> Gandhi v. <i>gracilis</i> Gandhi
				<i>Gomphonema montanum</i> Schum. v. <i>acuminatum</i> mayer
				<i>Gomphonema parvulum</i> (Kuetz.) Grun.
				<i>Gomphonema subapicatum</i> Fritsch et Rich
			Epithemiaceae	<i>Rhopalodia gibba</i> (Ehr.) Muell.
			Nitzschiaceae	<i>Hantzschia amphioxys</i> (Ehr.) Gru.
				<i>Hantzschia amphioxys</i> (Ehr.) Gru. v. <i>pusilla</i> Dippel
				<i>Hantzschia linearis</i> (O.Muell.) A. Cl.
				<i>Nitzschia apiculata</i> (Greg.) Grun.
				<i>Nitzschia closterium</i> W. Smith
				<i>Nitzschia intermedia</i> Hantzsch

Division	Class	order	Family	Species
			Surirellaceae	<i>Nitzschia obtusa</i> W. Smith <i>Nitzschia obtusa</i> W. Smith v. <i>scalpelliformis</i> Grun. <i>Nitzschia philippinarum</i> Hustedt <i>Nitzschia sublinearis</i> Hustedt <i>Surirella biseriata</i> Breb. <i>Surirella capronioides</i> Ghandi <i>Surirella robusta</i> Ehr. <i>Surirella tenera</i> Greg. var. <i>ambigua</i> Gandhi <i>Surirella tenera</i> Greg. var. <i>nervosa</i> A. S.
Euglenophyta	Euglenophyceae	Euglenales	Euglenaceae	<i>Euglena acus</i> Ehr. <i>Euglena agilis</i> Carter <i>Euglena acus</i> Ehrenberg var. <i>acus</i> (Starmach) <i>Euglena anabaena</i> Mainx var. <i>anabaena</i> Ehr. <i>Euglena archeoplastidiata</i> Chadeffaud <i>Euglena chlamydophora</i> Main <i>Euglena deses</i> fo. <i>deses</i> (Pringsheim) <i>Euglena deses</i> fo. <i>intermedia</i> Klebs <i>Euglena deses</i> fo. <i>klebsii</i> (Lemmermann) Popova <i>Euglena ettlia</i> Wolowski <i>Euglena fusca</i> (Klebs) Lemm. <i>Euglena gracilis</i> Klebs <i>Euglena hemichromata</i> Skuja <i>Euglena oxyuris</i> Schmarda fo. <i>Oxyuris</i> Popova <i>Euglena oxyuris</i> Schmarda var. <i>charkowiensis</i> (Swirenko) <i>Euglena oxyuris</i> Schmarda var. <i>playfairii</i> Bourrelly <i>Euglena oxyuris</i> Schmarda var. <i>minor</i> Prescott <i>Euglena polymorpha</i> Dangeard <i>Euglena proxima</i> Dangeard <i>Euglena rustica</i> Schiller var. <i>rustica</i> (Huber-Pestalozzi) <i>Euglena sanguinea</i> Ehrenberg (Pringsheim) <i>Euglena</i> sp. 1

Division	Class	order	Family	Species
				<i>Euglena</i> sp. 2
				<i>Euglena spirogyra</i> Ehr. var. <i>spirogyra</i> Klebs
				<i>Euglena spirogyra</i> Ehr.
				<i>Euglena splendens</i> Dangeard (Pringsheim)
				<i>Euglena tripteris</i> (Dujardin) Klebs var. <i>tripteris</i>
				<i>Euglena texta</i> (Dujardin) Hubner var. <i>texta</i> (starmach)
				<i>Euglena viridis</i> Ehrenberg fo. <i>Viridis</i> (popova)
				<i>Phacus anacoelus</i> Stokes
				<i>Phacus curvicauda</i> Swirenko
				<i>Phacus lefevrei</i> Bourelly in Bourelly et Mangui
				<i>Phacus orbicularis</i> Huebner
				<i>Phacus orbicularis</i> fo. <i>communis</i> Popov
				<i>Phacus orbicularis</i> Hubner fo. <i>orbicularis</i>
				<i>Phacus pseudoswirenkoi</i> Prescott
				<i>Phacus splendens</i> Pochmann
				<i>Phacus</i> sp.1
				<i>Phacus</i> sp.2
				<i>Phacus stokesii</i> Lemmermann
				<i>Phacus tortus</i> (Lemm) Skvortzov
				<i>Phacus viguieri</i> Allorge & lefevre
				<i>Lepocinclis fusiformis</i> (Carter) Lemm. Emend. Conrad
				<i>Lepocinclis ovum</i> (Ehr.) Minikiewic var. <i>ovum</i> Starmach
				<i>Lepocinclis playfairiana</i> Deflandre
				<i>Trachelomonas abrupta</i> (Swir.) Deflandre
				<i>Trachelomonas armata</i> (Ehr.) Stein.
				<i>Trachelomonas armata</i> (Ehr.) Stein. var. <i>longispina</i> (Playf.) Defl.
				<i>Trachelomonas caudata</i> (Ehrenberg) stein fo. <i>caudata</i> (Starmach)
				<i>Trachelomonas dybwoskii</i> Drezepolski ex Deflandre
				<i>Trachelomonas globularis</i> (Awerincew) Lemmermann fo. <i>globularis</i>
				<i>Trachelomonas granulosa</i> Playfair

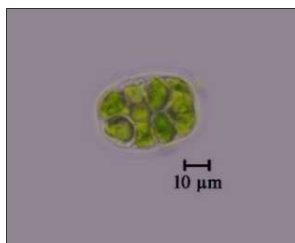
Division	Class	order	Family	Species
				<i>Trachelomonas hispida</i> (Perty) Stein emend. Defl.
				<i>Trachelomonas lacustris</i> Drezepolski
				<i>Trachelomonas lacustris</i> Drez. var. <i>klebsii</i> (Deflandre) Popova
				<i>Trachelomonas planctonica</i> fo. <i>ornata</i> Skvortzov
				<i>Trachelomonas planctonica</i> Swirenko fo. <i>planctonica</i>
				<i>Trachelomonas pulcherrima</i> Playf. var. <i>minor</i> Playf.
				<i>Trachelomonas robusta</i> Swirenko
				<i>Trachelomonas</i> sp.1
				<i>Trachelomonas superba</i> var. <i>duplex</i> Deflandre
				<i>Trachelomonas superba</i> var. <i>Swirenkiana</i> Deflandre
				<i>Trachelomonas varians</i> Deflandre
				<i>Trachelomonas volvocina</i> Ehr.
				<i>Trachelomonas volvocinopsis</i> Swirenko
				<i>Strombomonas fluviatilis</i> (Lemm.) Defl.
				<i>Strombomonas girardiana</i> (Playf.) Defl.
				<i>Strombomonas gibberosa</i> (Playf.) Defl.
				<i>Strombomonas</i> sp.1
Pyrrhophyta	Dinophyceae	Peridinales	Glenodiniaceae	<i>Peridiniopsis quadridens</i> (Stein) Schiller
Cyanophyta	Cyanophyceae	Chroococcales	Chroococcaceae	<i>Microcystis aeruginosa</i> (Kuetz.) Kuetzing
				<i>Chroococcus minimus</i> (Keissler) Lemm.
				<i>Chroococcus minutus</i> (Kuetz.) Nag.
				<i>Chroococcus turgidus</i> (Kuetz.) Nag.
				<i>Aphanocapsa delicatissima</i> West & west
				<i>Merismopedia elegans</i> A.Braun
				<i>Merismopedia elegans</i> A.Braun var. <i>major</i> G.M.Smith
				<i>Merismopedia tenuissima</i> Lemmermann
		Oscillatoriales	Pseudanabaenaceae	<i>Pseudoanabaena galeata</i> Bocher
				<i>Spirulina major</i> Kutzing ex Gomont
				<i>Spirulina nordstedtii</i> Gomont
				<i>Spirulina subsalsa</i> Oersted ex Gomont
			Phormidiaceae	<i>Arthrospira khannae</i> Drouet et Strickland

Division	Class	order	Family	Species
				<i>Phormidium articulatum</i> Anagnostidis et Komarek
				<i>Phormidium formosum</i> Anagnostidis et Komarek
				<i>Planktothrix</i> sp. 1
				<i>Oscillatoria limosa</i> Agardh ex Gomont
				<i>Oscillatoria lutea</i> Agardh ex Gomont
				<i>Oscillatoria meslinii</i> Anagnostidis et Komarek
				<i>Oscillatoria princeps</i> Vaucher ex Gomont
				<i>Oscillatoria</i> sp. 2
			Nostocaceae	<i>Dolichospermum perturbatum</i> (Hill) Wacklin
				<i>Anabaena ghosei</i> Welsh
				<i>Anabaena</i> sp.1

Division: Chlorophyta
Class : Chlorophyceae
Order : Volvocales
Family : Volvocaceae

Genus: *PANDORINA* Bory

1. *Pandorina morum* (O.F. Müller) Bory
 Iyengar and Desikachary, 1981. p. 418, pl. 243, fig. 7



Dimensions:

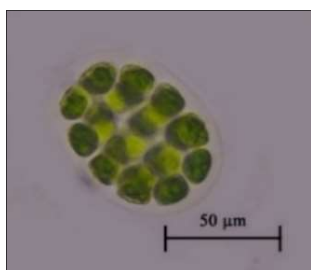
Colony length - 45µm

Colony breadth - 26µm

Comments:

Colonies spherical, 8 celled, within a common matrix, cells ovate and tightly packed.

2. *Pandorina morum* (Mull.) Bory f. *major* M.O.P.Iyengar
 Iyengar and Desikachary, 1981. p. 418, pl. 243, figs. 1-15



Dimensions:

Colony length - 75µm

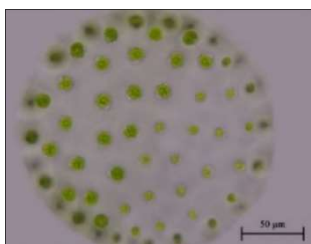
Colony breadth - 56µm

Comments:

Colonies ellipsoidal with rounded ends, chloroplast with pyrenoids.

Genus: *PLEODORINA* Shaw

3. *Pleodorina sphaerica* M.O.P.Iyengar
 Iyengar and Desikachary, 1981. p. 446, pl. 262, figs. 1-7



Dimensions:

Colony breadth - 182µm

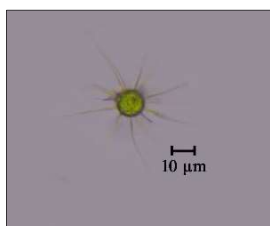
Comments:

Colonies spherical, 64 celled, young colonies in posterior side and mature colonies in anterior.

Order : Chlorococcales
Family : Micractiniaceae

Genus: *GOLENKINIA* Chodat

4. *Golenkinia paucispina* West. & G.S.West
 Smith, 1920. p. 127, fig. 5



Dimensions:

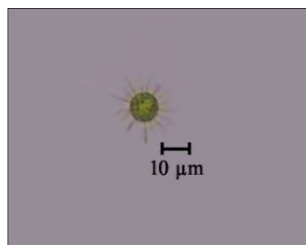
Cell breadth - 12µm

Setae length - 8µm

Comments: Cells solitary, spherical with short tapering delicate setae.

Genus: *GOLENKINIOPSIS* Korshikov

5. *Golenkiniopsis minutissima* (Iyengar et Balkr.) R.Starr
Philipose, 1967. p. 103, fig. 28a

**Dimensions:**

Cell breadth - 9μm

Setae length - 8μm

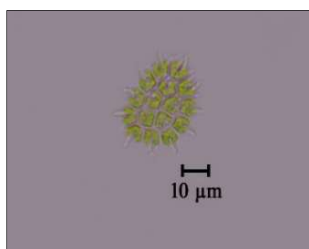
Comments:

Cells solitary, spherical bearing several fine setae.

Family: Hydrodictyaceae

Genus: *PEDIASTRUM* Meyen

6. *Pediastrum biradiatum* (Meyen) E.Hegewald
Philipose, 1967. p. 127, fig. 44

**Dimensions:**

Colony length - 34μm

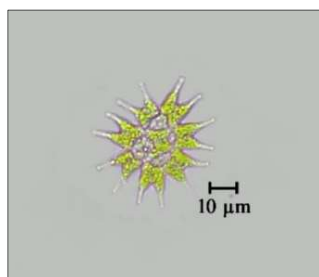
Colony breadth - 28μm

Cell breadth - 9μm

Comments:

Colonies with 16 celled, intercellular spaces, Lobes dilated at apex and ending in horn like processes.

7. *Pediastrum boryanum* var. *longicorne* (Reinsch) Tsarenko
Philipose, 1967. p. 119, fig. 40b

**Dimensions:**

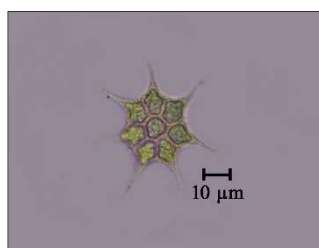
Colony length - 48μm

Cell breadth - 7μm

Comments:

Colonies 8 celled, each cell with two short processes ending with short spines.

8. *Pediastrum simplex* Meyen
Philipose, 1967. p. 115, fig. 36c

**Dimensions:**

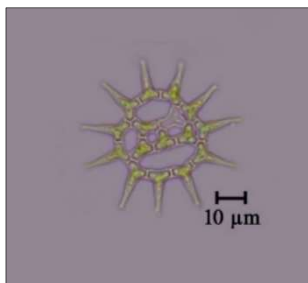
Colony length - 49μm

Cell breadth - 9μm

Comments:

Colonies 8 celled, outer side produced in to tapering process, cells without intercellular spaces, cell walls granulated.

9. *Pediastrum simplex* var. *duodenarium* (Bailey) Rabenhorst
Philipose, 1967. p. 115, fig. 36 d



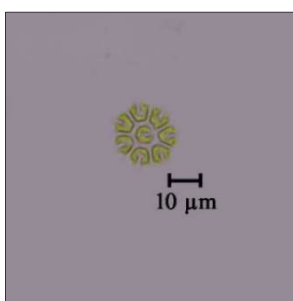
Dimensions:

Colony length - 52µm

Cell breadth - 9µm

Comments: Colonies with 4 celled, cells without intercellular spaces, cell wall smooth.

10. *Pediastrum tetras* (Ehr.) Ralfs
Philipose, 1967. p. 128, fig. 45 b



Dimensions:

Colony length - 17µm

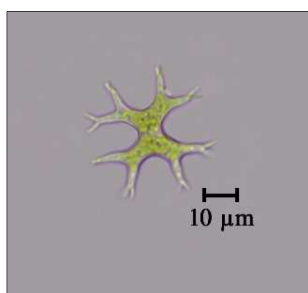
Cell breadth - 5µm

Comments:

Colonies with 8 celled, cells divided into two lobes make incision on outer side of the cell reach to middle of the cell.

Genus: **TETRAEDRON** Kuetzing

11. *Tetraedron gracile* (Reinsch) Hansgirg
Philipose, 1967. p. 154, fig. 69a



Dimensions:

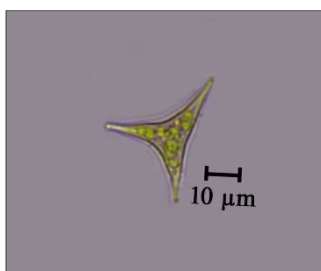
Cell length - 23µm

Cell breadth - 32µm

Comments:

Cells rectangular with the corners produced into narrow processes branch twice and end in spines.

12. *Tetraedron proteiforme* (Turn.) Brunnthaler
Philipose, 1967. p. 141, fig. 57



Dimensions:

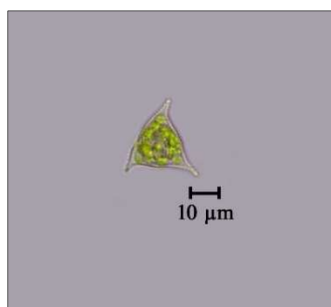
Cell breadth - 30µm

Comments:

Cells 3 cornered, angles drawn out and ending in long spine.

13. *Tetraedron regulare* var. *granulatum* Prescott

Philipose, 1967. p. 147, fig. 60i



Dimensions:

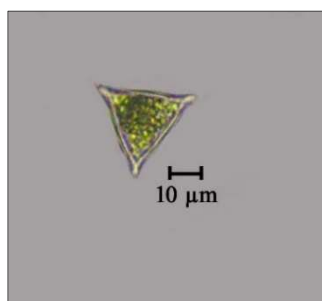
Cell breadth -28μm

Comments:

Cell wall granular, angles broadly rounded with short spines.

14. *Tetraedron regulare* var. *minus* Reinsch

Philipose, 1967. p. 146, fig. 60h



Dimensions:

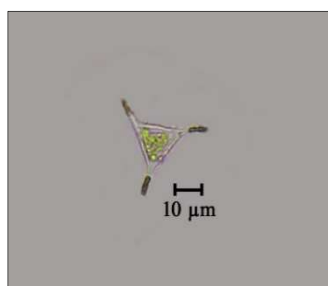
Cell breadth -25μm

Comments:

Cells tetragonal with long spine on each corner.

15. *Tetraedron trigonum* (Naegeli) Hansgirg

Philipose, 1967. p. 142, fig. 58i



Dimensions:

Cell breadth -16μm

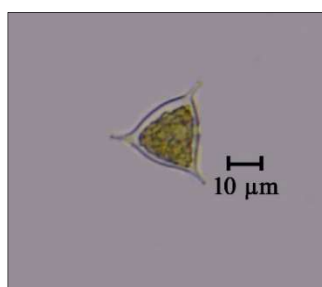
Spine length - 9μm

Comments:

Cells triangular, rounded corners, angles with a stout spine.

16. *Tetraedron trigonum* f. *crassum* (Reinsch) De Toni

Philipose, 1967. p. 142, fig. 58e



Dimensions:

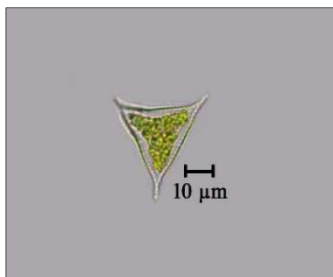
Cell breadth - 18μm

Spine length - 6μm

Comments:

Cells triangular, rounded corners, angles with short spines.

17. *Tetraedron trigonum* var. *verrucosum* Jao
Philipose, 1967. p. 145, fig. 58n



Dimensions:

Cell breadth -25μm

Spine length -7μm

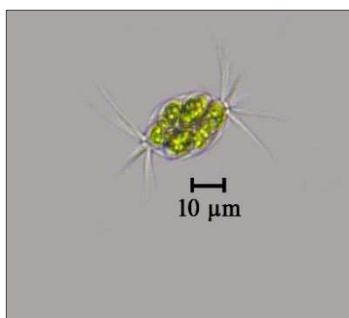
Comments:

Cells triangular, angles with a short spine, cell membrane and spines irregularly granulated.

Family: Oocystaceae

Genus: *LAGERHEIMIA* Chodat

18. *Lagerheimia ciliata* (Lag.) Chodat
Prescott, 1982. p. 250, pl. 55, fig. 1



Dimensions:

Cell length - 23μm

Cell breadth -15μm

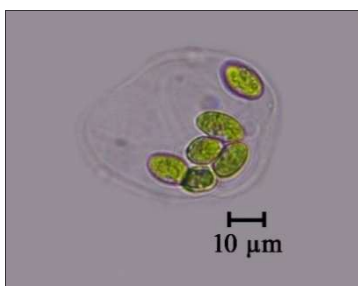
Setae length -15μm

Comments:

Cells oblong-ovate with setae at each pole, chloroplast with pyrenoids.

Genus: *OOCYSTIS* Naegeli

19. *Oocystis borgei* J.W.Snow
Prescott, 1951. p. 244, pl. 51, fig. 10



Dimensions:

Cell length - 12μm

Cell breadth -9μm

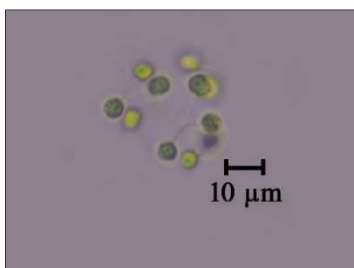
Comments:

Cells ellipsoid, ovate, enclosing envelope round.

Family: Dictyosphaeriaceae

Genus: *DICTYOSPHAERIUM* Naegeli

20. *Dictyosphaerium ehrenbergianum* Nageli
Philipose, 1967. p. 201, fig. 111



Dimensions:

Colony length - 38μm

Cell length - 4μm

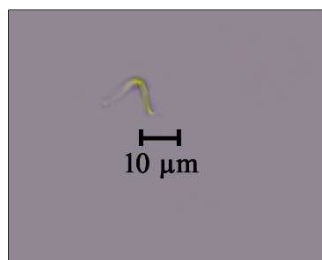
Comments:

Colonies spherical, cells ovoid, chloroplast one or two in each cell.

Family: Selenastraceae

Genus: *ANKISTRODESMUS* Corda21. *Ankistrodesmus convolutus* (Corda)

Philipose, 1967. p. 213, fig. 122 d

**Dimensions:**

Cell length - 3μm

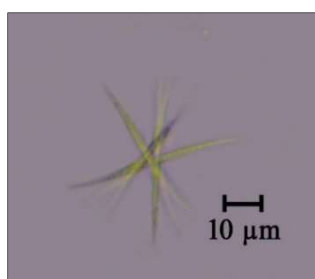
Cell breadth - 1.5μm

Comments:

Cells solitary, curved, ends pointed.

22. *Ankistrodesmus falcatus* (Corda) Ralfs

Philipose, 1967. p. 211, fig. 121 a

**Dimensions:**

Cell length - 50μm

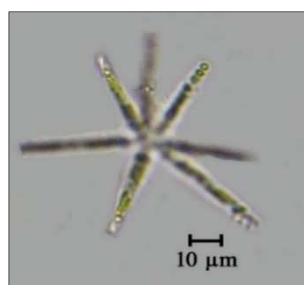
Cell breadth - 2μm

Comments:

Cells curved, twisted around one another, apices free, with tapering end.

Genus: *ACTINASTRUM* Lagerheim23. *Actinastrum gracillimum* var. *elongatum* (G.M.Smith) Fott

Philipose, 1967. p. 218, fig. 125 d

**Dimensions:**

Cell length - 35μm

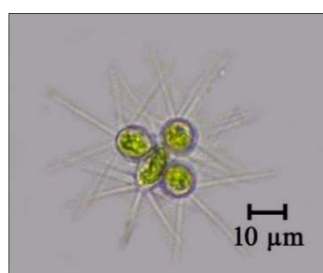
Cell breadth - 3μm

Comments:

Colonies 8 celled, cells radially arranged joined together to form colonies and apices slightly rounded.

Genus: *MICRATINIUM* Fresenius24. *Micratinium pusillum* var. *elegans* G.M.Smith

Prescott, 1951. p. 288, pl. 66, fig. 7

**Dimensions:**

Cell length - 9μm

Cell breadth - 7μm

Setae - 20μm

Comments:

Colonies 4 celled, cells rounded, setae long, Associated with other cells.

Genus: *MESSASTRUM* Reinsch**25. *Messastrum gracile*** (Reinsch) T.S Garcia

Philipose, 1967. p. 219, fig. 128

**Dimensions:**

Cell length - 13μm

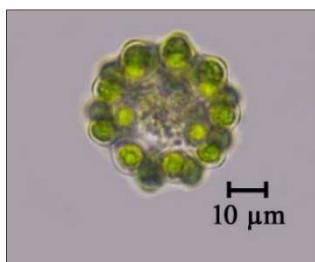
Cell breadth -3μm

Comments:

Cells broad, sickle shaped, lunate, apices of cells acute.

Family: CoelastraceaeGenus: *COELASTRUM* Naegeli**26. *Coelastrum microporum*** Nageli

Philipose, 1967. p. 228, fig. 135

**Dimensions:**

Colony length - 37μm

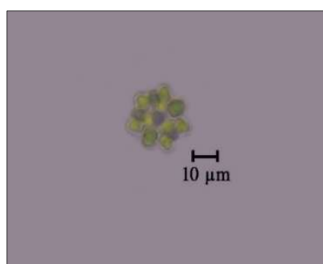
Cell breadth -7μm

Comments:

Colonies spherical, cells spherical with small intercellular spaces.

27. *Coelastrum proboscideum* Bohlin

Philipose, 1967. p. 229, fig. 137

**Dimensions:**

Cell length - 5μm

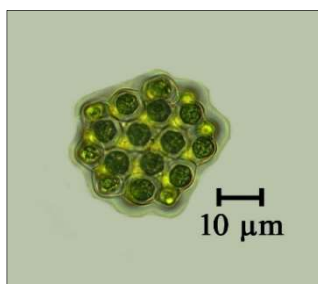
Colony breadth -25μm

Comments:

Cells conical, truncate with intercellular spaces.

28. *Coelastrum sphaericum* Nageli

Philipose, 1967. p. 229, fig. 136

**Dimensions:**

Colony breadth - 31μm

Cell breadth -7μm

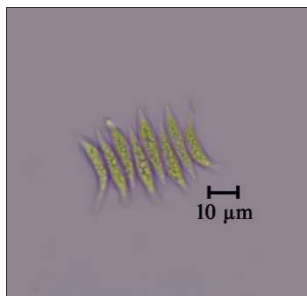
Comments:

Cells ovoid, narrow end directed outwards, colony spherical, cells regularly arranged.

Family: Scenedesmaceae

Genus: *SCENEDESMUS* Meyen

29. *Scenedesmus acuminatus* (Lagerheim) Chodat
Philipose, 1967. p. 251, fig. 161

**Dimensions:**

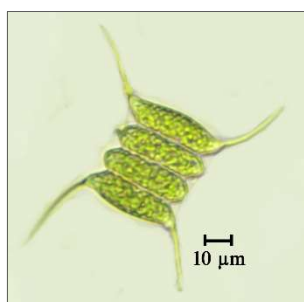
Cell length - 25μm

Cell breadth - 2μm

Comments:

Colonies 8 celled, cells fusiform with sharp pointed ends, apical cell lunate shaped, cell wall smooth.

30. *Scenedesmus carinatus* (Lemm.) Chodat
Philipose, 1967. p. 266, fig. 172c

**Dimensions:**

Cell length - 25μm

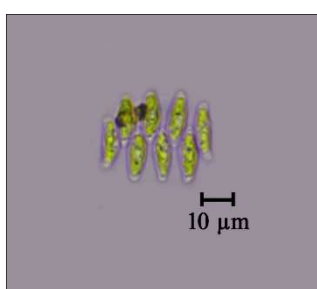
Cell breadth - 9μm

Spine length - 17μm

Comments:

Colonies 4 celled, cells arranged in series, fusiform with pointed ends, spines of terminal cells long.

31. *Scenedesmus bijugatus* var. *graevenitzii* (Bernard) Philippose
Philipose, 1967. p. 256, figs. 164 h, j

**Dimensions:**

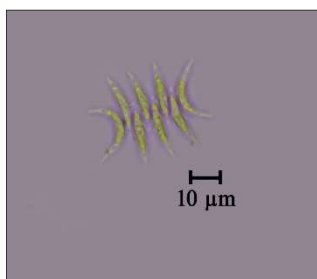
Cell length - 11μm

Cell breadth - 6μm

Comments:

Colony 8 celled, cells arranged in alternating series, adjacent cells contact only through small portion of their length.

32. *Scenedesmus dimorphus* (Turp.) Kützing
Philipose, 1967. p. 249, fig. 160a

**Dimensions:**

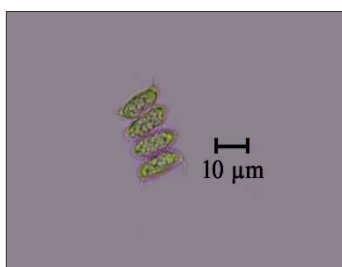
Cell length - 25μm

Cell breadth - 3μm

Comments:

Colonies 8 celled, apical cells lunate shaped, individual cells with tapering ends.

33. *Scenedesmus magnus* Meyen
Philipose, 1967. p. 273, fig. 180a



Dimensions:

Cell length - 21µm

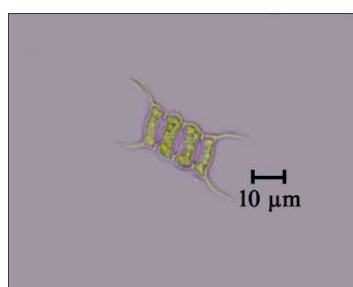
Cell breadth - 4µm

Spine length - 1.5µm

Comments:

Colony 4 celled, cells ovoid with rounded ends, poles with spines.

34. *Scenedesmus perforatus* Lemm.
Philipose, 1967. p. 280, fig. 186 a



Dimensions:

Cell length - 25µm

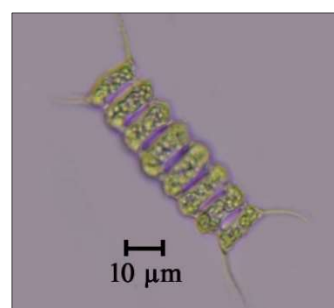
Cell breadth - 5µm

Spine length - 10µm

Comments:

Colony 4 celled, cells with perforations
And long spines.

35. *Scenedesmus perforatus* var. *major* (Turn.) Philipose
Philipose, 1967. p. 282, fig. 186 f



Dimensions:

Cell length - 36µm

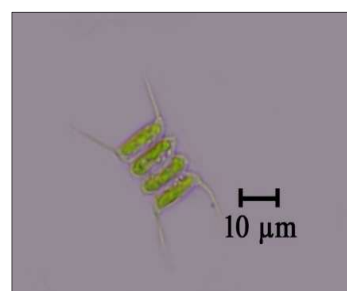
Cell breadth - 10µm

Spine length - 22µm

Comments:

Colony 8 celled, cells with perforations
1µm broad, spines long, small perforations
between adjacent cells with long spines.

36. *Scenedesmus quadricauda* Chodat
Philipose, 1967. p. 283, fig. 187 h



Dimensions:

Cell length - 11µm

Cell breadth - 8µm

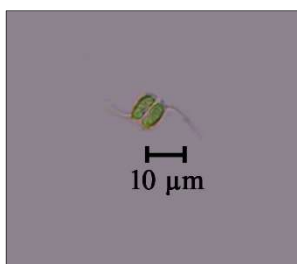
Spine length - 9µm

Comments:

Colonies 4 celled, cells cylindrical with
rounded ends, cell wall smooth with
spines.

37. *Scenedesmus quadricauda* var. *bicaudatus* Hansgirg

Philipose, 1967. p. 284, fig. 187 k

**Dimensions:**

Cell length - 12μm

Cell breadth - 4μm

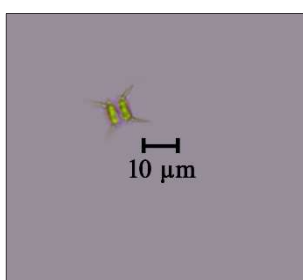
Spine length - 7μm

Comments:

Colonies 2 celled, cells with long spine from one pole only.

38. *Scenedesmus quadricauda* var. *quadrispina* (Chodat) G. M. Smith

Philipose, 1967. p. 285, fig. 187 h

**Dimensions:**

Cell length - 11μm

Cell breadth - 6μm

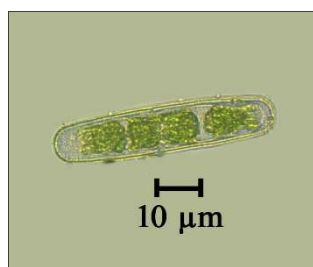
Spine length - 3μm

Comments:

Colonies 2 celled, cells spherical, cell wall smooth, poles with short spines.

DESMIDS**Family: Gonatozygaceae****Genus: *CYLINDROCYSTIS* Meneghini****39. *Cylindrocystis brebissonii*** (Ralfs) De Bary

Scott and Prescott, 1961. p. 8, pl. 1, fig. 3

**Dimensions:**

Cell length - 50μm

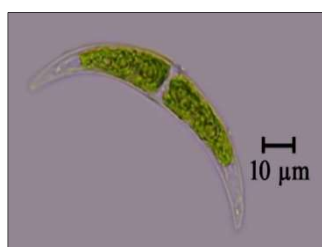
Cell breadth - 11μm

Comments:

Cells cylindrical with large chloroplast.

Family: Desmidiaceae**Genus: *CLOSTERIUM* Nitzsch****40. *Closterium diana* var. *minus*** Hieronymys

Scott and Prescott, 1961. p. 11, pl. 2, fig. 8.

**Dimensions:**

Cell length - 100μm

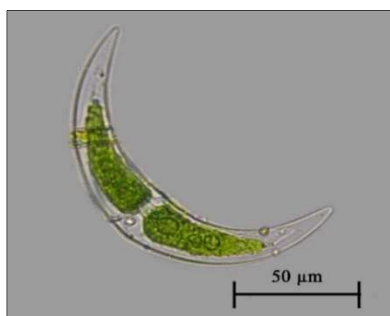
Cell breadth - 10μm

Comments:

Cells slightly curved, attenuated at apices, apex 4μm.

41. *Closterium ehrenbergii* Menegh. ex Ralfs

West and West, 1904. vol. 1, p. 143, pl. 17, fig. 1

**Dimensions:**

Cell length - 472μm

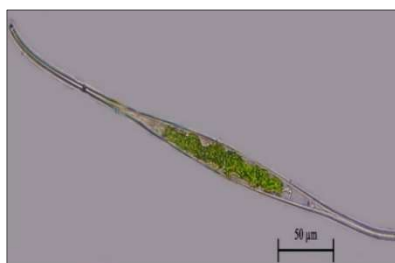
Cell breadth - 69μm

Comments:

Cells large, curved, inner margin slightly inflated in the middle region, cell wall smooth and contain many scattered pyrenoids.

42. *Closterium kuetzingii* Brebisson

West and West, 1904. vol. 1, p. 186, pl. 25, figs. 6–11

**Dimensions:**

Cell length - 54μm

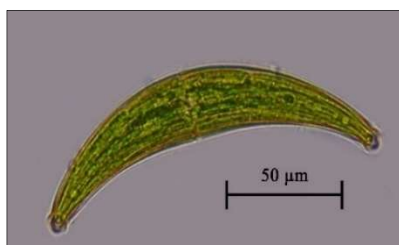
Cell breadth - 12μm

Comments:

Cells medium size, straight, median part of the cells fusiform, lanceolate, apex 4μm.

43. *Closterium lagoense* Nordst.

West and West, 1904. vol. 1, p. 114, pl. 11, fig. 6

**Dimensions:**

Cell length - 155μm

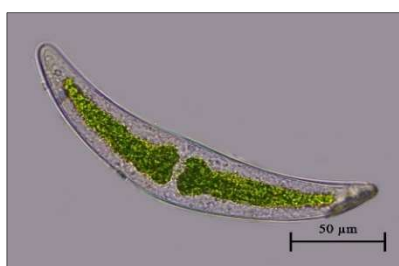
Cell breadth - 25μm

Comments:

Cells medium size, narrowed to apices, straight, apex 6μm.

44. *Closterium moniliferum* Ehr. ex Ralfs

West and West, 1904. vol. 1, p. 142, pl. 16, fig. 16

**Dimensions:**

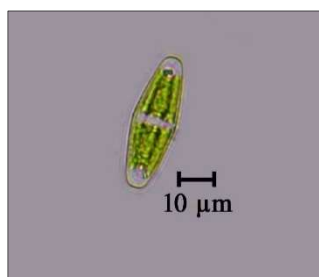
Cell length – 328μm

Cell breadth - 40μm

Comments:

Cells narrowed towards the apex, cell wall smooth and colourless, poles 9μm.

45. *Closterium navicula* Breb. Lukemuller
West and West, 1904. vol. 1, p. 75, pl. 7, fig. 14



Dimensions:

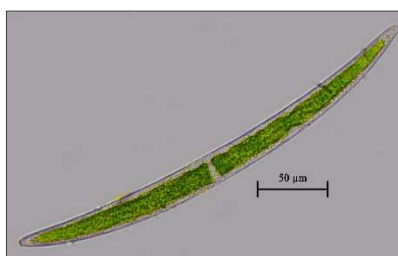
Cell length - 35μm

Cell breadth - 12μm

Comments:

Cells small, fusiform, poles rounded, cell wall smooth and colourless.

46. *Closterium peracerosum* F.Gay
West and West, 1904. vol. 1, p. 154, pl. XIX, figs. 9



Dimensions:

Cell length - 300μm

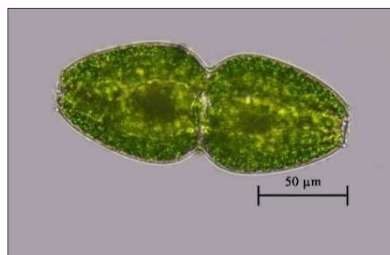
Cell breadth - 17μm

Comments:

Cells slightly curved, cell wall smooth, colourless, broad, chloroplasts with ridges and pyrenoids.

Genus: *PLEUROTAENIUM* Nageli

47. *Pleurotaenium ovatum* Nordst. (Nordst.)
Scott and Prescott, 1961. p. 17, pl. 6, fig. 2



Dimensions:

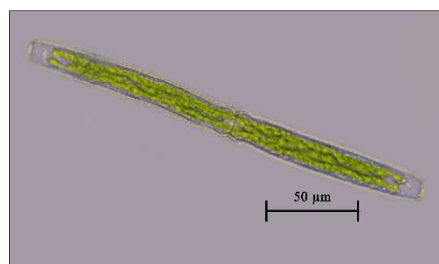
Cell length - 325μm

Cell breadth - 80μm

Comments:

Cells bearing a ring of tubercles, isthmus 46μm, pole 28μm,

48. *Pleurotaenium trabecula* var. *rectum* (Delp.) West et West
West and West, 1904. vol. 1, p. 212, pl. 30, fig. 10



Dimensions:

Cell length - 225μm

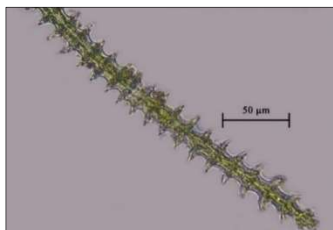
Cell breadth - 20μm

Comments:

Cells medium size, semicells without undulations above the basal inflations, poles 14μm, isthmus 16μm.

Genus: *TRIPLOCERAS* Bailey

49. *Triploceras gracile* f. *undulatum* (Scott & Prescott) Townsend
 Scott and Prescott, 1961. p. 21, pl. 6, fig. 9

**Dimensions:**

Cell length - 360 μ m

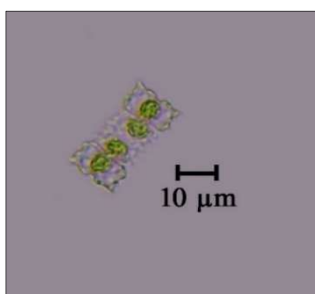
Cell breadth - 19 μ m

Comments:

Cells with apex 14 μ m.

Genus: *EUASTRUM* Ehrenberg

50. *Euastrum gayanum* De Toni
 Scott and Prescott, 1961. p. 27, pl. 14, fig. 3

**Dimensions:**

Cell length – 10.5 μ m

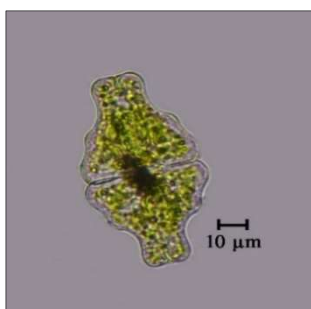
Cell breadth - 3 μ m

Isthmus - 3.5 μ m

Comments:

Cells smaller type, semicells are parallel with swellings.

51. *Euastrum sinuosum* Kützing
 West and West, 1905. vol. 2, p. 20, pl. 36, fig. 1

**Dimensions:**

Cell length - 75 μ m

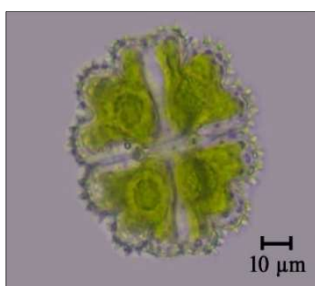
Cell breadth - 43 μ m

Isthmus - 13 μ m

Comments:

Cells medium size, lower and upper lobes lying above one another.

52. *Euastrum spinulosum* Delponte
 Scott and Prescott, 1961. p. 40, pl. 10, fig. 3

**Dimensions:**

Cell length - 61 μ m

Cell breadth - 49 μ m

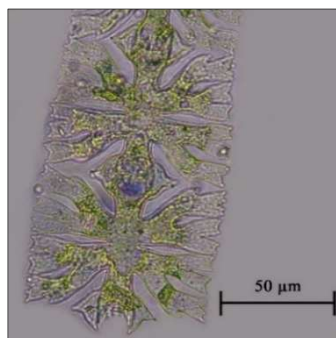
Isthmus - 13 μ m

Comments:

Cells wide and larger, widely rounded lobes, rosette shape.

Genus: MICRASTERIAS Agardh

53. *Micrasterias foliacea* Bail. ex ralfs
Scott and Prescott, 1961. p. 48, pl. 20, fig. 4

**Dimensions:**

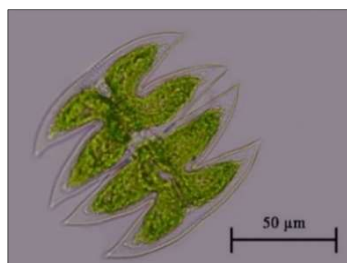
Cell length - 75μm

Cell breadth - 76μm

Comments:

Cells broad and leaf like form and lobed.

54. *Micrasterias laticeps* var. *acuminata* W. Krieger
Turner, 1892. P. 95. pl. 5, fig. 2

**Dimensions:**

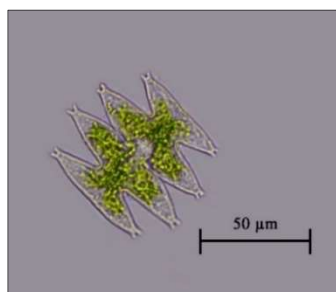
Cell length - 90μm

Cell breadth - 88μm

Comments:

Cells possess acuminate instead of 2-denticulate basal lobes.

55. *Micrasterias pinnatifida* Ralfs
Scott and Prescott, 1961. p. 51, pl. 12, fig. 6

**Dimensions:**

Cell length - 60μm

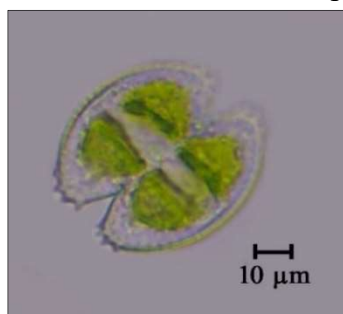
Cell breadth - 64μm

Comments:

Cells with end margin straight, lobes triangular, cells bifid projecting above the apical margin.

Genus: COSMARIUM Corda

56. *Cosmarium auriculatum* Reinsch
Scott and Prescott, 1961. p. 54, pl. 26, fig. 4

**Dimensions:**

Cell length - 42μm

Cell breadth - 38μm

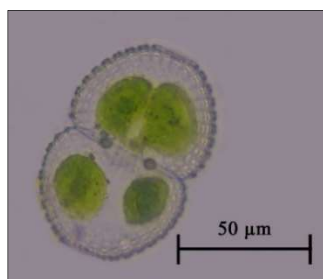
Isthmus - 21μm

Comments:

Cells granulate and deeply constricted.

57. *Cosmarium binum* Nordst.

West and West, 1908. vol. 3, p. 246, pl. 88, fig. 11

**Dimensions:**

Cell length - 83μm

Cell breadth - 50μm

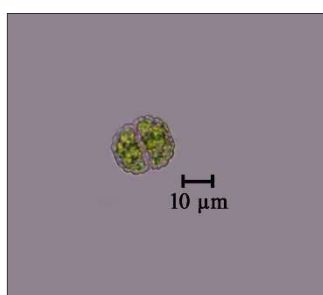
Isthmus - 13μm

Comments:

Cell margins granulate, granules arranged in concentric rings.

58. *Cosmarium blyttii* Wille

Scott and Prescott, 1961. p. 55, pl. 31, fig. 15

**Dimensions:**

Cell length - 19μm

Cell breadth - 15μm

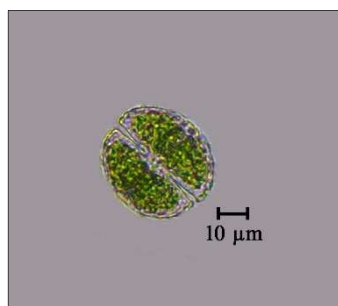
Isthmus - 5μm

Comments:

Cells very small, crenate, wall margins wavy.

59. *Cosmarium depressum* (Nag.) Lund.

Scott and Prescott, 1961. p. 58, pl. 26, fig. 6

**Dimensions:**

Cell length - 35μm

Cell breadth - 32μm

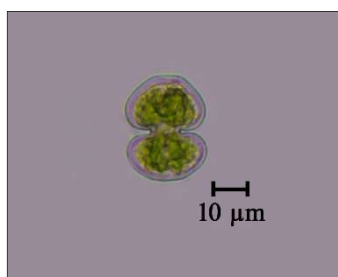
Isthmus - 7μm

Comments:

Cells lunar shaped and margins with crenations.

60. *Cosmarium depressum* var. *apertum* (Turn.) Hirano

Scott and Prescott, 1961. p. 58, pl. 26, fig. 7

**Dimensions:**

Cell length - 26μm

Cell breadth - 21μm

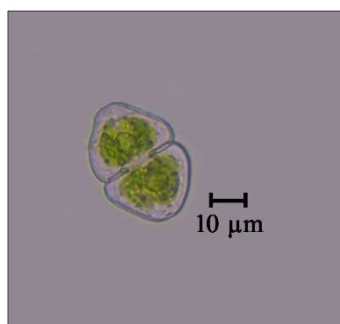
Isthmus - 6μm

Comments:

Cell wall smooth, thick and deeply constricted.

61. *Cosmarium granatum* Breb. ex Ralfs

West and West, 1905. vol. 2, p. 186, pl. 63, fig. 3

**Dimensions:**

Cell length - 35μm

Cell breadth - 25μm

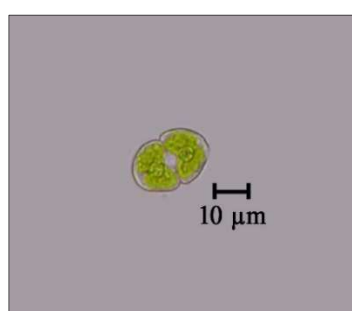
Isthmus - 9μm

Comments:

Cells pyramidate shaped, sinus narrow and slightly dilated.

62. *Cosmarium granatum* var. *rotundatum* W. Krieg.

Scott and Prescott, 1961. p. 59, pl. 27, fig. 17

**Dimensions:**

Cell length - 24μm

Cell breadth - 14μm

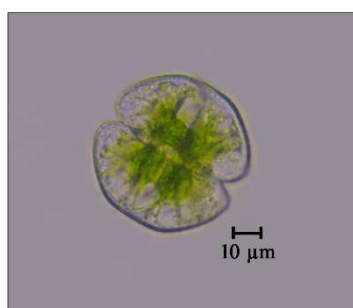
Isthmus - 6μm

Comments:

Cells small with central dilation, semiells with single pyrenoids.

63. *Cosmarium lundellii* Delp.

Scott and Prescott, 1961. p. 60, pl. 25, fig. 6

**Dimensions:**

Cell length - 75μm

Cell breadth - 56μm

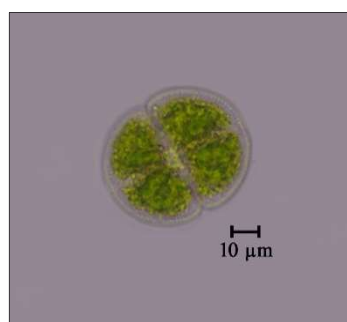
Isthmus - 31μm

Comments:

Cells with granulations, sinus narrow and constricted, rounded at apex.

64. *Cosmarium lundellii* var. *circulare* (Reinsch) W. Krieg.

Scott and Prescott, 1961. p. 60, pl. 25, fig. 7

**Dimensions:**

Cell length - 61μm

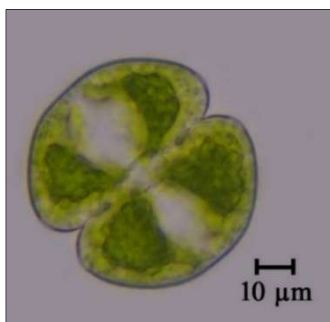
Cell breadth - 50μm

Isthmus - 14μm

Comments:

Semicells circular in shape, cell wall smooth and simple.

65. *Cosmarium lundellii* var. *corruptum* (Turn.) West & West
Scott and Prescott, 1961. p. 61, pl. 25, fig. 9



Dimensions:

Cell length - 59μm

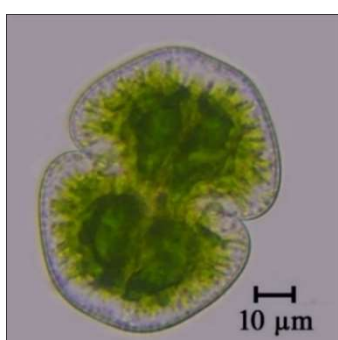
Cell breadth - 51μm

Isthmus - 14μm

Comments:

Cells with convex apical margins, cell wall smooth, simple and closely punctate.

66. *Cosmarium galeritum* Nordst.
West and West, 1912. vol. 4, p. 194, pl. 63, fig. 25



Dimensions:

Cell length - 59μm

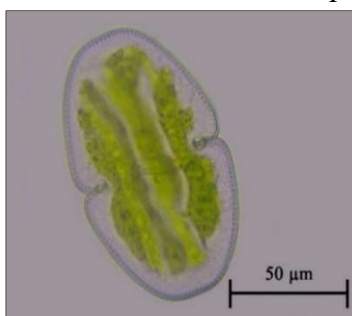
Cell breadth - 51μm

Isthmus - 12μm

Comments:

Cells truncate-pyramidate, cell wall smooth and simple.

67. *Cosmarium maculatum* Turn.
Scott and Prescott, 1961. p. 61, pl. 24, fig. 2



Dimensions:

Cell length - 175μm

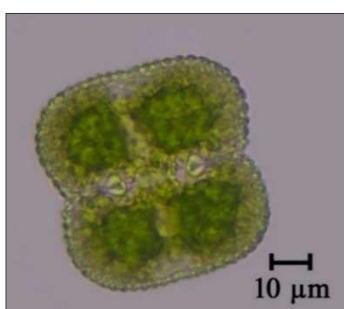
Cell breadth - 71μm

Isthmus - 46μm

Comments:

Cells larger in size, with granulations, cell wall striated.

68. *Cosmarium margaritatum* var. *sublatum* (Nordst.) Krieg.
Scott and Prescott, 1961. p. 63, pl. 29, fig. 4



Dimensions:

Cell length - 61μm

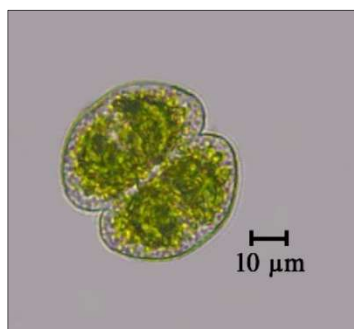
Cell breadth - 54μm

Isthmus - 22μm

Comments:

Cells of medium size, sinus narrow and closed, cell wall granulated.

69. *Cosmarium medioscrobiculatum* var. *egranulatum* Gutw.
Scott and Prescott, 1961. p. 63, pl. 26, fig. 3



Dimensions:

Cell length - 48µm

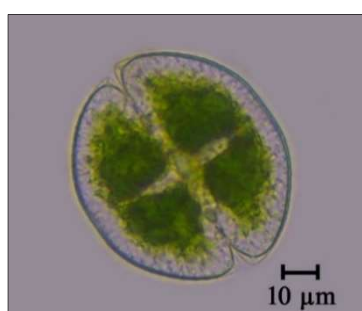
Cell breadth - 45µm

Isthmus - 18µm

Comments:

Cells of medium size, rounded apex, sinus small.

70. *Cosmarium obsoletum* (Hantzsch) Reinsch
Scott and Prescott, 1961. p. 63, pl. 26, fig. 1



Dimensions:

Cell length - 52µm

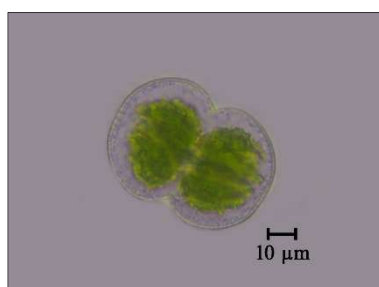
Cell breadth - 60µm

Isthmus - 26µm

Comments:

Cells constricted with narrow sinus, granulate, apex in convex shape.

71. *Cosmarium pseudoconnatum* Nordst.
Scott and Prescott, 1961. p. 66, pl. 25, fig. 4



Dimensions:

Cell length - 61µm

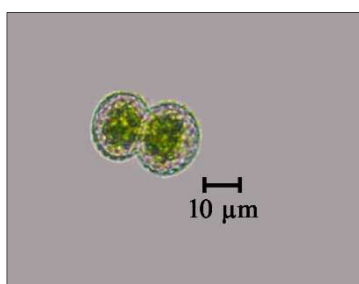
Cell breadth - 47µm

Isthmus - 40µm

Comments:

Semicells circular, cell wall punctate, shallow sinus.

72. *Cosmarium punctulatum* var. *subpunctulatum* (Nordst.) Borg.
Scott and Prescott, 1961. p. 67, pl. 31, fig. 8



Dimensions:

Cell length - 25µm

Cell breadth - 23µm

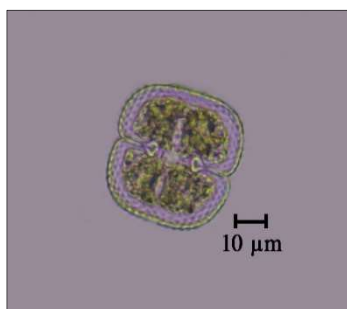
Isthmus - 13µm

Comments:

Cells small, rounded, deeply constricted
With wavy margins.

73. *Cosmarium quadrum* P.Lundell

West and West, 1912. vol. 4, p. 20, pl. 100, fig. 4

**Dimensions:**

Cell length - 52μm

Cell breadth - 51μm

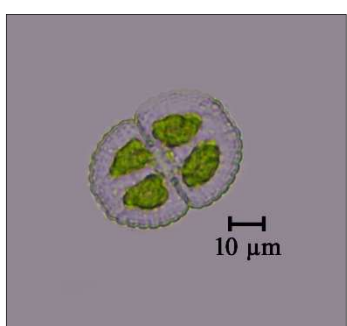
Isthmus - 4μm

Comments:

Cells quadrate with deeply constricted, densely granulated.

74. *Cosmarium quadrifarium* P.Lundell

West and West, 1908. vol. 3, p. 141, pl. 76, figs. 15–17 & pl. 77, figs. 1–3

**Dimensions:**

Cell length - 42μm

Cell breadth - 32μm

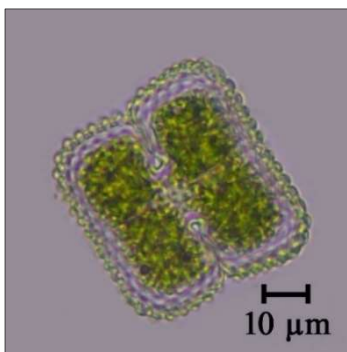
Isthmus - 11μm

Comments:

Cells medium size, semicells semicircular and little rounded.

75. *Cosmarium scabrum* W.B.Turner

Scott and Prescott, 1961. p. 68, pl. 29, fig. 3

**Dimensions:**

Cell length - 49μm

Cell breadth - 52μm

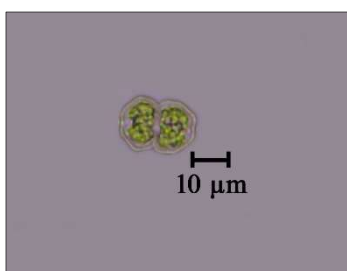
Isthmus - 14μm

Comments:

Cells quadrate, cell wall margins granulated, sinus narrow and closed.

76. *Cosmarium sexangulare* P.Lundell

Scott and Prescott, 1961. p. 69, pl. 32, fig. 11

**Dimensions:**

Cell length - 18μm

Cell breadth - 12μm

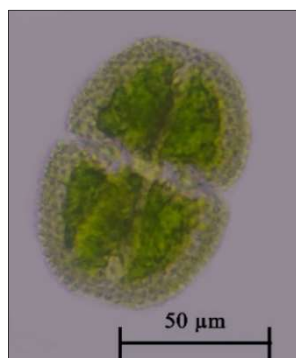
Isthmus - 5μm

Comments:

Cells, cell wall margins smooth and wavy, sinus narrow.

77. *Cosmarium subspicosum* var. *validius* Nordst.

West and West, 1908. vol. 3, p. 253, pl. 89, fig. 13

**Dimensions:**

Cell length - 90μm

Cell breadth - 62μm

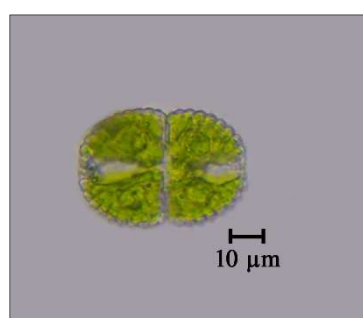
Isthmus - 13μm

Comments:

Cells medium sized with crenations, presence of series of granules, margins also granulated.

78. *Cosmarium subundulatum* Wille

West and West, 1908. vol. 3, p. 151, pl. 59, fig. 14

**Dimensions:**

Cell length - 50μm

Cell breadth - 34μm

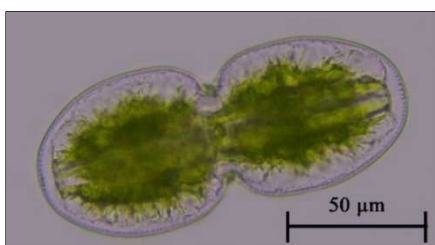
Isthmus - 14μm

Comments:

Cells with row of granules, cell wall margins smooth and two rows of undulations.

79. *Cosmarium turgidum* Breb. ex Ralfs

West and West, 1908. vol. 3, p. 115, pl. 75, fig. 3

**Dimensions:**

Cell length - 171μm

Cell breadth - 79μm

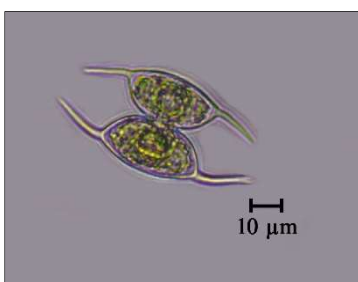
Isthmus - 38μm

Comments:

Cells large, semicells ovate with broad base, apex rounded.

Genus: *ARTHRODESMUS* Ehrenberg**80. *Arthrodesmus curvatus* var. *latus* Scott and Prescott**

Scott and Prescott, 1961. p. 76, pl. 33, fig. 7

**Dimensions:**

Cell length - 35μm

Cell breadth - 68μm

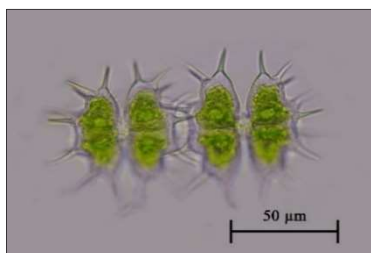
Isthmus - 12μm

Comments:

Cells medium size, angles acutely rounded with long spines.

Genus: *XANTHIDIUM* Ehrenberg

81. *Xanthidium sexmamillatum* var. *pulneyense* Iyengar & Bai
Scott and Prescott, 1961. p. 84, pl. 39, fig. 2

**Dimensions:**

Cell length - 38μm

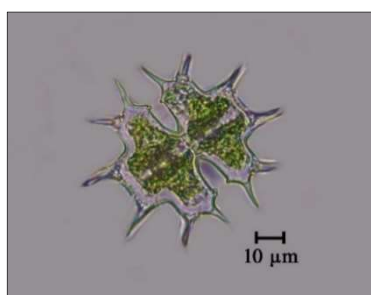
Cell breadth - 45μm

Isthmus - 18μm

Comments:

Cells broad with spine, spines 12μm long.

82. *Xanthidium subtrilobum* var. *inornatum* Skuja
Scott and Prescott, 1961. p. 85, pl. 38, fig. 4

**Dimensions:**

Cell length - 55μm

Cell breadth - 50μm

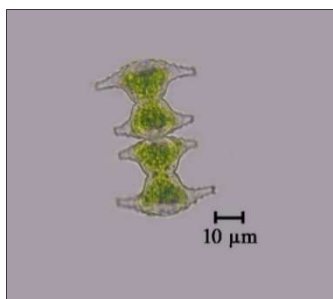
Isthmus - 38μm

Comments:

Cells medium size, longer spines, spines 13μm long.

Genus: *STAURASTRUM* Meyen

83. *Staurastrum crenulatum* (Nag.) Delp.
Scott and Prescott, 1961. p. 88, pl. 59, fig. 10

**Dimensions:**

Cell length - 22μm

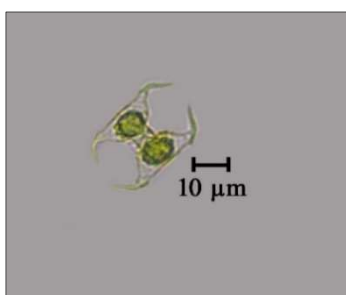
Cell breadth - 32μm

Isthmus - 9μm

Comments:

Cells small, deeply constricted, sinus open, cell wall granulated.

84. *Staurastrum glabrum* Ralfs.
West and West, 1908. vol. 4, p. 129, pl. 143, fig. 15

**Dimensions:**

Cell length - 26μm

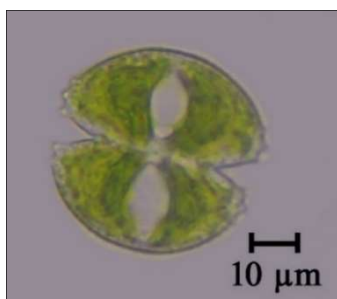
Cell breadth - 20μm

Comments:

Cells very small and deeply constricted, sinus open.

85. *Staurastrum proboscidium* (Breb) Arch.

West and West, 1908. vol. 4, p. 129, pl. 143, fig. 15

**Dimensions:**

Cell length - 40µm

Cell breadth - 35µm

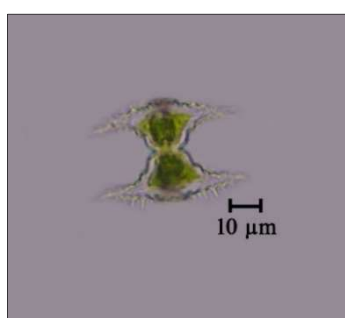
Isthmus - 11µm

Comments:

Cells medium size, truncated apex, concentric granules, sinus acute.

86. *Staurastrum saltans* var. *polycharax* Scott & Prescott

Scott and Prescott, 1961. p. 105, pl. 51, fig. 8

**Dimensions:**

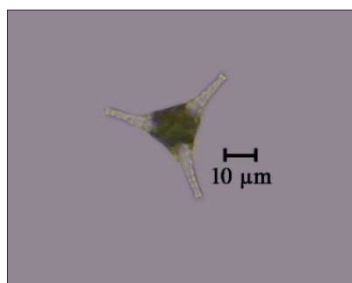
Cell length - 43µm

Cell breadth - 30µm

Isthmus - 9µm

Comments:

Cells with external side convex covered with short spines, sinus open.

87. *Staurastrum* sp. 1**Dimensions:**

Cell length - 43µm

Cell breadth - 13µm

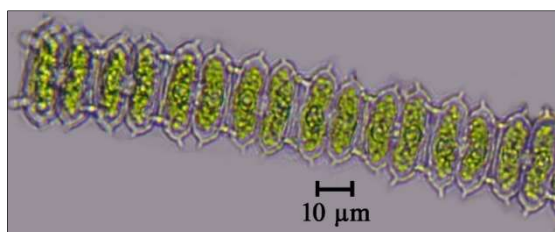
Isthmus - 1.5µm

Comments:

Cells triangulate, angles prolonged to form short processes.

Genus: ***ONYCHONEMA*** Wallich**88. *Onychonema laeve*** var. *micracanthum* Nordst.

Scott and Prescott, 1961. p. 121, pl. 60, fig. 14

**Dimensions:**

Cell length - 20µm

Cell breadth - 19µm

Isthmus - 5.5µm

Comments:

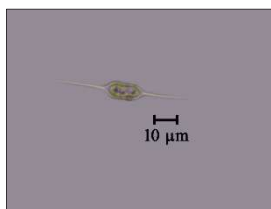
Cells narrowed and rounded and at apex with short spines.

Division : **Chrysophyta**
 Class : **Xanthophyceae**
 Order : **Heterococcales**
 Family : **Centrtractaceae**

Genus: **CENTRITRACTUS** Lemmermann

89. *Centrtractus belanophorus* (Schmidle) Lemm.

Prescott, 1982. p. 361, pl. 95, figs. 37 & 38



Dimensions:

Cell length - 42μm

Cell breadth - 7μm

Comments:

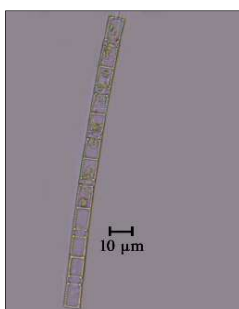
Cells elongate-cylindric with a long, slender spine at each pole, spines larger than the cell.

Division : **Bacillariophyta**
 Class : **Bacillariophyceae**
 Order : **Centrales**
 Family : **Coscinodiscaceae**

Genus: **AULACOSEIRA** Thwaites

90. *Aulacoseira granulata* (Ehr.) Simonsen

Sarode and Kamat, 1984. p. 18, pl. 1, fig. 1



Dimensions:

Valve length - 10μm

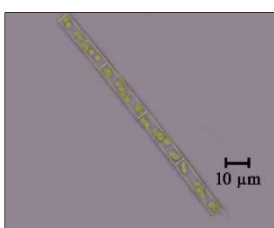
Valve breadth - 6μm

Comments:

Frustules cylindrical and united in chains, end cells with spines, rows of aeroles.

91. *Aulacoseira granulata* (Ehr.) Simonsen var. *angustissima* (O.Muller) Simonsen

Sarode and Kamat, 1984. p. 18, pl. 1, fig. 2



Dimensions:

Valve length - 20μm

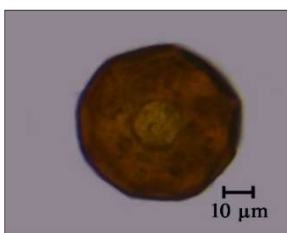
Valve breadth - 3μm

Comments:

Frustules cylindrical and united in chains, end cells with spines.

92. *Actinocyclus normanii* (Gregory) Hustedt

Desikachary, 1989. P.3, fig. 5



Dimensions:

Valve breadth - 3μm

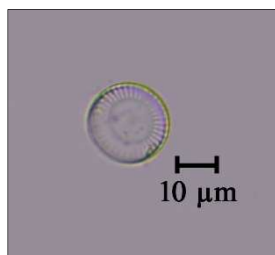
Comments:

Valves circular, centric form, shallow mantle, margins striated, small refractive area at valve margin.

Genus: *CYCLOTELLA* Kuetz.

93. *Cyclotella meneghiniana* f. *meneghiniana* Kützing

Sarode and Kamat, 1984. p. 21, pl. 1, fig. 11



Dimensions:

Valve length - 42μm

Valve breadth - 7μm

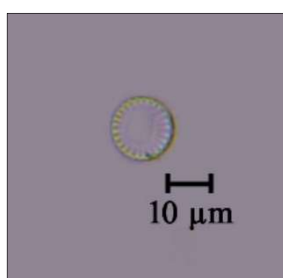
Striae - 8 (10μm)

Comments:

Valves discoid, thick wavy margins, central field large and punctate,

94. *Cyclotella striata* (Kützing) Grunow

Sarode and Kamat, 1984. p. 23, pl. 1, fig. 16



Dimensions:

Valve breadth - 16μm

Striae - 9 (10μm)

Comments:

Valves discoid, large central field.

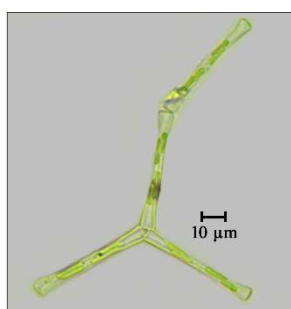
Order : **Pennales**

Family : **Fragilariaceae**

Genus: *TABELLARIA* Ehrenberg

95. *Tabellaria fenestrata* (Lyngbye) Kützing

Venkataraman, 1939. p. 303, fig. 35



Dimensions:

Valve length - 50μm

Valve breadth - 4μm

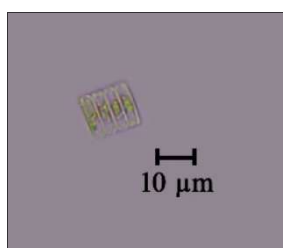
Comments:

Valves elongated and forming zigzag chains, inflated in the middle and poles.

Genus: *FRAGILARIA* Lyngbye

96. *Fragilaria venter* var. *venter* Ehrenberg

Sarode and Kamat, 1984. p. 26, pl. 1, fig. 20



Dimensions:

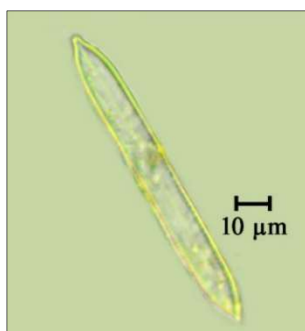
Valve length - 12μm

Valve breadth - 2μm

Comments:

Valves attached together to form short chains.

97. *Fragilaria capucina* var. *vaucheriae* (Kutz.) Lange Bertalot
Sarode and Kamat, 1984. p. 27, pl. 1, fig. 21



Dimensions:

Valve length - 94μm

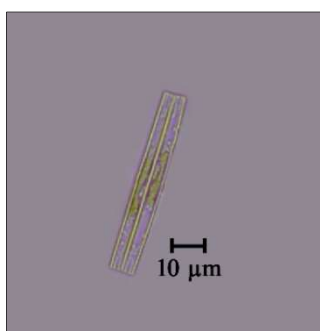
Valve breadth - 8μm

Comments:

Valves linear, broad, ends tapering and rounded, axial area narrow.

Genus: *SYNEDRA* Ehrenberg

98. *Synedra familiaris* f. *familiaris* Kutzing
Sarode and Kamat, 1984. p. 28, pl. 1, fig. 26



Dimensions:

Valve length - 48μm

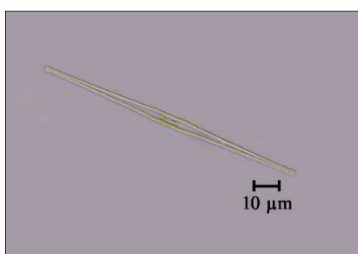
Valve breadth - 4μm

Comments:

Valves centrally constricted.

99. *Synedra acus* Kuetz.

Sarode and Kamat, 1984. p. 30, pl. 2, fig. 32



Dimensions:

Valve length - 102μm

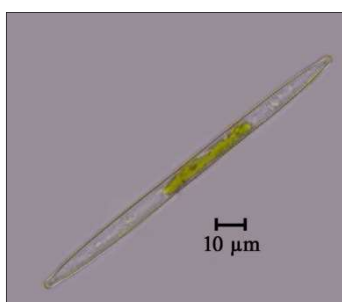
Valve breadth - 3μm

Comments:

Valves linear, narrow needle like subcapitate ends, narrow pseudoraphe, striae indistinct, broad in the middle and tapering towards ends.

100. *Synedra ulna* (Nitz.) Ehr.

Sarode and Kamat, 1984. p. 31, pl. 2, fig. 37



Dimensions:

Valve length - 149μm

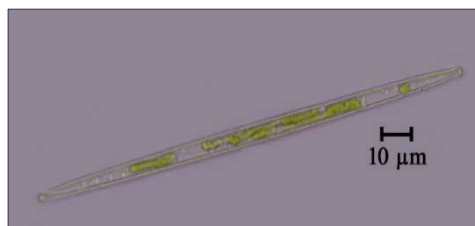
Valve breadth - 5μm

Raphe - 9 (10μm)

Comments:

Valves linear lanceolate, ends rounded, narrow pseudoraphe.

101. *Synedra ulna* var. *subaequalis* Grunow
Sarode and Kamat, 1984. p. 33, pl. 2, fig. 44



Dimensions:

Valve length - 197 μ m

Valve breadth - 6.5 μ m

Raphe - 9 (10 μ m)

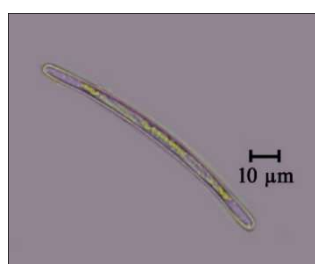
Comments:

Valves linear lanceolate, sub-capitate ends, narrow pseudoraphe.

Family: **Eunotiaceae**

Genus: ***EUNOTIA*** Ehrenberg

102. *Eunotia lunaris* (Ehr.) Gurnow
Gandhi, 1957. P.49, fig. 14



Dimensions:

Valve length - 80 μ m

Valve breadth - 3 μ m

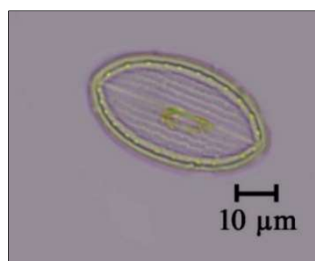
Comments:

Valves linear, curved forming arc, small polar nodules with rounded apex.

Family: **Achnanthaceae**

Genus: ***COCCONEIS*** Ehrenberg

103. *Cocconeis placentula* Ehr.
Sarode and Kamat, 1984. p. 49, pl. 4, fig. 95



Dimensions:

Valve length - 36 μ m

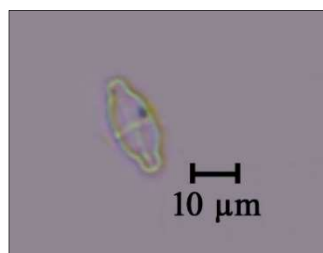
Valve breadth - 21 μ m

Comments:

Valves elliptical, pseudoraphe, many longitudinal wavy hyaline bands present.

Genus: ***ACHNANTHES*** Bory

104. *Achnanthes exigua* Grun.
Sarode and Kamat, 1984. p. 53, pl. 5, fig. 108



Dimensions:

Valve length - 12 μ m

Valve breadth - 5 μ m

Comments:

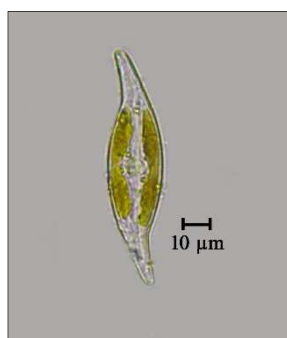
Valves rectangular in middle with rostrate end, raphe thin and straight.

Family: **Naviculaceae**

Genus: **GYROSIGMA** Hassal

105. *Gyrosigma distortum* var. *parkeri* Harrison

Sarode and Kamat, 1984. p. 67, pl. 7, fig. 148



Dimensions:

Valve length - 78μm

Valve breadth - 17μm

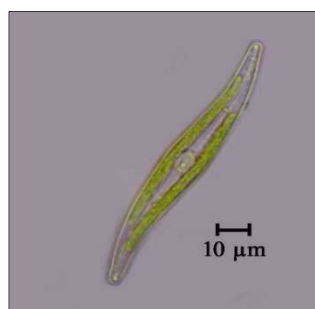
Comments:

Valves slightly sigmoid, lanceolate with protracted ends, axial area narrow.

Genus: **PLEUROSIGMA** W. Smith

106. *Pleurosigma kuetzingii* f. *kuetzingii* Gurnow

Sarode and Kamat, 1984. p. 66, pl. 7, fig. 149



Dimensions:

Valve length - 91μm

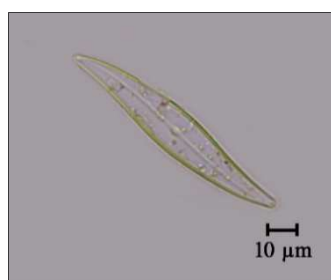
Valve breadth - 12μm

Comments:

Valves sigmoid, lanceolate with rounded ends, raphe thick and sigmoid.

107. *Pleurosigma salinarum* Grun.

Sarode and Kamat, 1984. p. 70, pl. 8, fig. 157



Dimensions:

Valve length - 91μm

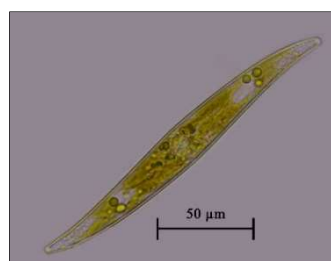
Valve breadth - 14μm

Comments:

Valves linear, lanceolate, sigmoid, rounded at poles.

108. *Pleurosigma elongatum* var. *karianum* (Grun.) Cleve

Sarode and Kamat, 1984. p. 70, pl. 8, fig. 158



Dimensions:

Valve length - 175μm

Valve breadth - 18μm

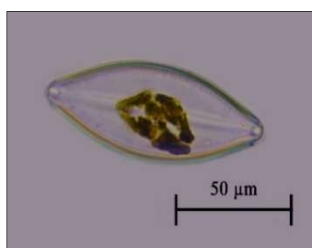
Comments:

Valves sigmoid, attenuated and rounded ends, raphe thin, sigmoid.

Genus: *CALONEIS* Cleve

109. *Caloneis permagna* (Bail.) Cleve

Sarode and Kamat, 1984. p. 72, pl. 8, fig. 164



Dimensions:

Valve length - 90μm

Valve breadth - 35μm

Striae - 13 (10μm)

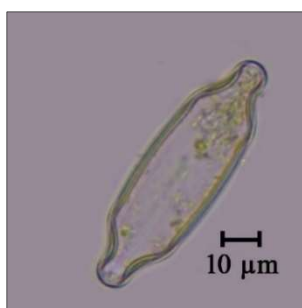
Comments:

Frustules large and lanceolate, rounded ends, raphe thick, terminal fissures curved.

Genus: *NEIDIUM* Pfitzer

110. *Neidium productum* var. *bombayensis* Gonzalves

Sarode and Kamat, 1984. p. 85, pl. 9, fig. 199



Dimensions:

Valve length - 75μm

Valve breadth - 20μm

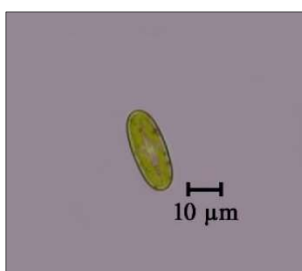
Comments:

Valves linear elliptic, thick margins and rounded ends, raphe thin and straight with central nodule.

Genus: *DIPLONEIS* Ehrenberg

111. *Diploneis ovalis* (Bail.) Cleve

Sarode and Kamat, 1984. p. 86, pl. 10, fig. 203



Dimensions:

Valve length - 20μm

Valve breadth - 10μm

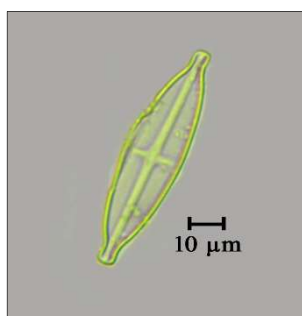
Comments:

Valves linear elliptic, raphe with central nodule H shaped.

Genus: *STAURONEIS* Ehrenberg

112. *Stauroneis anceps* Ehr.

Sarode and Kamat, 1984. p. 89, pl. 10, fig. 210



Dimensions:

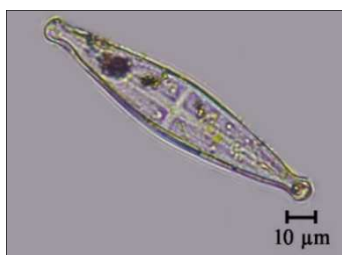
Valve length - 72μm

Valve breadth - 13μm

Comments:

Valves elliptic, lanceolate, ends capitate and rounded, raphe thin, central area wide and stauroid.

113. *Stauroneis anceps* f. *gracilis* (Ehr.) Cleve
Sarode and Kamat, 1984. p. 89, pl. 10, fig. 211



Dimensions:

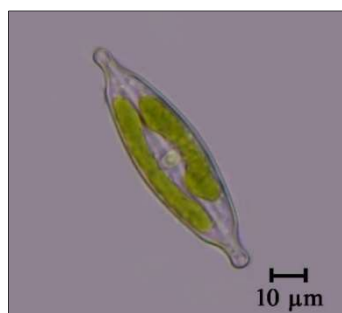
Valve length - 105µm

Valve breadth - 21µm

Comments:

Valves lanceolate, ends capitate, rounded, raphe thin.

114. *Stauroneis phoenicenteron* f. *capitata* Gonzalves et Gandhi
Sarode and Kamat, 1984. p. 93, pl. 11, fig. 224.



Dimensions:

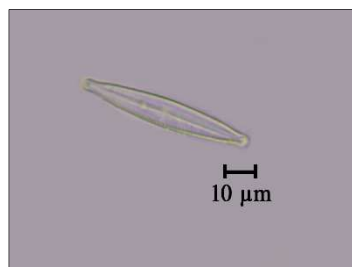
Valve length - 78µm

Valve breadth - 19µm

Comments:

Valves lanceolate, rounded capitate ends, thick and straight raphe with central nodules.

115. *Stauroneis phoenicenteron* f. *producta* Gandhi
Sarode and Kamat, 1984. p. 94, pl. 11, fig. 226



Dimensions:

Valve length - 52µm

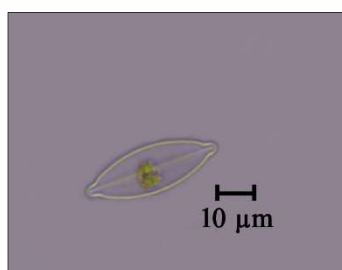
Valve breadth - 9.5µm

Comments:

Valves lanceolate and capitate ends, raphe thick and straight with central nodules.

Genus: *NAVICULA* Bory

116. *Navicula constans* var. *symmetrica* Hustedt
Sarode and Kamat, 1984. p. 106, pl. 12, fig. 253



Dimensions:

Valve length - 29µm

Valve breadth - 11µm

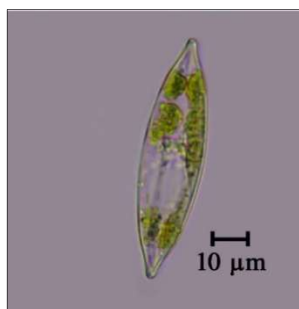
Striae - 13 (10µm)

Comments:

Valves lanceolate with capitate ends, raphe thin with central nodules.

117. *Navicula cuspidata* Otto Müller

Sarode and Kamat, 1984. p. 107, pl. 12, fig. 258

**Dimensions:**

Valve length - 66µm

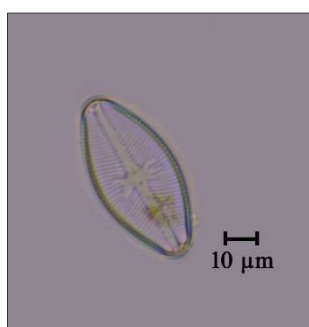
Valve breadth - 15µm

Comments:

Valves lanceolate with rounded ends at apex.

118. *Navicula gastrum* Sensu Pantocsek

Sarode and Kamat, 1984. p. 111, pl. 13, fig. 272

**Dimensions:**

Valve length - 52µm

Valve breadth - 21µm

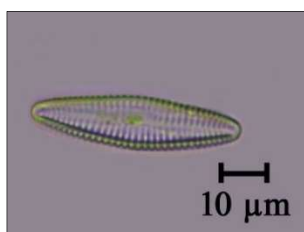
Striae - 8 (10µm)

Comments:

Valves elliptic lanceolate, rounded ends with large central area.

119. *Navicula gracilis* Ehrenberg

Sarode and Kamat, 1984. p. 112, pl. 13, fig. 275

**Dimensions:**

Valve length - 45µm

Valve breadth - 10µm

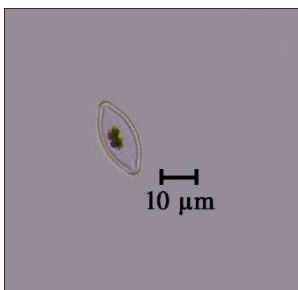
Striae - 9 (10µm)

Comments:

Valves linear lanceolate, axial area, rounded ends, raphe thin.

120. *Navicula laterostrata* Hustedt

Sarode and Kamat, 1984. p. 113, pl. 13, fig. 281

**Dimensions:**

Valve length - 42µm

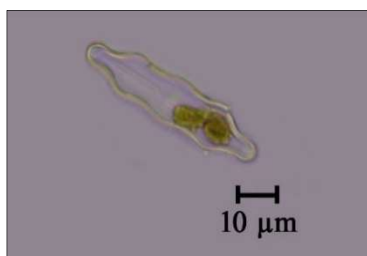
Valve breadth - 7µm

Striae - 12 (10µm)

Comments:

Valves elliptic lanceolate with rounded ends, raphe thin and straight.

121. *Navicula mutica* var. *linearis* Gonzalves & Gandhi
Sarode and Kamat, 1984. p. 116, pl. 13, fig. 290



Dimensions:

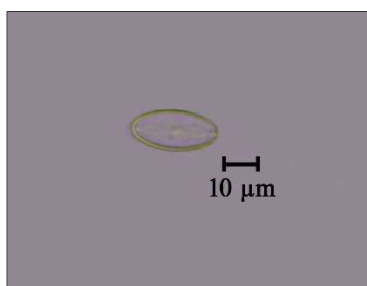
Valve length - 40μm

Valve breadth - 10μm

Comments:

Valves linear lanceolate, triundulate margins, rounded and capitate ends, raphe thin and straight, axial area narrow.

122. *Navicula pygmaea* Kützing
Sarode and Kamat, 1984. p. 119, pl. 13, fig. 301



Dimensions:

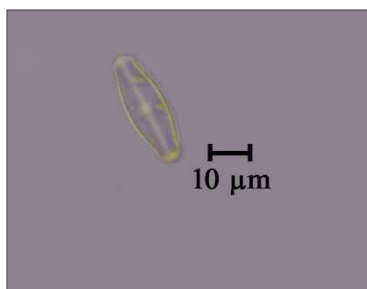
Valve length - 23μm

Valve breadth - 10μm

Comments:

Valves elliptic lanceolate with rounded ends, raphe thin with central nodules.

123. *Navicula pupula* Bristol
Sarode and Kamat, 1984. p. 118, pl. 13, fig. 295



Dimensions:

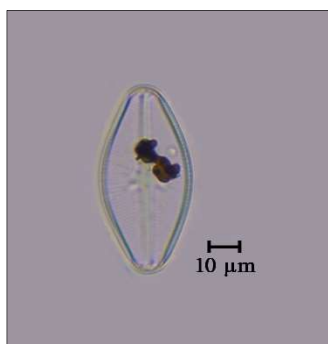
Valve length - 26μm

Valve breadth - 9μm

Comments:

Valves linear lanceolate, subcapitate ends, raphe straight with central nodules.

124. *Navicula pusilla* Sensu Donkin
Sarode and Kamat, 1984. p. 119, pl. 13, fig. 300



Dimensions:

Valve length - 62μm

Valve breadth - 28μm

Striae - 10 (10μm)

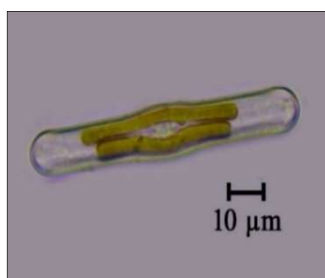
Comments:

Valves elliptic lanceolate with capitate ends, central area wide, raphe thick and curved with central nodules.

Genus: *PINNULARIA* Ehrenberg

125. *Pinnularia acrosphaeria* W. Smith

Sarode and Kamat, 1984. p. 133, pl. 15, fig. 340



Dimensions:

Valve length - 58μm

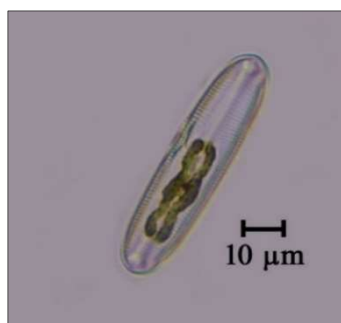
Valve breadth - 9.2μm

Comments:

Valves axial area broad and inflated at middle with central nodules.

126. *Pinnularia divergens* var. *elliptica* Grunow

Sarode and Kamat, 1984. p. 140, pl. 16, fig. 363



Dimensions:

Valve length - 71μm

Valve breadth - 14μm

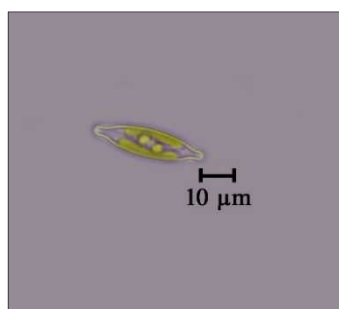
Striae - 10 (10μm)

Comments:

Valves linear elliptical with rounded ends, terminal pores curved.

127. *Pinnularia interrupta* var. *minor* Cleve-Euler

Sarode and Kamat, 1984. p. 144, pl. 16, fig. 378



Dimensions:

Valve length - 28μm

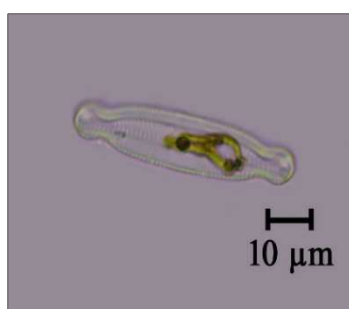
Valve breadth - 8μm

Comments:

Valves linear lanceolate, capitate rounded ends, raphe thin.

128. *Pinnularia lundii* Hustedt

Sarode and Kamat, 1984. p. 146, pl. 17, fig. 386



Dimensions:

Valve length - 50μm

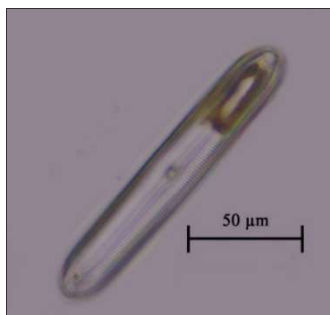
Valve breadth - 10μm

Striae - 13 (10μm)

Comments:

Valves lanceolate, capitate rounded ends, curved terminal fissures.

129. *Pinnularia major* f. *linearis* (Cleve) Dippel
Sarode and Kamat, 1984. p. 147, pl. 17, fig. 387



Dimensions:

Valve length - 125μm

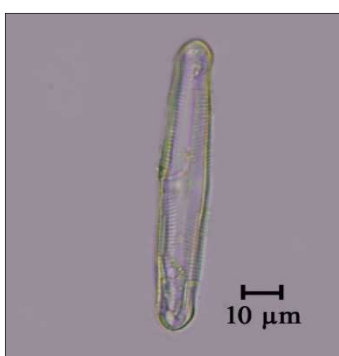
Valve breadth - 18μm

Striae - 8 (10μm)

Comments:

Valves linear lanceolate, rounded and capitate ends, raphe thick and complex, unilaterally bend, bayonet shaped.

130. *Pinnularia panhalgarhensis* Gandhi
Sarode and Kamat, 1984. p. 151, pl. 18, fig. 400



Dimensions:

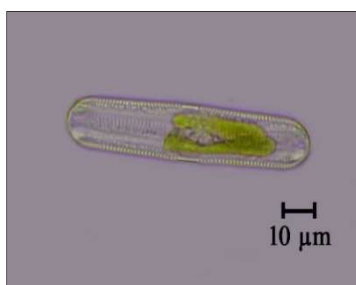
Valve length - 85μm

Valve breadth - 11μm

Comments:

Valves linear, constricted ends, curved terminal fissures, raphe unilaterally bent.

131. *Pinnularia stomatophoroides* var. *ornata* (A. Cl.) Cl.-Euler
Sarode and Kamat, 1984. p. 155, pl. 18, fig. 414



Dimensions:

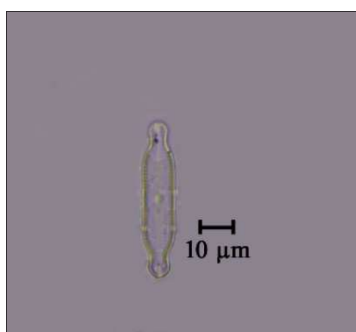
Valve length - 75μm

Valve breadth - 12μm

Comments:

Valves linear lanceolate, broadly rounded, capitate ends, raphe thick.

132. *Pinnularia termis* var. *termitiana* (Ehr.) A. Cl.
Sarode and Kamat, 1984. p. 157, pl. 19, fig. 420



Dimensions:

Valve length - 45μm

Valve breadth - 8μm

Striae - 12 (10μm)

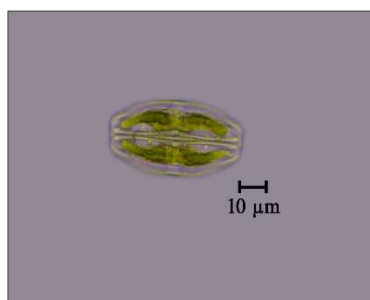
Comments:

Valves lanceolate, capitate rounded ends, curved terminal fissures.

Genus: *AMPHORA* Ehrenberg

133. *Amphora ovalis* f. *gracilis* Ehrenberg

Sarode and Kamat, 1984. p. 162, pl. 19, fig. 434



Dimensions:

Valve length - 52μm

Valve breadth - 25μm

Striae - 11 (10μm)

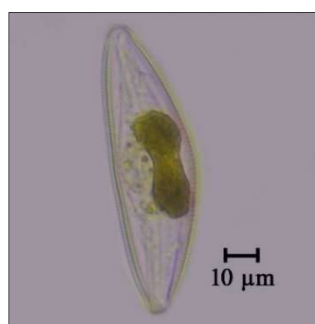
Comments:

Valves lunate with convex dorsal side, narrow at axial side.

Genus: *CYMBELLA* Agardh

134. *Cymbella bengalensis* Grunow

Sarode and Kamat, 1984. p. 167, pl. 19, fig. 444



Dimensions:

Valve length - 84μm

Valve breadth - 25μm

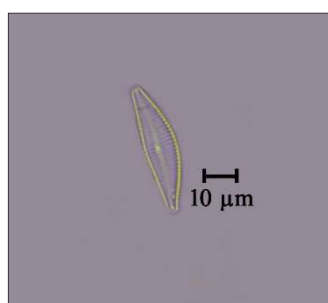
Striae - 9 (10μm)

Comments:

Valves asymmetrical, broadly rounded ends, central area large.

135. *Cymbella signata* Pantocsek

Sarode and Kamat, 1984. p. 170, pl. 20, fig. 453



Dimensions:

Valve length - 36μm

Valve breadth - 9μm

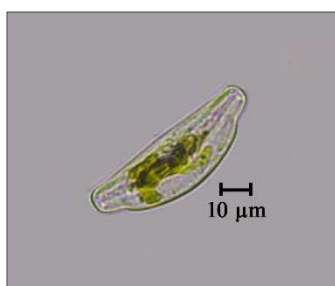
Striae - 11 (10μm)

Comments:

Valve ends rounded, dorsal margin convex and ventral margin straight.

136. *Cymbella laevis* Nageli

Sarode and Kamat, 1984. p. 171, pl. 20, fig. 455



Dimensions:

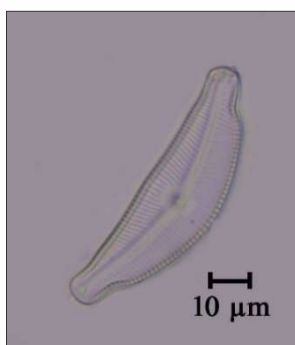
Valve length - 30μm

Valve breadth - 9μm

Comments:

Valves curved, dorsal margin convex and ventral margin straight with median expansion, raphe thick.

137. *Cymbella tumida* (A. Schmidt) Skabichevskii
Sarode and Kamat, 1984. p. 176, pl. 20, fig. 468



Dimensions:

Valve length - 72 μ m

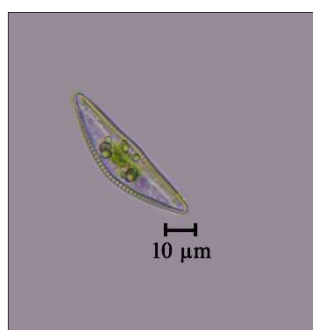
Valve breadth - 20 μ m

Striae - 12 (10 μ m)

Comments:

Valves asymmetrical and curved, dorsal margin convex, raphe thick.

138. *Cymbella turgida* Pantocsek
Sarode and Kamat, 1984. p. 177, pl. 21, fig. 471



Dimensions:

Valve length - 50 μ m

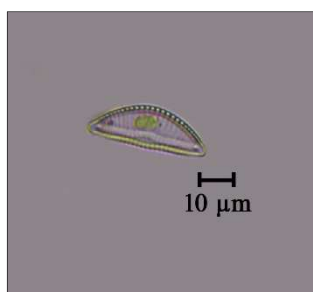
Valve breadth - 12 μ m

Striae - 8 (10 μ m)

Comments:

Valves lunate, ends acute, rounded.

139. *Cymbella ventricosa* Kutzing
Sarode and Kamat, 1984. p. 178, pl. 21, fig. 473



Dimensions:

Valve length - 33 μ m

Valve breadth - 9 μ m

Striae - 10 (10 μ m)

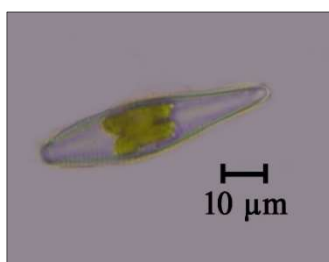
Comments:

Valves straight on the ventral side, ends acute, rounded.

Family: **Gomphonemaceae**

Genus: **GOMPHONEMA** Agardh

140. *Gomphonema aequatoriale* Hustedt
Sarode and Kamat, 1984. p. 182, pl. 22, fig. 500



Dimensions:

Valve length - 51 μ m

Valve breadth - 10 μ m

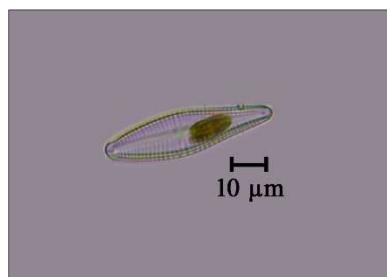
Striae - 9 (10 μ m)

Comments:

Valves clavate, ends rounded at apex.

141. *Gomphonema gracile* var. *intricatiformis* Mayer

Sarode and Kamat, 1984. p. 186, pl. 21, fig. 486

**Dimensions:**

Valve length - 55μm

Valve breadth - 10μm

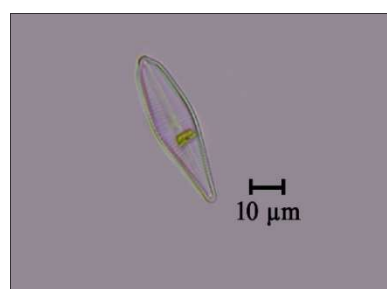
Striae - 12 (10μm)

Comments:

Valves lanceolate, ends acutely rounded, central nodules, striae lineate.

142. *Gomphonema gracile* var. *frickei* Gandhi

Sarode and Kamat, 1984. p. 185, pl. 21, fig. 498

**Dimensions:**

Valve length - 45μm

Valve breadth - 9μm

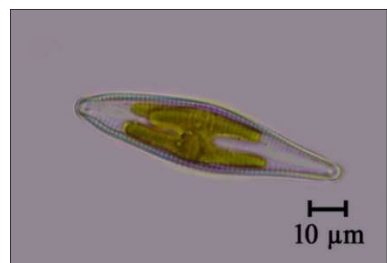
Striae - 8 (10μm)

Comments:

Valves lanceolate, apiculate apex, distinct central nodules.

143. *Gomphonema lacus-rankala* var. *gracilis* Gandhi

Sarode and Kamat, 1984. p. 190, pl. 22, fig. 512

**Dimensions:**

Valve length - 72μm

Valve breadth - 14μm

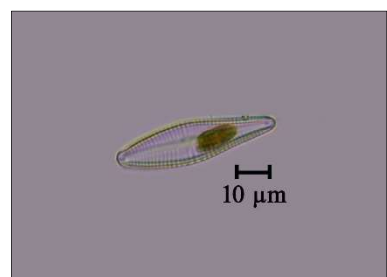
Striae - 9 (10μm)

Comments:

Valves lanceolate, apiculate end at apex, striae shortened in the middle.

144. *Gomphonema montanum* var. *acuminatum* f. *indicum* Sarode & Kamat

Sarode and Kamat, 1984. p. 193, pl. 23, fig. 524

**Dimensions:**

Valve length - 49μm

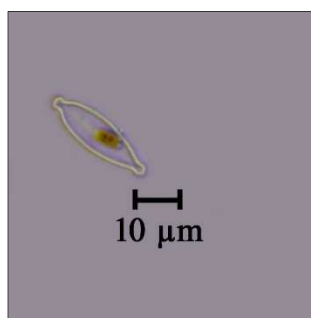
Valve breadth - 11μm

Striae - 8 (10μm)

Comments:

Valves lanceolate, slightly constricted at apex, raphe thin and straight.

145. *Gomphonema parvulum* (Kuetzing) Kutzing
Sarode and Kamat, 1984. p. 196, pl. 23, fig. 534



Dimensions:

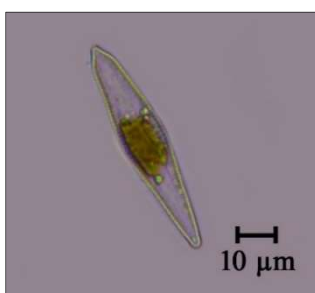
Valve length - 24μm

Valve breadth - 7μm

Comments:

Valves clavate, capitate ends at apex, raphe thin and straight.

146. *Gomphonema subapicatum* Fritsch & Rich
Sarode and Kamat, 1984. p. 198, pl. 23, fig. 538



Dimensions:

Valve length - 58μm

Valve breadth - 10μm

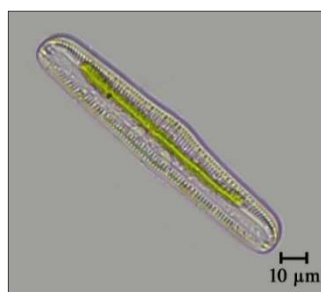
Comments:

Valves lanceolate, clavate, subapiculate apex, raphe thin and straight, axial area narrow.

Family: **Epithemiaceae**

Genus: ***RHOPALODIA*** Muller

147. *Rhopalodia gibba* (Ehr.) O. Muller
Sarode and Kamat, 1984. p. 203, pl. 24, fig. 554



Dimensions:

Valve length - 112μm

Valve breadth - 14μm

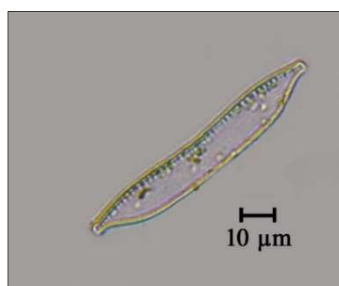
Comments:

Valves inflations in the middle, rounded ends.

Family: **Nitzschiaceae**

Genus: ***HANTZSCHIA*** Grunow

148. *Hantzschia amphioxys* (Ehr.) Grunow
Sarode and Kamat, 1984. p. 206, pl. 24, fig. 562



Dimensions:

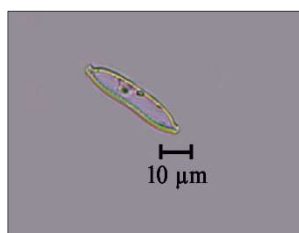
Valve length - 72μm

Valve breadth - 9μm

Comments:

Valves ends constricted and capitate, keel punctae 9 in 10μm.

149. *Hantzschia amphioxys* var. *pusilla* (Gru.) Dippel
Sarode and Kamat, 1984. p. 208, pl. 24, fig. 568



Dimensions:

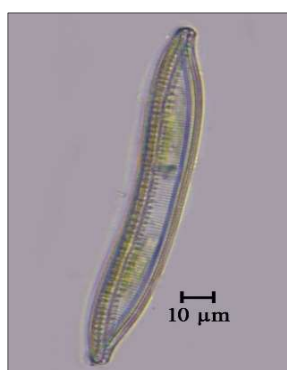
Valve length - 35µm

Valve breadth - 7µm

Comments:

Valves ends constricted and narrowed, small keel punctae.

150. *Hantzschia linearis* (O. Mull.) Cl.- Euler
Sarode and Kamat, 1984. p. 209, pl. 25, fig. 574



Dimensions:

Valve length - 127µm

Valve breadth - 111µm

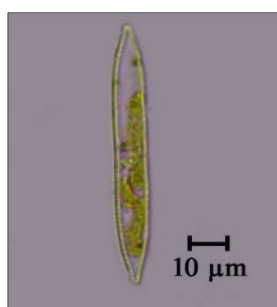
Striae - 13 (10µm)

Comments:

Valves linear, ends narrowed and subcapitate.

Genus: *NITZSCHIA* Hassal

151. *Nitzschia apiculata* (Greg.) Grun.
Sarode and Kamat, 1984. p. 214, pl. 25, fig. 580



Dimensions:

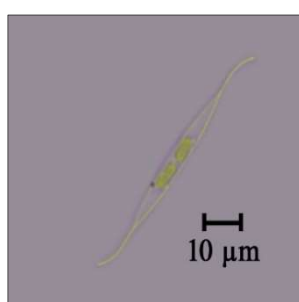
Valve length - 69µm

Valve breadth - 9µm

Comments:

Valves linear with apiculate ends.

152. *Nitzschia closterium* Eulenstein
Sarode and Kamat, 1984. p. 215, pl. 25, fig. 584



Dimensions:

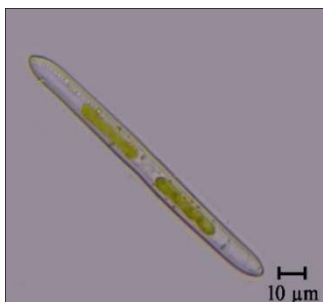
Valve length - 62µm

Valve breadth - 2µm

Comments:

Valves long attenuated ends, retracted in opposite directions.

153. *Nitzschia intermedia* Hantzsch ex Cleve & Grunow
Sarode and Kamat, 1984. p. 218, pl. 26, fig. 598



Dimensions:

Valve length - 101μm

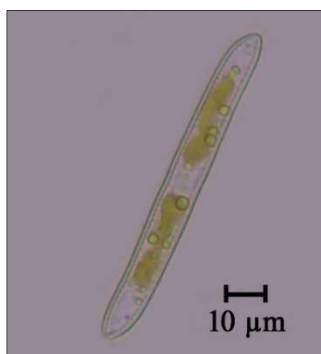
Valve breadth - 6μm

Comments:

Valves linear, lanceolate, subcapitate ends.

154. *Nitzschia obtusa* W. Smith

Sarode and Kamat, 1984. p. 221, pl. 26, fig. 608



Dimensions:

Valve length - 75μm

Valve breadth - 9μm

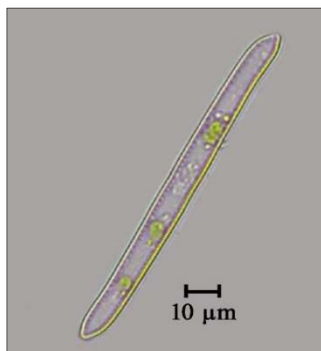
Striae - 9 (10μm)

Comments:

Valves linear with rounded ends in opposite directions.

155. *Nitzschia scalpelliformis* Grunow

Sarode and Kamat, 1984. p. 222, pl. 26, fig. 609



Dimensions:

Valve length - 112μm

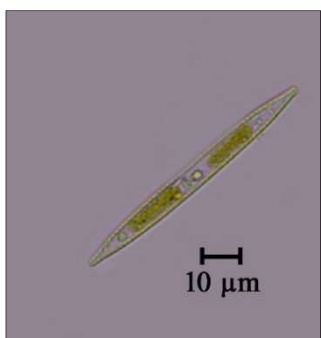
Valve breadth - 7.5μm

Comments:

Valves linear with rounded ends in opposite directions.

156. *Nitzschia philippinarum* Hustedt

Sarode and Kamat, 1984. p. 223, pl. 26, fig. 615



Dimensions:

Valve length - 66μm

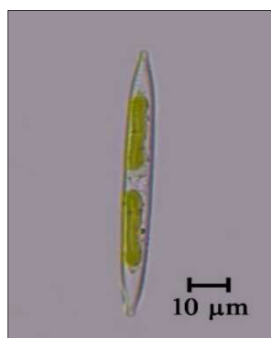
Valve breadth - 5μm

Comments:

Valves lanceolate, narrow capitate rounded ends.

157. *Nitzschia sublinearis* Hustedt

Sarode and Kamat, 1984. p. 225, pl. 26, fig. 623

**Dimensions:**

Valve length - 83µm

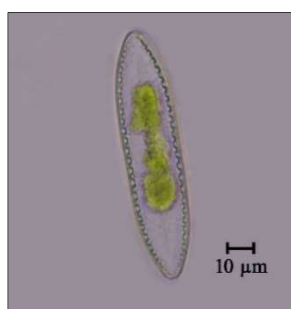
Valve breadth - 6µm

Comments:

Valves narrow capitate ends, linear lanceolate.

Family: **Surirellaceae**Genus: ***SURIRELLA*** Turpin**158. *Surirella biseriata*** Brebisson

Sarode and Kamat, 1984. p. 230, pl. 27, fig. 639

**Dimensions:**

Valve length - 90µm

Valve breadth - 20µm

Comments:

Valves isopolar, acutely rounded ends, linear, lanceolate.

159. *Surirella capronioides* Gandhi

Sarode and Kamat, 1984. p. 231, pl. 27, fig. 642

**Dimensions:**

Valve length - 109µm

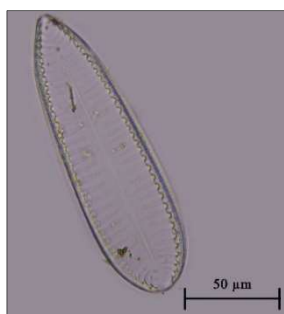
Valve breadth - 47µm

Comments:

Valves heteropolar, ovate with rounded ends at apex, thick wavy projections from margin.

160. *Surirella robusta* Ehrenberg

Sarode and Kamat, 1984. p. 233, pl. 28, fig. 652

**Dimensions:**

Valve length - 154µm

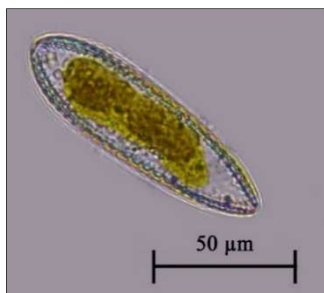
Valve breadth - 31µm

Comments:

Valves narrowly ovate with rounded apex.

161. *Surirella tenera* var. *ambigua* Gandhi

Sarode and Kamat, 1984. p. 234, pl. 28, fig. 655

**Dimensions:**

Valve length - 97μm

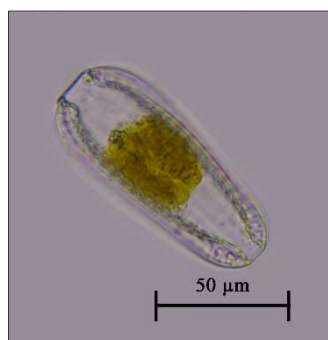
Valve breadth - 25μm

Comments:

Valves heteropolar, striae indistinct, narrowly ovate with rounded apex.

162. *Surirella tenera* var. *nervosa* A. Schmidt

Sarode and Kamat, 1984. p. 234, pl. 28, fig. 656

**Dimensions:**

Valve length - 97μm

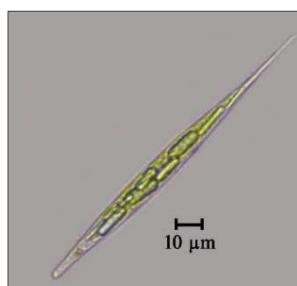
Valve breadth - 31μm

Comments:

Valves narrowly ovate with rounded apex.

Division : **Euglenophyta**Class : **Euglenophyceae**Order : **Euglenales**Family : **Euglenaceae**Genus: ***EUGLENA*** Ehrenberg**163. *Euglena acus* (O.F.Muller) Ehr.**

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

**Dimensions:**

Cell length - 83μm

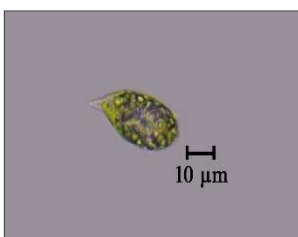
Cell breadth - 20μm

Comments:

Cells elongate, spindle shaped, produced posteriorly into a long, fine tapering point, narrowed and truncate at the anterior end.

164. *Euglena agilis* Carter

Wolowski, 1998. p.27, fig. 78

**Dimensions:**

Cell length - 30μm

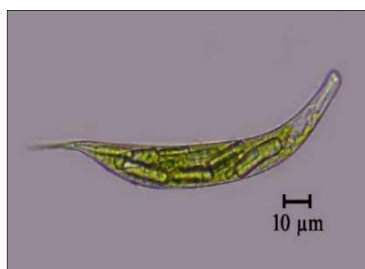
Cell breadth - 13μm

Comments:

Cells short, fusiform, chloroplast many with pyrenoids.

165. *Euglena acus* var. *acus* Starmach

Wolowski,1998. p.13, fig. 9

**Dimensions:**

Cell length - 125µm

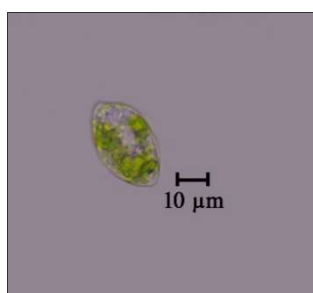
Cell breadth - 10µm

Comments:

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

166. *Euglena anabaena* var. *anabaena* Mainx

Wolowski,1998. p.28, fig. 88

**Dimensions:**

Cell length - 30µm

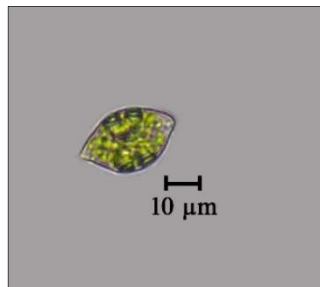
Cell breadth - 19µm

Comments:

Cells wide, fusiform, narrowing towards the anterior end.

167. *Euglena archeoplastidiata* Chadeaud

Wolowski,1998. p.25, fig. 66

**Dimensions:**

Cell length - 26µm

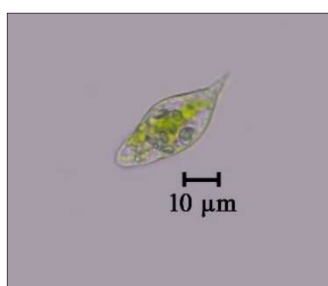
Cell breadth - 13µm

Comments:

Cells cylindrical with several chloroplasts, rounded at posterior end.

168. *Euglena chlamydophora* Mainx

Wolowski,1998. p.23, fig. 53

**Dimensions:**

Cell length - 42µm

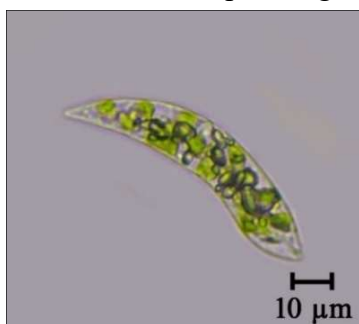
Cell breadth - 20µm

Comments:

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

169. *Euglena deses* fo. *deses* Pringsheim

Wolowski,1998. p.38, fig.125

**Dimensions:**

Cell length - 68µm

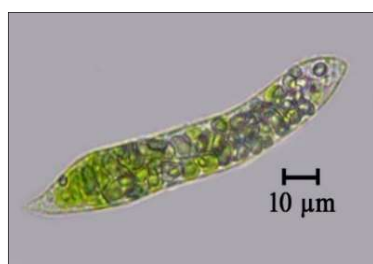
Cell breadth - 12µm

Comments:

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

170. *Euglena deses* Ehrenberg

Wolowski,1998. p.39, fig.130

**Dimensions:**

Cell length - 102µm

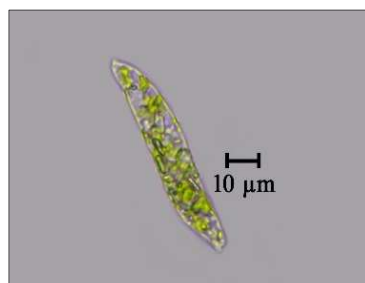
Cell breadth - 12µm

Comments:

Cells cylindrical, truncate at the anterior end.

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

Wolowski,1998. p.38, fig.128

**Dimensions:**

Cell length - 61µm

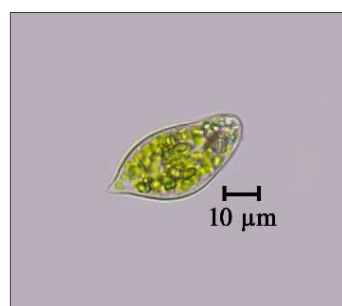
Cell breadth - 10µm

Comments:

Cells longitudinally cylindrical, flattened with many chloroplasts.

172. *Euglena ettlii* Wolowski

Wolowski,1998. p.26, fig.72

**Dimensions:**

Cell length - 41µm

Cell breadth - 10µm

Comments:

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

173. *Euglena fusca* (Klebs) Lemm.

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

**Dimensions:**

Cell length - 195μm

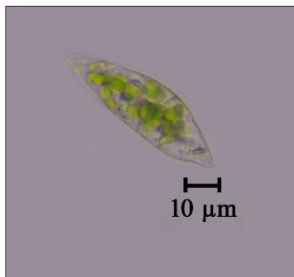
Cell breadth - 27μm

Comments:

Cells slightly bent, posterior end tapering, paramylum present.

174. *Euglena gracilis* Klebs

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

**Dimensions:**

Cell length - 51μm

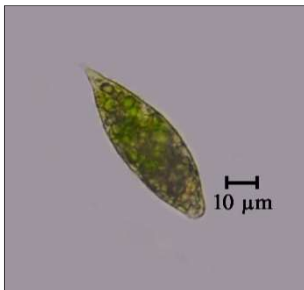
Cell breadth - 15μm

Comments:

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

175. *Euglena hemichromata* Skuja

Wolowski,1998. p.22, fig.49

**Dimensions:**

Cell length - 60μm

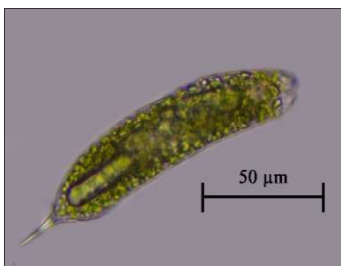
Cell breadth - 18μm

Comments:

Cells spindle-shaped to cylindrical, anterior end rounded, posterior end tapering, presence of spherical to irregular discs.

176. *Euglena oxyuris* f. *oxyuris* Popova

Wolowski,1998. p.15, fig. 21

**Dimensions:**

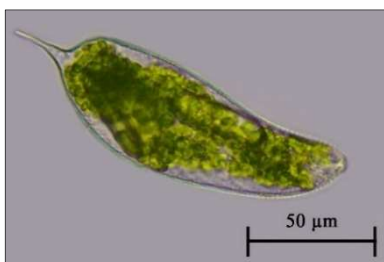
Cell length - 125μm

Cell breadth - 25μm

Comments:

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

177. *Euglena oxyuris* var. *charkowiensis* (Swirenko) Bourrelly
Philipose, 1984. p.576, fig. 12c



Dimensions:

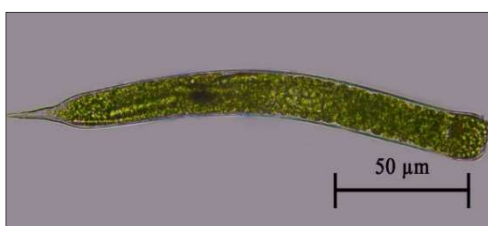
Cell length - 137μm

Cell breadth - 38μm

Comments:

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

178. *Euglena oxyuris* var. *playfairii* Bourrelly
Philipose, 1984. p.575, fig. 12b



Dimensions:

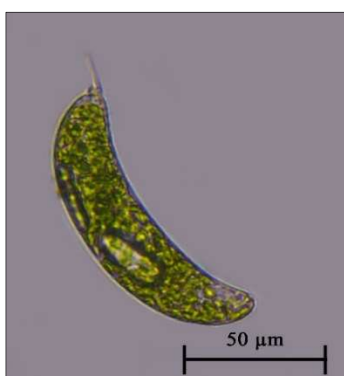
Cell length - 300μm

Cell breadth - 24μm

Comments:

Cells with anterior end truncate, posterior with tail.

179. *Euglena oxyuris* var. *minor* Deflandre
Prescott, 1982. p. 393, pl. 85, fig. 18



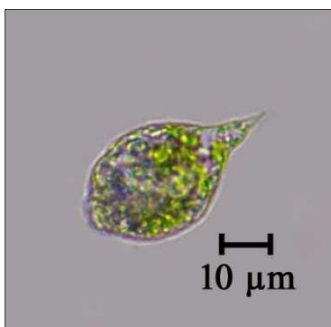
Dimensions:

Cell length - 120μm

Cell breadth - 25μm

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

180. *Euglena polymorpha* Dangeard
Wolowski, 1998. p.31, fig. 98



Dimensions:

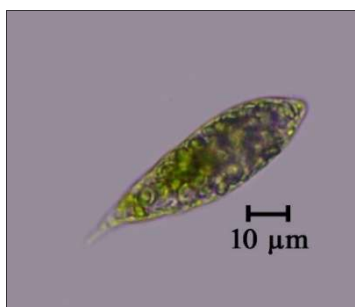
Cell length - 42μm

Cell breadth - 23μm

Comments:

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

181. *Euglena proxima* Dangeard
Prescott, 1982. p. 394, pl. 85, fig. 25



Dimensions:

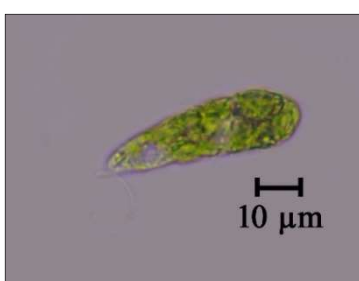
Cell length - 61µm

Cell breadth - 15µm

Comments:

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

182. *Euglena rustica* var. *rustica* Huber-Pestalozzi
Wolowski, 1998. p.21, pl. V11, fig. 45



Dimensions:

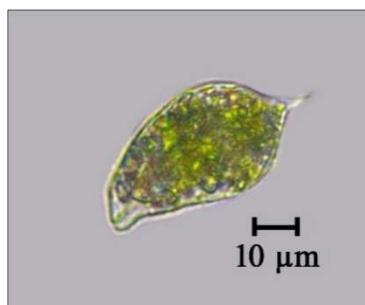
Cell length - 45µm

Cell breadth - 12µm

Comments:

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

183. *Euglena sanguinea* Ehrenberg
Wolowski, 1998. p.34, fig. 113



Dimensions:

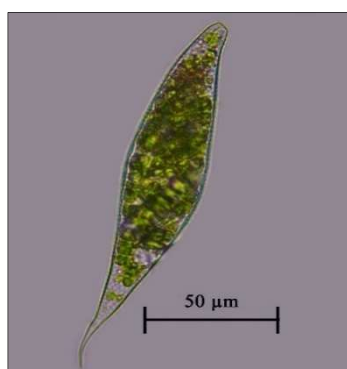
Cell length - 55µm

Cell breadth - 28µm

Comments:

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

184. *Euglena* sp. 1



Dimensions:

Cell length - 151µm

Cell breadth - 30µm

Comments:

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

185. *Euglena* sp. 2



Dimensions:

Cell length - 89μm

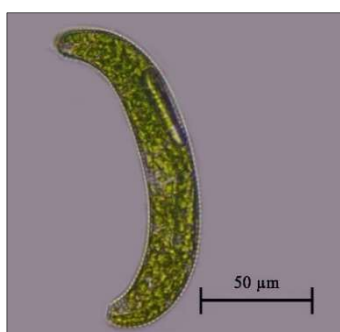
Cell breadth - 50μm

Comments:

Cells elongated, rounded at median, narrowed posteriorly with sharp tail.

186. *Euglena spirogyra* var. *spirogyra* Klebs

Wolowski, 1998. p.17, fig. 28



Dimensions:

Cell length - 140μm

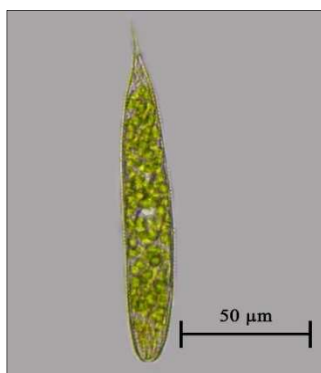
Cell breadth - 19μm

Comments:

Cells elongated, curved, longitudinally cylindrical and narrowed posteriorly.

187. *Euglena spirogyra* Ehrenberg

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



Dimensions:

Cell length - 108μm

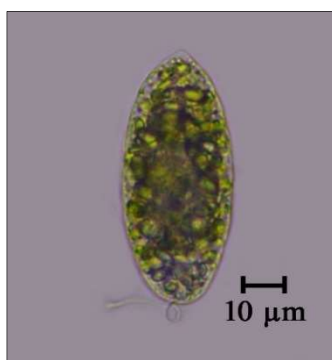
Cell breadth - 19μm

Comments:

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

188. *Euglena splendens* Dangeard

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



Dimensions:

Cell length - 65μm

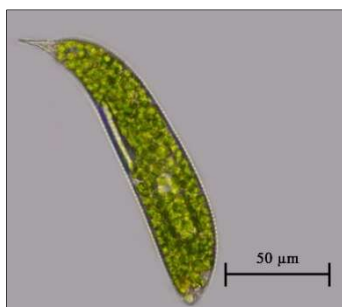
Cell breadth - 23μm

Comments:

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

189. *Euglena tripteris* var. *tripteris* Klebs

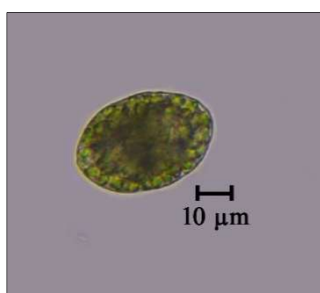
Wolowski, 1998. p.19, fig. 337

**Dimensions:**Cell length - 147 μ mCell breadth - 26 μ m**Comments:**

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

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

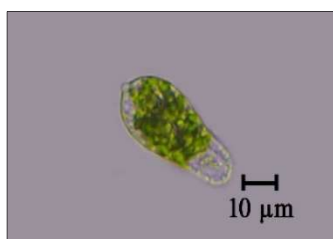
Wolowski, 1998. p.35, pl. V11, fig. 116

**Dimensions:**Cell length - 35 μ mCell breadth - 16 μ m**Comments:**

Cells elongate-cylindric and rounded at anterior end.

191. *Euglena viridis* f. *Viridis* (Popova) Ehrenberg

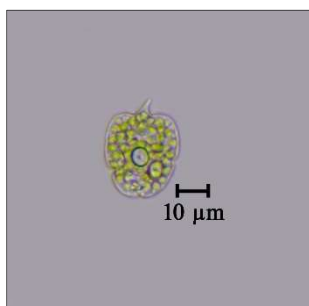
Wolowski, 1998. p.35, pl. V11, fig. 116

**Dimensions:**Cell length - 35 μ mCell breadth - 16 μ m**Comments:**

Cells elongate-cylindric and rounded at anterior end.

Genus: ***PHACUS*** Dujardin**192. *Phacus anacoelus* Stokes**

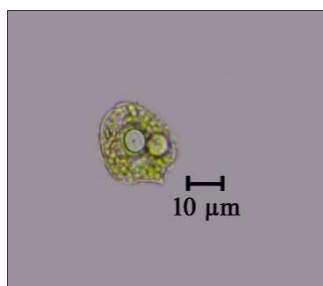
Prescott, 1982. p. 397, pl. 87, fig. 7

**Dimensions:**Cell length - 36 μ mCell breadth - 29 μ m**Comments:**

Cells ovoid, anterior end broadly rounded, chloroplast numerous, short caudus in posterior, paramylon bodies present.

193. *Phacus curvicauda* Svirenko

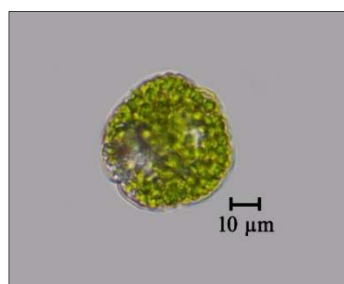
Prescott, 1982. p. 399, pl. 87, fig. 14

**Dimensions:**Cell length - 27 μ mCell breadth - 23 μ m**Comments:**

Cells ovoid, anterior end broadly rounded, chloroplast numerous.

194. *Phacus lefevrei* Bourelly

Philipose, 1984. p.520, fig. 12

**Dimensions:**Cell length - 48 μ mCell breadth - 47 μ m**Comments:**

Cells ellipsoid with both ends rounded, broad, posterior end broader with larger swelling, numerous paramylum.

195. *Phacus orbicularis* Huebner

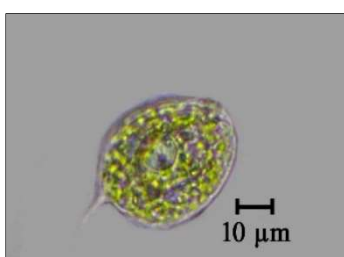
Philipose, 1984. p.529, fig. 30

**Dimensions:**Cell length - 110 μ mCell breadth - 90 μ m**Comments:**

Cells circular, short tail, which is bent, numerous transverse striae, two paramylum, one large and in center.

196. *Phacus orbicularis* f. *communis* Popova

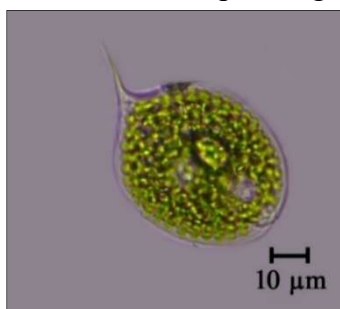
Wolowski, 1998. p.76, fig. 260

**Dimensions:**Cell length - 47 μ mCell breadth - 28 μ m**Comments:**

Cells wide, oval with posterior caudus.

197. *Phacus orbicularis* f. *orbicularis* Hubner

Wolowski, 1998. p.76, fig. 260

**Dimensions:**

Cell length - 62μm

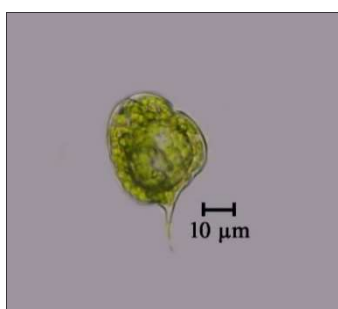
Cell breadth - 35μm

Comments:

Cells wide, oval with long curved posterior caudus.

198. *Phacus pseudoswirenkoi* Prescott

Prescott, 1982. P. 402, pl. 85, fig. 26

**Dimensions:**

Cell length - 45μm

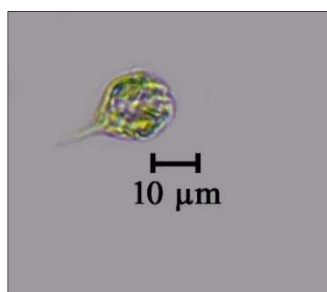
Cell breadth - 27μm

Comments:

Cells with posterior caudus short, sharp and curved, anterior end broadly rounded with large circular disc.

199. *Phacus splendens* Pochmann

Wolowski, 1998. p.86, fig. 303

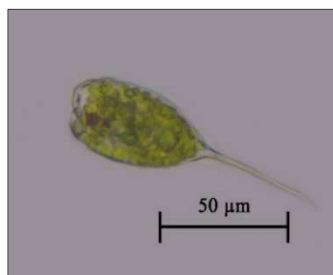
**Dimensions:**

Cell length - 26μm

Cell breadth - 12.5μm

Comments:

Cells ovoid, narrowing towards posterior end with short conical cauda.

200. *Phacus* sp.1**Dimensions:**

Cell length - 54μm

Cell breadth - 27μm

Comments:

Cells with large eye spot, narrowing towards posterior end with long conical cauda.

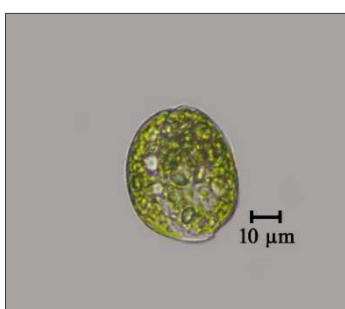
201. *Phacus* sp.2**Dimensions:**

Cell length - 160μm

Cell breadth - 125μm

Comments:

Cells large, circular, narrowing towards posterior end with conical cauda.

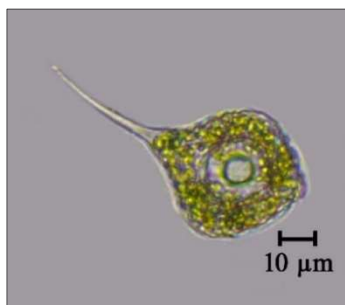
202. *Phacus stokesii* Lemmermann
Wolowski,1998. p.70, fig. 220**Dimensions:**

Cell length - 42μm

Cell breadth - 36μm

Comments:

Cells ovoid, irregularly heart shaped and chloroplast numerous.

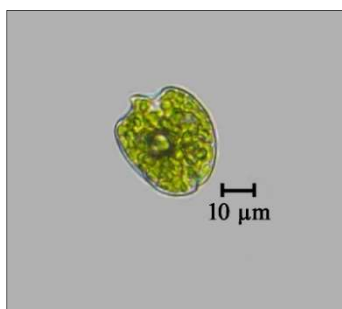
203. *Phacus tortus* (Lemm) Skvortzov
Philipose, 1984. p.540, fig. 40**Dimensions:**

Cell length - 82μm

Cell breadth - 33μm

Comments:

Cells ovoid, anteriorly and posteriorly narrowed with long straight tail.

204. *Phacus viguieri* Allorge & lefevre
Wolowski,1998. p.82, fig. 285**Dimensions:**

Cell length - 26μm

Cell breadth - 23μm

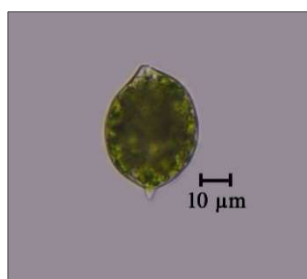
Comments:

Cells widely ovate, short cauda, tail alone 32μm, ovoid, anteriorly and posteriorly narrowed with long straight tail,

Genus: *LEPOCINCLIS* Perty

205. *Lepocinclis fusiformis* (Carter) Lemm.

Philipose, 1984. p.512, fig. 7a



Dimensions:

Cell length - 44μm

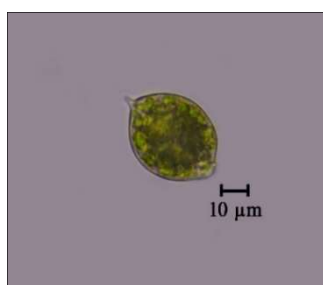
Cell breadth - 27μm

Comments:

Cells broadly ovoid, obtuse ends, posterior end with a short caudus.

206. *Lepocinclis ovum* var. *ovum* Starmach

Wolowski, 1998. p.66, fig. 210



Dimensions:

Cell length - 37μm

Cell breadth - 23μm

Comments:

Cells broadly ovoid, end broadly rounded, posterior end with caudus.

207. *Lepocinclis playfairiana* Deflandre

Prescott, 1982. p. 407, pl. 89, fig.16



Dimensions:

Cell length - 48μm

Cell breadth - 26μm

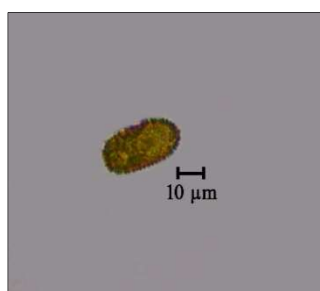
Comments:

Cells oval with short caudus, short rounded apex at anterior, slight invagination on lower side.

Genus: *TRACHELOMONAS* Ehrenberg

208. *Trachelomonas abrupta* Svirenko

Prescott, 1982. p. 410, pl. 83, fig. 18



Dimensions:

Cell length - 27μm

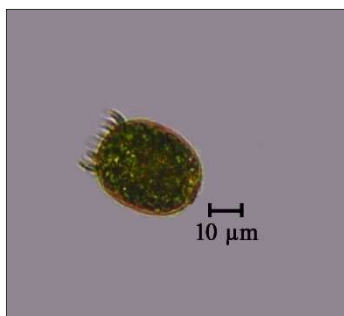
Cell breadth - 15μm

Comments:

Cell broadly oval, wall coarsely punctate, truncate at the anterior end.

209. *Trachelomonas armata* (Ehr.) Stein.

Prescott, 1982. p. 410, pl. 83, fig. 32

**Dimensions:**

Cell length - 25µm

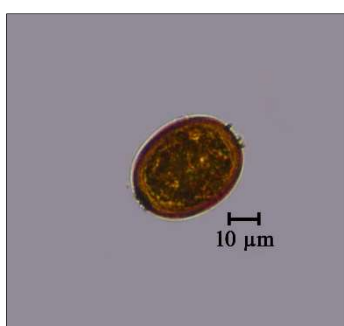
Cell breadth - 35µm

Comments:

Cell broadly ovate and flagellum aperture in a collar.

210. *Trachelomonas armata* var. *longispina* Playfair

Prescott, 1982. p. 411, pl. 83, fig. 27

**Dimensions:**

Cell length - 40µm

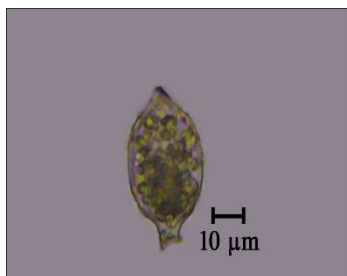
Cell breadth - 29µm

Comments:

Cell obovate, reddish brown, with collar, posterior end short spines.

211. *Trachelomonas caudata* f. *caudata* Starmach

Wolowski, 1998. p.64, fig. 204

**Dimensions:**

Cell length - 40µm

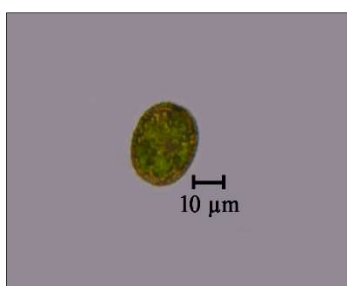
Cell breadth - 23µm

Comments:

Cell elliptical, collar 4µm high, posterior end conical and caudate.

212. *Trachelomonas dybwoskii* Drezepolski ex Deflandre

Prescott, 1982. p. 412, pl. 83, fig.21

**Dimensions:**

Cell length - 25µm

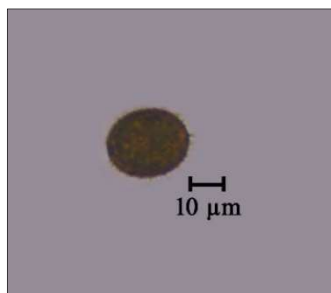
Cell breadth - 19µm

Comments:

Cell elliptical, flagellum opening without a collar, wall smooth.

213. *Trachelomonas globularis* f. *Globularis* Lemmermann

Wolowski, 1998. p.49, fig. 176

**Dimensions:**

Cell length - 19µm

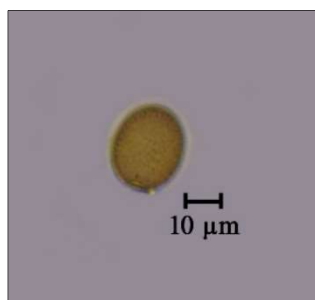
Cell breadth - 25µm

Comments:

Cell globular, covered with short thick spines, reddish brown.

214. *Trachelomonas granulosa* Playfair

Philipose, 1988. p.357, fig. 31a

**Dimensions:**

Cell length - 20µm

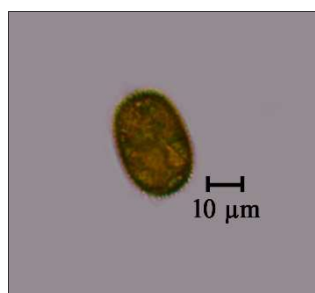
Cell breadth - 25µm

Comments:

Cell ellipsoid with densely crowded granulations, depressed collar, reddish brown.

215. *Trachelomonas hispida* (Perty) Stein

Philipose, 1988. p.344, fig. 8a

**Dimensions:**

Cell length - 15µm

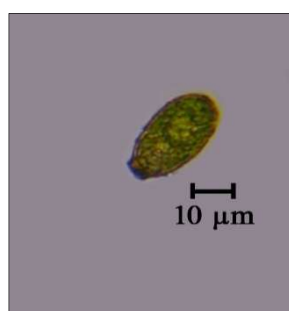
Cell breadth - 24µm

Comments:

Cell ellipsoid, covered with short spines, very much depressed collar with few spines, reddish brown.

216. *Trachelomonas lacustris* Drezepolski

Prescott, 1982. p. 415, pl. 83, fig. 15

**Dimensions:**

Cell length - 27µm

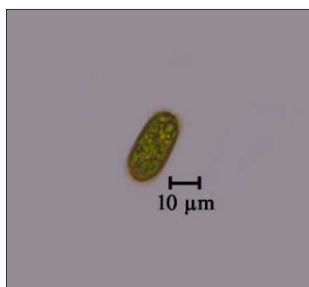
Cell breadth - 12µm

Comments:

Cell cylindrical, flagellum aperture without collar, slightly raised rim, wall punctate, golden yellow brown.

217. *Trachelomonas klebsii* Deflandre

Wolowski, 1998. p.54, fig. 181

**Dimensions:**

Cell length - 26μm

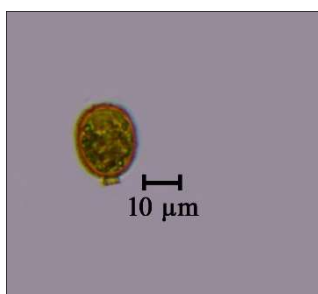
Cell breadth - 13μm

Comments:

Cell cylindrical, covered with short spines, cylindrical, covered with short spines, without collar, yellowish brown.

218. *Trachelomonas planctonica* f. *ornata* Skvortzov

Wolowski, 1998. p.62, fig. 199

**Dimensions:**

Cell length - 23μm

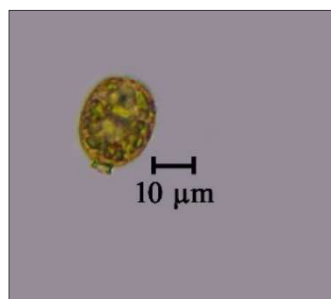
Cell breadth - 15μm

Comments:

Cell elliptical covered with spores, collar with irregular rim.

219. *Trachelomonas planctonica* f. *Planctonica* Swirenko

Wolowski, 1998. p.62, fig. 197

**Dimensions:**

Cell length - 22μm

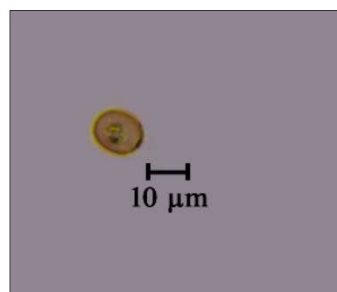
Cell breadth - 16μm

Comments:

Cell elliptical covered with spores and granules, reddish brown in colour with dentate collar.

220. *Trachelomonas oblonga* var. *minor* (Playfair) Taskin & Alp

Prescott, 1951. p. 416, pl. 83, fig. 24

**Dimensions:**

Cell length - 12μm

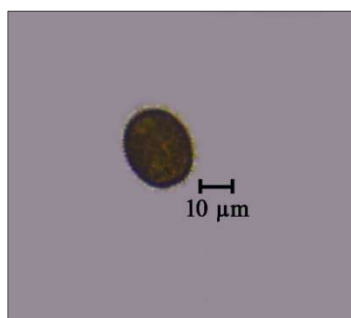
Cell breadth - 10μm

Comments:

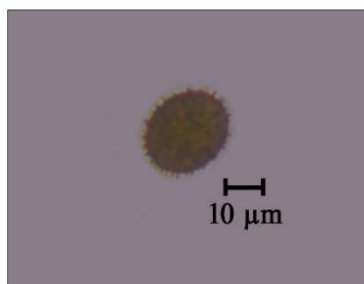
Cell elliptic, flagellum aperture without a collar, wall brown, smooth.

221. *Trachelomonas robusta* Svirenko

Prescott, 1951. p. 416, pl. 83, fig. 29

**Dimensions:**Cell length - 23 μ mCell breadth - 18 μ m**Comments:**

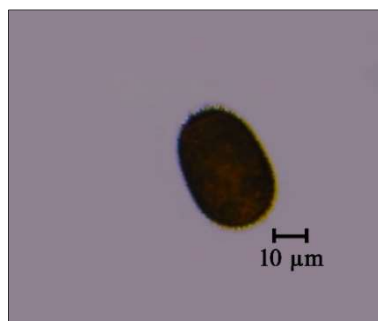
Cell oval without collar, sharp spines throughout the surface.

222. *Trachelomonas* sp.1**Dimensions:**Cell length - 26 μ mCell breadth - 20 μ m**Comments:**

Cell oval with short collar, small, pointed spines interspersed throughout the surface.

223. *Trachelomonas superba* var. *duplex* Deflandre

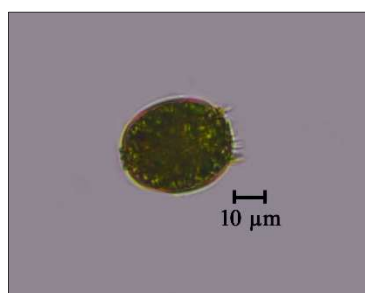
Prescott, 1951. p. 417, pl. 84, fig. 11

**Dimensions:**Cell length - 37 μ mCell breadth - 28 μ m**Comments:**

Cell oval with spines throughout the surface.

224. *Trachelomonas superba* var. *Swirenkiana* Deflandre

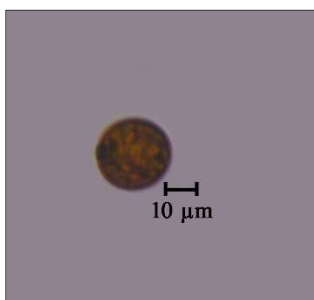
Prescott, 1951. p. 418, pl. 83, fig. 34

**Dimensions:**Cell length - 40 μ mCell breadth - 30 μ m**Comments:**

Cell globose, ring like collar, posterior with longer and stouter spines.

225. *Trachelomonas varians* Deflandre

Philipose, 1988. p.330, fig. 73

**Dimensions:**

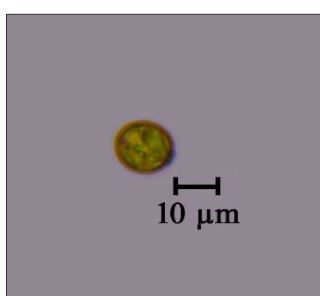
Cell length - 24μm

Comments:

Cell spherical, smooth and dark reddish brown, pore 3μm.

226. *Trachelomonas volvocina* (Ehr.) Ehrenberg

Prescott, 1982. p. 419, pl. 83, fig. 1

**Dimensions:**

Cell length - 12μm

Comments:

Cell with depressed collar, wall smooth, yellowish brown, pore 1.5μm.

227. *Trachelomonas volvocinopsis* Svirenko

Wolowski, 1998. p.48, fig. 173

**Dimensions:**

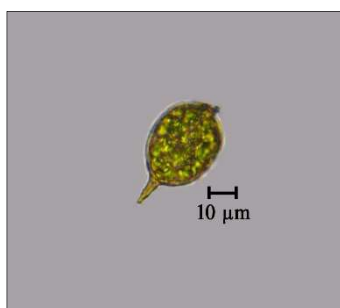
Cell length - 16μm

Comments:

Cell wall smooth and brown, many chromatophores.

Genus: ***STROMBOMONAS*** Deflandre**228. *Strombomonas fluviatilis*** (Lemm.) Defl.

Islam and Irfanullah, 2005a. pl. 3, fig. 44

**Dimensions:**

Cell length - 43μm

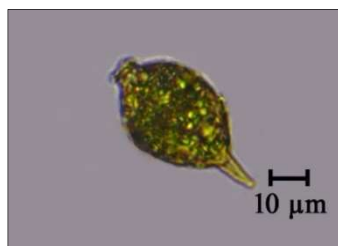
Cell breadth - 25μm

Comments:

Cell with tail, lorica light brown colour.

229. *Strombomonas girardiana* (Playf.) Defl.

Philipose, 1988. p.379, fig. 53

**Dimensions:**

Cell length - 42μm

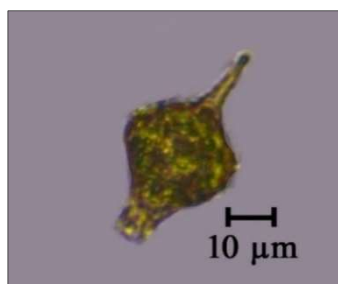
Cell breadth - 23μm

Comments:

Cell light brown colour, tail short.

230. *Strombomonas gibberosa* (Playf.) Defl.

Philipose, 1988. p.385, fig. 62b

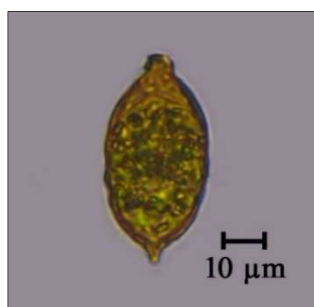
**Dimensions:**

Cell length - 48μm

Cell breadth - 25μm

Comments:

Cell rhomboid with median angular, lorica light brown colour.

231. *Strombomonas* sp.1**Dimensions:**

Cell length - 50μm

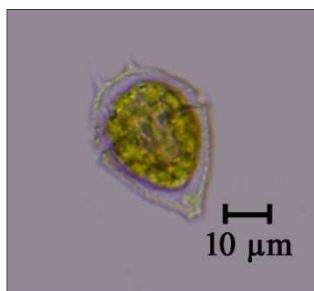
Cell breadth - 25μm

Comments:

Cell rhomboid, posterior end with short cauda, lorica light brown colour.

Division : **Pyrrhophyta**Class : **Dinophyceae**Order : **Peridinales**Family : **Glenodiniaceae**Genus: ***PERIDINIOPSIS*** (Ehrenberg.) Stein**232. *Peridiniopsis quadridens* (Stein) Bourrelly**

Prescott, 1982. p. 430, pl. 90, fig. 19

**Dimensions:**

Cell length - 32μm

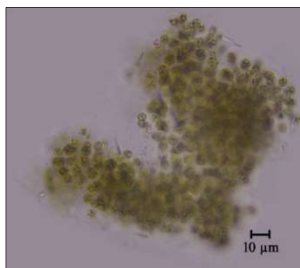
Cell breadth - 25μm

Comments:

Cells ovate, hypocone rounded with 2 short sharp spines, transverse furrow which equally dividing the cell.

Division : **Cyanophyta**
 Class : **Cyanophyceae**
 Order : **Chroococcales** wettstein
 Family : **Chroococcaceae** naegeli
 Genus: **MICROCYSTIS** Kuetzing

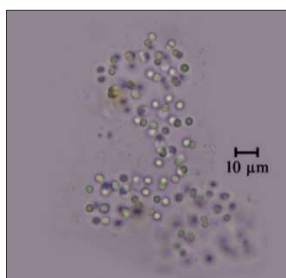
233. *Microcystis aeruginosa* (Kützing) Kützing
 Komarek, 2013. p. 232, fig. 304



Dimensions:
 Cell breadth - 7μm
Comments:
 Cells spherical, colonies with large number of irregularly arranged cells.

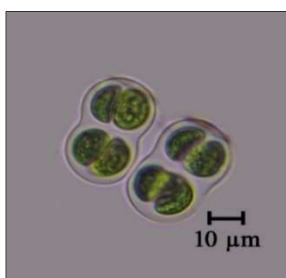
Genus: **CHROOCOCCUS** Nageli

234. *Chroococcus minimus* (Keissler) Lemm.
 Komarek, 2013. p. 286, fig. 371



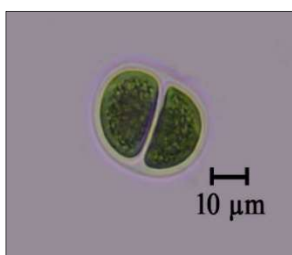
Dimensions:
 Cell breadth - 2μm
Comments:
 Cells spherical, pale blue green, arranged in small groups.

235. *Chroococcus minutus* (Kuetzing) Nag.
 Komarek, 2013. p. 296, fig. 391



Dimensions:
 Cell breadth - 10μm
 Colony length - 30μm
Comments:
 Cells hemispherical, granulate content, colonies enclosed by colourless sheath.

236. *Chroococcus turgidus* (Kuetz.) Nag.
 Komarek, 2013. p. 306, fig. 407

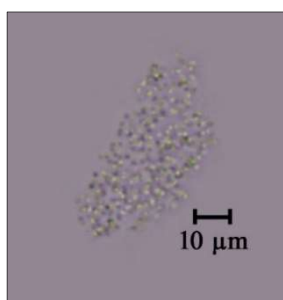


Dimensions:
 Cell length - 12μm
 Colony length - 27μm
Comments:
 Colony of 2 hemispherical cells enclosed by colonial sheath, bright blue green.

Genus: *APHANOCAPSA* Nageli

237. *Aphanocapsa delicatissima* West & west

Komarek, 2013. p. 151, fig. 171



Dimensions:

Cell breadth – 0.8μm

Colony length - 50μm

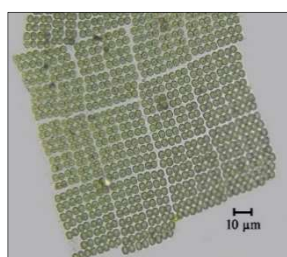
Comments:

Cells spherical, colonies irregular, minute, bluish colour.

Genus: *MERISMOPEDIA* Meyen

238. *Merismopedia elegans* A.Braun ex Kützing

Komarek, 2013. p. 180, fig. 227



Dimensions:

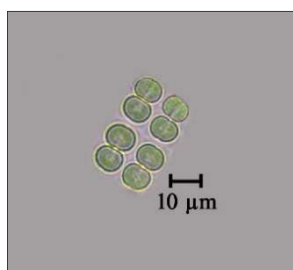
Cell breadth - 5μm

Comments:

Cells spherical, densely arranged, granular content, colonies rectangular.

239. *Merismopedia smithii* De Toni

Prescott, 1982. p. 459, pl. 100, fig. 18



Dimensions:

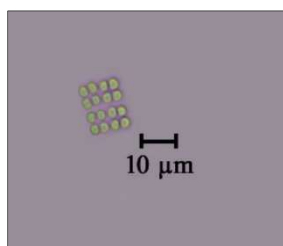
Cell breadth - 9μm

Comments:

Cells spherical, large sized, mucilage distinct.

240. *Merismopedia tenuissima* Lemmermann

Komarek, 2013. p. 174, fig. 219



Dimensions:

Cell breadth - 2μm

Comments:

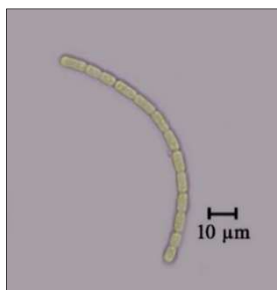
Cells hemispherical, blue green, colonies rectangular, densely packed cells.

Order : **Oscillatoriales**
 Family : **Pseudanabaenaceae**

Genus: **PSEUDANABAENA** Lauterborn

241. Pseudoanabaena galeata Bocher

Komarek, 2013. p. 88, fig. 67



Dimensions:

Cell breadth – 1.2μm

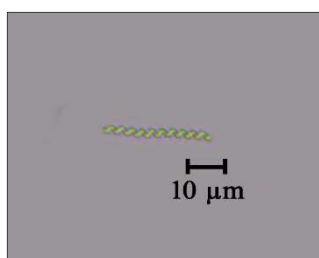
Comments:

Cells cylindrical with rounded ends, connected with cross walls, curved.

Genus: **SPIRULINA** Turpin ex. Gardner

242. Spirulina menengiana Zanardini ex Gomont

Komarek, 2013. p. 148, fig. 173



Dimensions:

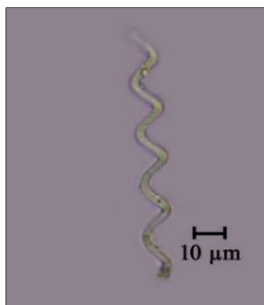
Cell breadth - 1μm

Comments:

Thallus thin, blue green, not constricted at walls.

243. Spirulina subsalsa Oersted ex Gomont

Komarek, 2013. p. 148, fig. 175



Dimensions:

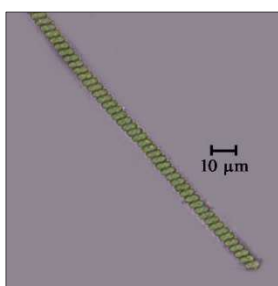
Cell breadth - 3μm

Comments:

Trichomes coiled, not constricted at walls, blue green.

244. Arthrospira fusiformis Komarek et Lund

Komarek, 2013. p. 150, fig. 176



Dimensions:

Cell breadth – 1.2μm

Comments:

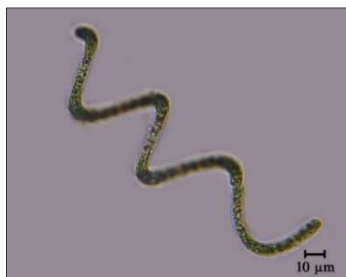
Thallus bright green, densely screw like coiled, not constricted at walls.

Family: **Phormidiaceae**

Genus: *ARTHROSPIRA* Stizenberger

245. *Arthrospira khannae* Drouet et Strickland

Komarek, 2013. p. 347, fig. 482



Dimensions:

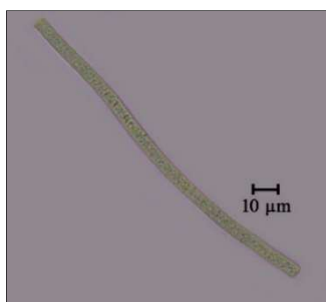
Cell breadth - 3μm

Comments:

Trichomes solitary, free floating, loosely coiled and granulated.

Genus: *PLANKTOTHRIX* Anagnostidis et Komarek

246. *Planktothrix agardhii* Anagnostidis et Komarek



Dimensions:

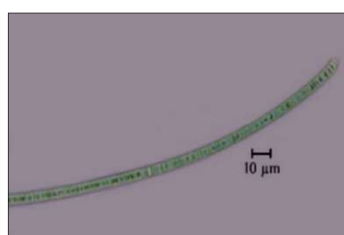
Cell breadth - 6μm

Comments:

Filaments solitary, straight, granulated cross walls.

247. *Planktothrix* sp.

Komarek, 2013. p. 439, fig. 639



Dimensions:

Cell breadth - 5μm

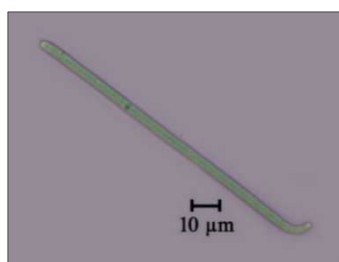
Comments:

Filaments solitary, straight, not constricted at the granulated cross walls, attenuated ends.

Genus: *PHORMIDIUM* Kuetzing

248. *Phormidium irrigum* Anagnostidis et komarek

Komarek, 2013. p. 421, fig. 602



Dimensions:

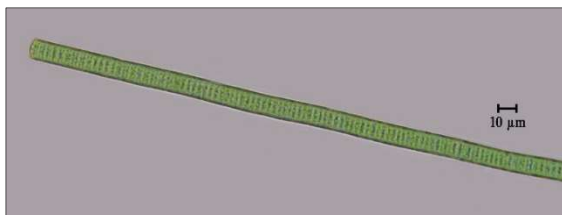
Cell breadth – 4.5μm

Comments:

Filaments solitary, straight, granulated cross walls, attenuated ends.

249. *Phormidium* sp.

Komarek, 2013. p. 593, fig. 886

**Dimensions:**

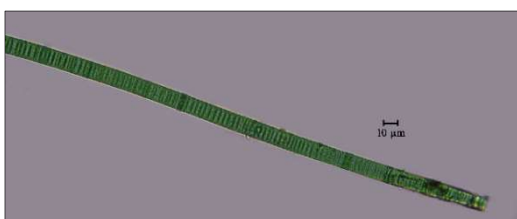
Cell breadth - 10μm

Comments:

Thallus blue green, straight, granulated, not attenuated at ends.

Genus: *OSCILLATORIA* Vaucher**250. *Oscillatoria jenesis* Schmid**

Komarek, 2013. p. 593, fig. 884

**Dimensions:**

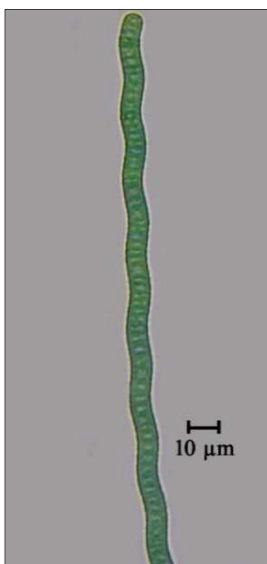
Cell breadth - 8μm

Comments:

Thallus solitary, not constricted, flattened-rounded apical cells.

251. *Oscillatoria limosa* Agardh ex Gomont

Komarek, 2013. p. 599, fig. 902

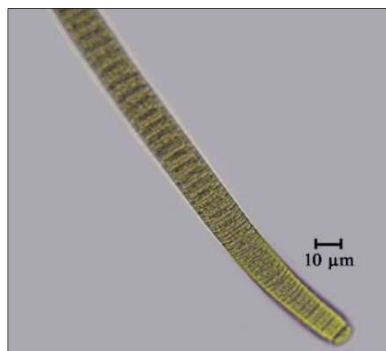
**Dimensions:**

Cell breadth - 7μm

Comments:

Thallus blue green, loosely spirally coiled, not attenuated and capitate at ends.

252. *Oscillatoria princeps* Vaucher ex Gomont
Komarek, 2013. p. 590, fig. 883



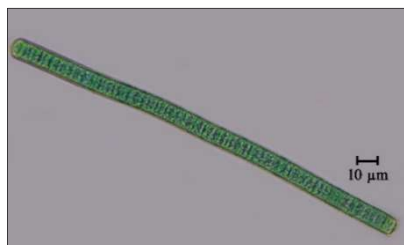
Dimensions:

Cell breadth - 21 μm

Comments:

Thallus straight, long, attenuated at ends, granulated cross walls.

253. *Oscillatoria lutea* Agardh ex Gomont
Komarek, 2013. p. 599, fig. 802



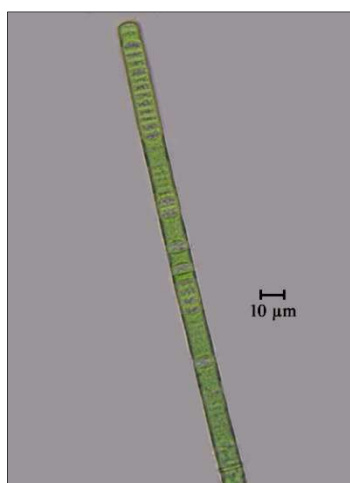
Dimensions:

Cell breadth - 8 μm

Comments:

Filaments solitary, dark blue green, straight, granulated cross walls, not attenuated at the ends

254. *Oscillatoria subbrevis* Schmidle
Komarek, 2013. p. 599, fig. 914



Dimensions:

Cell breadth - 10 μm

Comments:

Thallus straight, granulated cross walls, rounded apical cells.

Family: **Nostocaceae**

Genus: ***DOLICHOSPERMUM*** Hoffmann et Komarek

255. *Dolichospermum perturbatum* (Hill) Wacklin

Komarek, 2013. p. 704, fig. 868



Dimensions:

Cell breadth - 5µm

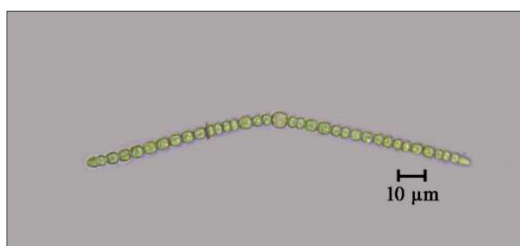
Comments:

Trichomes circular with spirals, granulated, not attenuated at ends.

Genus: ***ANABAENA*** Bory

256. *Anabaena ghosei* Welsh

Komarek, 2013. p. 835, fig. 1061



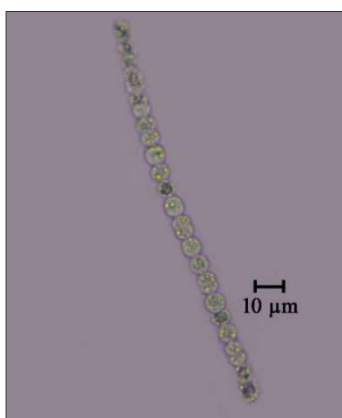
Dimensions:

Cell breadth – 3.5µm

Comments:

Filaments short, constricted at walls, cells barrel shaped, apical cells conical.

257. *Anabaena* sp.



Dimensions:

Cell breadth – 7µm

Comments:

Filaments straight, constricted at walls, granulated and barrel shaped.

4.4 Quantitative analysis of phytoplankton

Station wise and month wise distribution of taxa during the study period was given in tables 5 & 6. Highest number of taxa were recorded from station 7 (353120 cells/L) and lowest at station 10 (31020 cells/L). Month wise highest taxa was recorded in May (217260 cells/L) and lowest in June (25330 cells/L).

Table 5. Monthly distribution of average number of algal taxa from the rivers in Palakkad district

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
1	<i>Achnanthes exigua</i>	2210	0	0	0	40	0	2160	650	0	0	70	120
2	<i>Actinastrum hantzschii</i> var. <i>elongatum</i>	0	1140	0	0	0	210	0	50	0	110	50	0
3	<i>Actinocyclus normanii</i>	80	0	0	320	540	430	4320	70	0	0	80	50
4	<i>Amphora ovalis</i> var. <i>gracilis</i>	440	0	60	0	50	0	0	80	110	0	0	80
5	<i>Anabaena ghosei</i>	40	0	0	0	0	0	80	0	70	90	0	0
6	<i>Anabaena</i> sp.1	0	0	0	0	0	0	0	140	0	0	0	0
7	<i>Ankistrodesmus convolutus</i>	0	0	260	0	0	1100	610	0	0	0	80	40
8	<i>Ankistrodesmus falcatus</i>	150	680	0	0	1310	50	870	0	0	340	70	150
9	<i>Aphanocapsa delicatissima</i>	80	0	0	110	0	0	0	0	540	0	0	670
10	<i>Arthrodesmus curvatus</i> var. <i>latus</i>	0	40	0	720	560	40	0	0	40	40	0	0
11	<i>Arthrospira fusiformis</i>	0	0	60	0	0	0	780	0	0	0	1210	0
12	<i>Arthrospira khannae</i>	0	90	0	0	530	0	0	3420	0	0	0	0
13	<i>Aulacoseira granulata</i>	1120	980	740	60	890	9840	800	7600	70	690	60	560
14	<i>Aulacoseira granulata</i> var. <i>Angustissima</i>	0	100	0	0	540	780	2450	650	420	70	0	80
15	<i>Caloneis permagna</i>	670	80	0	230	870	0	540	0	230	0	160	0
16	<i>Centritractus belanophorus</i>	0	90	870	110	0	210	160	100	0	0	40	0
17	<i>Chroococcus minimus</i>	40	0	70	0	0	230	0	0	0	0	0	0
18	<i>Chroococcus minutus</i>	0	0	0	430	0	0	160	0	0	760	0	0
19	<i>Chroococcus turgidus</i>	0	0	450	0	0	0	0	6530	0	780	920	0

Sl. No	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
20	<i>Closterium diana</i> . var. <i>minus</i>	650	200	0	1230	520	0	640	80	0	170	50	90
21	<i>Closterium ehrenbergii</i>	560	0	120	790	0	0	0	400	0	40	190	0
22	<i>Closterium kuetzingii</i>	400	0	0	1370	0	370	0	0	40	60	120	160
23	<i>Closterium lagoense</i>	0	0	450	0	310	0	0	60	310	0	0	80
24	<i>Closterium moniliferum</i>	450	670	0	320	0	600	170	0	120	80	100	0
25	<i>Closterium navicula</i>	40	0	120	0	0	0	0	0	0	0	0	0
26	<i>Closterium peracerosum</i>	0	0	70	0	310	140	0	90	240	300	0	0
27	<i>Cocconeis placentula</i>	0	0	620	120	360	750	680	0	310	80	0	280
28	<i>Coelastrum microporum</i>	0	40	80	110	0	0	110	80	40	0	340	40
29	<i>Coelastrum proboscideum</i>	60	0	0	130	620	0	0	80	0	0	70	290
30	<i>Coelastrum sphaericum</i>	610	50	0	0	780	0	540	0	540	120	0	50
31	<i>Cosmarium auriculatum</i>	0	640	0	50	40	420	0	110	310	0	260	180
32	<i>Cosmarium binum</i>	120	230	80	190	430	240	100	0	380	50	120	80
33	<i>Cosmarium blyttii</i>	430	100	650	0	210	0	860	120	0	160	40	0
34	<i>Cosmarium depressum</i>	120	0	400	310	0	0	80	320	240	0	0	110
35	<i>Cosmarium depressum</i> var. <i>apertum</i>	200	0	0	0	80	100	0	0	0	70	0	0
36	<i>Cosmarium galeritum</i>	0	310	0	100	0	40	0	450	0	0	410	0
37	<i>Cosmarium granatum</i>	220	80	0	340	220	0	310	0	0	0	60	160
38	<i>Cosmarium granatum</i> . var. <i>rotundatum</i>	0	0	120	60	0	0	40	440	230	0	210	0
39	<i>Cosmarium lundellii</i>	40	0	310	0	0	160	0	870	0	90	0	80
40	<i>Cosmarium lundellii</i> var. <i>circulare</i>	70	220	100	0	130	0	0	220	320	0	0	0
41	<i>Cosmarium lundellii</i> var. <i>corruptum</i>	0	0	280	0	0	0	760	40	0	80	0	0
42	<i>Cosmarium maculatum</i> .	110	540	120	0	680	0	0	0	60	0	60	0
43	<i>Cosmarium margaritatum</i> var. <i>sublatum</i>	0	110	0	430	80	0	440	540	80	210	40	0
44	<i>Cosmarium medioscrobiculatum</i> var. <i>egranulatum</i>	0	0	310	0	0	640	0	210	90	0	0	40
45	<i>Cosmarium obsoletum</i>	0	340	0	610	430	340	0	0	0	220	0	60
46	<i>Cosmarium pseudoconnatum</i> .	430	550	0	100	0	430	50	0	50	40	0	60
47	<i>Cosmarium punctulatum</i> var. <i>subpunctulatum</i>	0	0	230	170	330	60	0	0	0	100	60	210
48	<i>Cosmarium quadrifarium</i>	70	4	0	100	0	100	590	820	110	0	40	0
49	<i>Cosmarium quadrum</i>	240	0	310	0	50	80	0	0	0	60	0	40
50	<i>Cosmarium scabrum</i>	100	530	0	0	130	40	640	560	220	0	100	0
51	<i>Cosmarium sexangulare</i> fa. <i>minimum</i>	0	80	90	60	0	0	0	370	0	0	60	120

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
52	<i>Cosmarium subspeciosum</i> var. <i>validius</i>	60	0	520	0	250	410	610	140	0	230	310	0
53	<i>Cosmarium subundulatum</i>	0	500	0	70	0	90	0	0	160	0	880	0
54	<i>Cosmarium turgidum</i>	0	0	210	60	0	0	50	0	120	40	0	0
55	<i>Cyclotella meneghiniana</i>	430	130	0	60	40	420	640	0	730	0	180	60
56	<i>Cyclotella striata</i>	210	180	600	80	4900	460	620	5240	80	100	70	420
57	<i>Cylindrocystis brebissonii</i>	0	0	240	0	0	0	0	0	0	70	0	110
58	<i>Cymbella bengalensis</i>	0	460	0	910	0	780	70	0	230	240	820	0
59	<i>Cymbella hungarica</i> var. <i>sigmata</i>	0	800	0	80	100	40	480	2100	0	0	540	870
60	<i>Cymbella laevis</i>	240	60	800	0	0	650	100	0	0	80	110	0
61	<i>Cymbella tumida</i>	120	620	410	600	80	80	910	90	240	60	40	110
62	<i>Cymbella turgida</i>	580	0	790	160	0	2450	60	3210	0	0	430	650
63	<i>Cymbella ventricosa</i>	0	0	520	0	0	0	0	0	640	0	0	0
64	<i>Dictyosphaerium ehrenbergianum</i>	90	0	0	0	0	0	180	0	0	640	0	0
65	<i>Diploneis ovalis</i>	0	40	0	0	140	0	320	680	0	0	60	0
66	<i>Dolichospermum perturbatum</i>	0	8400	60	0	0	780	1660	0	70	680	0	0
67	<i>Euastrum gayanum</i>	0	180	0	0	0	0	0	0	460	0	0	80
68	<i>Euastrum sinuosum</i>	0	0	640	0	120	0	0	0	0	70	0	110
69	<i>Euastrum spinulosum</i>	40	60	0	0	0	0	100	0	0	80	110	0
70	<i>Euglena acus</i>	120	620	410	0	80	0	110	0	240	0	0	0
71	<i>Euglena acus</i> var. <i>acus</i>	0	0	240	80	0	0	0	740	0	0	250	790
72	<i>Euglena agilis</i>	0	0	580	0	0	0	330	0	0	0	0	0
73	<i>Euglena anabaena</i> var. <i>anabaena</i>	0	0	0	510	0	0	0	0	0	60	360	0
74	<i>Euglena archeoplastidiata</i>	0	190	0	0	0	0	0	0	0	420	0	0
75	<i>Euglena chlamydophora</i>	60	0	0	0	0	480	80	0	80	0	0	0
76	<i>Euglena deses</i> fo. <i>deses</i>	0	0	70	60	0	0	210	0	60	00	0	90
77	<i>Euglena deses</i> fo. <i>intermedia</i>	510	480	0	40	90	60	0	0	0	0	0	80
78	<i>Euglena deses</i> fo. <i>klebsii</i>	0	0	0	0	0	0	0	430	0	0	0	80
79	<i>Euglena etllei</i>	0	250	0	70	0	0	0	0	0	0	70	0
80	<i>Euglena fusca</i>	0	0	190	0	80	330	540	980	510	60	0	0
81	<i>Euglena gracilis</i>	480	0	0	310	0	0	0	280	80	0	60	0
82	<i>Euglena hemichromata</i>	0	0	60	100	0	0	740	580	0	0	250	0
83	<i>Euglena oxyuris</i> Schmarida fo. <i>oxyuris</i>	60	190	0	0	0	330	0	0	80	0	60	0

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
84	<i>Euglena oxyuris</i> var. <i>charkowiensis</i>	0	0	0	480	70	0	120	280	0	60	0	70
85	<i>Euglena oxyuris</i> var. <i>minor</i>	0	460	40	0	0	0	870	740	0	0	50	0
86	<i>Euglena oxyuris</i> var. <i>playfairii</i>	0	0	280	0	0	780	330	0	120	0	60	0
87	<i>Euglena polymorpha</i>	0	200	0	110	0	60	0	570	0	60	0	0
88	<i>Euglena proxima</i>	50	590	120	0	0	0	650	0	30	120	0	0
89	<i>Euglena rustica</i> var. <i>rustica</i>	60	70	0	0	0	80	80	0	580	0	70	0
90	<i>Euglena sanguinea</i>	100	0	90	40	0	40	610	0	60	0	0	90
91	<i>Euglena</i> sp. 1	0	0	0	0	0	60	0	80	0	0	0	0
92	<i>Euglena</i> sp. 2	0	0	0	0	0	0	0	30	0	0	0	0
93	<i>Euglena spirogyra</i>	0	250	0	70	0	0	0	0	0	0	70	0
94	<i>Euglena spirogyra</i> var. <i>spirogyra</i>	0	0	190	0	80	330	80	980	510	60	0	0
95	<i>Euglena splendens</i>	310	0	70	0	0	0	0	880	80	0	60	0
96	<i>Euglena texta</i> var. <i>texta</i>	110	0	40	280	0	0	0	940	0	0	250	90
97	<i>Euglena tripteris</i> var. <i>tripteris</i>	0	60	680	0	0	0	830	0	0	0	0	0
98	<i>Euglena viridis</i> fo. <i>viridis</i>	0	0	0	220	0	0	970	0	0	60	760	0
99	<i>Eunotia lunaris</i>	860	0	0	540	0	1360	80	890	0	980	0	210
100	<i>Fragilaria rumpens</i> var. <i>familiaris</i>	4560	0	790	0	650	430	0	8240	0	0	320	680
101	<i>Fragilaria construens</i> var. <i>venter</i>	2300	480	0	5430	0	690	0	9760	250	0	1460	70
102	<i>Fragilaria intermedia</i>	5790	70	180	430	890	6780	1350	8750	0	0	670	890
103	<i>Peridiniopsis quadridens</i>	0	0	0	0	0	0	160	0	80	0	0	0
104	<i>Golenkinia paucispina</i>	0	250	0	0	0	70	0	40	0	0	0	180
105	<i>Golenkiniopsis minutissima</i>	40	0	0	70	70	0	0	120	70	50	70	0
106	<i>Gomphonema aequatoriale</i>	0	8680	0	0	80	0	0	480	0	70	90	0
107	<i>Gomphonema gracile</i> var. <i>frickei</i>	0	0	0	50	0	60	240	0	430	0	0	890
108	<i>Gomphonema gracile</i> var. <i>intricatiforme</i>	110	0	0	570	0	0	4310	1840	0	70	480	0
109	<i>Gomphonema lacus-rankala</i> var. <i>gracilis</i>	70	180	0	0	60	340	0	7650	330	0	0	0
110	<i>Gomphonema montanum</i> var. <i>acuminatum</i>	0	0	670	190	0	890	0	1480	0	0	0	0
111	<i>Gomphonema parvulum</i>	110	70	0	280	40	340	650	0	70	0	0	0
112	<i>Gomphonema subapicatum</i>	820	90	0	70	0	560	0	7690	80	0	0	90
113	<i>Gyrosigma distortum</i> var. <i>parkeri</i>	0	0	0	80	0	0	120	80	0	0	80	0
114	<i>Gyrosigma kuetzingii</i>	260	0	50	0	50	4800	0	890	0	80	0	70
115	<i>Hantzschia amphioxys</i>	0	410	60	0	230	70	2190	90	0	210	0	0

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
116	<i>Hantzschia amphioxys</i> var. <i>pusilla</i>	580	0	0	0	70	230	400	0	0	80	0	0
117	<i>Hantzschia linearis</i>	0	120	0	0	0	0	0	0	630	0	0	60
118	<i>Lagerheimia ciliata</i>	40	0	90	0	0	0	80	0	0	0	0	0
119	<i>Lepocinclis fusiformis</i>	0	0	110	60	0	0	280	760	0	80	90	0
120	<i>Lepocinclis ovum</i> var. <i>ovum</i>	80	120	0	0	60	230	0	7900	0	0	0	0
121	<i>Lepocinclis playfairiana</i>	0	0	8110	60	0	0	80	60	0	0	50	0
122	<i>Oscillatoria meslinii</i>	0	0	0	0	0	240	0	0	0	0	0	0
123	<i>Merismopedia elegans</i>	210	0	0	530	0	430	0	870	0	0	80	0
124	<i>Merismopedia elegans</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	540	0	0
125	<i>Merismopedia tenuissima</i>	0	0	0	0	80	80	70	0	520	0	0	80
126	<i>Micrasterias foliacea</i>	0	0	540	0	0	0	0	0	0	0	320	0
127	<i>Micrasterias laticeps</i> var. <i>acuminata</i>	60	310	0	0	70	0	100	90	0	0	0	70
128	<i>Micrasterias pinnatifida</i> (Kuetz.) Ralfs	0	0	70	110	0	60	0	0	0	210	0	670
129	<i>Micratinium pusillum</i> var. <i>elegans</i>	60	0	0	0	80	0	0	40	0	0	0	0
130	<i>Microcystis aeruginosa</i>	0	0	710	0	0	0	460	890	0	0	0	0
131	<i>Navicula constans</i> var. <i>symmetrica</i>	0	0	0	800	0	0	60	1630	0	0	320	0
132	<i>Navicula cuspidata</i>	60	570	89	0	110	790	0	4500	640	80	0	470
133	<i>Navicula gracilis</i>	80	0	0	0	0	60	0	240	0	0	80	120
134	<i>Navicula gastrum</i>	0	0	40	0	50	0	960	0	0	830	90	0
135	<i>Navicula lateostrata</i>	0	0	0	0	0	70	0	360	0	120	0	0
136	<i>Navicula mutica</i> var. <i>linearis</i>	50	430	80	50	0	80	0	760	70	0	220	0
137	<i>Navicula pupula</i>	0	0	0	420	130	0	400	640	60	0	0	670
138	<i>Navicula pusilla</i>	0	60	0	260	0	190	0	0	0	880	0	0
139	<i>Navicula pygmaea</i>	100	0	60	0	70	80	0	0	120	0	0	420
140	<i>Neidium productum</i> var. <i>bombayensis</i>	0	0	0	0	0	210	0	0	70	0	0	0
141	<i>Nitzschia apiculata</i>	0	0	210	0	0	0	240	0	0	180	0	340
142	<i>Nitzschia closterium</i>	240	0	230	0	160	690	0	1320	0	140	790	80
143	<i>Nitzschia intermedia</i>	0	250	0	640	80	0	0	7490	980	0	180	1320
144	<i>Nitzschia obtusa</i>	260	780	0	0	3500	0	140	8640	900	0	0	80
145	<i>Nitzschia obtusa</i> var. <i>scalpelliformis</i>	0	0	80	0	0	120	60	0	0	530	610	80
146	<i>Nitzschia philippinarum</i>	0	0	100	0	0	60	0	0	0	0	0	60
147	<i>Nitzschia sublinearis</i>	70	0	650	140	120	90	360	650	60	0	50	130

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
148	<i>Onychonema laeve</i> var. <i>micracanthum</i>	0	620	90	0	0	0	0	490	0	110	0	0
149	<i>Oocystis borgei</i>	0	0	0	130	0	650	410	0	120	0	90	0
150	<i>Oscillatoria limosa</i>	0	450	680	0	0	80	230	0	0	0	0	690
151	<i>Oscillatoria lutea</i>	740	0	0	2100	0	70	0	580	0	0	0	0
152	<i>Oscillatoria princeps</i>	0	330	0	0	0	0	0	0	0	0	0	0
153	<i>Oscillatoria</i> sp.1	110	0	230	80	900	0	910	0	0	0	0	800
154	<i>Pandorina morum</i>	80	210	0	0	50	0	230	2100	40	210	0	790
155	<i>Pandorina morum</i> var. <i>major</i>	0	0	0	70	60	0	320	70	0	0	310	50
156	<i>Pediastrum biradiatum</i>	520	0	250	0	0	330	0	80	0	80	60	0
157	<i>Pediastrum boryanum</i> var. <i>longicorne</i>	0	60	120	0	0	0	540	540	90	60	0	0
158	<i>Pediastrum simplex</i>	0	0	0	70	50	0	0	0	0	0	80	210
159	<i>Pediastrum simplex</i> var. <i>duodenarium</i>	0	140	0	0	0	170	0	280	0	0	80	140
160	<i>Pediastrum tetras</i>	160	80	0	120	0	580	260	0	0	290	0	870
161	<i>Phacus anacoelus</i>	220	0	0	60	90	430	0	310	210	0	0	80
162	<i>Phacus curvicauda</i>	0	0	120	0	70	220	230	0	0	0	0	100
163	<i>Phacus lefevrei</i>	160	60	0	0	0	0	0	230	350	80	50	0
164	<i>Phacus orbicularis</i>	60	0	0	120	0	0	0	70	0	0	0	60
165	<i>Phacus orbicularis</i> fo. <i>communis</i>	0	0	40	0	0	0	190	0	0	0	0	0
166	<i>Phacus orbicularis</i> fo. <i>orbicularis</i>	120	70	0	0	0	140	0	920	0	100	0	230
167	<i>Phacus pseudoswirenkoi</i>	0	0	0	60	0	260	0	170	420	0	40	0
168	<i>Phacus</i> sp.1	0	0	120	0	0	310	0	0	0	0	0	0
169	<i>Phacus</i> sp.2	0	0	0	2300	0	0	0	0	0	0	0	0
170	<i>Phacus splendens</i>	80	120	0	60	130	0	220	430	0	100	0	0
171	<i>Phacus stokesii</i>	160	0	0	0	0	0	0	230	80	0	0	210
172	<i>Phacus tortus</i>	0	40	0	0	0	0	0	190	0	0	60	0
173	<i>Phacus viguieri</i>	0	0	0	0	920	0	0	0	0	40	0	230
174	<i>Phormidium articulatum</i>	0	0	0	0	0	420	0	80	0	0	0	0
175	<i>Phormidium formosum</i>	0	0	590	0	0	0	0	0	0	0	0	0
176	<i>Pinnularia acrosphaeria</i>	0	0	250	560	0	110	0	2270	50	140	190	0
177	<i>Pinnularia divergens</i> var. <i>elliptica</i>	160	0	0	0	170	0	320	0	0	0	0	0
178	<i>Pinnularia interrupta</i> var. <i>minor</i>	0	260	0	0	0	0	0	0	0	110	0	0
179	<i>Pinnularia lundii</i>	0	0	760	0	0	690	0	0	0	0	0	430

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
180	<i>Pinnularia major</i> var. <i>linearis</i>	890	0	0	310	0	0	0	1240	0	0	640	0
181	<i>Pinnularia panhalgarhensis</i>	1450	370	0	0	550	0	2620	0	460	610	0	0
182	<i>Pinnularia stomatophoroides</i> var. <i>ornata</i>	140	0	0	0	0	0	0	0	50	0	0	60
183	<i>Pinnularia termis</i> var. <i>termitiana</i>	0	120	0	0	0	860	0	780	0	0	40	0
184	<i>Planktothrix agardhii</i>	0	0	0	0	690	0	0	2310	0	0	0	0
185	<i>Planktothrix</i> sp. 1	0	0	0	0	0	0	560	0	710	0	0	0
186	<i>Pleodorina sphaerica</i>	0	0	540	0	0	0	0	70	0	320	0	180
187	<i>Pleurosigma elongatum</i> var. <i>karianum</i>	0	0	0	280	0	860	410	0	0	0	230	460
188	<i>Pleurosigma salinarum</i>	790	530	0	0	0	870	0	680	0	90	0	0
189	<i>Pleurotaenium ovatum</i>	0	0	140	0	0	0	0	0	80	0	0	0
190	<i>Pleurotaenium trabecula</i> . var. <i>rectum</i>	0	0	840	0	0	0	0	0	0	0	0	0
191	<i>Pseudoanabaena galeata</i>	0	0	0	0	0	730	0	0	0	0	0	0
192	<i>Rhopalodia gibba</i>	0	430	0	1480	0	2350	0	7680	60	470	0	150
193	<i>Scenedesmus acuminatus</i>	0	0	0	100	210	0	420	0	140	0	340	70
194	<i>Scenedesmus bijugatus</i> var. <i>graevenitzii</i>	120	60	270	0	0	0	0	0	0	0	0	70
195	<i>Scenedesmus carinatus</i>	0	40	0	0	0	0	420	0	0	0	80	0
196	<i>Scenedesmus dimorphus</i>	260	0	0	0	0	0	1360	40	0	50	0	90
197	<i>Scenedesmus longus</i>	0	450	210	40	160	0	0	110	230	190	0	80
198	<i>Scenedesmus perforatus</i>	40	80	0	0	90	420	0	300	140	0	90	290
199	<i>Scenedesmus perforatus</i> var. <i>major</i>	0	420	0	0	0	0	0	0	0	0	0	270
200	<i>Scenedesmus quadricauda</i>	0	670	210	60	80	0	180	810	70	100	0	60
201	<i>Scenedesmus quadricauda</i> var. <i>bicaudatus</i>	0	210	0	0	70	0	0	380	0	0	40	0
202	<i>Scenedesmus quadricauda</i> var. <i>quadrispina</i>	180	0	50	0	0	170	0	190	80	0	70	40
203	<i>Selenastrum gracile</i>	0	80	0	0	60	0	0	0	0	0	0	100
204	<i>Spirulina major</i>	0	0	0	0	0	0	0	0	0	0	450	0
205	<i>Spirulina nordstedtii</i>	0	0	0	0	0	0	0	0	760	0	0	0
206	<i>Staurastrum crenulatum</i>	0	0	40	0	0	0	0	0	80	0	0	0
207	<i>Staurastrum glabrum</i>	60	0	0	80	0	0	120	80	0	70	40	0
208	<i>Staurastrum proboscidium</i>	120	0	0	0	0	70	110	0	70	0	40	0
209	<i>Staurastrum saltans</i> var. <i>polycharax</i>	0	0	0	80	0	0	60	0	0	0	0	120
210	<i>Staurastrum</i> sp. 1	280	0	0	0	70	0	0	40	0	0	240	0
211	<i>Stauroneis anceps</i>	90	260	920	0	790	2480	3360	8740	0	420	460	130

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
212	<i>Stauroneis anceps</i> fo. <i>gracilis</i>	0	0	0	0	340	980	790	0	150	0	0	0
213	<i>Stauroneis phoenicenteron</i> fa. <i>capitata</i>	0	0	180	820	0	0	1360	750	0	160	0	460
214	<i>Stauroneis phoenicenteron</i> fa. <i>producta</i>	0	120	0	0	0	0	0	0	0	0	0	830
215	<i>Strombomonas fluviatilis</i>	90	0	0	08	50	0	240	410	90	0	70	540
216	<i>Strombomonas gibberosa</i>	0	0	0	0	0	0	0	0	0	0	80	160
217	<i>Strombomonas girardiana</i>	0	0	60	0	0	80	0	100	0	80	0	0
218	<i>Strombomonas</i> sp.1	0	0	0	0	0	0	80	0	0	0	0	40
219	<i>Surirella biseriata</i>	40	0	0	1290	0	0	850	2430	410	0	460	80
220	<i>Surirella capronioides</i>	0	820	0	0	0	210	1340	970	80	60	0	230
221	<i>Surirella robusta</i>	140	50	0	990	80	0	1250	830	100	90	60	0
222	<i>Surirella tenera</i> var. <i>ambigua</i>	0	120	70	0	900	780	640	910	800	760	0	930
223	<i>Surirella tenera</i> var. <i>nervosa</i>	0	0	0	530	0	0	90	0	0	0	0	0
224	<i>Synedra acus</i>	890	420	9800	80	6580	80	9610	9930	30	420	1230	40
225	<i>Synedra ulna</i>	590	70	8840	730	70	650	6740	9890	80	1750	970	650
226	<i>Synedra ulna</i> var. <i>subaequalis</i>	0	0	0	120	0	0	0	230	0	0	80	0
227	<i>Tabellaria fenestrata</i>	40	0	0	320	780	0	2130	4320	790	80	0	90
228	<i>Tetraedron gracile</i>	0	80	310	0	60	80	0	0	90	0	240	0
229	<i>Tetraedron proteiforme</i>	0	0	0	0	140	0	0	430	0	0	90	50
230	<i>Tetraedron regulare</i> var. <i>granulata</i>	0	0	0	0	0	700	0	0	0	90	0	0
231	<i>Tetraedron regulare</i> var. <i>minus</i>	0	80	0	0	0	0	150	0	0	0	0	80
232	<i>Tetraedron trigonum</i>	70	0	90	40	0	60	0	120	90	0	60	0
233	<i>Tetraedron trigonum</i> fa. <i>crassum</i>	0	0	0	0	0	0	0	40	0	0	80	0
234	<i>Tetraedron trigonum</i> var. <i>verrucosum</i>	0	180	0	80	40	0	0	0	160	70	0	80
235	<i>Trachelomonas abrupta</i>	0	60	0	130	80	0	40	980	80	840	80	640
236	<i>Trachelomonas armata</i>	60	0	960	450	90	5380	0	1130	0	0	650	980
237	<i>Trachelomonas armata</i> var. <i>longispina</i>	820	70	0	0	0	980	0	0	480	150	0	0
238	<i>Trachelomonas caudata</i> fo. <i>caudata</i>	0	340	0	640	0	540	590	0	0	0	160	60
239	<i>Trachelomonas dybwoskii</i>	0	0	50	0	40	0	630	140	0	0	0	0
240	<i>Trachelomonas globularis</i> fo. <i>globularis</i>	160	0	0	0	0	380	0	0	0	80	0	0
241	<i>Trachelomonas granulosa</i>	0	0	120	0	0	60	0	0	0	0	0	80
242	<i>Trachelomonas hispida</i>	640	70	0	0	0	0	0	6320	580	0	80	0
243	<i>Trachelomonas lacustris</i>	670	0	0	0	50	0	0	670	0	460	0	790

Sl. No.	Taxa	Months											
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
244	<i>Trachelomonas lacustris</i> var. <i>klebsii</i>	0	0	0	860	0	0	0	830	0	0	0	950
245	<i>Trachelomonas planctonica</i> f. <i>ornata</i>	820	0	0	0	0	0	980	0	0	350	0	0
246	<i>Trachelomonas planctonica</i> fo. <i>planctonica</i>	0	840	0	0	0	790	0	0	650	0	0	260
247	<i>Trachelomonas pulcherrima</i> var. <i>minor</i>	0	0	0	0	0	0	40	80	0	0	0	0
248	<i>Trachelomonas robusta</i>	660	0	60	0	80	0	670	980	0	0	80	0
249	<i>Trachelomonas</i> sp.1	0	0	120	0	0	0	0	0	0	0	0	60
250	<i>Trachelomonas superba</i> var. <i>duplex</i>	670	40	0	640	80	940	8790	100	50	0	460	760
251	<i>Trachelomonas superba</i> var. <i>Swirenkiana</i>	0	0	90	70	0	0	1630	240	110	0	520	80
252	<i>Trachelomonas varians</i>	60	80	0	110	0	1380	0	0	0	780	0	200
253	<i>Trachelomonas volvocina</i>	200	70	1120	0	990	3260	0	8700	0	400	0	880
254	<i>Trachelomonas volvocinopsis</i>	140	170	0	0	0	0	100	4320	80	60	0	0
255	<i>Triploceras gracile</i> var. <i>undulatum</i>	0	0	0	0	50	0	0	0	0	460	0	90
256	<i>Xanthidium sexmamillatum</i> var. <i>pulneyense</i>	0	0	0	860	0	0	0	30	0	0	0	50
257	<i>Xanthidium subtrilobum</i> var. <i>inornatum</i>	0	0	0	0	0	0	0	0	450	0	90	0
Total cells/L		43880	45394	56319	40548	39430	76810	96300	217260	25330	27110	26300	32450

Table 6. Spatial distribution of average number of algal taxa from rivers in Palakkad district

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
1	<i>Achnanthes exigua</i>	0	0	0	0	560	90	3200	60	0	0
2	<i>Actinastrum hantzschii</i> var. <i>elongatum</i>	0	0	0	540	0	0	3280	0	0	0
3	<i>Actinocyclus normanii</i>	90	0	50	0	620	0	860	0	0	0
4	<i>Amphora ovalis</i> var. <i>gracilis</i>	0	430	780	0	70	110	0	680	80	0
5	<i>Anabaena ghosei</i>	0	0	0	0	0	100	120	0	0	0
6	<i>Anabaena</i> sp.1	0	310	0	0	0	0	0	0	0	0
7	<i>Ankistrodesmus convolutus</i>	60	0	260	0	0	0	670	80	0	0
8	<i>Ankistrodesmus falcatus</i>	0	0	620	0	0	0	0	0	0	0
9	<i>Aphanocapsa delicatissima</i>	1110	0	0	0	400	0	0	790	0	0
10	<i>Arthrodesmus curvatus</i> var. <i>latus</i>	70	0	0	40	180	40	6790	100	0	0
11	<i>Arthrospira fusiformis</i>	0	0	240	0	0	0	0	0	0	0

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
12	<i>Arthrospira khannae</i>	0	0	0	0	0	0	0	0	500	90
13	<i>Aulacoseira granulata</i>	5480	7640	5380	8750	90	7590	9870	5280	7210	90
14	<i>Aulacoseira granulata</i> var. <i>Angustissima</i>	0	430	690	5670	0	5460	6750	0	0	2370
15	<i>Caloneis permagna</i>	0	60	90	70	0	0	930	140	0	100
16	<i>Centritractus belanophorus</i>	0	0	0	110	320	0	700	0	0	0
17	<i>Chroococcus minimus</i>	0	0	600	0	0	0	0	0	0	0
18	<i>Chroococcus minutus</i>	450	800	0	0	790	900	2310	0	0	0
19	<i>Chroococcus turgidus</i>	900	80	210	0	650	0	500	760	90	0
20	<i>Closterium diana</i> var. <i>minus</i>	100	70	120	0	490	4360	900	700	0	0
21	<i>Closterium ehrenbergii</i>	0	70	600	790	0	0	0	320	0	60
22	<i>Closterium kuetzingii</i>	0	0	0	0	50	0	0	0	0	460
23	<i>Closterium lagoense</i>	0	0	0	650	0	0	0	0	0	100
24	<i>Closterium moniliferum</i>	70	0	80	0	0	870	650	50	0	0
25	<i>Closterium navicula</i>	0	50	0	0	0	600	0	0	0	0
26	<i>Closterium peracerosum</i>	0	0	0	820	0	0	0	0	0	0
27	<i>Cocconeis placentula</i>	70	540	0	0	540	780	6450	80	60	0
28	<i>Coelastrum microporum</i>	0	0	540	0	70	50	0	0	0	410
29	<i>Coelastrum proboscideum</i>	0	190	0	80	0	0	50	110	0	0
30	<i>Coelastrum sphaericum</i>	0	0	0	0	370	0	430	0	0	0
31	<i>Cosmarium auriculatum</i>	350	0	80	0	70	310	0	0	0	0
32	<i>Cosmarium binum</i>	0	570	0	0	0	0	0	420	0	320
33	<i>Cosmarium blyttii</i>	0	0	320	540	80	240	60	90	0	0
34	<i>Cosmarium depressum</i>	570	0	90	760	310	0	320	0	0	0
35	<i>Cosmarium depressum</i> var. <i>apertum</i>	0	4590	0	0	0	560	0	0	0	0
36	<i>Cosmarium galeritum</i>	0	0	0	5780	0	0	0	0	0	0
37	<i>Cosmarium granatum</i>	790	70	0	0	0	0	0	0	40	0
38	<i>Cosmarium granatum</i> var. <i>rotundatum</i>	0	0	0	0	780	620	0	100	0	0
39	<i>Cosmarium lundellii</i>	120	60	2190	0	0	890	900	0	0	90
40	<i>Cosmarium lundellii</i> var. <i>circulare</i>	0	470	0	540	0	0	80	0	0	0
41	<i>Cosmarium lundellii</i> var. <i>corruptum</i>	760	0	0	0	0	600	470	70	0	0
42	<i>Cosmarium maculatum</i>	0	0	590	0	0	0	0	0	0	0
43	<i>Cosmarium margaritatum</i> var. <i>sublatum</i>	110	0	70	0	610	0	0	0	0	0

Sl. No	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
44	<i>Cosmarium medioscrobiculatum</i> var. <i>egranulatum</i>	0	0	0	0	0	0	5420	310	0	0
45	<i>Cosmarium obsoletum</i>	0	120	0	320	0	0	0	0	0	0
46	<i>Cosmarium pseudoconnatum</i> .	90	650	0	0	790	0	2180	0	80	0
47	<i>Cosmarium punctulatum</i> var. <i>subpunctulatum</i>	0	70	0	540	0	0	0	70	0	0
48	<i>Cosmarium quadrifarium</i>	30	200	0	0	70	760	0	1250	100	0
49	<i>Cosmarium quadrum</i>	2500	0	450	0	0	90	5360	0	0	200
50	<i>Cosmarium scabrum</i>	0	60	90	0	0	0	0	360	0	0
51	<i>Cosmarium sexangulare</i> fa. <i>minimum</i>	80	0	0	0	600	650	0	280	0	0
52	<i>Cosmarium subspeciosum</i> var. <i>validius</i>	60	0	70	410	0	0	0	0	210	0
53	<i>Cosmarium subundulatum</i>	130	0	0	890	0	430	0	0	0	0
54	<i>Cosmarium turgidum</i>	0	430	0	60	0	0	6450	0	0	0
55	<i>Cyclotella meneghiniana</i>	560	580	5470	4670	7620	90	9870	870	890	70
56	<i>Cyclotella striata</i>	230	4350	80	700	80	7690	6890	6540	760	700
57	<i>Cylindrocystis brebissonii</i>	0	0	0	0	0	0	460	0	0	0
58	<i>Cymbella bengalensis</i>	3290	0	720	480	0	0	0	0	0	0
59	<i>Cymbella hungarica</i> var. <i>sigmata</i>	0	70	0	0	790	670	430	640	0	0
60	<i>Cymbella laevis</i>	570	0	870	970	0	0	70	0	750	0
61	<i>Cymbella tumida</i>	0	1680	0	0	640	7200	8640	860	170	810
62	<i>Cymbella turgida</i>	6540	870	2990	4310	0	2580	6780	0	0	90
63	<i>Cymbella ventricosa</i>	80	0	60	0	800	0	0	640	0	3140
64	<i>Dictyosphaerium ehrenbergianum</i>	0	0	0	60	0	0	750	80	0	0
65	<i>Diploneis ovalis</i>	80	1360	0	0	920	110	900	820	0	0
66	<i>Dolichospermum perturbatum</i>	0	0	600	0	0	0	0	0	0	0
67	<i>Euastrum gayanum</i>	0	0	0	0	0	60	0	0	0	0
68	<i>Euastrum sinuosum</i>	0	0	410	0	210	530	0	0	0	190
69	<i>Euastrum spinulosum</i>	0	540	0	320	0	740	590	140	0	0
70	<i>Euglena acus</i>	60	0	0	0	700	8790	6780	0	0	0
71	<i>Euglena acus</i> var. <i>acus</i>	0	0	7890	0	0	0	870	0	0	0
72	<i>Euglena agilis</i>	0	0	0	670	0	310	0	600	70	0
73	<i>Euglena anabaena</i> var. <i>anabaena</i>	0	50	0	0	80	80	0	0	0	0
74	<i>Euglena archeoplastidiata</i>	0	0	640	0	0	4390	4560	0	0	0
75	<i>Euglena chlamydotheca</i>	120	0	0	8540	710	110	650	80	0	0

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
76	<i>Euglena deses</i> fo. <i>deses</i>	0	0	0	2470	0	0	0	0	0	420
77	<i>Euglena deses</i> fo. <i>intermedia</i>	0	430	0	2130	0	0	0	0	0	0
78	<i>Euglena deses</i> fo. <i>klebsii</i>	650	0	740	0	90	5390	430	0	0	0
79	<i>Euglena ettlia</i>	0	70	0	5310	0	4320	0	410	0	0
80	<i>Euglena fusca</i>	0	0	70	410	80	0	7650	0	0	0
81	<i>Euglena gracilis</i>	310	0	0	0	0	0	700	0	0	0
82	<i>Euglena hemichromata</i>	610	0	0	0	100	80	0	0	0	0
83	<i>Euglena oxyuris</i> fo. <i>oxyuris</i>	0	0	0	60	0	0	600	140	0	0
84	<i>Euglena oxyuris</i> var. <i>charkowiensis</i>	0	3480	690	4360	0	740	4260	0	0	50
85	<i>Euglena oxyuris</i> var. <i>minor</i>	810	0	0	0	540	0	0	0	0	0
86	<i>Euglena oxyuris</i> var. <i>playfairii</i>	0	0	150	530	8320	0	0	870	0	0
87	<i>Euglena polymorpha</i>	0	0	0	410	0	1170	6580	0	0	0
88	<i>Euglena proxima</i>	3210	50	230	70	2750	8310	90	50	40	170
89	<i>Euglena rustica</i> var. <i>rustica</i>	0	80	0	0	0	0	800	0	0	0
90	<i>Euglena sanguinea</i>	0	0	90	480	0	580	0	0	0	0
91	<i>Euglena</i> sp. 1	60	0	0	90	0	0	130	0	0	0
92	<i>Euglena</i> sp. 2	0	600	0	0	0	0	0	500	70	0
93	<i>Euglena spirogyra</i>	100	0	3280	790	0	0	7880	0	0	0
94	<i>Euglena spirogyra</i> var. <i>spirogyra</i>	0	610	0	0	400	460	6430	0	0	380
95	<i>Euglena splendens</i>	0	90	600	40	0	0	650	60	0	0
96	<i>Euglena texta</i> var. <i>texta</i>	90	0	0	0	310	0	0	0	0	0
97	<i>Euglena tripteris</i> var. <i>tripteris</i>	0	520	0	510	0	0	0	0	0	0
98	<i>Euglena viridis</i> fo. <i>viridis</i>	0	0	0	0	0	0	0	0	0	0
99	<i>Eunotia lunaris</i>	1100	0	0	0	700	90	3490	900	700	90
100	<i>Fragilari rumpens</i> var. <i>familiaris</i>	0	490	6540	0	7320	0	7640	0	600	780
101	<i>Fragilaria construens</i> var. <i>venter</i>	4630	4210	0	4170	0	890	0	690	0	900
102	<i>Fragilaria intermedia</i>	5380	60	980	3210	8650	1450	9760	80	460	790
103	<i>peridiniopsis quadridens</i>	0	0	80	0	650	0	0	0	90	0
104	<i>Golenkinia paucispina</i>	0	240	0	0	0	0	890	0	40	0
105	<i>Golenkiniopsis minutissima</i>	0	120	0	750	80	0	0	0	0	0
106	<i>Gomphonema aequatoriale</i>	520	0	650	640	300	0	500	490	1420	0
107	<i>Gomphonema gracile</i> var. <i>frickei</i>	0	600	0	0	0	0	70	0	00	210

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
108	<i>Gomphonema gracile</i> var. <i>intricatiforme</i>	0	0	0	60	0	790	0	0	260	0
109	<i>Gomphonema lacus-rankala</i> var. <i>gracilis</i>	690	460	0	430	720	0	2670	0	0	0
110	<i>Gomphonema montanum</i> var. <i>acuminatum</i>	80	0	0	110	0	0	800	380	0	0
111	<i>Gomphonema parvulum</i>	0	0	9870	0	100	0	0	0	0	0
112	<i>Gomphonema subapicatum</i>	0	440	0	0	0	4210	870	0	0	0
113	<i>Gyrosigma distortum</i> var. <i>parkeri</i>	810	0	0	50	520	0	690	0	460	120
114	<i>Gyrosigma kuetzingii</i>	650	0	670	0	480	890	0	360	0	0
115	<i>Hantzschia amphioxys</i>	650	70	0	0	60	0	60	0	0	70
116	<i>Hantzschia amphioxys</i> var. <i>pusilla</i>	0	0	580	0	780	2340	0	430	0	0
117	<i>Hantzschia linearis</i>	140	0	0	5210	0	0	5420	0	0	0
118	<i>Lagerheimia ciliata</i>	0	0	0	0	0	70	90	0	0	0
119	<i>Lepocinclis fusiformis</i>	0	670	0	500	160	0	150	310	0	0
120	<i>Lepocinclis ovum</i> var. <i>ovum</i>	60	0	0	0	700	0	0	0	670	0
121	<i>Lepocinclis playfairiana</i>	4210	0	0	0	0	0	0	0	0	0
122	<i>Oscillatoria meslinii</i>	0	2310	90	0	0	670	900	0	0	0
123	<i>Merismopedia elegans</i>	240	110	0	200	0	350	630	0	0	0
124	<i>Merismopedia elegans</i> var. <i>major</i>	0	0	0	0	310	0	0	0	0	0
125	<i>Merismopedia tenuissima</i>	40	90	280	90	0	3110	900	650	80	0
126	<i>Micrasterias foliacea</i>	320	0	0	0	0	0	90	0	0	0
127	<i>Micrasterias laticeps</i> var. <i>acuminata</i>	0	0	120	0	0	0	0	130	0	0
128	<i>Micrasterias pinnatifida</i> (Kuetz.) Ralfs	90	0	0	0	0	0	0	0	0	0
129	<i>Micratinium pusillum</i> var. <i>elegans</i>	0	0	0	0	0	0	4260	0	0	0
130	<i>Microcystis aeruginosa</i>	0	0	0	0	0	0	1000	0	0	210
131	<i>Navicula constans</i> var. <i>symmetrica</i>	0	110	0	0	4680	180	0	0	80	0
132	<i>Navicula cuspidata</i>	670	260	450	640	70	900	6750	780	220	780
133	<i>Navicula gracilis</i>	0	0	0	0	480	0	860	0	0	0
134	<i>Navicula gastrum</i>	0	6450	410	3210	0	0	0	0	60	0
135	<i>Navicula lateostrata</i>	0	0	0	650	0	340	0	0	0	70
136	<i>Navicula mutica</i> var. <i>linearis</i>	650	0	0	0	540	0	0	400	520	430
137	<i>Navicula pupula</i>	0	0	540	890	0	760	760	0	0	0
138	<i>Navicula pusilla</i>	0	0	220	0	0	0	0	0	70	0
139	<i>Navicula pygmaea</i>	0	80	0	760	650	0	0	0	0	870

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
140	<i>Neidium productum</i> var. <i>bombayensis</i>	0	0	0	0	0	0	0	650	0	0
141	<i>Nitzschia apiculata</i>	150	0	800	0	0	110	0	0	0	0
142	<i>Nitzschia closterium</i>	0	180	0	0	0	0	5480	110	750	0
143	<i>Nitzschia intermedia</i>	0	920	6590	670	580	0	0	0	0	0
144	<i>Nitzschia obtusa</i>	680	0	0	0	0	860	9650	0	0	800
145	<i>Nitzschia obtusa</i> var. <i>scalpelliformis</i>	0	0	3220	0	630	0	0	4390	0	0
146	<i>Nitzschia philippinarum</i>	0	90	0	0	0	0	950	0	520	1260
147	<i>Nitzschia sublinearis</i>	170	0	0	0	930	100	0	900	0	140
148	<i>Onychonema laeve</i> var. <i>micracanthum</i>	0	0	0	70	0	90	80	0	0	0
149	<i>Oocystis borgei</i>	0	0	0	60	0	0	610	0	0	0
150	<i>Oscillatoria limosa</i>	0	0	0	0	0	0	0	0	120	0
151	<i>Oscillatoria lutea</i>	500	890	0	3450	0	0	5260	0	0	0
152	<i>Oscillatoria princeps</i>	0	0	600	0	0	0	90	0	700	0
153	<i>Oscillatoria</i> sp.1	0	800	0	0	1670	800	6410	0	0	0
154	<i>Pandorina morum</i>	80	1460	0	0	650	0	0	450	0	100
155	<i>Pandorina morum</i> var. <i>major</i>	0	0	690	300	0	0	0	0	420	0
156	<i>Pediastrum biradiatum</i>	0	310	530	0	0	860	90	0	0	310
157	<i>Pediastrum boryanum</i> var. <i>longicorne</i>	0	0	0	430	410	460	260	0	0	0
158	<i>Pediastrum simplex</i>	580	0	600	0	430	0	0	760	610	0
159	<i>Pediastrum simplex</i> var. <i>duodenarium</i>	90	960	0	640	0	290	620	0	0	0
160	<i>Pediastrum tetras</i>	0	0	560	0	0	0	3650	560	0	0
161	<i>Phacus anacoelus</i>	670	0	0	0	680	0	590	0	150	0
162	<i>Phacus curvicauda</i>	0	0	0	80	0	470	0	0	0	0
163	<i>Phacus lefevrei</i>	460	80	0	0	600	0	0	0	0	60
164	<i>Phacus orbicularis</i>	0	0	0	90	0	60	0	0	0	0
165	<i>Phacus orbicularis</i> fo. <i>communis</i>	0	260	790	100	0	0	810	0	0	0
166	<i>Phacus orbicularis</i> fo. <i>orbicularis</i>	0	0	0	870	0	0	670	750	0	0
167	<i>Phacus pseudoswirenkoi</i>	700	0	0	0	600	0	2150	0	410	0
168	<i>Phacus</i> sp.1	0	0	0	0	0	0	0	0	0	60
179	<i>Phacus</i> sp.2	0	0	0	0	0	200	90	0	0	0
170	<i>Phacus splendens</i>	0	0	1740	0	0	8670	0	860	0	0
171	<i>Phacus stokesii</i>	0	0	0	480	0	910	90	0	0	0

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
172	<i>Phacus tortus</i>	0	60	0	0	80	0	850	0	0	0
173	<i>Phacus viguieri</i>	0	0	630	0	0	0	0	0	0	0
174	<i>Phormidium articulatum</i>	0	0	210	0	80	110	2100	0	0	0
175	<i>Phormidium formosum</i>	0	0	0	0	0	0	0	100	0	0
176	<i>Pinnularia acrosphaeria</i>	1280	0	0	780	650	0	0	570	60	0
177	<i>Pinnularia divergens</i> var. <i>elliptica</i>	0	4310	0	0	0	0	4530	0	0	650
178	<i>Pinnularia interrupta</i> var. <i>minor</i>	0	0	890	0	0	5430	0	0	0	0
179	<i>Pinnularia lundii</i>	100	0	0	4530	800	0	5740	0	340	630
180	<i>Pinnularia major</i> var. <i>linearis</i>	670	0	0	0	0	730	0	3140	420	0
181	<i>Pinnularia panhargarhensis</i>	0	70	4320	0	0	0	0	0	0	0
182	<i>Pinnularia stomatophoroides</i> var. <i>ornata</i>	0	0	0	0	320	640	650	0	0	80
183	<i>Pinnularia termis</i> var. <i>termitiana</i>	0	0	450	0	0	0	0	0	160	0
184	<i>Planktothrix agardhii</i>	0	530	0	0	0	0	80	0	0	0
185	<i>Planktothrix</i> sp. 1	430	0	0	0	0	0	0	0	0	0
186	<i>Pleodorina sphaerica</i>	0	80	0	0	0	0	70	0	0	0
187	<i>Pleurosigma elongatum</i> var. <i>karianum</i>	0	0	0	0	590	0	2540	750	0	0
188	<i>Pleurosigma salinarum</i>	60	290	0	530	0	390	800	0	0	460
189	<i>Pleurotaenium ovatum</i>	0	0	0	0	0	160	80	0	0	0
190	<i>Pleurotaenium trabecula</i> var. <i>rectum</i>	0	0	0	0	0	90	0	0	0	0
191	<i>Pseudoanabaena galeata</i>	0	0	0	400	0	0	0	0	0	0
192	<i>Rhopalodia gibba</i>	0	0	7520	0	6840	0	7510	0	750	0
193	<i>Scenedesmus acuminatus</i>	200	0	0	0	0	360	4680	0	0	0
194	<i>Scenedesmus bijugatus</i> var. <i>graevenitzii</i>	0	690	0	540	40	760	0	0	0	0
195	<i>Scenedesmus carinatus</i>	0	0	650	0	0	60	3260	0	0	90
196	<i>Scenedesmus dimorphus</i>	430	760	0	0	700	0	0	460	0	0
197	<i>Scenedesmus longus</i>	0	0	810	310	0	130	0	0	0	0
198	<i>Scenedesmus perforatus</i>	150	0	50	170	0	0	0	0	0	0
199	<i>Scenedesmus perforatus</i> var. <i>major</i>	0	700	0	0	460	790	4300	0	0	110
200	<i>Scenedesmus quadricauda</i>	160	0	360	690	0	0	3670	300	100	0
201	<i>Scenedesmus quadricauda</i> var. <i>bicaudatus</i>	0	0	0	90	0	400	0	0	0	0
202	<i>Scenedesmus quadricauda</i> var. <i>quadrispina</i>	0	0	430	0	0	0	540	0	0	0
203	<i>Selenastrum gracile</i>	0	40	0	60	0	540	0	0	0	630

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
204	<i>Spirulina major</i>	0	0	0	0	400	0	0	0	0	0
205	<i>Spirulina nordstedtii</i>	120	0	0	0	0	90	870	0	0	0
206	<i>Staurastrum crenulatum</i>	0	320	90	0	450	0	0	140	0	0
207	<i>Staurastrum glabrum</i>	160	0	0	0	0	0	0	0	0	0
208	<i>Staurastrum proboscidium</i>	70	0	0	0	0	520	0	0	0	0
209	<i>Staurastrum saltans</i> var. <i>polycharax</i>	90	0	80	500	0	0	80	890	0	0
210	<i>Staurastrum</i> sp. 1	0	100	0	0	80	0	90	0	0	140
211	<i>Stauroneis anceps</i>	0	0	600	540	650	0	0	650	8610	0
212	<i>Stauroneis anceps</i> fo. <i>gracilis</i>	0	580	0	0	0	680	1450	0	0	480
213	<i>Stauroneis phoenicenteron</i> fa. <i>capitata</i>	570	0	900	560	0	0	2640	0	0	0
214	<i>Stauroneis phoenicenteron</i> fa. <i>producta</i>	0	0	0	0	0	6470	0	0	0	0
215	<i>Strombomonas fluviatilis</i>	0	580	0	0	80	890	630	400	0	0
216	<i>Strombomonas gibberosa</i>	0	0	620	110	0	0	0	0	0	0
217	<i>Strombomonas girardiana</i>	0	0	0	0	0	0	70	60	420	0
218	<i>Strombomonas</i> sp.1	100	0	0	0	0	0	0	0	0	0
219	<i>Surirella biseriata</i>	670	800	0	3670	0	980	0	0	0	100
220	<i>Surirella capronioides</i>	0	0	170	0	750	0	0	0	0	0
221	<i>Surirella robusta</i>	310	890	0	0	860	0	5310	480	310	230
222	<i>Surirella tenera</i> var. <i>ambigua</i>	0	0	0	0	0	1760	870	0	0	90
223	<i>Surirella tenera</i> var. <i>nervosa</i>	170	3470	760	750	0	0	0	0	0	420
224	<i>Synedra acus</i>	1560	0	600	9670	0	900	9560	7860	0	800
225	<i>Synedra ulna</i>	670	6580	9879	80	6580	7460	9980	800	1250	5460
226	<i>Synedra ulna</i> var. <i>subaequalis</i>	0	0	0	5890	0	0	7760	80	890	0
227	<i>Tabellaria fenestrata</i>	560	90	0	900	5430	700	0	0	0	0
228	<i>Tetraedron gracile</i>	0	0	70	0	90	0	600	0	0	0
229	<i>Tetraedron proteiforme</i>	0	700	0	120	0	0	0	0	0	0
230	<i>Tetraedron regulare</i> var. <i>granulata</i>	0	0	0	610	0	140	0	0	0	0
231	<i>Tetraedron regulare</i> var. <i>minus</i>	70	0	0	80	340	0	400	60	0	0
232	<i>Tetraedron trigonum</i>	0	450	380	0	0	590	0	0	0	0
233	<i>Tetraedron trigonum</i> fa. <i>crassum</i>	0	0	0	50	0	0	0	0	50	0
234	<i>Tetraedron trigonum</i> var. <i>verrucosum</i>	0	0	470	0	0	0	70	400	0	0
235	<i>Trachelomonas abrupta</i>	0	80	600	0	70	0	540	0	90	0

Sl. No.	Taxa	Stations									
		1	2	3	4	5	6	7	8	9	10
236	<i>Trachelomonas armata</i>	360	50	80	5480	80	1250	800	4310	60	870
237	<i>Trachelomonas armata</i> var. <i>longispina</i>	0	420	0	0	0	0	0	0	0	620
238	<i>Trachelomonas caudata</i> fo. <i>caudata</i>	0	0	400	0	0	700	0	0	0	0
239	<i>Trachelomonas dybwoskii</i>	0	700	640	0	0	0	750	0	60	0
240	<i>Trachelomonas globularis</i> fo. <i>globularis</i>	570	0	0	0	0	0	0	0	0	0
241	<i>Trachelomonas granulosa</i>	0	0	0	570	4260	650	0	360	0	0
242	<i>Trachelomonas hispida</i>	0	0	0	90	800	640	5430	7000	0	800
243	<i>Trachelomonas lacustris</i>	520	0	600	780	0	0	0	0	120	0
244	<i>Trachelomonas lacustris</i> var. <i>klebsii</i>	0	140	0	0	0	0	7800	0	0	0
245	<i>Trachelomonas planctonica</i> fo. <i>ornata</i>	0	0	0	0	800	430	0	640	0	0
246	<i>Trachelomonas planctonica</i> fo. <i>planctonica</i>	70	0	1130	0	0	890	0	0	0	0
247	<i>Trachelomonas pulcherrima</i> var. <i>minor</i>	0	0	0	150	0	0	3160	0	0	0
248	<i>Trachelomonas robusta</i>	410	70	0	0	560	340	800	0	80	0
249	<i>Trachelomonas</i> sp.1	0	90	0	0	0	0	0	0	0	0
250	<i>Trachelomonas superba</i> var. <i>duplex</i>	0	0	640	1270	0	870	7900	870	0	0
251	<i>Trachelomonas superba</i> var. <i>Swirenkiana</i>	0	0	0	0	7450	0	0	0	0	0
252	<i>Trachelomonas varians</i>	0	1420	0	0	0	0	0	70	0	90
253	<i>Trachelomonas volvocina</i>	0	0	4360	0	0	8750	6740	560	540	0
254	<i>Trachelomonas volvocinopsis</i>	0	690	0	400	0	90	0	0	0	0
255	<i>Triploceras gracile</i> var. <i>undulatum</i>	110	0	0	0	0	0	0	0	0	0
256	<i>Xanthidium sexmamillatum</i> var. <i>pulneyense</i>	0	0	0	0	0	90	0	80	0	0
257	<i>Xanthidium subtrilobum</i> var. <i>inornatum</i>	70	0	0	0	100	0	320	0	0	0
Total cells/L		67180	81860	116859	129500	109170	157830	353120	71460	34840	31020

Figure 11. Graph showing average number of total phytoplankton in different stations (cells/L)

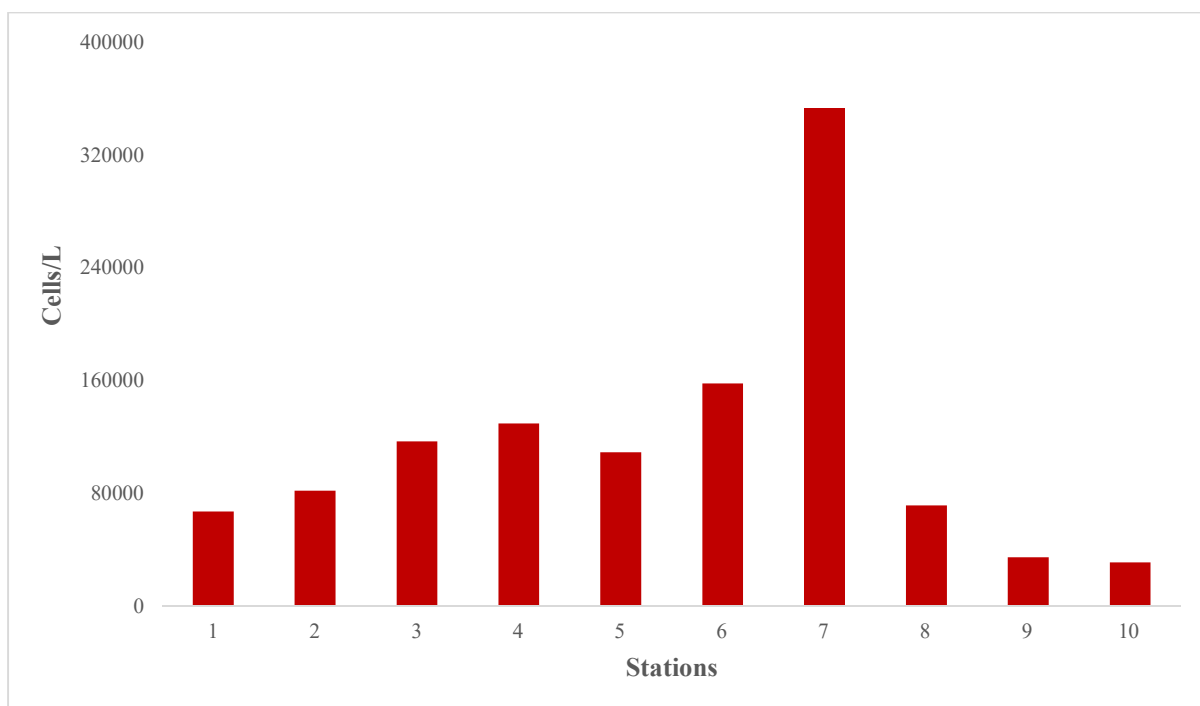


Figure 12. Graph showing average number of total phytoplankton in different months (cells/L)

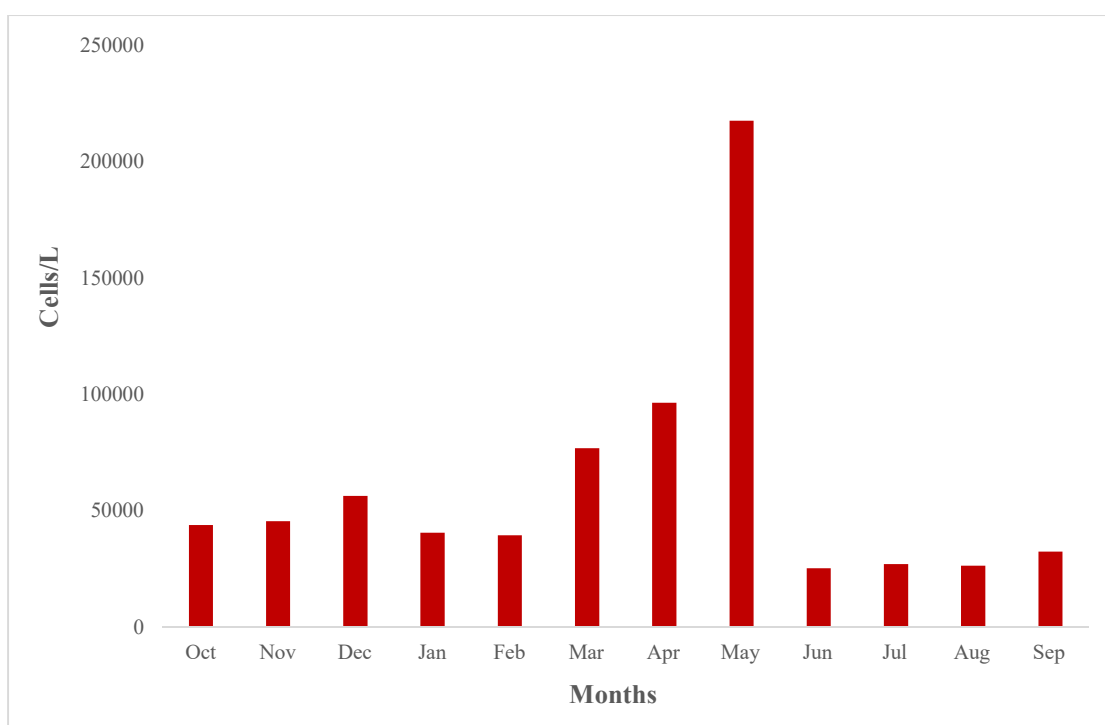


Figure 13. Graph showing spatial distribution of phytoplankton taxa from the study sites

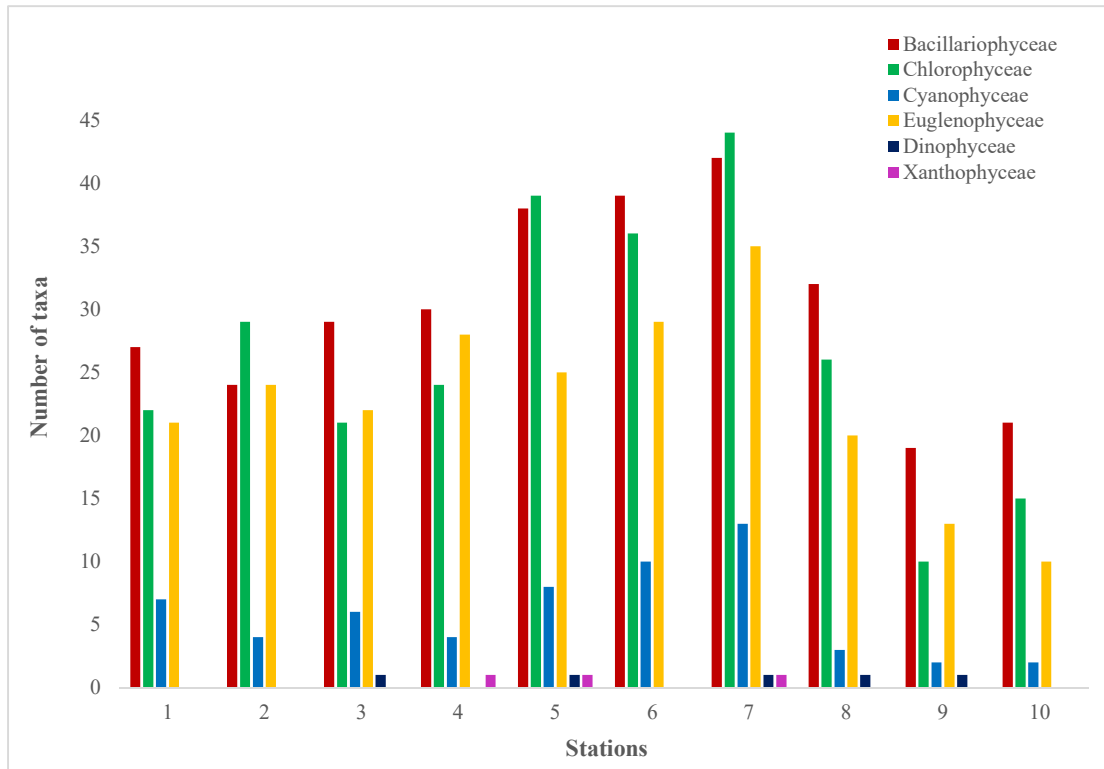


Figure 14. Graph showing spatial distribution of total phytoplankton from the study area

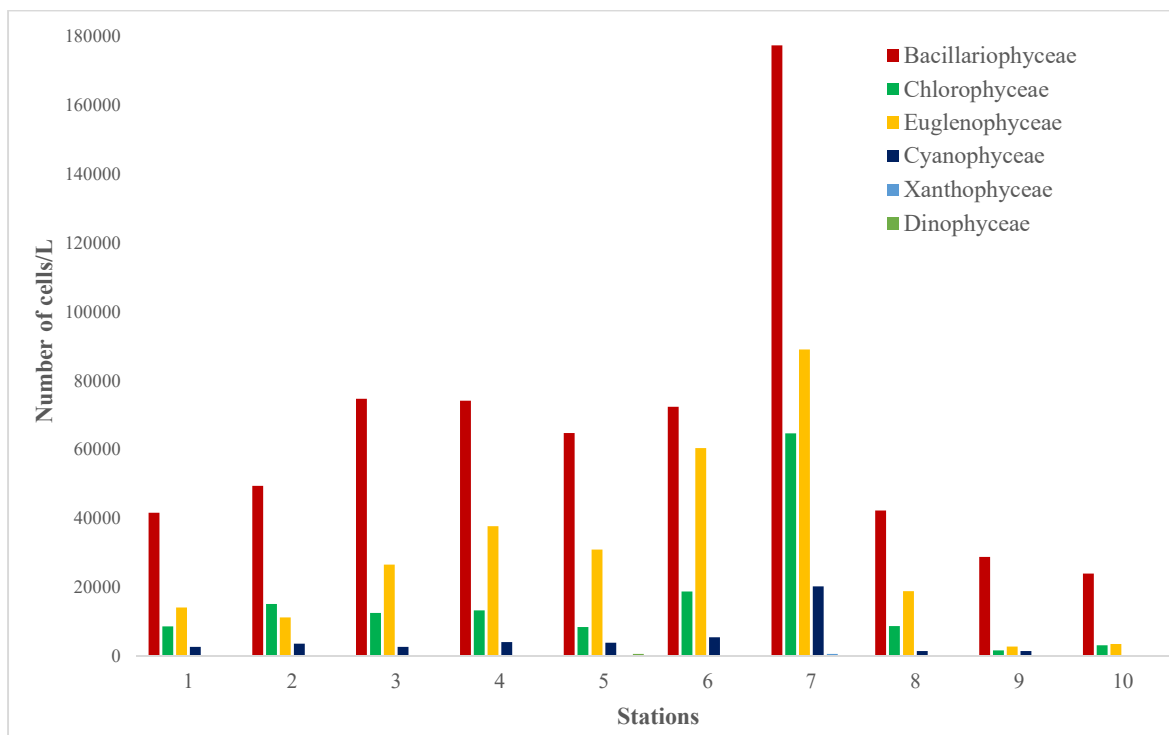


Figure 15. Graph showing monthly distribution of phytoplankton taxa from the study area

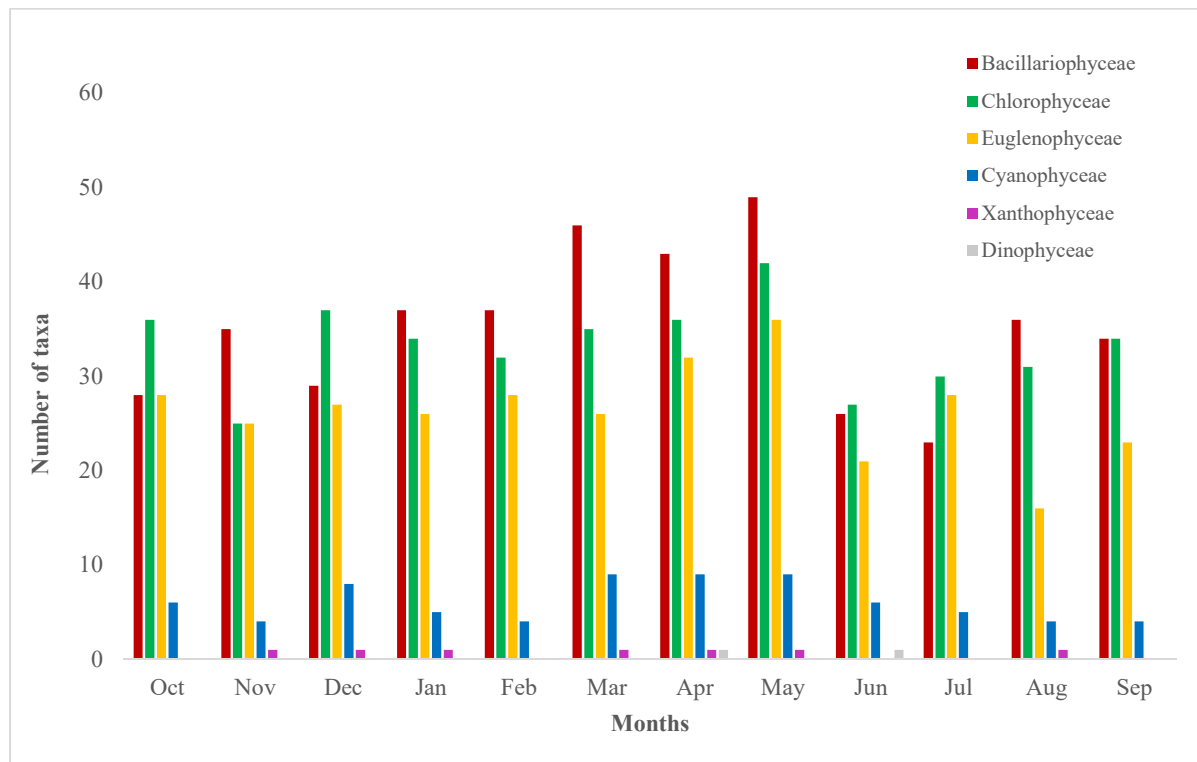


Figure 16. Graph showing monthly distribution of total phytoplankton observed from the study area

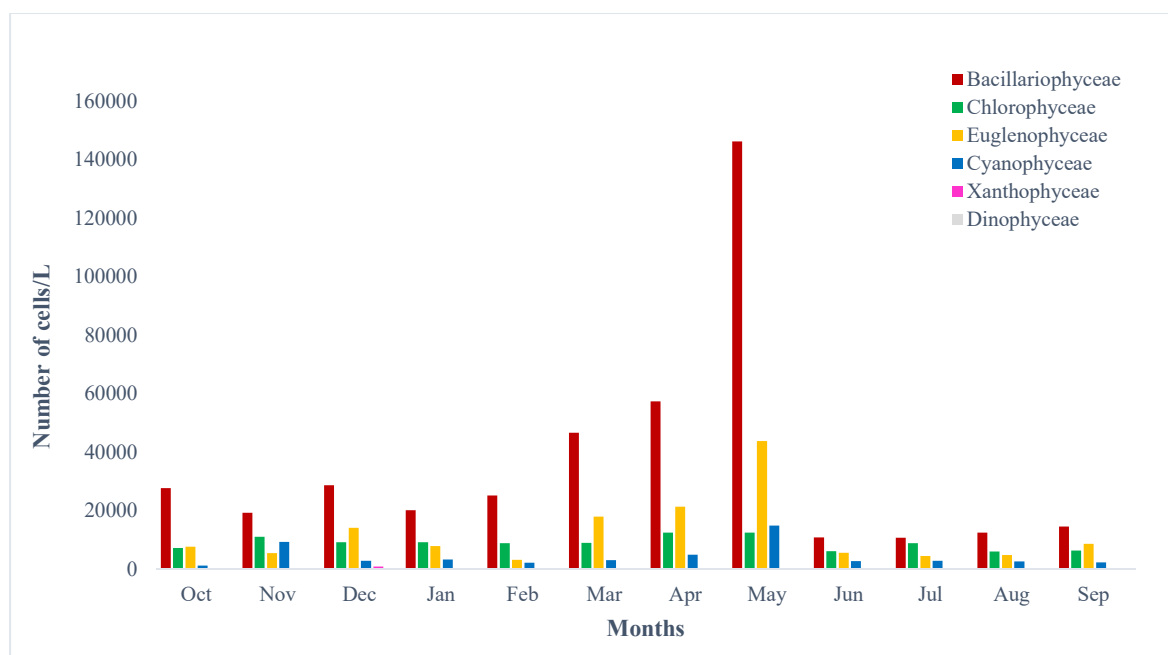


Table 7. Frequent distribution of phytoplankton recorded from the study area

Sl. No.	Name of frequent taxa	Relative frequency
1	<i>Synedra ulna</i>	7.35
2	<i>Aulacoseira granulata</i>	7.35
3	<i>Navicula cuspidata</i>	7.35
4	<i>Fragilaria capucina</i>	7.35
5	<i>Chroococcus turgidus</i>	5.14
6	<i>Cymbella tumida</i>	5.14
7	<i>Euglena polymorpha</i>	4.41
8	<i>Trachelomonas hispida</i>	4.41
9	<i>Euglena acus</i>	3.67
10	<i>Trachelomonas volvocina</i>	3.67

4.5 Community structure

A community of organisms is made up of all the interacting populations of a species that live in a specific area or habitat. Species diversity provides scientific understanding of communities and ecosystems in ecological studies. The species richness, evenness, Shannon and Simpson indices are used to measure biodiversity.

The water quality of the rivers in Palakkad district were analysed with the environmental variables as well as phytoplankton abundance and community structure. Seasonal variations in the composition and abundance of freshwater phytoplankton are influenced by interactions between physical and chemical factors, which are in turn influenced by environmental factors (Reynolds 1984). The changes in water quality are reflected by phytoplankton community structure, distribution patterns, and the proportion of sensitive species (Gharib et al. 2011; Sudeep and Hosmani 2007).

4.5.1 Diversity indices

The species diversity in various stations and months among the phytoplankton were recorded in tables 8 and 9. Number of taxa were obtained higher in May (137) and lowest obtained in July (101). The study reports that the highest taxa recorded at station 7 (135) and lowest at station 9 (57). The Shannon-wiener's diversity index value of the stations study showed comparatively highest value (4.99) during May and lowest value (2.25) in June. Station wise indices found to be high in station 7 (4.3) and low in station 9 (2.96). The highest Simpson diversity were obtained during the month of May (0.98) and least during June and July (0.92). Highest evenness index value was observed in April (0.69) and lowest value in December (0.29). The evenness value were recorded at station 7 was high (0.55) and low (0.34) at station 9. The phytoplankton richness was maximum in May (11.37) and minimum in June (9.16) and also highest richness value was obtained at station 7 (10.49) and lowest at station 9 (5.35).

Table 8. Month wise diversity indices recorded from the study area

Months	Taxa	H	1-D	Evenness	Richness
Jan	105	3.93	0.96	0.48	9.80
Feb	107	3.56	0.96	0.36	9.97
Mar	115	4.85	0.95	0.61	9.81
Apr	120	4.97	0.96	0.69	10.37
May	137	4.99	0.98	0.64	11.37
Jun	104	2.25	0.92	0.47	9.16
Jul	101	2.98	0.92	0.53	9.39
Aug	112	3.18	0.95	0.58	9.51
Sep	120	4.31	0.96	0.61	9.46
Oct	110	3.86	0.97	0.43	10.2
Nov	106	3.59	0.97	0.34	9.79
Dec	104	3.43	0.96	0.29	9.41

Table 9. Station wise diversity indices recorded from the study area

Stations	Taxa	H	1-D	Evenness	Richness
1	97	3.71	0.96	0.42	8.64
2	97	3.69	0.96	0.42	8.49
3	97	3.69	0.95	0.41	8.23
4	101	3.79	0.96	0.44	8.49
5	99	3.68	0.95	0.40	8.45
6	108	3.86	0.96	0.44	8.94
7	135	4.3	0.98	0.55	10.49
8	84	3.59	0.95	0.43	7.43
9	57	2.96	0.88	0.34	5.35
10	58	3.37	0.93	0.51	5.51

4.5.2 Multivariate similarity analysis

The average level of similarity between stations and months in terms of phytoplankton abundance and composition was determined using multivariate similarity analysis, as well as how evenly this similarity is distributed. SIMPER analysis was carried to identify the most contributed stations and months in determining algal class as temporal factor according to Bray-Curtis similarity.

Stations 7, 3, 4, 5 and 6 were contributed more than 69% of the phytoplankton abundance in the study area (Table 10). When comparing all algal classes, the contribution percentage of station 7 was higher (22.71), followed by station 3 (12.54), station 4 (12.48), station 5 (11.3) and station 6 (10.68). Month wise similarity analysis results that high contribution percentage towards the month of May (43.19), followed by April (14.24) and March (12.2). The analysis of the data confirmed that pre monsoon season and station 7 was contributing high percentage to the significant variation in phytoplankton abundance. Analysis of similarity (ANOSYM) within

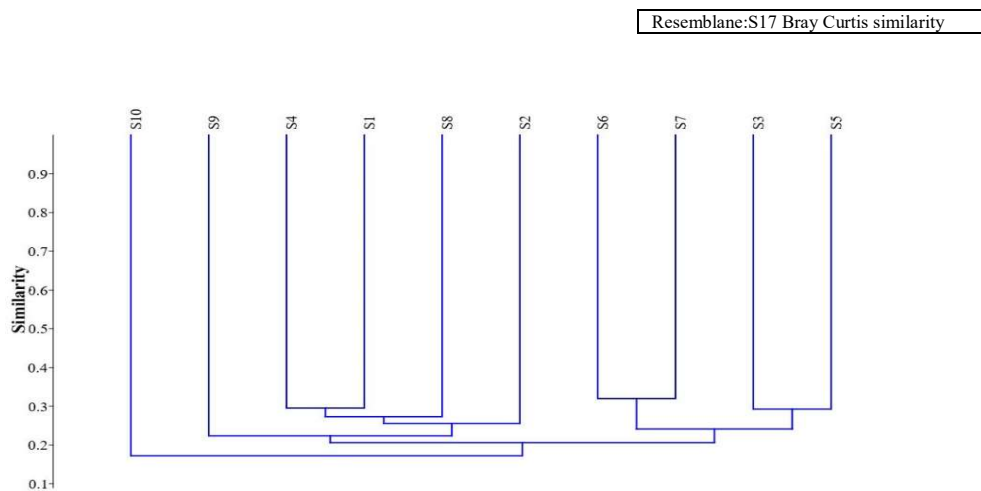
stations and months can be used to determine statistical significance. The results show that phytoplankton distribution differs significantly between stations ($P = 0.002$, $R = 0.91$) and months ($P = 0.001$, $R = 0.82$).

Table 10. data showing the contribution percentage of phytoplankton abundance in different stations and months

Variables	Av. Dissim.	Contrib. %	Cum. %
Stations			
S7	14.05	22.71	22.71
S3	7.76	12.54	35.25
S4	7.72	12.48	47.74
S5	6.99	11.3	59.03
S6	6.61	10.68	69.72
S8	4.42	7.141	76.86
S2	4.19	6.783	83.64
S1	4.11	6.64	90.28
S9	3.27	5.28	95.56
S10	2.75	4.44	100
Months			
May	25.48	43.19	43.19
Apr	8.399	14.24	57.43
Mar	7.195	12.2	69.62
Dec	3.571	6.053	75.67
Oct	3.463	5.87	81.54
Feb	3.126	5.29	86.84
Jan	2.133	3.615	90.46
Sep	1.585	2.69	93.14
Nov	1.563	2.65	95.79
Aug	1.264	2.142	97.94
Jun	0.8359	1.42	99.35
Jul	0.3822	0.65	100

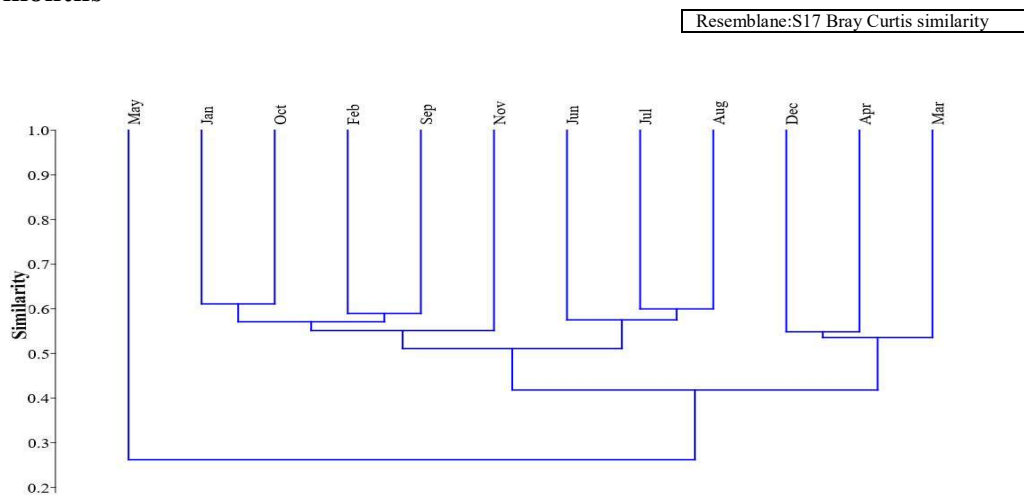
The results of the hierarchical cluster analysis, implemented on the stations and months are presented as a dendrogram that represents the grouping based on the Bray-Curtis similarity matrix values (Figures 17 and 18) formed two distinct groups at 0.223 similarity level. Station 10 forms the outgroup to other stations. The first group comprised four stations (5, 3, 7 and 6). The second group comprised four stations (2, 8, 1 and 4). Station 9 have close similarity with station 10. These two stations are located along the river Bhavani. Cluster analysis revealed that phytoplankton composition in stations 9 and 10 were distinct from that of other stations.

Figure 17. Dendrogram shows the hierarchical cluster analysis in different stations



The month wise cluster analysis based on the Bray-Curtis similarity matrix values (Figure 18) formed two distinct groups at 0.431 similarity level. The month of May represents the outgroup to other months. The first group comprised of three months which were mainly pre monsoon months and the second group comprised of monsoon and post monsoon months. Cluster analysis revealed that the phytoplankton composition in the ecosystem differed from that of the monsoon and post monsoon months.

Figure 18. Dendrogram shows the hierarchical cluster analysis in different months



Canonical Correspondence Analysis (CCA) is a multivariate tool to illuminate the relationships between phytoplankton and their environment, helps to extract environmental gradients from ecological data sets. In the present investigation, the ordination plot has revealed the statistically significant influence of physico chemical parameters on phytoplankton distribution and abundance. Seasonal variations in physico chemical parameters and quantitative assessment of phytoplankton were used as a baseline for CCA analysis. The ordination plot works out the abundance of species based on the score provided by (Chandler 1970). The number of species in a sample set larger than 100 used for the analysis which represents the 'very abundant' level. Table 11 represents the list of taxa separated for CCA analysis. The summary of CCA output in axis 1 and axis 2 given in the figures 19, 20 and 21. Environmental variables are depicted by long arrows and species are given in code words.

Figure 19. CCA plot showing the variation between environmental parameters and phytoplankton in Pre monsoon season

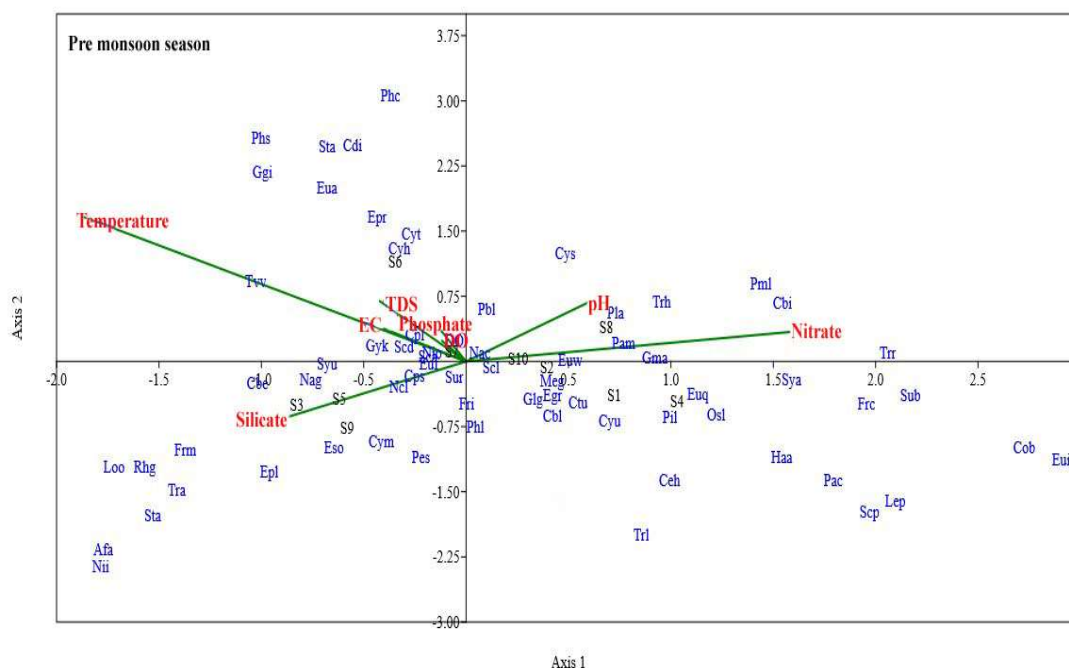


Figure 20. CCA plot showing the variation between environmental parameters and phytoplankton in monsoon season

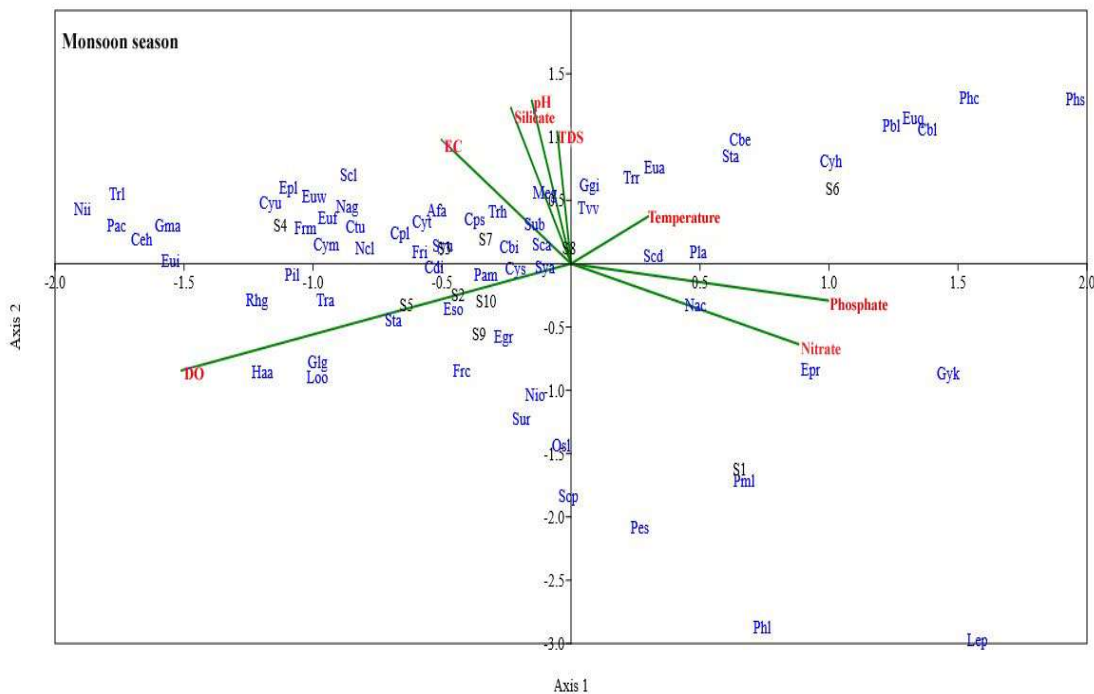


Figure 21. CCA plot showing the variation between environmental parameters and phytoplankton in Post monsoon season

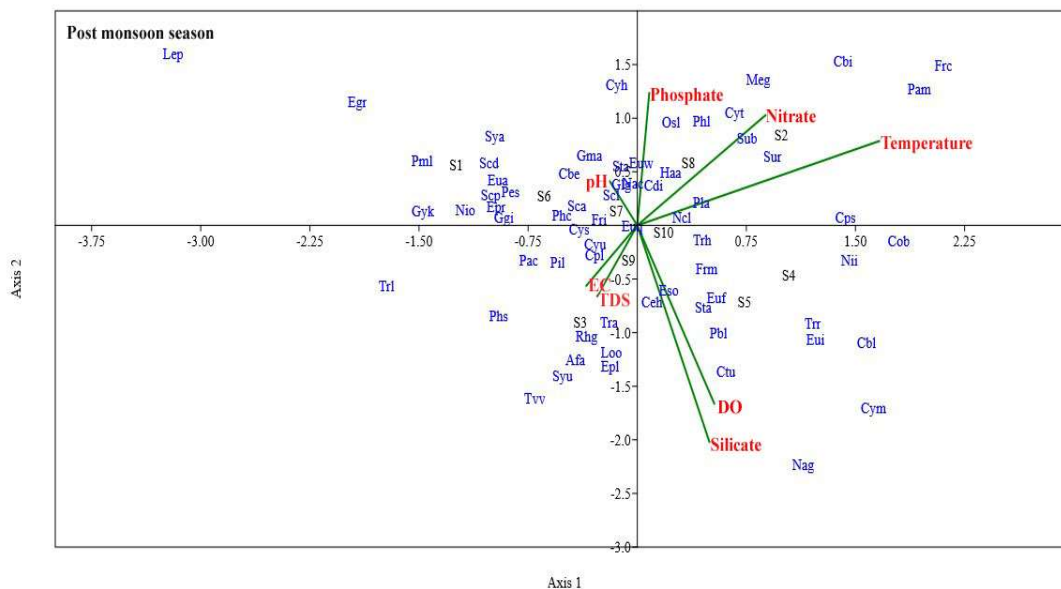


Table 11. List of phytoplankton taxa separated based on CCA axis

Taxa	Acronyms	Taxa	Acronyms
<i>Ankistrodesmus falcatus</i>	Afa	<i>Navicula cuspidata</i>	Nac
<i>Aulacoseira granulata</i>	Meg	<i>Navicula gracilis</i>	Nag
<i>Centrtractus belanophorus</i>	Cbe	<i>Nitzschia closterium</i>	Nac
<i>Chroococcus turgidus</i>	Ctu	<i>Nitzschia intermedia</i>	Nii
<i>Closterium diana. var. minus</i>	Cdi	<i>Nitzschia obtusa</i>	Nio
<i>Closterium ehrenbergii</i>	Ceh	<i>Oscillatoria limosa</i>	Osl
<i>Cosmarium pseudoconnatum</i>	Cps	<i>Pandorina morum</i>	Pam
<i>Cyclotella meneghiniana</i>	Cym	<i>Pediastrum boryanum var. longicorne</i>	Pbl
<i>Cyclotella striata</i>	Cys	<i>Pediastrum simplex</i>	Pes
<i>Cymbella hungarica var. sigmata</i>	Cyh	<i>Phacus curvicauda</i>	Phc
<i>Cymbella tumida</i>	Cyt	<i>Phacus lefevrei</i>	Phl
<i>Cymbella turgida</i>	Cyu	<i>Phacus splendens</i>	Phs
<i>Euglena acus</i>	Eua	<i>Pinnularia lundii</i>	Pil
<i>Euglena deses fo. intermedia</i>	Eui	<i>Pinnularia major var. linearis</i>	Pml
<i>Euglena fusca</i>	Euf	<i>Pleurosigma salinarum</i>	Pla
<i>Euglena gracilis</i>	Egr	<i>Rhopalodia gibba</i>	Rhg
<i>Euglena oxyuris var. charkowiensis</i>	Euw	<i>Scenedesmus acuminatus</i>	Sca
<i>Euglena oxyuris var. minor</i>	Euq	<i>Scenedesmus dimorphus</i>	Scd
<i>Euglena proxima</i>	Epr	<i>Scenedesmus longus</i>	Scl
<i>Euglena spirogyra var. spirogyra</i>	Eso	<i>Scenedesmus perforatus</i>	Scp
<i>Euglena splendens</i>	Epl	<i>Stauroneis anceps</i>	Sta
<i>Fragilari rumpens var. familiaris</i>	Frm	<i>Surirella biseriata</i>	Sub
<i>Fragilaria construens var. venter</i>	Frc	<i>Surirella robusta</i>	Sur
<i>Fragilaria capucina var. vaucheriae</i>	Fri	<i>Surirella tenera var. ambigua</i>	Sta
<i>Gomphonema gracile var. intricatiforme</i>	Ggi	<i>Synedra acus</i>	Sya
<i>Gomphonema lacus-rankala var. gracilis</i>	Glg	<i>Synedra ulna</i>	Syu
<i>Gomphonema montanum var. acuminatum</i>	Gma	<i>Trachelomonas abrupta</i>	Tra
<i>Gyrosigma kuetzingii</i>	Gyk	<i>Trachelomonas armata</i>	Trr
<i>Hantzschia amphioxys</i>	Haa	<i>Trachelomonas hispida</i>	Trh
<i>Lepocinlis ovum var. ovum</i>	Loo	<i>Trachelomonas lacustris</i>	Trl
<i>Lepocinlis playfairiana</i>	Lep	<i>Trachelomonas volvocina</i>	Tvv

4.6 Phytoplankton as pollution indicators

Environmental disturbances induce changes in structure and function of the biological system and nature of water quality. Water pollution indices are commonly used for the evaluation of water quality. Most of our water bodies, including ponds, lakes, rivers, streams, and canals, have become polluted as a result of the discharge of industrial effluents, detergents, agricultural runoff water and domestic sewage. In this study, two indices are taken into consideration of biological information based on phytoplankton Boyd's diversity index and Palmer's pollution index.

Table 12. Boyd's diversity index of phytoplankton score from the study area

Months	No. of genera (S)	Total no. of phytoplankton (N)	Score
January	31	40548	2.82
February	24	39430	2.16
March	25	76810	2.12
April	21	96300	1.65
May	20	217260	1.54
June	44	25330	4.24
July	40	27110	3.81
August	39	26300	3.73
September	41	32450	3.84
October	34	43880	2.08
November	33	45394	2.92
December	32	56319	2.83

> 4 = Less polluted, 2–3 = Moderately polluted, < 1 = Heavily polluted

Table 13. Score of Palmer pollution index of algal genera found in the study area

Phytoplankton	Score	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
<i>Euglena</i>	5	+	-	+	+	+	+	+	-	-	-
<i>Oscillatoria</i>	4	-	-	-	+	+	+	+	-	-	-
<i>Scenedesmus</i>	4	+	-	-	+	+	+	+	-	-	-
<i>Navicula</i>	3	+	-	+	+	+	+	+	-	-	-
<i>Nitzschia</i>	3	-	+	+	+	+	+	+	-	-	-
<i>Ankistrodesmus</i>	2	-	-	-	+	-	-	+	+	-	-
<i>Phacus</i>	2	-	-	-	+	+	+	+	-	-	-
<i>Synedra</i>	2	+	+	+	+	+	+	+	+	+	+
<i>Closterium</i>	1	+	+	+	+	+	+	+	+	-	-
<i>Cyclotella</i>	1	+	+	+	+	+	+	+	+	+	-
<i>Gomphonema</i>	1	+	+	+	+	+	+	+	+	-	-
<i>Lepocinclis</i>	1	+	+	+	-	+	+	+	-	-	-
<i>Aulacoseira</i>	1	+	+	+	+	+	+	+	+	+	+
<i>Micractinium</i>	1	-	-	-	-	-	-	+	-	-	-
<i>Microcystis</i>	1	-	-	-	-	-	-	-	+	-	-
<i>Pandorina</i>	1	-	-	-	-	+	+	+	-	-	-
<i>Phormidium</i>	1	-	-	+	-	+	+	+	-	-	-
Total Score		19	10	19	29	30	30	32	9	4	3