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DEPARTMENT OF WATER AFFAIRS

An aid to the identification of the dominant and commonly occurring genera of algae observed in some South African impoundments.

E. TRUTER

Pediastrum spp.

CLASSIFICATION (Komarek and Fott, 1983

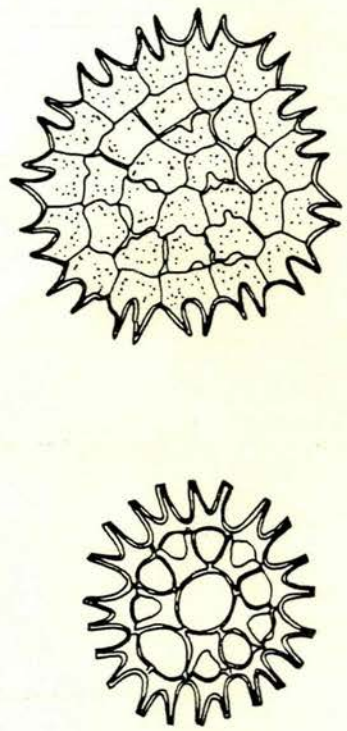
Phylum : Chlorophyta (Green
Class : Chlorophyceae
Order : Chlorococcales
Family : Hydrodictyaceae
Genus : Pediastrum

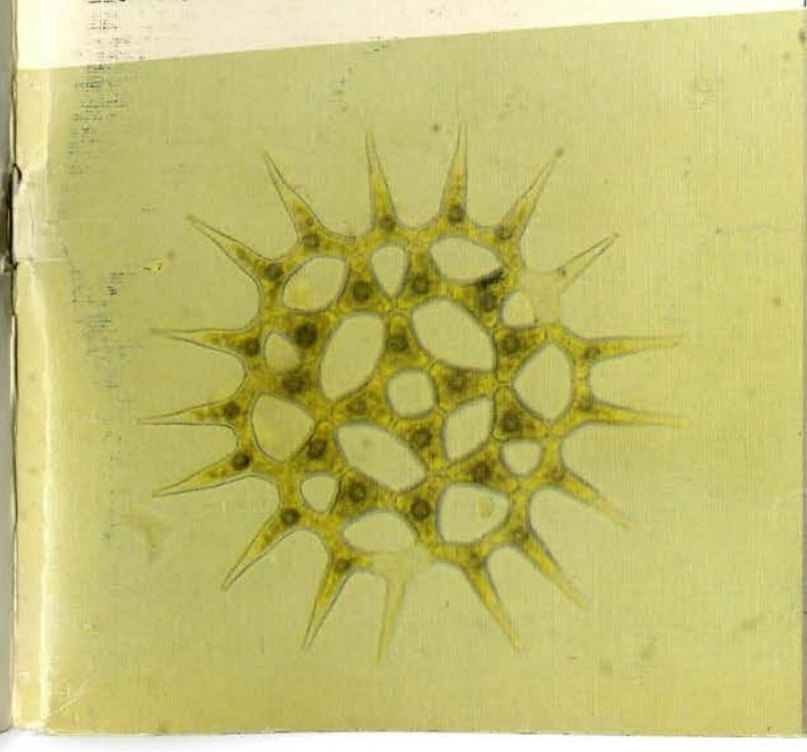
Morphology

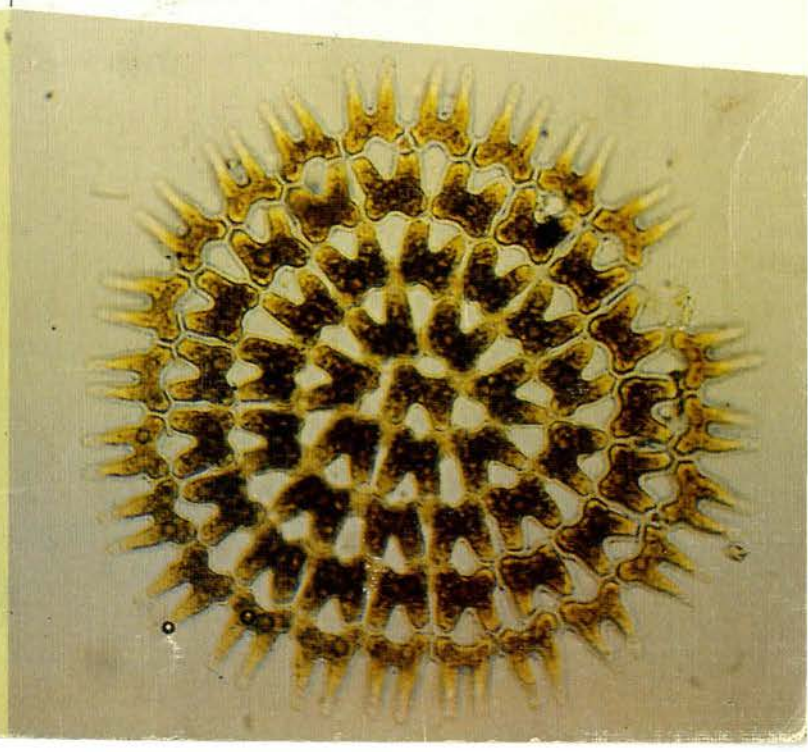
The cells form circular plates with
different in shape from those within
nucleated with serrated edges. The

Occurrence

Pediastrum is widely distributed in
tychoplankton of all types of waters







DEPARTMENT OF WATER AFFAIRS
HYDROLOGICAL RESEARCH INSTITUTE

An Aid to the Identification of the Dominant and Commonly occurring Genera of Algae observed in some South African Impoundments

by

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0001

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SYNOPSIS

The principal objective of this report is to serve as a guide for the identification and classification of microscopic algae commonly occurring in South African impoundments. A brief description of the morphology and occurrence of each genus is given and illustrated by means of both drawings and photographs. In addition, data on the presence and dominance of different genera observed in 29 South African impoundments, sampled during 1986, are included.

SINOPSIS

Die hoofdoel van hierdie verslag is om te dien as 'n hulpmiddel vir die identifikasie en klassifikasie van mikroskopiese alge wat algemeen voorkom in Suid-Afrikaanse damme. Die morfologie en voorkoms van elke genus word kortliks beskryf en geïllustreer deur middel van sketse en foto's. Data oor die dominansie en teenwoordigheid van die verskillende genera waargeneem in 29 Suid-Afrikaanse damme gedurende 1986 is ook ingesluit.

ACKNOWLEDGEMENTS

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The Water Bailiffs of the different dams for taking many of the algal samples.

I am very grateful to Dr. G.W. Prescott, the author and copyright holder of "Algae of the Western Great Lakes Area" (1962) for kindly giving permission to use figures from the book. All the figures that appear in this report are redrawn from Dr. Prescott's book.

AUTHOR'S NOTE

All the algae in this report are of microscopic dimensions and therefore require the use of a microscope for identification. Diatoms, except for Melosira and Cyclotella, were left out as their identification require specialized techniques and a good knowledge of their taxonomy.

All the photographs were taken with a 35 mm camera fitted to a Zeiss Axiomat compound microscope and because the samples were stained with Lugol's solution, the colour of the cells is not natural.

For the purpose of this study only genera were defined, with a few of the species names mentioned, if they occurred in abundance.

Twenty-three dams were sampled over a period of 1 year (1986) and 6 dams in Natal over a period of 4 months. Samples from most of the dams were taken twice a month. (Part 4).

UNITS AND SYMBOLS USED

Metre	m
Millimetre	mm
Millilitre	mℓ
Micrometre	µm
Gram	g
Revolutions per minute	rpm

CONTENTS

INTRODUCTION

Algae may be defined as organisms that perform oxygen-evolving photosynthesis and possess chloroplasts. Some of them are unicellular; some are filamentous, colonial or coenocytic (Stanier, Adelberg and Ingraham, 1977).

Many types of freshwater algae are found, floating freely in the currents or attached to plants and other submerged substrates. Most freshwater algae are microscopic, although a few genera are individually large enough to be seen without the aid of a microscope. Algae form the basis of the food chain and their productivity and ecology influences other aquatic life. Excess algal growth ('blooms') can lead to many problems such as taste, odour and the clogging of filters at purification works. Some algae produce toxins which can cause the death of various animals (Toerien, Scott & Pitout, 1976). Each species causes unique problems and responds differently to control measures. Some algae have an economic impact and others considerable biological significance and therefore it is necessary to gain knowledge of the algal groups and genera occurring in our impoundments. The impact of abundant growth of algae on the water quality of an impoundment is often dependent upon the species present, particularly upon whether the dominant forms are diatoms, green algae or blue-green algae (Cyanobacteria).

Due to their short life cycles, phytoplankton respond rapidly to environmental changes, and therefore the species composition may be an indicator of the quality of water in which they are found (APHA, 1980).

PART 1: MATERIALS AND METHODS

1.1 SAMPLE COLLECTION AND PRESERVATION

i) Surface samples are taken with a beaker and integrated (0-5 m) samples are taken with a hosepipe sampler. Samples can also be taken at selected depths with a Van Dorn sampler.

ii) Pour the sample into a suitable size container that can be capped.

iii) Preserve the sample with Lugol's solution (page 2) immediately after it has been taken. The sample can then be kept for at least a year if it is stored in a cool dark place.

iv) Fresh samples must be identified as soon as possible after collection, as the algae die and the cells rupture in a short time, making identification impossible.

v) When the algal concentration of an impoundment is low, large samples need to be taken. The sample must then be concentrated by centrifuging 10-15 mℓ subsamples at 4000 rpm for 6 minutes. If a centrifuge is not available, the sample can be concentrated by letting the algae settle out onto the bottom of a measuring cylinder of appropriate size. The upper water is carefully siphoned off.

vi) Dense populations may be diluted with distilled water.

vii) Interferences can be caused by very large populations of zooplankton or high sediment/detritus concentrations.

Lugol's stock solution (APHA, 1980)

Iodine crystals	40 g
Potassium iodide (KI)	60 g

Dissolve in 1 ℓ distilled water. Add 1 mℓ of the stock solution per 100 mℓ of sample.

Stock solutions should be kept in dark airtight bottles because iodine evaporates readily.

1.2 EQUIPMENT

i) Sedimentation chambers with cover slips (Zeiss, 10 mℓ).

ii) Microscope slides.

iii) Cover slips.

iv) Pasteur pipettes.

v) Microscope.

1.3 INVERTED MICROSCOPE METHOD

For the purpose of this study the total cell count was not addressed, but the numerical percentage representation of each genus was estimated.

i) Shake the preserved sample carefully to prevent damage to the structure of the cells.

ii) Pour the sample into the sedimentation chamber and cover with a cover slip.

iii) Leave the chamber on a flat surface to permit all the algal cells to settle onto the bottom of the chamber. Three hours per centimetre depth should be allowed. For a 10 mℓ Zeiss chamber the minimum settling time is 6 hours.

iv) Place the chamber onto the stage of an inverted microscope.

v) Choose the correct magnification. A total magnification of approximately 400x was found to be suitable for identifying all the algae described. The total magnification is obtained by multiplying the magnification of the ocular with the magnification of the objective used. The microscope that was used for this study has a ocular of 10x and a objective of 40x.

vi) Identify and estimate the numerical percentage representation of each genus, in relation to all the algae present, using transects covering the entire surface area of the chamber.

Thorough cleaning of the sedimentation chambers is necessary to avoid carry-over of cells to the next sample. Chambers should be rinsed with distilled water prior to detergent washing to avoid possible precipitation of an iodine complex which may be difficult to remove (Sartory, 1985).

1.4 ORDINARY LIGHT MICROSCOPE METHOD

i) Make a wet mount by taking a drop of sedimented algal cells, or fresh sample, and place it on a glass slide.

ii) Cover the specimen with a coverslip. Care should be taken to avoid air bubbles underneath the coverslip.

iii) Place the slide on the stage of the microscope.

iv) Use a low magnification to get the specimen into the field of view.

v) Once the specimen is in focus, a higher magnification can be used to identify the algae.

1.5 PREPARATION OF SLIDES

i) Semi-permanent microscope mounts can be made by placing a drop of the specimen on a slide, evenly spread out in a large drop of 5% glycerin.

ii) Store the slide in a dust-proof place.

iii) Once or twice an hour, for several hours, add other drops of glycerin (100%) until, through evaporation of the water, approximately 100% glycerin remains about the specimen (Prescott, 1978).

iv) Cover the specimen with the coverslip. Care should be taken to add just enough glycerin to fill out the area under the coverslip so as not to allow leakage from beneath it.

v) Seal the edges of the coverslip with a sealing material such as DPX or colourless fingernail polish.

The slide can be retained for a few years if stored in the dark (APHA, 1980).

PART 2: TAXONOMIC DESCRIPTIONS

2.1 PRIMARY CLASSIFICATION OF THE ALGAE

The primary classification of the algae is based on the following: the chemical nature of the wall, if present, the organic reserve materials; the nature of the photosynthetic pigments; and the nature and arrangement of the flagella when present (Stanier, Adelberg and Ingraham, 1977).

2.2 PHYLA (DIVISIONS) OF ALGAE

i) Cyanobacteria (Cyanophyta, Blue-green algae)

The blue-green algae are unicellular, colonial, or in simple or branched filaments. They have no chloroplasts and the pigments are distributed throughout the entire protoplast. Some authors consider them to be bacteria because of their close relationship, while others classify them as algae (Bold and Wynne, 1985). The blue-green algae differ from bacteria because they contain chlorophyll a and free oxygen is liberated during photosynthesis. The pigments that are present in the cells are chlorophyll a, C-phycocyanin, allophycocyanin, C-phycoerythrin, B-carotene and several xanthophylls. The cell wall is complex, usually multilayered and has a gelatinous outer sheath. There is no nucleus present but the nuclear material is centrally sited in each cell. Reproduction is by cell division or by spores. They store food in the form of glycogen or a starch-like substance.

ii) Chlorophyta (Green algae)

The green algae are unicellular, colonial, or filamentous and constitute one of the major groups of algae because of the abundance of species and their frequency of occurrence. The algae cells can be floating, swimming or be attached. The cells contain chloroplasts, in which chlorophyll a is the predominant pigment and 1 or more pyrenoids. The pyrenoids are a major site of starch formation, but it is also known that pyrenoids are absent in some starch-forming algae. The form of the chloroplast is important in the classification of the green algae. The pigments in the cells are chlorophyll a, chlorophyll b, carotenes and several xanthophylls. The cells have a definite nucleus. The cell wall of many green algae have not been analyzed critically, therefore generalization cannot be made as to their composition (Bold and Wynne, 1985). Cells that are motile have usually 2, or rarely, as many as 8 flagella of equal length. The sexual reproduction is by iso-, aniso- and heterogametes.

iii) Chrysophyta (Golden and Yellow-green algae, Diatoms)

The algae that belong to this phylum are unicellular or colonial, rarely filamentous. The pigments are also contained in chloroplasts and they are chlorophylls a and c, carotenes and xanthophylls. Carotenoids are predominant over the chlorophylls and therefore the cells have a colour other than the "grass green" of the Chlorophyta. The cell wall is thick and often silicified (Diatoms). Motile cells have 2 flagella of unequal length or only 1 flagellum. They store food in the form of B-linked glucan and chrysolaminaran (leucosin). Reproduction varies greatly and can be by cell division and fragmentation, or non-sexual which involves aplanospores, zoospores, or special modifications of these.

The class Bacillariophyceae (Diatoms) is included in this division. They are unicellular, although chains of cells may occur. Their classification is based on the structure and ornamentation of the cell wall (frustule). The cell wall is composed of silica with an organic coating which is highly tolerant of unfavourable conditions. The cells contain one nucleus which lies in the centre or to one side of the cell. The colour of the cell contents is typically golden-brown. They contain the same pigments as the other algae in this division. They store food in the form of chrysolaminaran. Diatoms reproduce by means of cell division of the vegetative cell.

iv) Euglenophyta (Euglenoids)

These organisms are solitary motile cells with 1 or 2 flagella. Many members have a gullet at the anterior end. A large central nucleus is present. Some species have many chloroplasts and also a single red eye-spot. The pigments present are chlorophyll a, chlorophyll b, carotenes and xanthophylls. Pyrenoids are usually present in the chloroplast or free in the cell. Food reserves are stored in the form of an insoluble starch, paramylum and fatty substances. The external cell membrane is in the form of a pellicle often rigid, or frequently striated. Vegetative reproduction is by cell division, or by encystment followed by multiplication of the cell. There is no sexual reproduction.

v) Cryptophyta (Cryptomonads)

The algae of this group occur as asymmetric solitary cells that are dorsiventrally flattened and are motile by 2 flagella of unequal length. A gullet is commonly present in the anterior end. One large chloroplast is present which is brown, blue or reddish in colour. Pyrenoids are commonly present and the pigments are chlorophylls a and c, carotenes, xanthophylls and a phycobiliprotein. The

external cell membrane is a firm periplast. Food is stored in the form of solid starch or starch-like substances. Reproduction is by longitudinal cell division.

vi) Pyrrhophyta (Dinoflagellates)

The algae of this phylum are motile solitary cells with 2 flagella of approximately equal length. The cells are mostly dorsiventrally flattened and differentiated. Many Dinoflagellates form cysts that can tolerate unfavourable conditions. The nucleus is relatively large and varies in shape. A pigment spot is commonly present. The pigments in the chloroplasts include chlorophyll a and c, carotenes, and xanthophylls. The cell wall, when present, is firm and simple and composed primarily of cellulose. Food reserve is in the form of starch or oil. Reproduction is by longitudinal division and asexual zoospores. Sexual reproduction is only known in a few instances.

PART 3: CLASSIFICATION, MORPHOLOGICAL DESCRIPTIONS AND OCCURRENCE OF ALGAL GENERA

3.1 DOMINANT ALGAL GENERA

Anabaena spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum: Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Oscillatoriales
Family: Nostocaceae
Genus : *Anabaena*

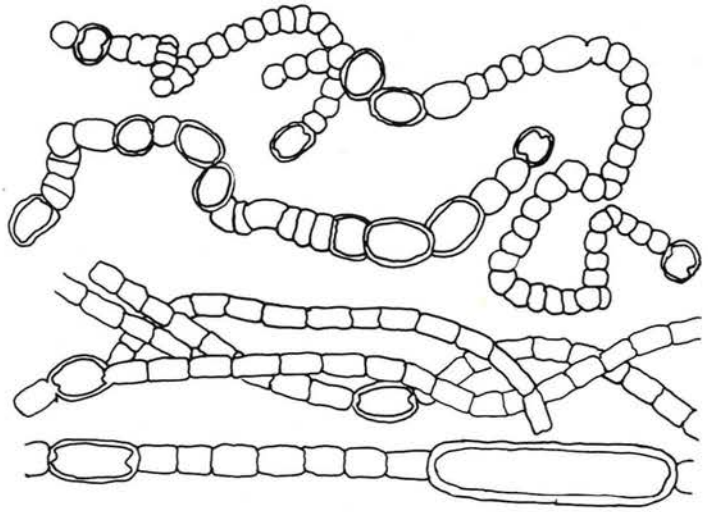


Figure 1a: *Anabaena* spp.

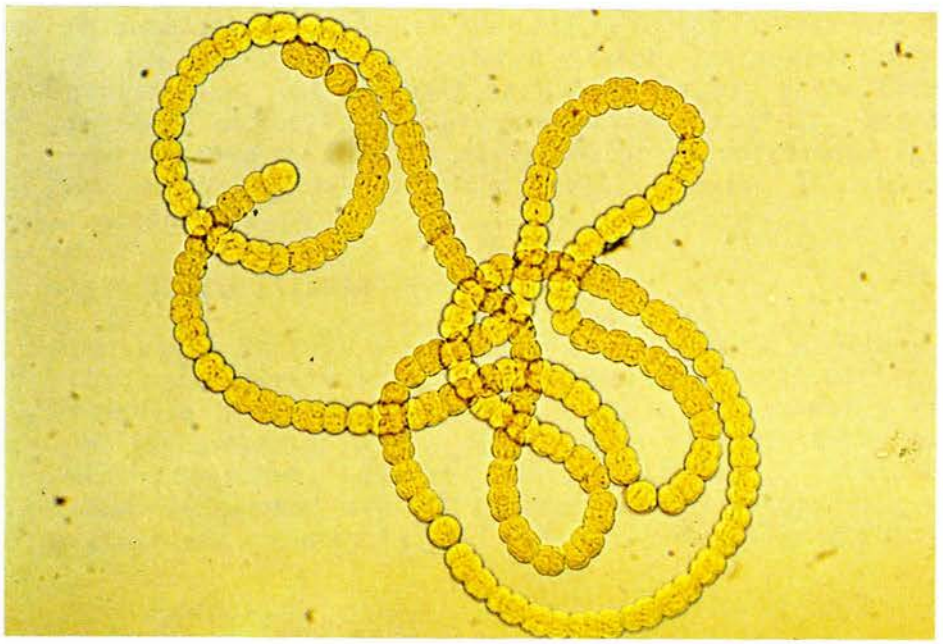


Figure 1b: *Anabaena circinalis*

Morphology

Trichomes are composed of beadlike or barrel-shaped cells, with heterocysts present in mature trichomes which are larger and different in shape from the vegetative cells. Some species are coiled, whereas others are straight or merely curved and entangled. The colony is soft and formless. Cells are usually 8-14 µm broad.

Occurrence

Common in the plankton of lakes and ponds. When occurring with Microcystis it is indicative of hard water with a high nutrient content (Greeson, 1982). Some species are responsible for "blooms" and are capable of producing toxins (Prescott, 1978). Anabaena can give a bad taste and odour to water, if present in high numbers, and can cause clogging of filters (APHA, 1980).

Anabaena is one of the most common and widely distributed genera in South African impoundments. It was dominant during summer but was also present in some impoundments during winter. Anabaena was dominant in the following impoundments: Allemanskraal, Bloemhof, Bronkhorstspruit, Grootdraai, Hazelmere, Koppies, Kosterrivier, Lindleyspoort and Roodeplaat.

Ceratium spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum: Pyrrhophyta
Class : Dinophyceae (Dinoflagellates)
Order : Gonyaulacales
Genus : Ceratium

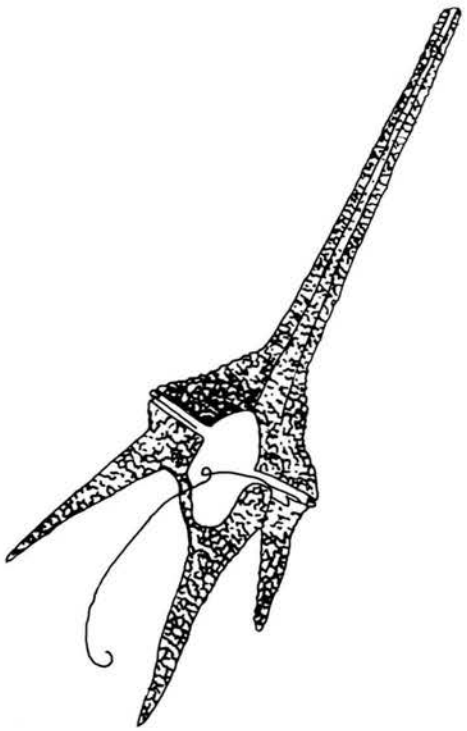


Figure 2a: Ceratium sp.

Figure 2b: Ceratium hirundinella

Morphology

The cell has a long, anterior horn and 2 or 3 posterior horns. This genus has such a distinct shape that it can be readily identified. There is a prominent transverse furrow that divides the cell into a epicone and a hypocone. The plates which compose the cell wall are marked with close reticulation. Two flagella are present, 1 longitudinal and the other transverse in a groove. Depending upon the environmental conditions the cells vary in size and can be up to 400 µm long.

Occurrence

It occurs in the eu- or tychoplankton, and is usually more abundant in hard water than in soft water (Prescott, 1962). The structure of the cells causes filters to block. Blooms develop and disappear suddenly and can be responsible for taste and odours in potable water.

Ceratium hirundinella was the only species observed, and was dominant in some months throughout the year in 3 impoundments in the Transvaal namely Lindleyspoort, Loskop and Vaalkop.

Chlamydomonas spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum: Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Volvocales
Family: Chlamydomonadaceae
Genus : Chlamydomonas

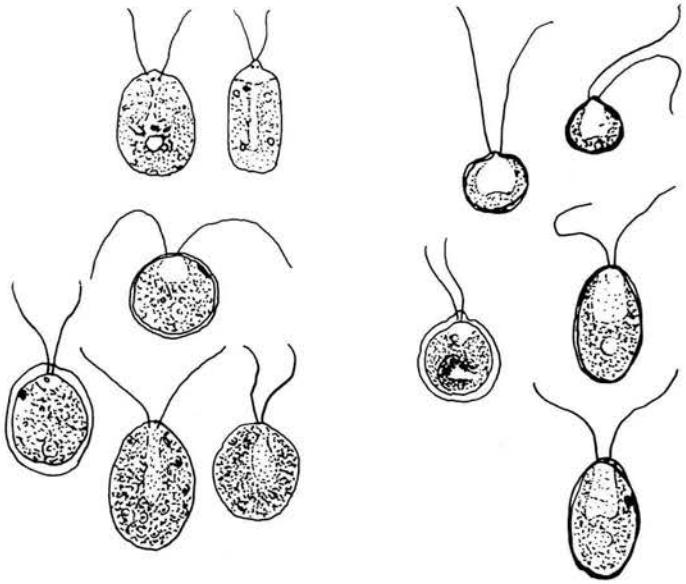


Figure 3a: Chlamydomonas spp.

Figure 3b: Chlamydomonas sp.

Morphology

The cells are actively motile and are round or elliptic to oval, with 1 parietal cup-shaped chloroplast and 1 or more pyrenoids. The 2 flagella of equal length, are not attached in an apical gullet but arise from blepharoplasts. An eye-spot is usually evident. Cells are 5-20 µm in length (excluding flagella).

Occurrence

They occur commonly in the euplankton and tychoplankton as solitary free-swimming cells. They are found in calm and very slow moving waters in every kind of aquatic habitat.

Chlamydomonas is very common and numerous in South African impoundments. It was found to be dominant mostly during winter in the following impoundments: Bloemhof, Bronkhorstspruit, Hazelmere, Henley, Koppies, Middelburg, Roodekopjes, Shongweni, Sterkfontein, Vaal, Vaalkop, Wemmershoek and Witbank.

Coelastrum spp.

CLASSIFICATION (Komarek and Fott, 1983; Bold and Wynne, 1985)

Phylum: Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family: Scenedesmaceae
Genus : Coelastrum

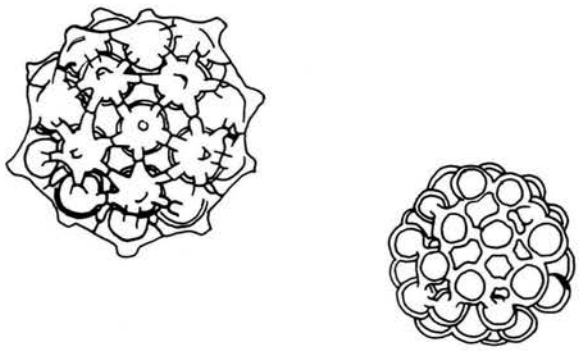


Figure 4a: Coelastrum spp.

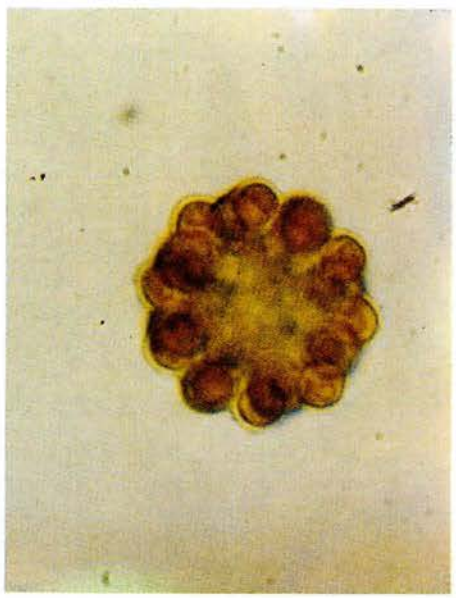


Figure 4b: Coelastrum sp.

Figure 4c: Coelastrum sp.

Morphology

The cells are ovoid, spherical or pyramidal and as many as 128 cells can be united to form a hollow spherical, free-floating colony. In some species the cells are closely associated and the hollow feature is observed with difficulty, whereas in others the cells are clearly separated and interconnected by prominent "arms" (Prescott, 1978). The sheath is very delicate. Colonies can be up to 100 µm across.

Occurrence

Widely distributed in slow moving waters in the eu- and tychoplankton.

Coelastrum occurred in many impoundments mainly in the Transvaal and Natal, and was dominant in only 1 impoundment in the Transvaal namely Roodekopjes Dam during November.

Cryptomonas spp.

CLASSIFICATION (Prescott, 1978)

Phylum : Cryptophyta
Class : Cryptophyceae
Order : Cryptomonadales
Family : Cryptomonadaceae
Genus : Cryptomonas

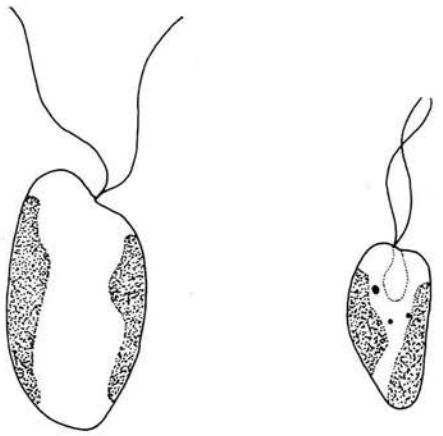


Figure 5a: Cryptomonas spp.

Figure 5b: Cryptomonas sp.

Morphology

Cells are oval or broadly rounded or asymmetrical at the anterior end. It has 1 or 2 parietal chloroplasts. The cells are broader at the anterior end. The 2 flagella are unequal and attached within an apical gullet. Cells are 10-80 µm long and 5-18 µm in diameter. Structures in the gullet called "trichocysts" show up as rows of spots.

Occurrence

Common in water-bodies of all types.

Occurred as the dominant genus in some months in many of the impoundments sampled, mostly during early winter and spring. It was dominant in the following impoundments: Allemanskraal, Bloemhof, Bon Accord, Bridle Drift, Bronkhorstspruit, Erfenis, Kosterrivier, Loskop, Middelburg, Vaal and Wemmershoek.

Cyclotella spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chrysophyta (Yellow green algae)
Class : Bacillariophyceae (Diatoms)
Order : Centrales
Suborder: Coscinodiscineae
Family : Thalassiosiraceae
Genus : Cyclotella

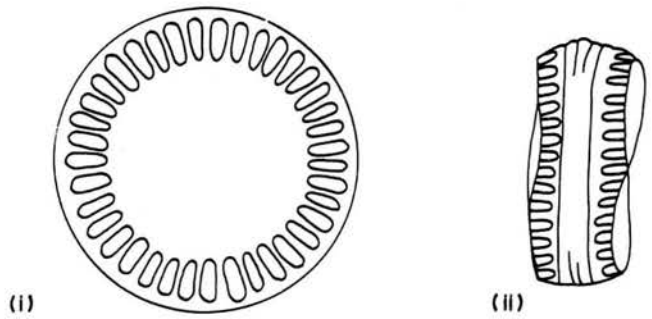


Figure 6a: Cyclotella sp; i) Valve view; ii) Girdle view.

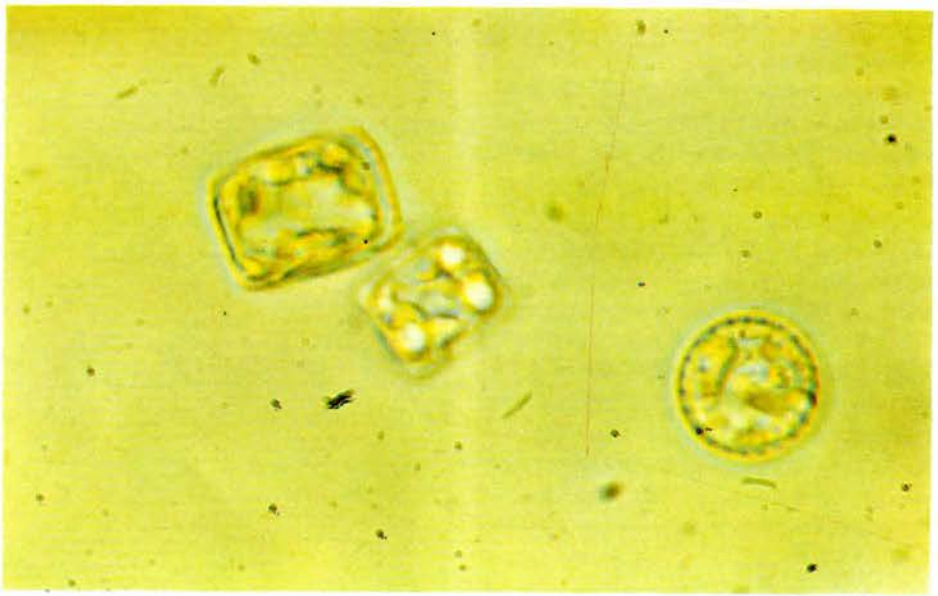


Figure 6b: Cyclotella sp; showing valve and girdle view.

Morphology

Cells are discoid, drum-shaped and usually solitary or in pairs but not in long chains. The valve view is circular or rarely elliptical and the girdle view is narrowly rectangular. In the valve view there is a zone of radiate costae within the valve margin, and a central smooth or finely punctate area. Intercalary bands are lacking. There are numerous small discoid chromatophores. Cells are 5-50 µm in diameter.

Occurrence

Widely distributed in all types of surface waters. Cyclotella ocellata is an indicator of clean water (APHA, 1980). Cyclotella causes filters to block if present in high numbers.

Cyclotella was found to be dominant, mostly during the summer in the following impoundments: Bloemhof, Boskop, Bridle Drift, Bronkhorstspruit, Grootdraai, Kosterrivier, Middelburg, Roodekopjes, Sterkfontein, Vaal, Vaalkop and Witbank.

Melosira spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chrysophyta (Yellow-green algae)
Class : Bacillariophyceae (Diatoms)
Order : Centrales
Suborder: Coscinodiscineae
Family : Melosiraceae
Genus : Melosira

Figure 7a: Melosira sp.

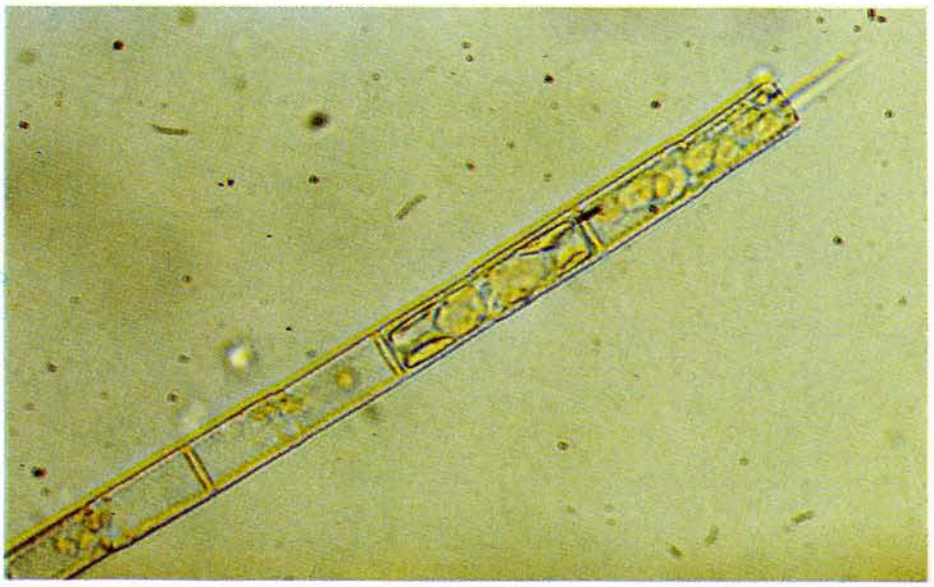


Figure 7b: Melosira sp.

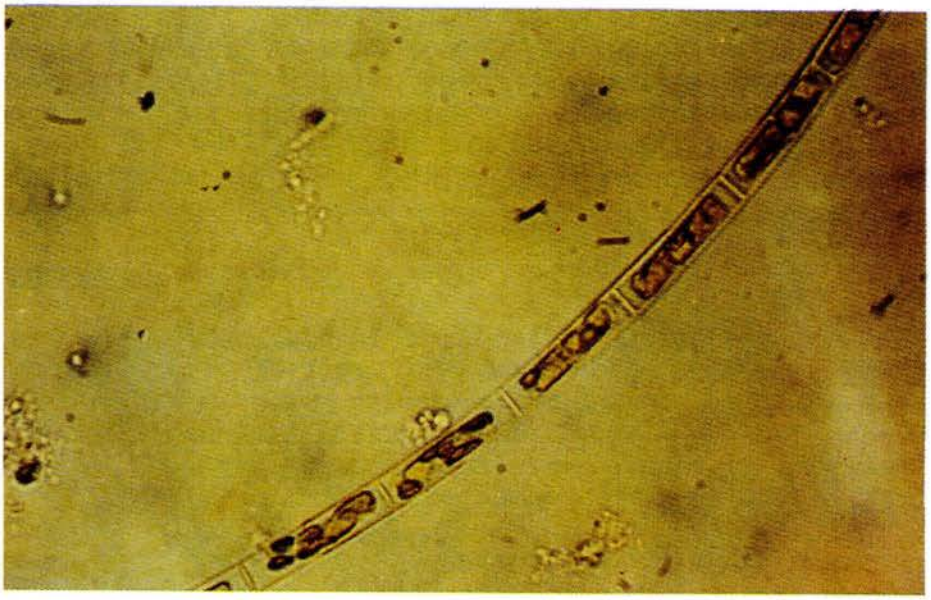


Figure 7c: Melosira sp.

Morphology

Cells are cylindrical and united into long filaments. The valves are either flat or convex. The length of the cells are greater than the breadth and are round in the valve view. In some species the walls are smooth but others have rows of spots. Chromatophores are numerous, small and disc-shaped. Cells are 5-100 µm in diameter.

Occurrence

Melosira is widely distributed in all types of waters and some species are indicative of particular environmental conditions. Due to the filamentous nature they can cause clogging to occur in filters.

Melosira was dominant mostly during the winter and early spring months in the following impoundments: Albert Falls, Bronkhorstspruit, Hazelmere, Koppies, Kosterrivier, Midmar, Nagle, Rietvlei, Roodeplaat, Sterkfontein, Voëlvlei and Witbank.

Microcystis spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Chroococcales
Family : Chroococcaceae
Genus : Microcystis

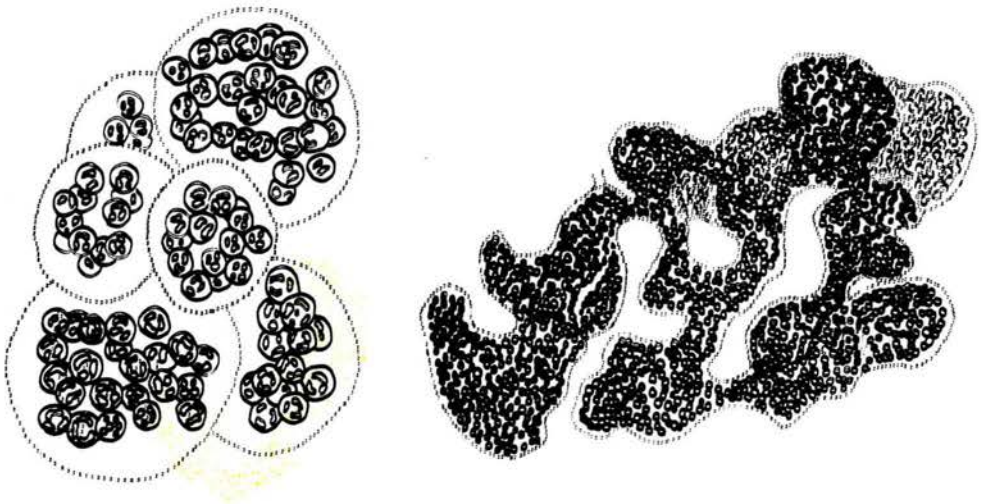


Figure 8a: Microcystis spp.

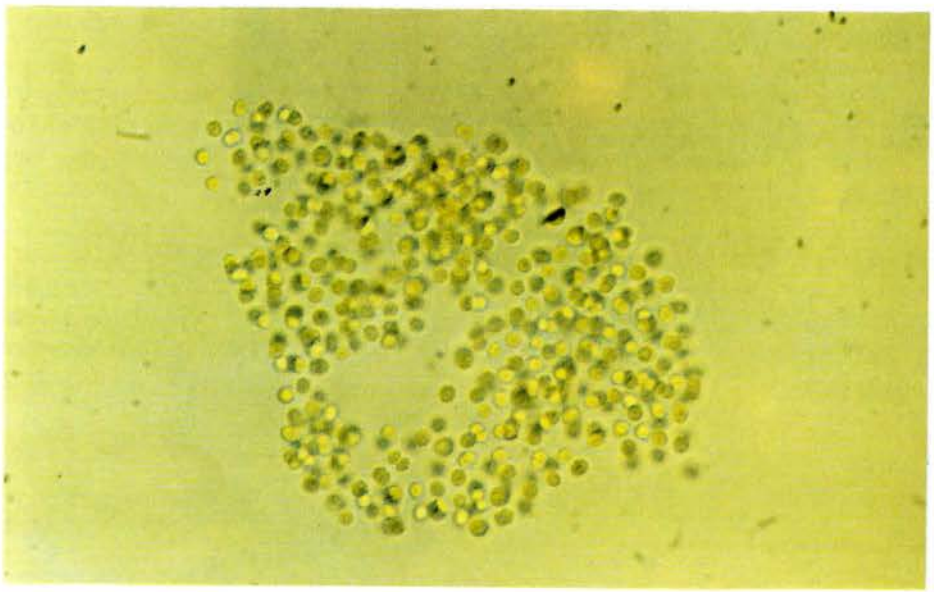


Figure 8b: Microcystis aeruginosa

Morphology

Microcystis is a free-floating or sedentary colony of numerous spherical cells closely and irregularly arranged within a copious mucilage, forming ovate, globose, or irregularly shaped masses (Prescott, 1962). The cells are highly granular with conspicuous gas vacuoles which cause the algae to float in the water. The mucilage is often not clearly seen in preserved material. The cells are 2-10 µm in diameter.

Occurrence

Microcystis is a frequent component of algal blooms in eutrophic waters during periods of high temperature. Microcystis aeruginosa is known to produce a toxin which can be poisonous to animals that drink infected water (Toerien, Scott and Pitout, 1976). It also causes bad tastes and odours in drinking water and is an indicator of polluted water (APHA, 1980).

Microcystis aeruginosa was found to be the most common species of this genus in many of the impoundments sampled, and was more abundant in dams in the Transvaal. It occurred throughout the year but formed blooms during summer. Microcystis was dominant in the following impoundments: Allemanskraal, Bloemhof, Bon Accord, Bridle Drift, Grootdraai, Klipvoor, Koppies, Lindleyspoort, Rietvlei, Roodekopjes, Roodeplaat, Vaalkop and Witbank.

Oocystis spp.

CLASSIFICATION (Komarek and Fott, 1983; Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Oocystaceae
Genus : Oocystis

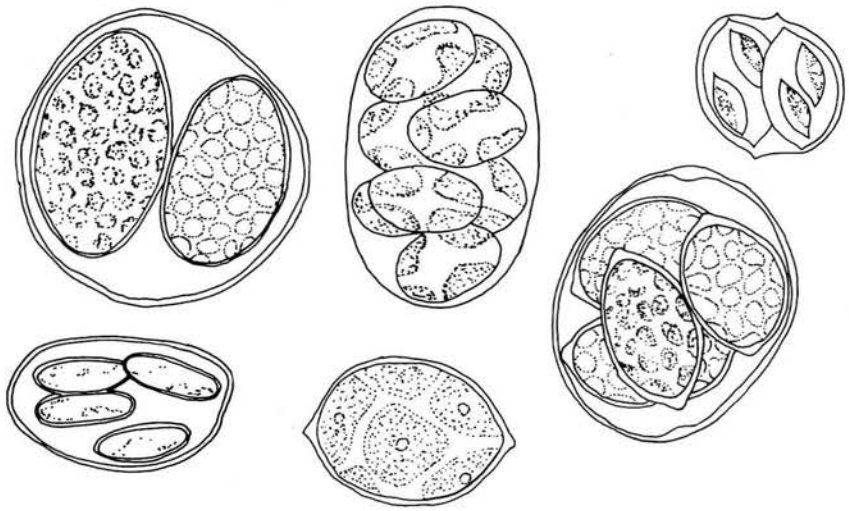


Figure 9a: Oocystis spp.

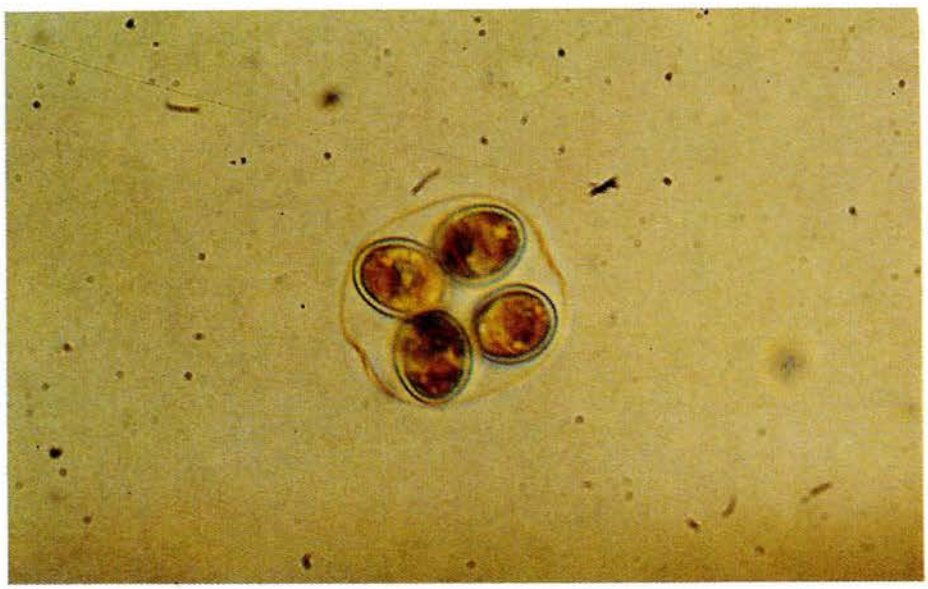


Figure 9b: Oocystis sp.

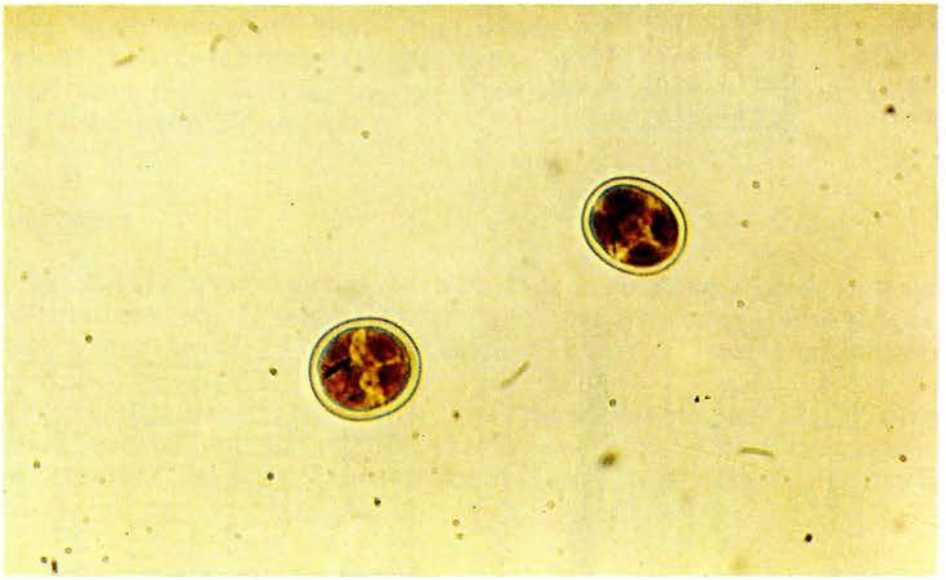


Figure 9c: Oocystis sp.

Morphology

Cells are ovoid, elliptic, lemon-shaped or cylindrical with smooth walls. Oocystis is unicellular or in colonies of 2-16 individuals (cells) surrounded by a swollen mother-cell wall of the previous generation. The number of chloroplasts varies from 1 to many. The chloroplasts are of various shapes, ovoid discs, irregular star-shaped plates, or reticular. A polar nodule may be present. The species of this genus are differentiated by the presence or absence of nodules at the poles, and by the number of chloroplasts. Cells are 5-20 µm long.

Occurrence

Common in the euplankton and tychoplankton. Oocystis is indicative of soft waters (Greeson, 1982).

Oocystis was found in nearly all the impoundments sampled, but was dominant only in impoundments in the Transvaal and the Cape Province. They were found to be dominant during the late winter and early summer months in the following impoundments: Bronkhorstspruit, Middelburg, Rietvlei, Roodekopjes, Roodeplaat, Voëlvlei and Wemmershoek.

Oscillatoria spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Oscillatoriales
Family : Oscillatoriaceae
Genus : Oscillatoria

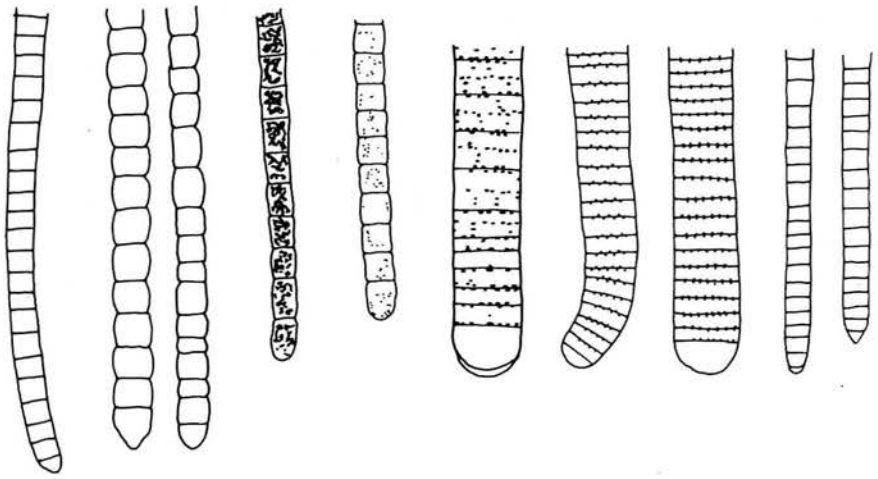


Figure 10a: Oscillatoria spp.

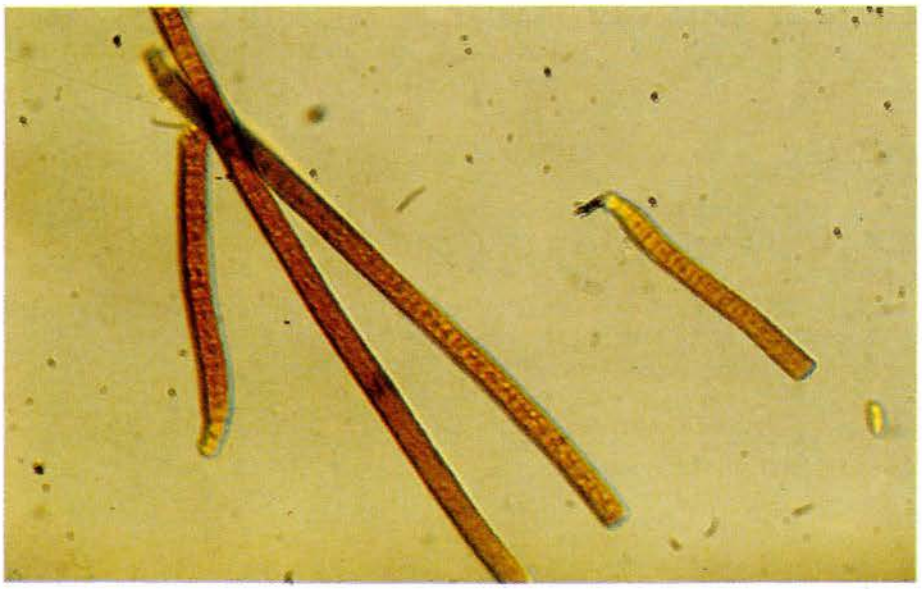


Figure 10b: Oscillatoria sp.

Morphology

These algae are filamentous and elongate without a sheath; straight, or twisted and entangled. The trichomes are unbranched and sometimes apically attenuated. Most species have cells much shorter than the width of the filament, with or without constrictions at the cross walls (Prescott, 1962). The algae move by oscillating or gliding movements. Diameters vary from 1 to over 30 µm.

Occurrence

It is widely distributed in all types of waters and is found in the euplankton, tychoplankton and periphyton. The algae can cause clogging of filters because of their filamentous nature.

Oscillatoria was found in a few impoundments mainly during the summer months and was particularly evident in the Transvaal. It was dominant in only 2 impoundments namely Bloemhof and Vaalkop.

Pediastrum spp.

CLASSIFICATION (Komarek and Fott, 1983; Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Hydrodictyaceae
Genus : Pediastrum

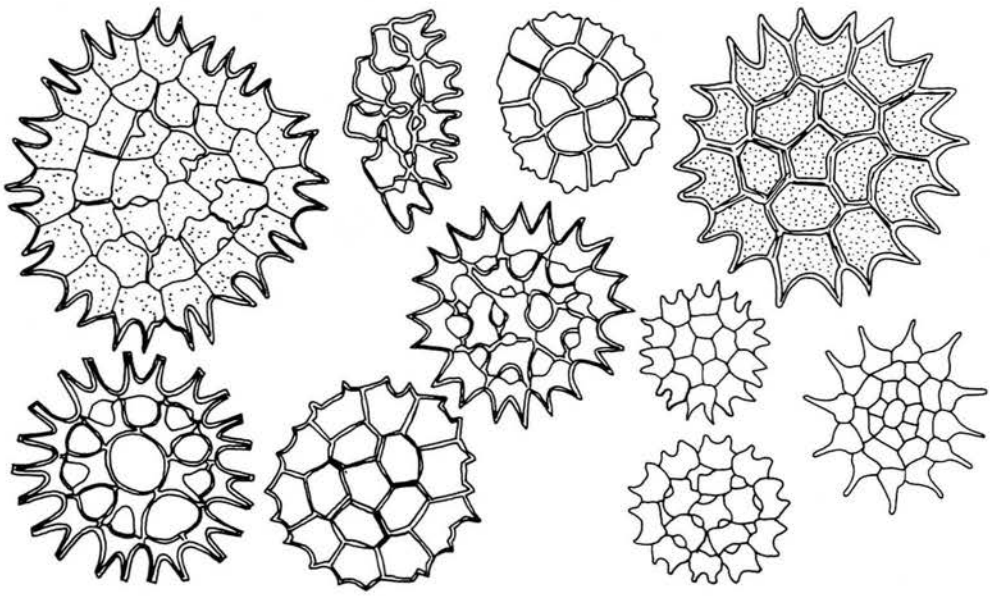


Figure 11a: Pediastrum spp.

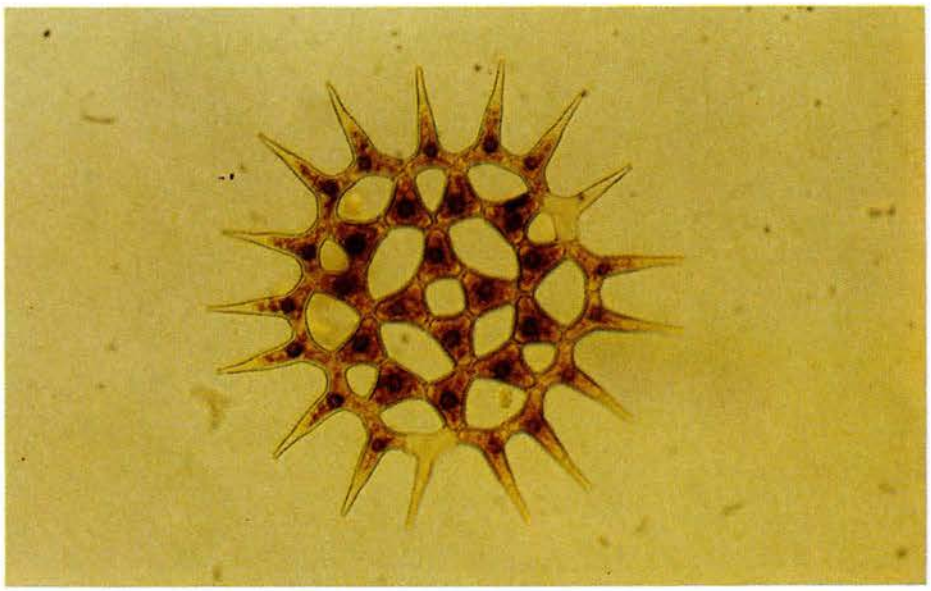


Figure 11b: Pediastrum simplex

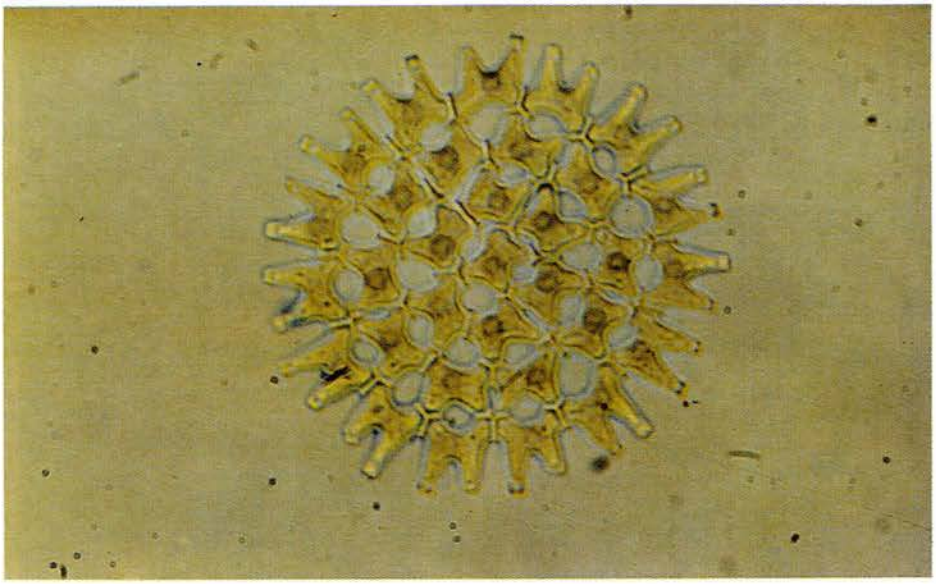


Figure 11c: Pediastrum sp.

Morphology

The cells form circular plates with the marginal cells usually different in shape from those within. The cells are multi-nucleated with serrated edges. The cell walls are highly resistant to decay. There are many species of this genus but the cells all have a great similarity and they can be identified by their plate-like arrangement and number of cells. In some species the plate is continuous whereas in others there are interstices. The coenobium may be as much as 450 µm in diameter.

Occurrence

Pediastrum is widely distributed in the euplankton and tychoplankton of all types of waters. Pediastrum duplex is indicative of eutrophic waters (Greeson, 1982).

Pediastrum was found in low numbers in many of the dams sampled. Many different species were observed. It was dominant in only 1 impoundment in the Transvaal namely Rietvlei Dam during November.

Scenedesmus spp.

CLASSIFICATION (Komarek and Fott, 1983; Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Scenedesmaceae
Genus : Scenedesmus

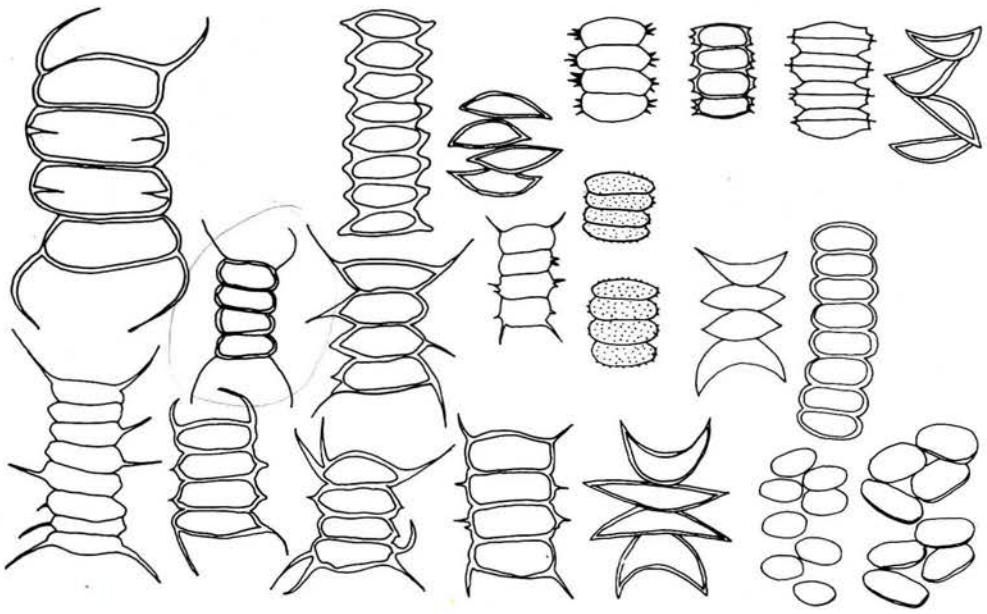


Figure 12a: Scenedesmus spp.

Figure 12b: Scenedesmus sp.

Figure 12c: Scenedesmus sp.

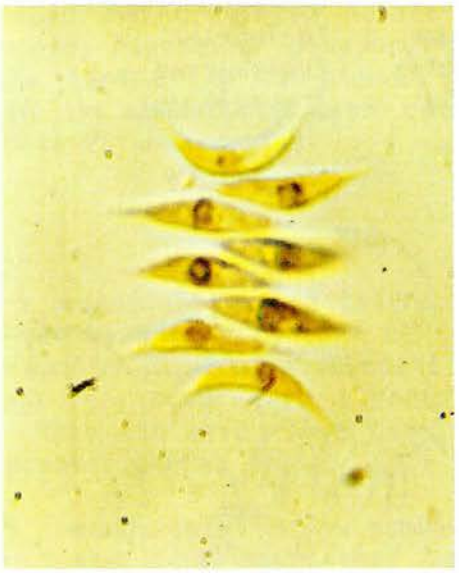


Figure 12d: Scenedesmus sp.

Morphology

Scenedesmus consists of flat colonies of 2-4-8-16-32 cells which can be ovoid, fusiform, ellipsoidal, acicular or oblong, lying side by side in a single series, or in a double row with the cells alternating. The single chromatophore is parietal. Some species have spines at the corners of the colonies. Colonies can be 3-25 µm long.

Occurrence

It is common in the euplankton, tychoplankton and periphyton of all types of waters. Scenedesmus quadricauda is perhaps the most common species of this genus (Prescott, 1978).

Scenedesmus is widely distributed in impoundments throughout the country and was dominant in the following 2 dams in Natal during winter: Albert Falls and Shongweni.

Trachelomonas spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Euglenophyta
Class : Euglenophyceae
Order : Euglenales
Family : Euglenaceae
Genus : Trachelomonas

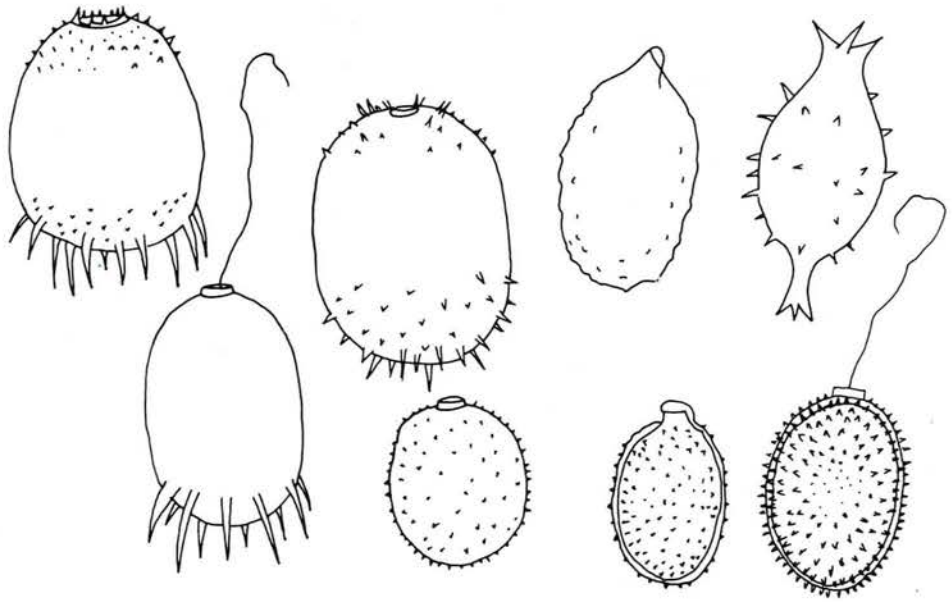


Figure 13a: Trachelomonas spp.

Figure 13b: Trachelomonas sp.

Figure 13c: Trachelomonas sp.

Morphology

The cells of Trachelomonas are solitary and uniflagellated and are enclosed in a firm gelatinous shell or lorica which has an opening for the flagellum. There are several hundred species, each showing a differently shaped and decorated lorica. The surface of the lorica may be smooth, punctate, spiny, reticulate or striate. The colour of the lorica can be brown, tan to nearly colourless, according to the amount of iron compounds deposited in it. They can be up to 25 µm across.

Occurrence

Most of the species occur in the tychoplankton and this genus is very indicative of warm waters having a high content of organic matter (Greeson, 1982). The organism may be so abundant as to colour the water brown, although they never form a conspicuous surface film (Prescott, 1978). They can also cause clogging of filters used in purification processes (APHA, 1980).

Trachelomonas was found in many impoundments in low numbers and was dominant in 2 impoundments, namely Allemanskraal Dam and Lindleyspoort Dam during September. Although they were dominant, the number of algae cells in these samples were not very high. Both these dams have a high turbidity.

3.2 COMMON ALGAL GENERA

Some of the algae in this section occurred only a few times during this study, but looking at data from some impoundments for previous years, they could occur more often.

Actinastrum spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Coelastraceae
Genus : Actinastrum

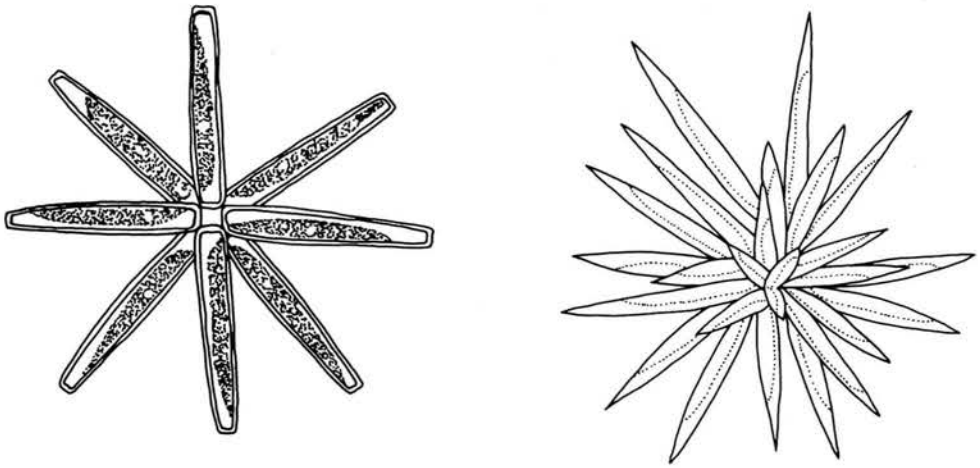


Figure 14a: Actinastrum spp.

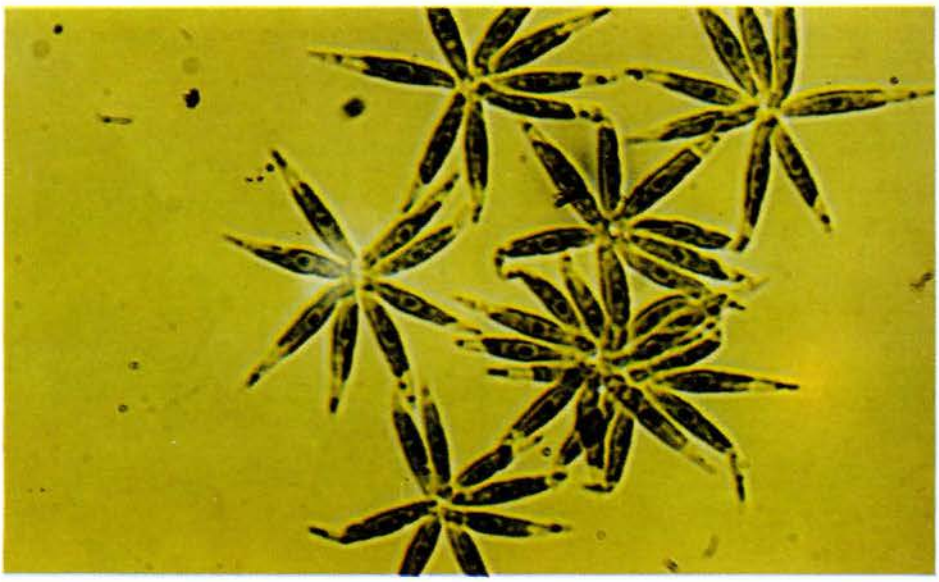


Figure 14b: Actinastrum sp.

Morphology

The cells are ovoid, oblong, truncate-fusiform, sometimes cigar-shaped and radiate from a common centre to form a star-shaped colony. The colonies are not enclosed in a gelatinous sheath and consist of 4-8-16 cells. Parietal chloroplasts are clearly visible in each cell. Colonies are 10-25 µm long.

Occurrence

Widely distributed in the euplankton of ponds, dams and slow flowing rivers.

Ankistrodesmus spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Chlorellaceae
Genus : Ankistrodesmus

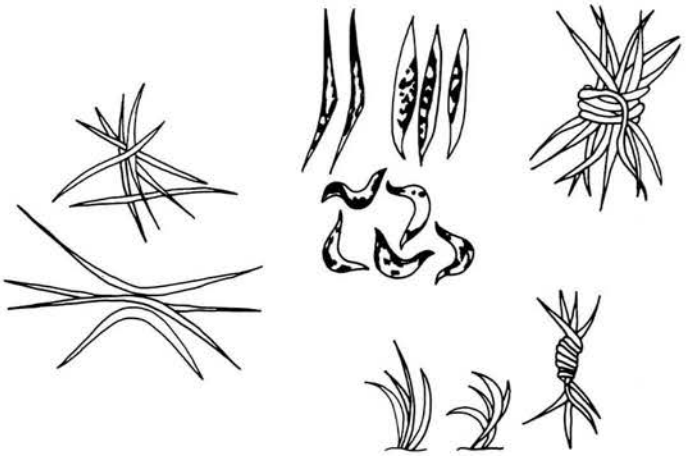


Figure 15a: Ankistrodesmus spp.

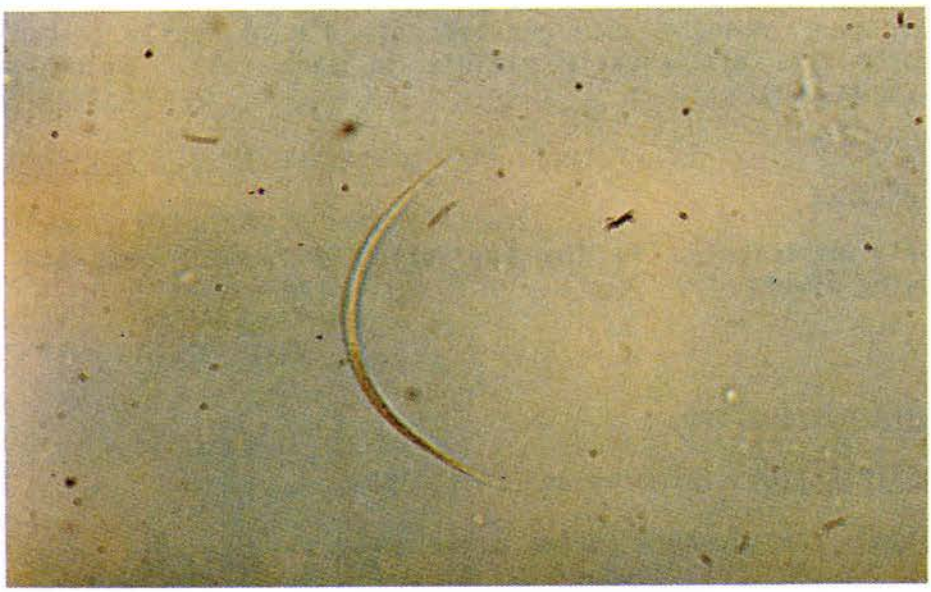


Figure 15b: Ankistrodesmus sp.

Morphology

The cells are straight or curved needle-shaped. They are solitary or loosely entangled about one another to form bundles. The chloroplast is a thin, parietal plate covering most of the cell wall. Pyrenoid may be present. The cells can be up to 50 µm long.

Occurrence

Common in all types of water.

Chroococcus spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Chroococcales
Family : Chroococcaceae
Genus : Chroococcus

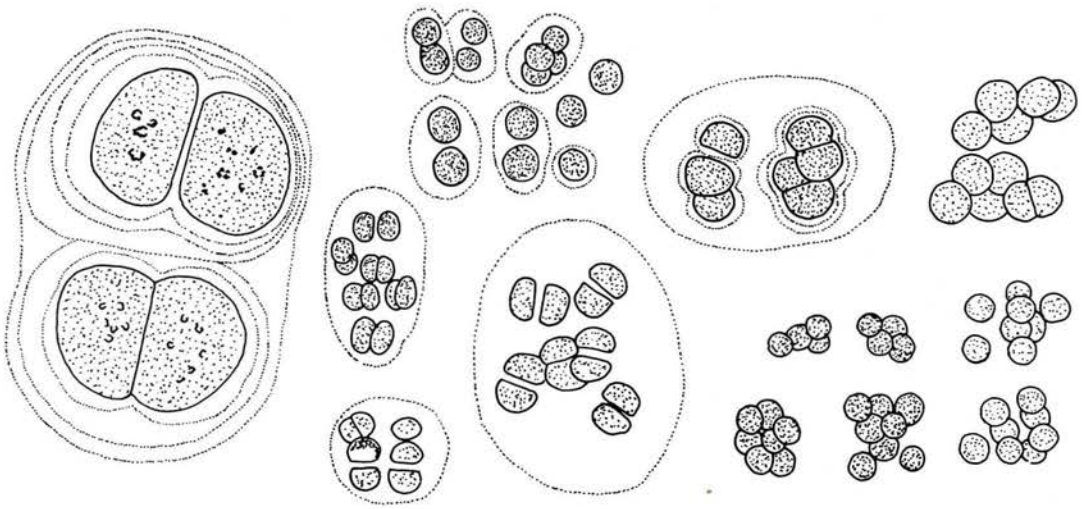


Figure 16a: Chroococcus spp.

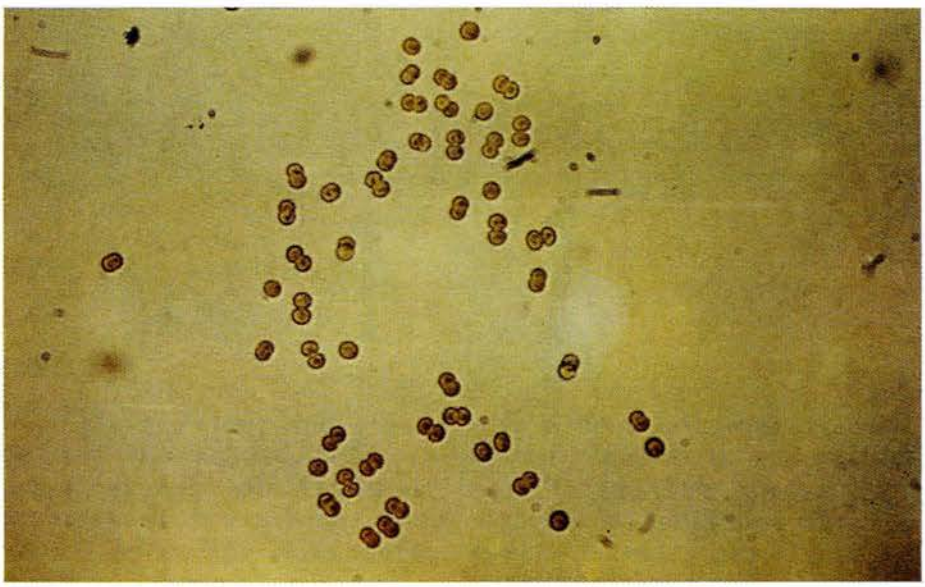


Figure 16b: Chroococcus sp.

Morphology

Spherical or elliptical cells occurring singly or in pairs of 4's, sometimes more. Usually free-floating. The colonial sheath does not usually show concentric layers. The cell contents are granular or homogeneous, not vacuolated. Chroococcus turgidus is a large species in which cells occur in 2's and 4's within a slightly stratified sheath (Prescott, 1978). Cells can be up to 50 µm across, but usually 1/2 or 1/4 this size.

Occurrence

Most species are eu- or tychoplanktonic.

Closteriopsis spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Chlorellaceae
Genus : Closteriopsis

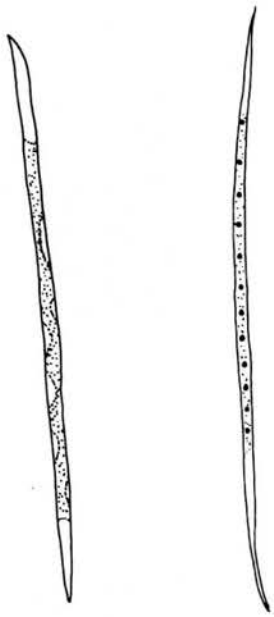


Figure 17a: Closteriopsis spp.

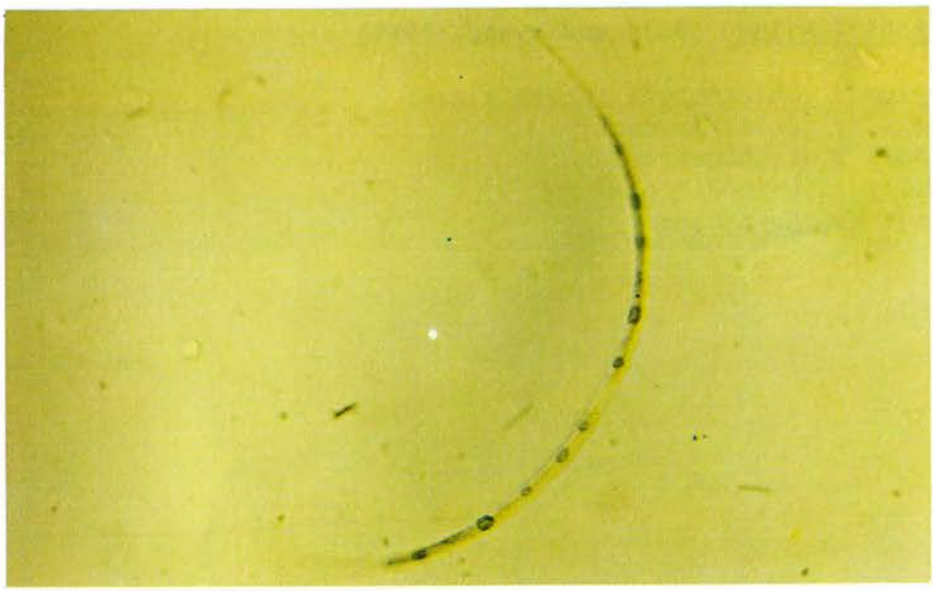


Figure 17b: Closteriopsis sp.

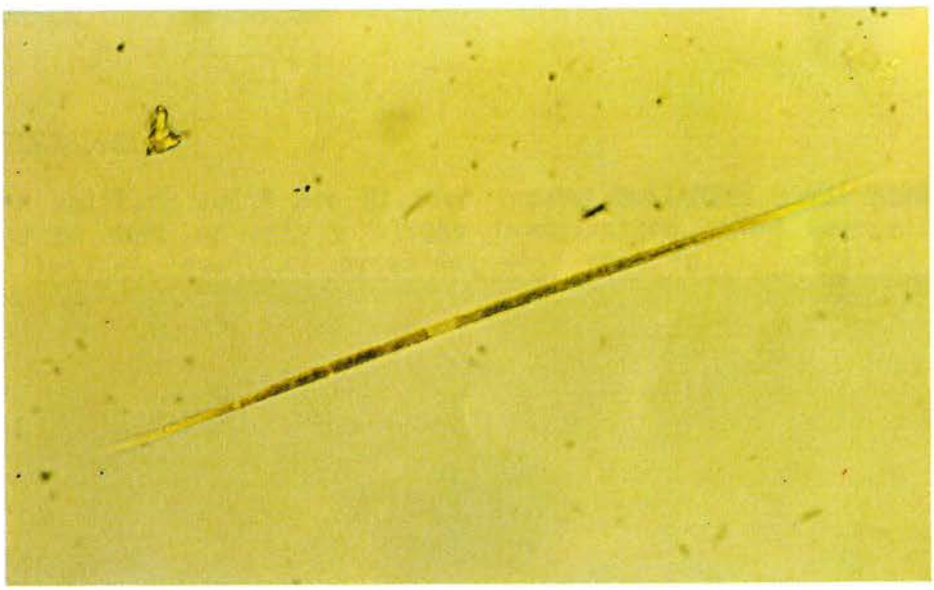


Figure 17c: Closteriopsis sp.

Morphology

The cells are long and needle-like with a chloroplast that has a row of pyrenoids. Closteriopsis should be compared with Ankistrodesmus and it is differentiated from Ankistrodesmus on the basis of its greater size, stouter proportions and the axial row of pyrenoids (Prescott, 1962). Cells are 190-370 µm in length.

Occurrence

Closteriopsis is found in the plankton.

Cosmarium spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Zygnematales
Family : Desmidiaceae
Genus : Cosmarium

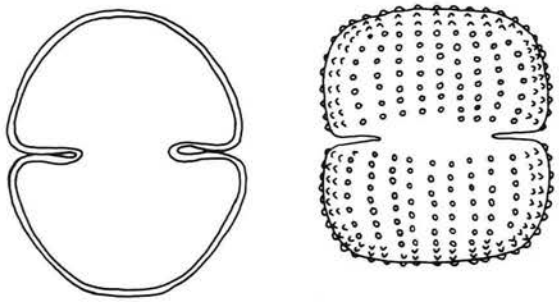


Figure 18a: Cosmarium spp.

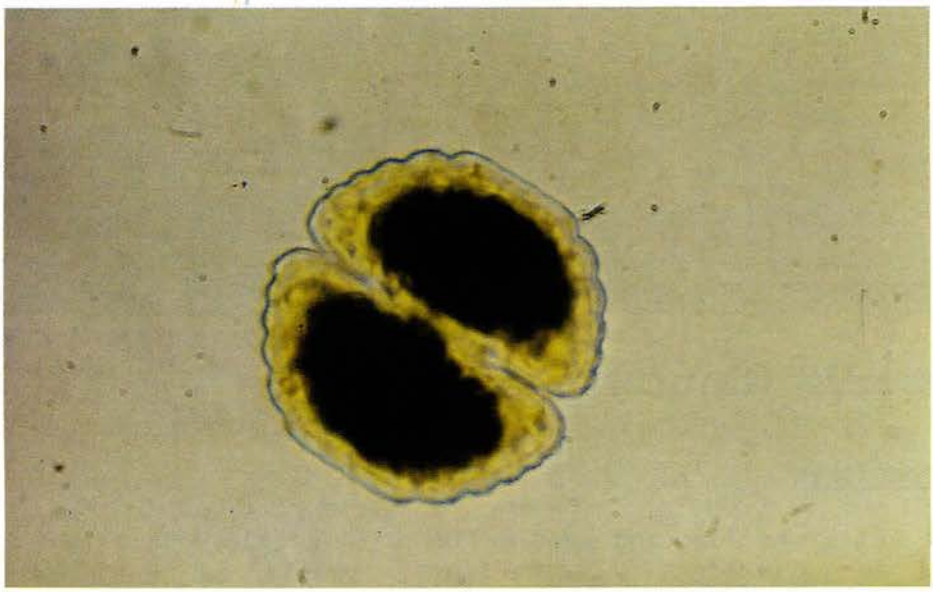


Figure 18b: Cosmarium sp.

Figure 18c: Cosmarium sp.

Morphology

The solitary cells are divided into 2 semicells by a sinus that may be deep or only a slight invagination. The semicells are elliptical, oval, or pyramidal when seen in the vertical view. The cell length is slightly greater than the breadth. The cell wall is smooth or ornamented with granules that are usually arranged in a definite pattern. There are few, large chloroplasts in the semicells. This genus includes thousands of species with considerable variations in shape, size and wall ornamentation. Cells are 10-200 µm long.

Occurrence

The different species have a widespread distribution in water bodies of all types.

Crucigenia spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Scenedesmaceae
Genus : Crucigenia

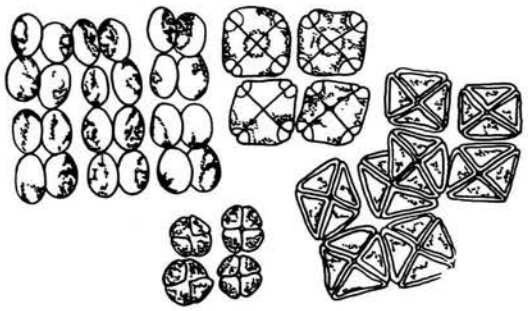


Figure 19a: Crucigenia spp.

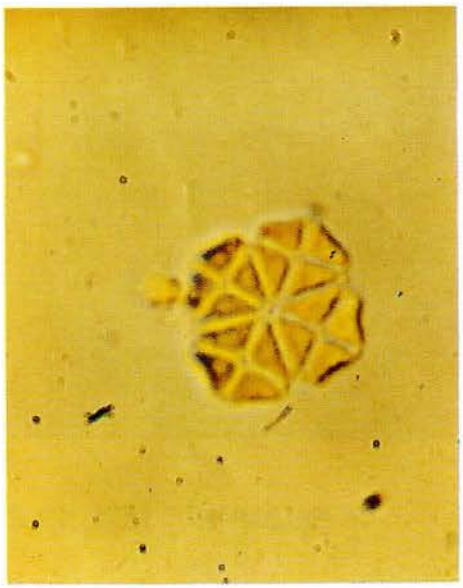


Figure 19b: Crucigenia sp.

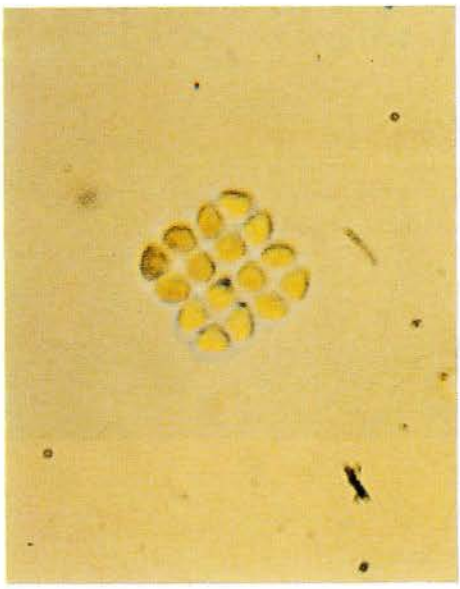


Figure 19c: Crucigenia sp.

Morphology

The free-floating colony consists of a plate of 4-8-16 trapezoid, rectangular or oval cells lying in one plane about a small or large central space (Prescott, 1978). The cells are joined to form a 4-celled coenobia. Several coenobia may be enclosed in a gelatinous envelope to form colonial complexes. Each cell has 1-4 cup-shaped chromatophores that are situated parietally. Cells are 3-15 µm long.

Occurrence

Crucigenia is distributed in the euplankton.

Dinobryon spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chrysophyta (Yellow-green algae)
Class : Chrysophyceae
Order : Ochromonadales
Family : Dinobryaceae
Genus : Dinobryon

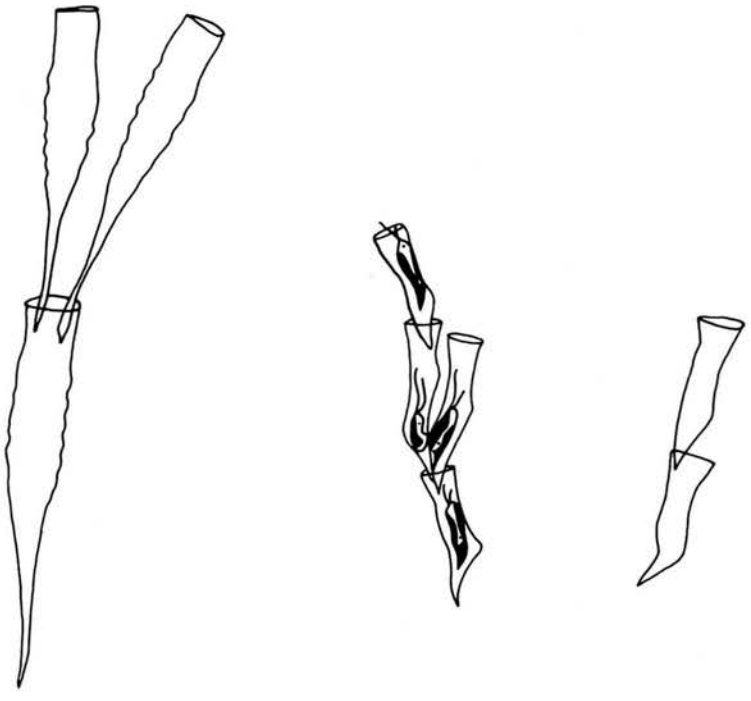


Figure 20a: Dinobryon spp.

Figure 20b: Dinobryon sp.

Morphology

Dinobryon can be free-swimming or attached, rarely solitary but usually forms colonies of vase-shaped loricas. One or 2 loricas arise from within the mouth of another to form forked series. Each lorica has a motile protoplast with 2 unequal flagella, but the protoplasts are often absent from the loricas. Loricas can be 18-100 µm long.

Occurrence

This genus is one which inhabits mostly hard water and eutrophic lakes, occurring in the euplankton and sometimes might form "blooms". They produce disagreeable odours and tastes in domestic water supplies (Prescott, 1978), and cause clogging of filters (APHA, 1980).

Elakatothrix spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum: Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family: Chlorellaceae
Genus : Elakatothrix

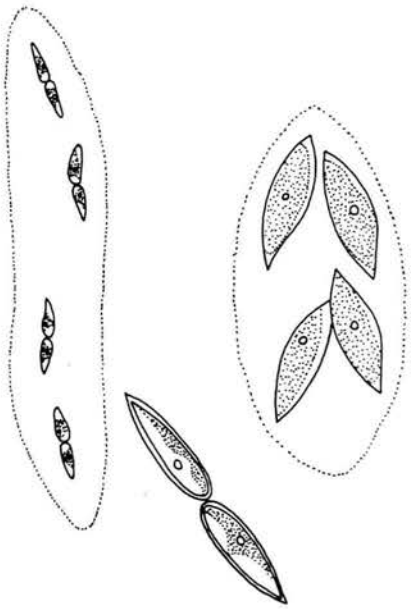


Figure 21a: Elakatothrix spp.

Figure 21b: Elakatothrix sp.

Morphology

Cells are fusiform or ovate "cigar"-shaped and occur end to end in pairs or side by side within a gelatinous sheath. The colonies usually contain 4 cells but there can be as many as 16 cells with either one or both poles pointed. The chloroplast is a parietal plate with 1 or 2 pyrenoids that covers almost all of the wall along one side. Cells are 3-15 µm in diameter and colonies can be up to 160 µm long.

Occurrence

Elakatothrix is mostly euplanktonic.

Euglena spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Euglenophyta
Class : Euglenophyceae
Order : Euglenales
Family : Euglenaceae
Genus : Euglena

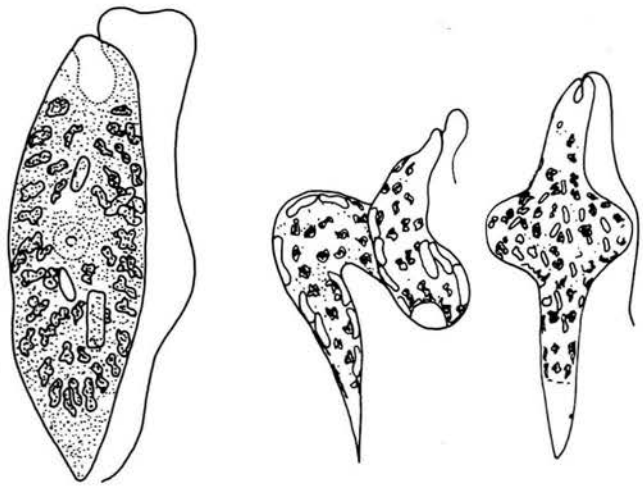


Figure 22a: Euglena spp.

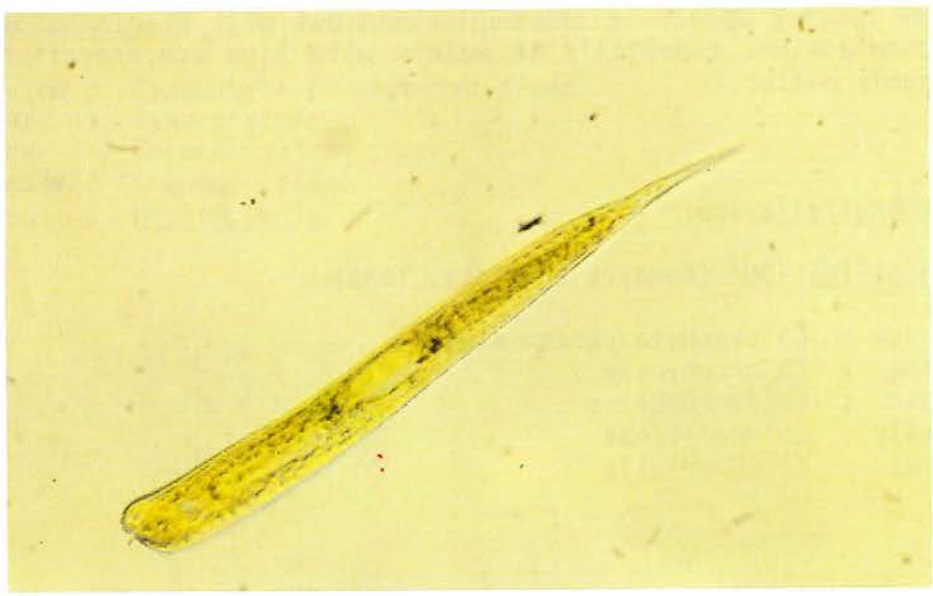


Figure 22b: Euglena sp.

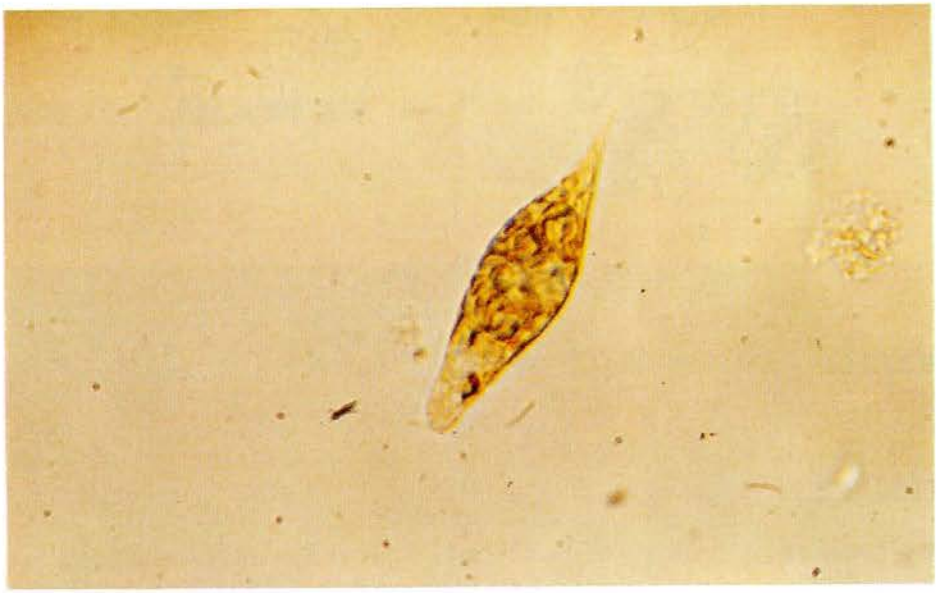


Figure 22c: Euglena sp.

Morphology

Cells are fusiform, cylindrical or ovate, usually round in cross section. The body can become fatter or thinner. The posterior end is either rounded or sometimes extended into a fine point, the anterior end is usually narrowed and sometimes conspicuously 2-lipped. The periplast is either firm with fine spiral striations or rows of granules, or soft and pliable, changing shape in its movements. There is a gullet at the anterior end from which arises a single flagellum of variable length. Some species have a conspicuous eyespot. Cells are 25-100 µm long.

Occurrence

Some species appear in the euplankton but most are found in the tychoplankton, especially in waters with high concentrations of organic matter.

Kirchneriella spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Chlorellaceae
Genus : Kirchneriella

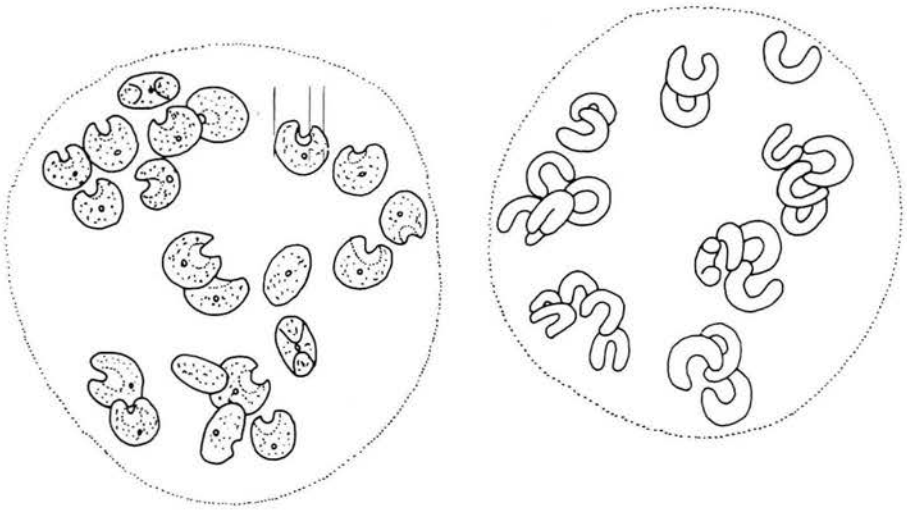


Figure 23: Kirchneriella spp.

Morphology

Free-floating colony of strongly curved, sickle-shaped cells, enclosed by a gelatinous envelope. Cells are arranged loosely in groups with no regular arrangement of the individuals. The chloroplast is a parietal plate along the convex wall with 1 pyrenoid. Cells are 3-5 µm in diameter and 10-18 µm long. The colonies can be as much as 250 µm in diameter.

Occurrence

This genus does not often occur in great numbers and is usually indicative of acidic conditions. Kirchneriella usually occurs in open water plankton.

Merismopedia spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Chroococcales
Family : Chroococcaceae
Genus : Merismopedia

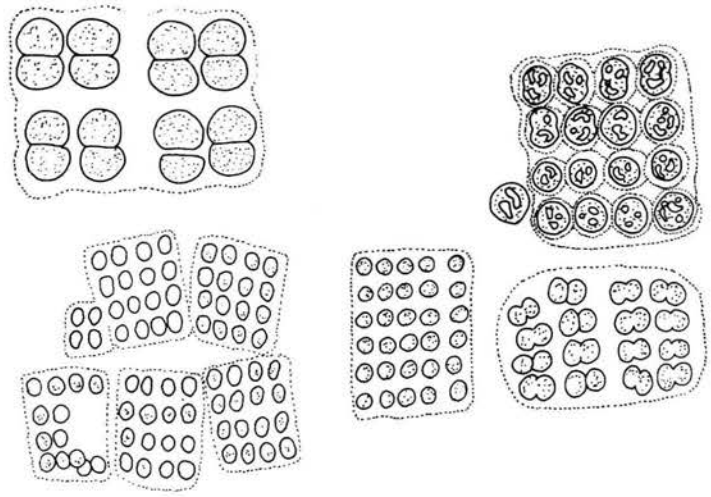


Figure 24a: Merismopedia spp.

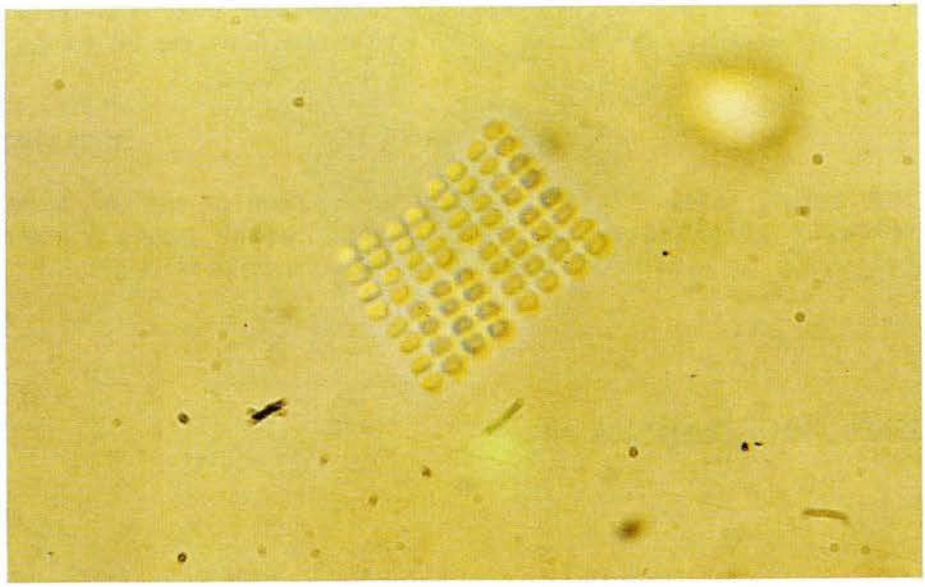


Figure 24b: Merismopedia sp.

Morphology

Merismopedia is a plate-like colony that consists of ovate or globose cells that are compactly or loosely arranged in rows. The colony is enclosed by a colourless mucilage which is quadrangular and becomes distorted with age. The colonies increase in size by cell division in 2 directions in 1 plane. The cells are 3-10 µm in diameter.

Occurrence

This genus is found in the euplankton and tychoplankton and generally is indicative of soft waters (Greeson, 1982).

Pandorina spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Volvocales
Family : Volvocaceae
Genus : Pandorina

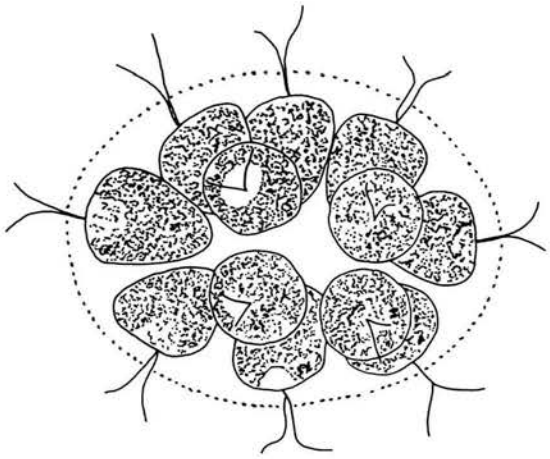


Figure 25a: Pandorina sp.

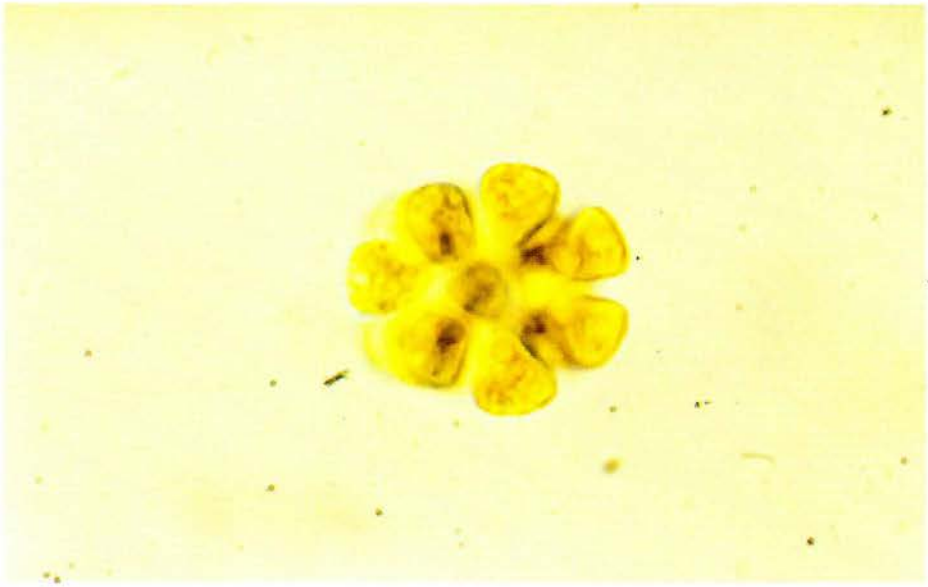


Figure 25b: Pandorina sp.

Morphology

Pandorina is a tumbling and rolling colony which usually is more oval than spherical. The colony consists of 8-16-(32) pear-shaped cells that are crowded and enclosed by a gelatinous envelope. The broad ends of the cells are directed outwardly with 2 flagella arising from the broad end of each cell and diverge widely after emerging from the colonial envelope. The chloroplast is a parietal cup with 1 pyrenoid. The colonies can be up to 50 µm in diameter.

Occurrence

Common in the plankton of hard and soft water lakes but more frequent among dense growths of algae, especially in water that is rich in nitrogenous matter (Prescott, 1962).

Peridinium spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Pyrrhophyta
Class : Dinophyceae (Dinoflagellates)
Order : Peridiniales
Genus : Peridinium

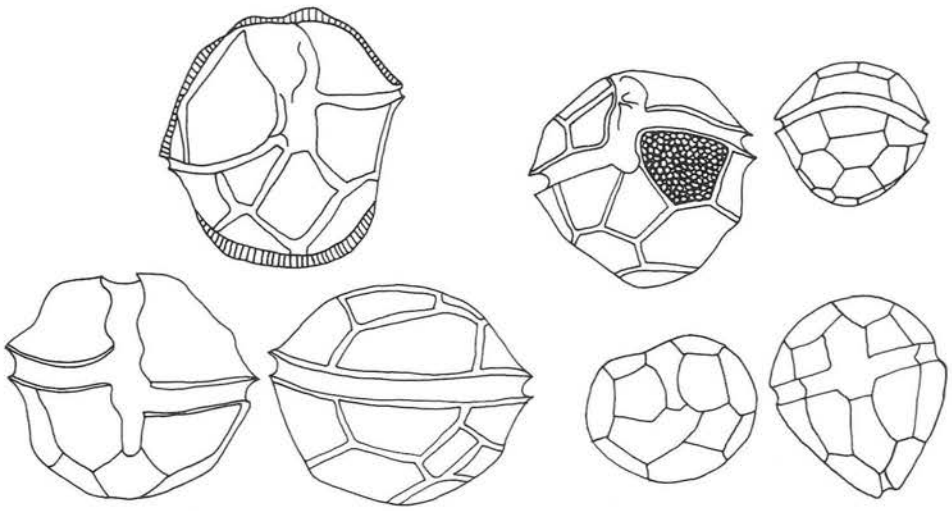


Figure 26a: Peridinium spp.

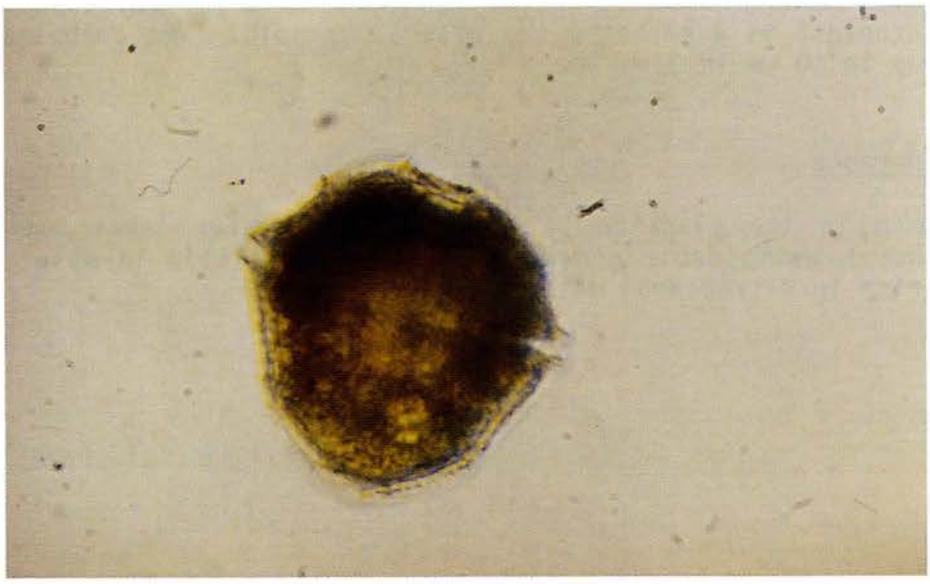


Figure 26b: Peridinium sp.

Morphology

The cells are globose, ovoid, or fusiform and usually dorsiventrally flattened. The poles are either rounded or sometimes extended to form short horns. The cells are divided into a hypocone and epicone. Two flagella are present, 1 winding about the cell and the other trailing. The species are differentiated by shape and size of the cell, and the number, shape and arrangement of the wall plates. The cells are 35-55 µm in diameter and 40-60 µm long.

Occurrence

They are found in the euplankton and tychoplankton.

Schroederia spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Characiaceae
Genus : Schroederia

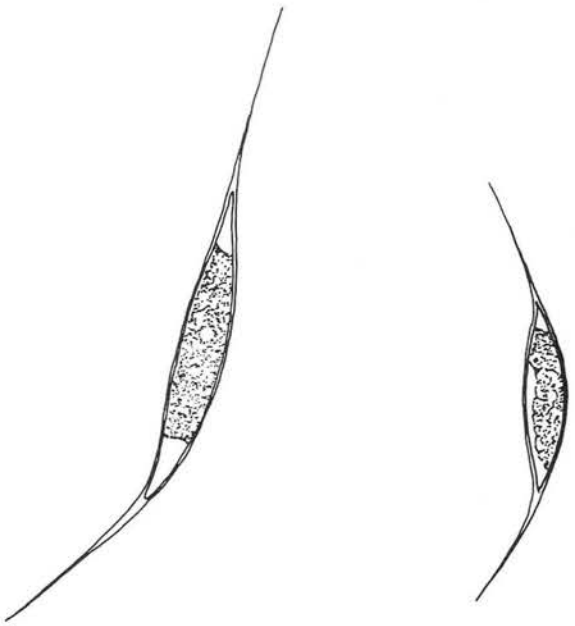


Figure 27a: Schroederia spp.

Figure 27b: Schroederia sp.

Morphology

Cells are free-floating and solitary. They are acicular to fusiform and are straight or slightly curved with each pole extended into a long stout spine. The cell has 1 parietal chloroplast that covers most of the cell wall. Cells are 3-6 µm in diameter and 60-85 µm long.

Occurrence

This genus is found in the euplankton.

Selenastrum spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Chlorellaceae
Genus : Selenastrum

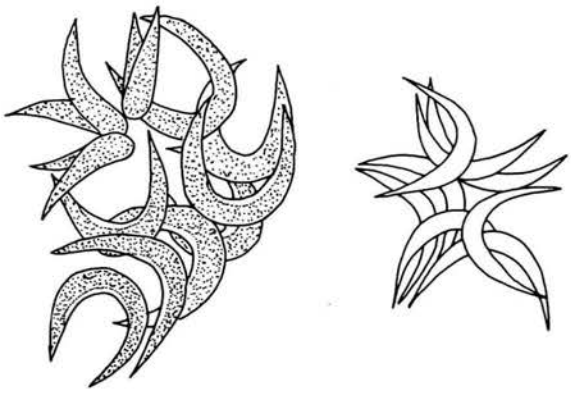


Figure 28a: Selenastrum spp.

Figure 28b: Selenastrum sp.

Morphology

Cells are lunate or sickle-shaped with apices acutely pointed. Cells can be solitary or in colonies of 4-16 cells, closely clustered, but not entangled, without a gelatinous envelope. The single chloroplast is parietal and covers most of the wall. Cells are 1,5-2,5 µm in diameter and 15-18 µm in length.

Occurrence

Distributed in the euplankton. Some species occur in soft, acidic waters (Greeson, 1982).

Sphaerocystis spp.

CLASSIFICATION (Komarek and Fott, 1983)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Chlorococcales
Family : Palmellaceae
Genus : Sphaerocystis

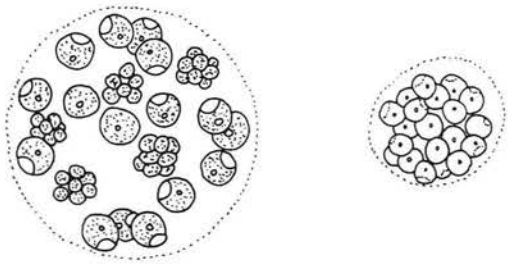


Figure 29a: Sphaerocystis spp.

Figure 29b: Sphaerocystis sp.

Figure 29c: Sphaerocystis sp.

Morphology

Colonies of 4-32 cells scattered throughout the colonial mucilage, ordinarily with several daughter colonies of smaller cells intermingled. The chromatophores are cup-shaped and may fill the entire cell. Cells are 6-20 µm in diameter and the colonies can be up to 500 µm in diameter.

Occurrence

Widely distributed in the euplankton.

Spirulina spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Cyanophyta (Blue-green algae)
Class : Cyanophyceae
Order : Oscillatoriales
Family : Oscillatoriaceae
Genus : Spirulina

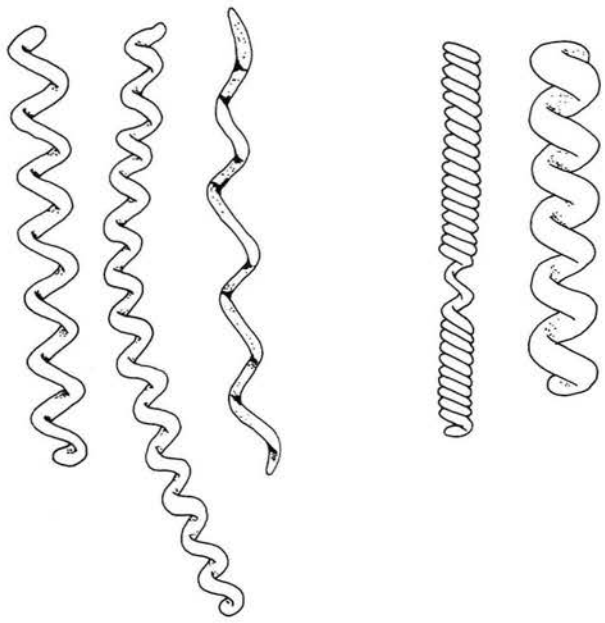


Figure 30a: Spirulina spp.

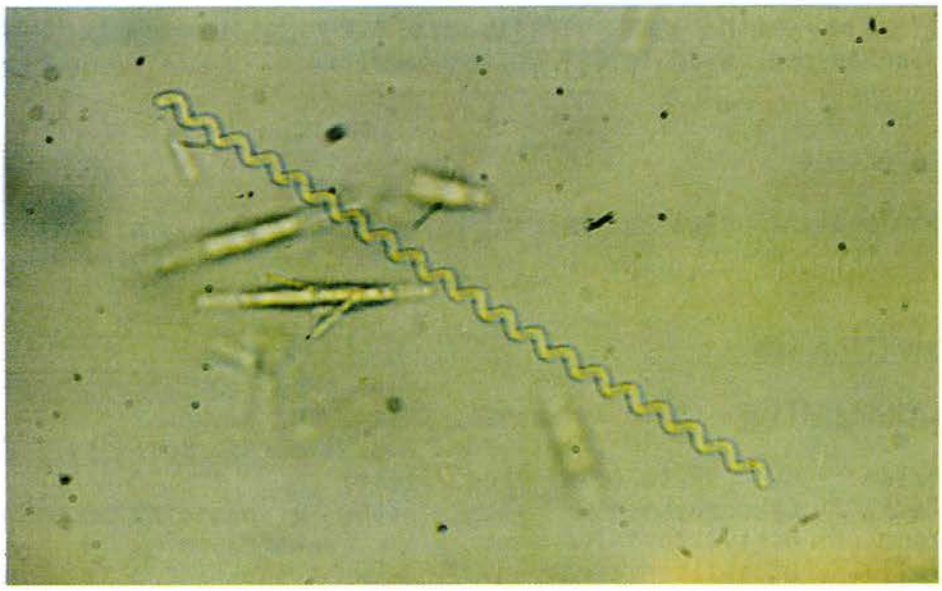


Figure 30b: Spirulina sp.

Morphology

The trichomes are unicellular (without cross walls) and thread-like. The species differ in size and by the shape of the coils or by the type of coiling. They are actively moving and are often found intermingled with Oscillatoria (Prescott, 1978). Trichomes are 0,7-5 µm in diameter.

Occurrence

They are found in the tychoplankton.

Staurastrum spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Zygnematales
Family : Desmidiaceae
Genus : Staurastrum

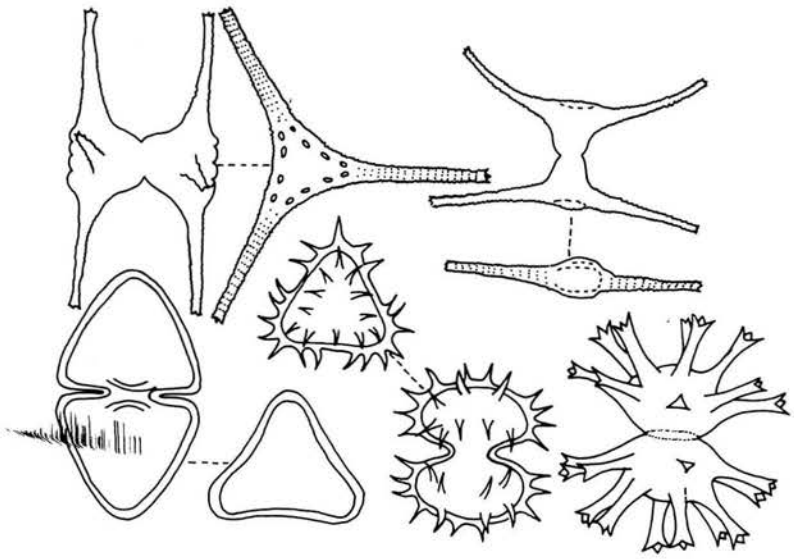


Figure 31a: Staurastrum spp.

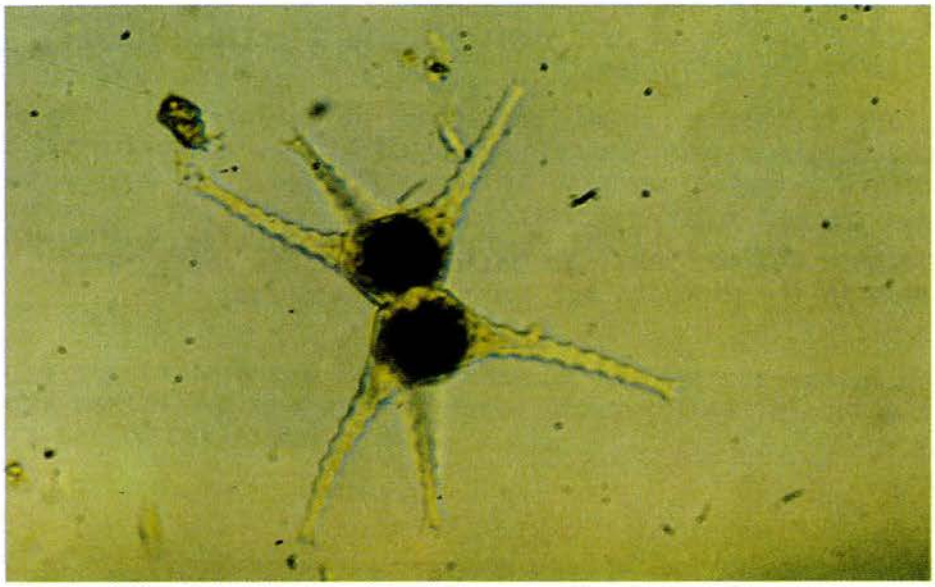


Figure 31b: Staurastrum sp.

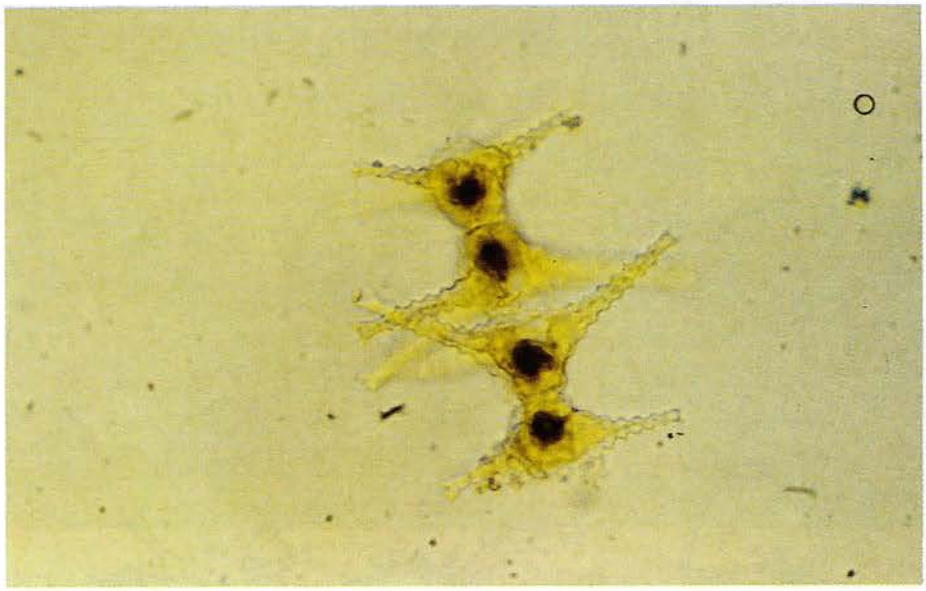


Figure 31c: Staurastrum sp.

Morphology

The cells are radially symmetrical and usually triangular in the end view, with 3 corners, spines or arms. Semicells and arms are either smooth or variously ornated with spines. The 2 poles of the cell are similar in morphology and arm arrangement. There are many species belonging to this genus, each with their own shape, size and ornamentation. The most distinctive feature is the extension of the semicell into 2 or more planes. Cells are up to 130 µm in length.

Occurrence

Most species are found in acid lakes, whereas a few are not selective and may occur in basic waters (Prescott, 1978). It is common in the plankton but not usually abundant.

Volvox spp.

CLASSIFICATION (Bold and Wynne, 1985)

Phylum : Chlorophyta (Green algae)
Class : Chlorophyceae
Order : Volvocales
Family : Volvocaceae
Genus : Volvox

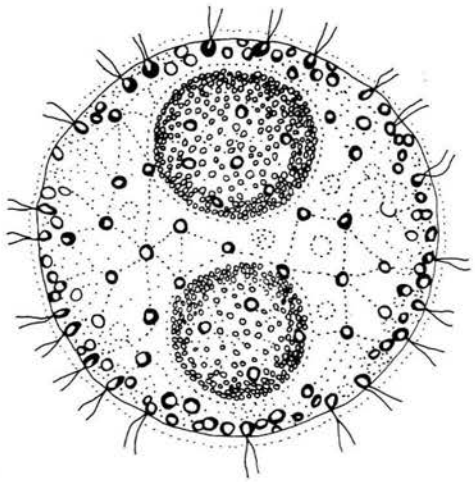


Figure 32: Volvox sp.

Morphology

Free-swimming spherical colony that contains thousands of chlamydomonas-like cells, each having 2 flagella of equal length. The chloroplast of each cell is parietal and covers most of the cell wall. The cells are arranged at the periphery of a gelatinous sphere of homogeneous mucilage and all the cells are directed outward. Mature colonies may contain several enlarged egg cells and 1 to several daughter colonies within the interior of the sphere. The colonies are large, up to 1 mm in diameter and can usually be seen with the naked eye.

Occurrence

Volvox occurs in water that is rich in nitrogenous matter during summer months and can produce large growths that last only for a short period (Bellinger, 1969).

PART 4: RESULTS

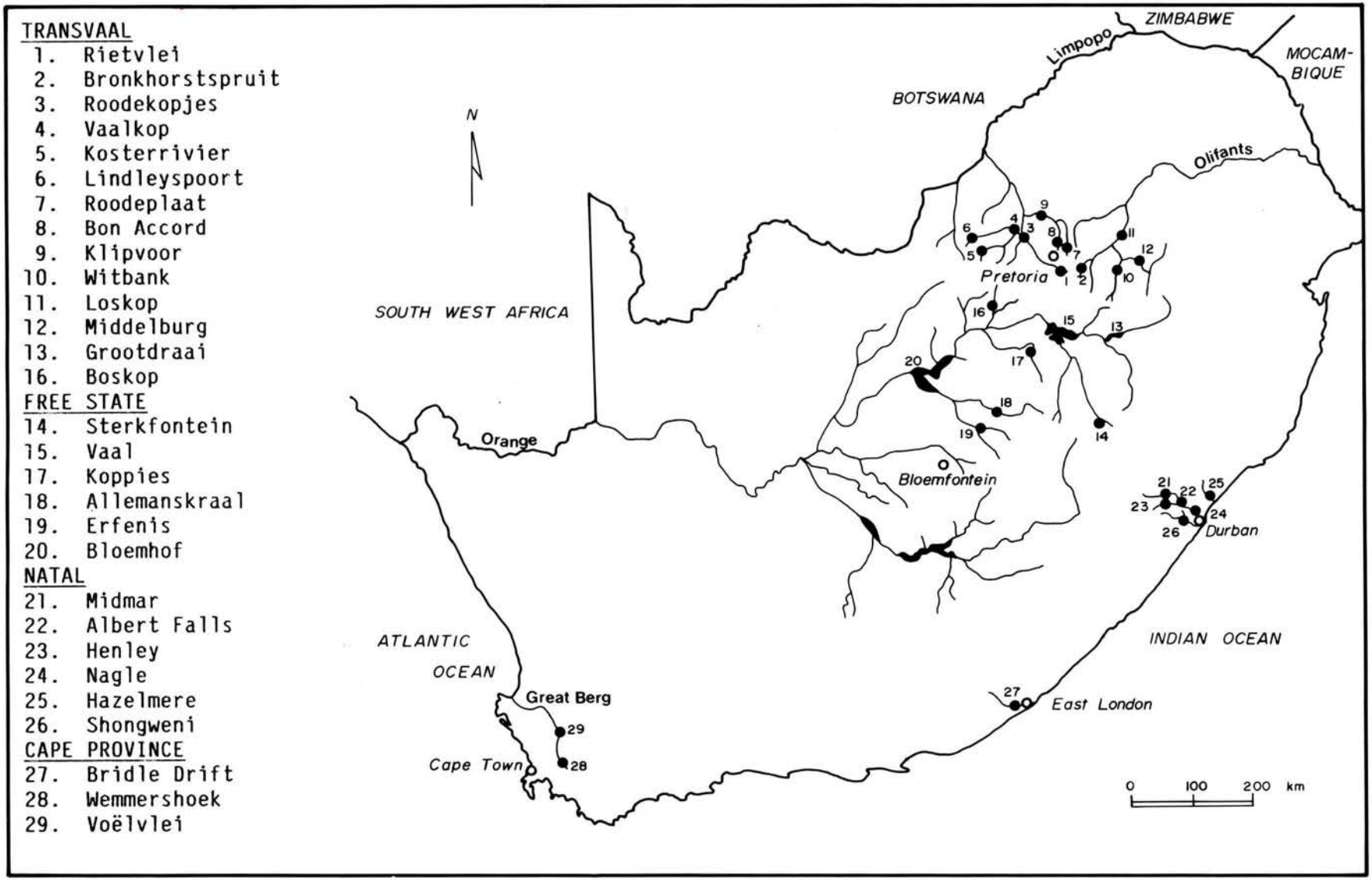
4.1 DISCUSSION

Microcystis was found to be the most frequently dominant alga and also one of the most widely distributed genera in South African impoundments. It occurred in 26 of the dams sampled and was periodically dominant in 13 of the dams.

Anabaena was found in all the 29 dams sampled and was therefore the most widely distributed algal genus. It was dominant at some periods in only 9 dams.

Cryptomonas was dominant at some periods in 11 of the 28 dams where it occurred, but the number of times that it was dominant was less than Microcystis.

Cyclotella, Melosira, Chlamydomonas and Oocystis were found in 26 of the dams sampled but the number of times that they were dominant were much less than the others mentioned. All the other recorded algae occurred in smaller percentages or were dominant only a few times.



4.2 Figure 33: Map of South Africa showing the dams from which samples were taken.

4.3 TABLES OF THE DAMS SAMPLED, INDICATING GENERA OBSERVED

TABLE 1: Albert Falls

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena						P	P	P				
Ankistrodesmus							P	P				
Ceratium												
Chlamydomonas							P					
Chroococcus							P	P				
Closteriopsis					P	P	P	P				
Coelastrum							P					
Cosmarium							P					
Crucigenia						P	P	P				
Cryptomonas					P							
Cyclotella					P		P	P				
Dinobryon												
Elakatothrix					P		P	P				
Euglena												
Kirchneriella												
Melosira					P	D	P	P				
Merismopedia												
Microcystis					P		P					
Oocystis					P	P	P					
Oscillatoria												
Pandorina												
Pediastrum								P				
Peridinium												
Scenedesmus					D	P	D	D				
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum					P	P	P	P				
Trachelomonas							P	P				
Volvox												

P = Present D = Dominant

TABLE 2: Allemanskraal

MONTHS OF THE YEAR (1986)

Algal Genera	J*	F	M	A	M	J	J	A	S	O	N	D
Actinastrum												
Anabaena		D	P	P	P		P		P	P		
Ankistrodesmus		P										
Ceratium												
Chlamydomonas				P	P							
Chroococcus												
Closteriopsis											P	
Coelastrum												
Cosmarium												
Crucigenia		P										
Cryptomonas				P	P	D	D	D	P	D	D	D
Cyclotella		P	P				P					
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira			P									
Merismopedia												
Microcystis		P	D	D	D							
Oocystis			P		P		P	P		P		P
Oscillatoria									P			
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus												
Schroederia												
Selenastrum												
Sphaerocystis		P										
Spirulina												
Staurastrum												
Trachelomonas								P	D	P		
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 3: Bloemhof

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
Actinastrum	P			P	P	P	P	P	P	P		
Anabaena	D	P	P		P	P				P	P	D
Ankistrodesmus	P		P	P	P	P	P	P	P	P	P	P
Ceratium												
Chlamydomonas	P				P	P	P	P	P	D	P	
Chroococcus								P				P
Closteriopsis		P	P		P	P	P	P	P			P
Coelastrum	P											
Cosmarium												
Crucigenia					P	P	P	P				
Cryptomonas	P	P	P	P	D	P	P	P	P	P		
Cyclotella	P	P	P	P	P	D	D	D	D	P	D	P
Dinobryon												
Elakatothrix												
Euglena	P			P	P	P	P	P	P	P	P	
Kirchneriella												
Melosira	P	P	P	P	P	P	P	P	P	P	P	P
Merismopedia												
Microcystis	P	D	D	P	P	P		P				P
Oocystis	P		P		P	P	P	P	P	P	P	P
Oscillatoria	P	P	P	D	P							P
Pandorina												
Pediastrum	P		P	P	P	P	P	P	P	P	P	P
Peridinium												
Scenedesmus	P		P	P	P	P	P	P	P	P	P	
Schroederia					P							
Selenastrum												
Sphaerocystis									P	P		
Spirulina	P		P	P	P	P						
Staurastrum	P					P						
Trachelomonas		P	P	P	P	P	P	P	P	P		P
Volvox												

P = Present D = Dominant

TABLE 4: Bon Accord

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D*
	- Not Sampled -											
Actinastrum												
Anabaena									P		P	
Ankistrodesmus					P				P	P		
Ceratium												
Chlamydomonas						P	P	P	P			
Chroococcus					P	P						
Closteriopsis												
Coelastrum												
Cosmarium												
Crucigenia												
Cryptomonas					P	P	P	P	D	P	P	
Cyclotella					P	P				P		
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira					P	P	P	P	P	P	P	
Merismopedia												
Microcystis					D	D	D	D	P	D	P	
Oocystis					P	P	P	P	P	P	P	
Oscillatoria												
Pandorina												
Pediastrum					P	P	P	P	P	P	P	
Peridinium												
Scenedesmus					P	P	P		P	P		
Schroederia					P		P			P	P	
Selenastrum												
Sphaerocystis								P				
Spirulina					P							
Staurastrum												
Trachelomonas												
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 5: Boskop

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	Not Sampled					Not Sampled			- Not Sampled -			
Actinastrum												
Anabaena			P	P	P		P					
Ankistrodesmus		P	P	P	P		P	P				
Ceratium												
Chlamydomonas			P	P			P	P				
Chroococcus							P	P				
Closteriopsis			P	P	P		P					
Coelastrum		P										
Cosmarium												
Crucigenia		P					P	P				
Cryptomonas		P	P	P	P		P	P				
Cyclotella		D	D	D	D		D	D				
Dinobryon												
Elakatothrix		P					P	P				
Euglena												
Kirchneriella		P										
Melosira		P		P	P		P	P				
Merismopedia		P	P									
Microcystis		P	P	P	P							
Oocystis		P	P	P			P	P				
Oscillatoria												
Pandorina												
Pediastrum		P	P	P	P		P	P				
Peridinium												
Scenedesmus		P	P	P	P		P	P				
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum		P	P	P	P		P					
Trachelomonas												
Volvox												

P = Present D = Dominant

TABLE 6: Bridle Drift

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A*	M	J	J	A	S	O	N	D
	Not Sampled					Not Sampled						
Actinastrum												
Anabaena											P	
Ankistrodesmus												
Ceratium												
Chlamydomonas			D						P	P	P	
Chroococcus										P		
Closteriopsis												
Coelastrum												
Cosmarium												
Crucigenia												
Cryptomonas			P		D			D	D	P		
Cyclotella										P		D
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira												
Merismopedia												
Microcystis			P							D		
Oocystis			P								P	
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus												
Schroederia										P		
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum												
Trachelomonas								P	P	P	P	
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 7: Bronkhorstspruit

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
			Not Sampled									Not Sampled
Actinastrum												
Anabaena	P	P		P	D	D	P	P	P		P	
Ankistrodesmus	P	P		P								
Ceratium				P	P	P						
Chlamydomonas	P	P			P	P	D		P			
Chroococcus						P	P				P	
Closteriopsis				P	P	P	P			P		
Coelastrum											P	
Cosmarium												
Crucigenia	P										P	
Cryptomonas	D	D		P		P	P		P			
Cyclotella	P	P		P	P	P		P		D	P	
Dinobryon												
Elakatothrix							P					
Euglena		P										
Kirchneriella		P										
Melosira	P	P		P	P	P	P	D	D	P	P	
Merismopedia												
Microcystis	P			P	P						P	
Oocystis	P	P		P			P	P	P	P	D	
Oscillatoria												
Pandorina												
Pediastrum	P	P		P		P	P		P	P	P	
Peridinium				D	P	P	P	P	P			
Scenedesmus		P		P			P				P	
Schroederia							P					
Selenastrum												
Sphaerocystis								P		P	P	
Spirulina												
Staurastrum						P						
Trachelomonas						P			P			
Volvox												

P = Present D = Dominant

TABLE 8: Erfenis

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O*	N*	D*
	Not Sampled											
Actinastrum												
Anabaena		P	P									
Ankistrodesmus												
Ceratium												
Chlamydomonas					P	P	P					
Chroococcus												
Closteriopsis		P	P			P		P	P			
Coelastrum												
Cosmarium												
Crucigenia												
Cryptomonas		D	D	D	D	P	P		P	P		
Cyclotella										P		
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira												
Merismopedia												
Microcystis												
Oocystis		P								P		
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus										P		
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum												
Trachelomonas								P	P			
Volvox												

P = Present D = Dominant *Samples contained high sediment concentrations.

TABLE 9: Grootdraai

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
			Not Sampled		Not Sampled					- Not Sampled -		
Actinastrum												
Anabaena	D	P		P			P	P	P			
Ankistrodesmus												
Ceratium												
Chlamydomonas	P											
Chroococcus												
Closteriopsis									P			
Coelastrum								P				
Cosmarium												
Crucigenia												
Cryptomonas	P	P		P								
Cyclotella	P	P		P			D	P	P			
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira	P	P					P	P				
Merismopedia												
Microcystis	P	D		D								
Oocystis	P	P						P				
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus												
Schroederia												
Selenastrum												
Sphaerocystis	P											
Spirulina												
Staurastrum												
Trachelomonas				P				P	P			
Volvox												
Diatoms								D				

P = Present D = Dominant

TABLE 10: Hazelmere

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena					P	D	P	P				
Ankistrodesmus						P						
Ceratium												
Chlamydomonas					D			P				
Chroococcus					P	P	P					
Closteriopsis					P	P	P	P				
Coelastrum					P			P				
Cosmarium												
Crucigenia						P	P	P				
Cryptomonas												
Cyclotella												
Dinobryon												
Elakatothrix						P						
Euglena												
Kirchneriella												
Melosira					P	P	D	D				
Merismopedia												
Microcystis						P	P	P				
Oocystis												
Oscillatoria					P							
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus					P	P		P				
Schroederia												
Selenastrum												
Sphaerocystis					P		P					
Spirulina					P	P	P					
Staurastrum					P	P						
Trachelomonas												
Volvox												

P = Present D = Dominant

TABLE 11: Henley

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena					P							
Ankistrodesmus					P	P						
Ceratium						P						
Chlamydomonas						D						
Chroococcus					P		P	P				
Closteriopsis					P	P	P	P				
Coelastrum												
Cosmarium								P				
Crucigenia					D	P	P	P				
Cryptomonas					P							
Cyclotella					P	P						
Dinobryon					P		D	D				
Elakatothrix							P					
Euglena						P						
Kirchneriella												
Melosira												
Merismopedia												
Microcystis					P							
Oocystis					P		P					
Oscillatoria												
Pandorina												
Pediastrum							P					
Peridinium					P		P					
Scenedesmus					P	P						
Schroederia												
Selenastrum												
Sphaerocystis							P					
Spirulina												
Staurastrum					P	P						
Trachelomonas												
Volvox												

P = Present D = Dominant

TABLE 12: Klipvoor

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
								Not Sampled				Not Sampled
Actinastrum												
Anabaena				P	P	P	P					
Ankistrodesmus		P		P								
Ceratium												
Chlamydomonas					P	P						
Chroococcus												
Closteriopsis												
Coelastrum												
Cosmarium												
Crucigenia												
Cryptomonas	P	P	P	P		P	P		P	P	P	
Cyclotella		P	P	P		P	P					
Dinobryon												
Elakatothrix							P					
Euglena												
Kirchneriella												
Melosira	P	P	P	P		P	P		P			
Merismopedia												
Microcystis	D	D	D	D	D	D	D		D	D	D	
Oocystis	P	P	P		P	P	P		P	P		
Oscillatoria				P						P		
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus			P	P		P	P		P	P		
Schroederia			P	P		P	P			P		
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum										P		
Trachelomonas		P		P	P							
Volvox												

P = Present D = Dominant

TABLE 13: Koppies

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N*	D
	Not Sampled											
Actinastrum												
Anabaena		P	P	P	D	P	P	P	P	P	P	D
Ankistrodesmus		P				P	P					
Ceratium												
Chlamydomonas		P				D	D	P	P			
Chroococcus						P	P				P	
Closteriopsis		P			P	P	P	P	P	P		P
Coelastrum												
Cosmarium							P					
Crucigenia										P		
Cryptomonas		P		P	P	P	P		P		P	P
Cyclotella		P			P	P	P	P	P	P		P
Dinobryon												
Elakatothrix							P					
Euglena						P	P	P	P	P		
Kirchneriella												
Melosira		P	D	D	P	P	P	D	D	D	P	
Merismopedia												
Microcystis		D	P	P	P	P	P					
Oocystis		P		P	P	P	P	P	P		P	P
Oscillatoria												
Pandorina												
Pediastrum						P				P		
Peridinium												
Scenedesmus											P	
Schroederia				P	P							
Selenastrum												
Sphaerocystis		P				P						
Spirulina												
Staurastrum												
Trachelomonas												
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 14: Kosterrivier

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J*	A	S	O	N	D
Actinastrum												
Anabaena	P	P	D	D	P	D		D	P	P	P	P
Ankistrodesmus	P											
Ceratium	P	P										
Chlamydomonas		P	P	P					P			
Chroococcus										P		
Closteriopsis			P	P	P	P	P	P	P	P		P
Coelastrum												
Cosmarium				P								
Crucigenia		P							P	P	P	
Cryptomonas		P	P	P	D	P	P	P	P	P	D	P
Cyclotella	P	D	P	P	P		P	P	D	D	P	D
Dinobryon												
Elakatothrix		P										
Euglena									P			
Kirchneriella												
Melosira	D	P		P	P	P	P	P	P	P	P	P
Merismopedia												
Microcystis	P	P	P	P		P	P					P
Oocystis		P	P	P					P			P
Oscillatoria		P	P	P	P		P	P	P			P
Pandorina												
Pediastrum		P										
Peridinium												
Scenedesmus											P	
Schroederia												
Selenastrum												
Sphaerocystis		P							P	P	P	
Spirulina												
Staurastrum												
Trachelomonas			P	P	P	P	P	P	P	P	P	P
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 15: Lindleyspoort

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J*	A	S	O	N	D
Actinastrum												
Anabaena	P	D		P	P	P	P	D	P	D	D	D
Ankistrodesmus												
Ceratium	P	P	D	D	P	D				P	P	P
Chlamydomonas							P		P	P	P	
Chroococcus												
Closteriopsis					P	P					P	
Coelastrum												P
Cosmarium												
Crucigenia												
Cryptomonas	P				P	P		P	P	P	P	
Cyclotella	P										P	
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella												
Melosira												
Merismopedia												
Microcystis	D	P	P	P	D	P				P		
Oocystis	P	P							P	P		P
Oscillatoria	P	P		P								
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus												
Schroederia												
Selenastrum												
Sphaerocystis						P						
Spirulina												
Staurastrum												
Trachelomonas								P	D	P		
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 16: Loskop

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
								Not Sampled		Not Sampled		
Actinastrum												
Anabaena	P	P	P	P		P						P
Ankistrodesmus		P					P					
Ceratium	D	D	D	D	D	D	D		P			D
Chlamydomonas				P	P		P					
Chroococcus						P	P					
Closteriopsis			P	P		P	P					P
Coelastrum						P	P					
Cosmarium												
Crucigenia	P											
Cryptomonas	P	P	P	P					D			
Cyclotella	P	P		P	P		P		P			P
Dinobryon												
Elakatothrix					P				P			
Euglena												
Kirchneriella												
Melosira	P	P	P	P	P	P	P		P			P
Merismopedia												
Microcystis	P	P	P	P	P	P	P					P
Oocystis	P	P	P		P				P			P
Oscillatoria			P				P					P
Pandorina												
Pediastrum		P				P	P		P			P
Peridinium									P			P
Scenedesmus					P							P
Schroederia												
Selenastrum												
Sphaerocystis			P						P			P
Spirulina												
Staurastrum			P				P					
Trachelomonas				P	P	P	P		P			P
Volvox												

P = Present D = Dominant

TABLE 17: Middelburg

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J*	A	S*	O	N*	D
	Not Sampled				Not Sampled							
Actinastrum												
Anabaena		P						P				
Ankistrodesmus												
Ceratium												
Chlamydomonas		P	P	P			P	D		P		
Chroococcus							P					P
Closteriopsis		P										
Coelastrum												
Cosmarium										P		
Crucigenia								P		P	P	P
Cryptomonas		P	D	P						P		
Cyclotella		D	P	D							P	D
Dinobryon												
Elakatothrix												
Euglena												
Kirchneriella			P									
Melosira							P	P		P		P
Merismopedia												
Microcystis		P		P								
Oocystis		P	P					P		D		P
Oscillatoria												
Pandorina												
Pediastrum			P	P						P		
Peridinium											P	
Scenedesmus		P	P	P						P		P
Schroederia										P		
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum										P		
Trachelomonas												
Volvox												

P = Present D = Dominant *Samples contained high sediment concentrations.

TABLE 18: Midmar

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena						P	P					
Ankistrodesmus							P					
Ceratium												
Chlamydomonas					P	P	P					
Chroococcus												
Closteriopsis					P	P	P	P				
Coelastrum												
Cosmarium							P					
Crucigenia					P	P	P	P				
Cryptomonas					P							
Cyclotella					P	P		P				
Dinobryon						P	P					
Elakatothrix												
Euglena												
Kirchneriella												
Melosira					D	D	D	D				
Merismopedia												
Microcystis												
Oocystis					P		P	P				
Oscillatoria												
Pandorina												
Pediastrum							P					
Peridinium												
Scenedesmus					P	P	P	P				
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum							P					
Trachelomonas					P			P				
Volvox												

P = Present D = Dominant

TABLE 19: Nagle

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena					P	P		P				
Ankistrodesmus					P	P	P	P				
Ceratium												
Chlamydomonas					P	P	P	P				
Chroococcus					P	P	P	P				
Closteriopsis					P	P	P	P				
Coelastrum												
Cosmarium							P					
Crucigenia					P	P	P	P				
Cryptomonas						P	P	P				
Cyclotella					P	P	P	P				
Dinobryon												
Elakatothrix							P					
Euglena												
Kirchneriella												
Melosira					D	D	P	P				
Merismopedia												
Microcystis					P	P		P				
Oocystis					P	P	P					
Oscillatoria												
Pandorina												
Pediastrum					P							
Peridinium												
Scenedesmus					P	P	P	P				
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina						P	P	P				
Staurastrum					P	P	P	P				
Trachelomonas												
Volvox												
Diatoms							D	D				

P = Present D = Dominant

TABLE 20: Rietvlei

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D*
	- Not Sampled -											
Actinastrum												
Anabaena					P	P	P			P	P	P
Ankistrodesmus												
Ceratium												
Chlamydomonas							P					
Chroococcus						P	P			P		
Closteriopsis							P			P		
Coelastrum								P	P	P		
Cosmarium											P	
Crucigenia												
Cryptomonas				P	P		P	P	P	P	P	
Cyclotella												
Dinobryon												
Elakatothrix										P		
Euglena												
Kirchneriella												
Melosira				P	P	D	P	P	P	P	P	
Merismopedia												
Microcystis				D	D	P	P	P		P		
Oocystis				P	P	P	D	D	D	D	P	P
Oscillatoria												
Pandorina												
Pediastrum					P		P	P	P	P	D	P
Peridinium												
Scenedesmus									P			
Schroederia				P	P		P		P	P	P	P
Selenastrum												
Sphaerocystis							P					
Spirulina												
Staurastrum				P							P	
Trachelomonas									P	P		
Volvox										P		

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 21: Roodekopjes

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
Actinastrum						P						
Anabaena	P	P		P	P	P	P				P	P
Ankistrodesmus	P	P	P			P	P		P	P		P
Ceratium	P											
Chlamydomonas	P	P				D	P				P	D
Chroococcus						P	P	P	P	P		P
Closteriopsis	P	P		P		P	P		P		P	P
Coelastrum	P	P	P			P	P	P	P	P	D	P
Cosmarium		P				P						P
Crucigenia	P	P						P		P	P	P
Cryptomonas	P	P	P	P		P	P	P	P	P	P	P
Cyclotella	P	D	P	P		P	P	P	P	P	P	
Dinobryon												
Elakatothrix									P	P	P	
Euglena									P	P	P	
Kirchneriella												
Melosira		P	P			P	P	P	P		P	P
Merismopedia			P									P
Microcystis	D	P	P	D	D	P	D	P	P		P	P
Oocystis	P	P	P			P	P	D	D	D	P	
Oscillatoria	P	P	P	P								P
Pandorina												P
Pediastrum	P	P				P	P		P	P	P	P
Peridinium											P	P
Scenedesmus	P		P	P		P	P	P	P	P	P	P
Schroederia						P	P	P		P	P	
Selenastrum							P					
Sphaerocystis		P				P	P	P	P	P	P	P
Spirulina	P	P		P		P						
Staurastrum										P	P	P
Trachelomonas				P			P	P		P	P	P
Volvox												
Diatoms			D									

P = Present D = Dominant

TABLE 22: Roodeplaat

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
Actinastrum												
Anabaena	D	P	P		P	P				P		
Ankistrodesmus			P									
Ceratium				P								
Chlamydomonas	P	P	P	P	P	P	P	P	P			
Chroococcus	P	P	P	P	P		P	P		P	P	
Closteriopsis				P	P	P	P	P	P	P		
Coelastrum	P				P		P	P	P	P	P	
Cosmarium							P	P	P	P		
Crucigenia								P				
Cryptomonas	P	P	P	P	P		P	P	P	P	P	P
Cyclotella	P		P	P	P	P	P	P				
Dinobryon												
Elakatothrix												
Euglena			P									
Kirchneriella												
Melosira	P	P	P	P	D	P	P	P	P	P	P	P
Merismopedia												
Microcystis	P	D	D	D	P	D	D	D	D	P	P	D
Oocystis	P	P	P	P	P	P	P	P	P	D	D	P
Oscillatoria					P							
Pandorina												
Pediastrum	P	P	P	P	P	P		P				P
Peridinium												
Scenedesmus	P		P	P	P	P	P	P			P	
Schroederia			P	P	P		P	P	P	P	P	
Selenastrum			P		P		P					
Sphaerocystis		P						P	P	P		
Spirulina												
Staurastrum	P	P	P	P	P		P	P	P	P	P	P
Trachelomonas							P	P				
Volvox												

P = Present D = Dominant

TABLE 23: Shongweni

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J*	J	A	S	O	N	D
	- Not Sampled -								- Not Sampled -			
Actinastrum												
Anabaena					P	P	P					
Ankistrodesmus					P	P	P	P				
Ceratium												
Chlamydomonas							D	D				
Chroococcus					P	P	P	P				
Closteriopsis					P	P	P	P				
Coelastrum					P	P						
Cosmarium												
Crucigenia					P		P	P				
Cryptomonas					P		P					
Cyclotella					P	P	P					
Dinobryon												
Elakatothrix						P						
Euglena						P						
Kirchneriella												
Melosira					P	P	P	P				
Merismopedia												
Microcystis					P		P					
Oocystis					P		P	P				
Oscillatoria												
Pandorina												
Pediastrum					P							
Peridinium												
Scenedesmus					D	P	P	P				
Schroederia												
Selenastrum					P							
Sphaerocystis												
Spirulina												
Staurastrum					P	P	P					
Trachelomonas					P	P	P	P				
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 24: Sterkfontein

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	Not Sampled					Not Sampled				- Sampled -		
Actinastrum												
Anabaena		P	P						P			
Ankistrodesmus		P					P	P	P			
Ceratium												
Chlamydomonas		P	D	P								
Chroococcus								P				
Closteriopsis				P								
Coelastrum												
Cosmarium								P				
Crucigenia		P					P		P			
Cryptomonas		P	P	P	P		P	P	P			
Cyclotella		D	P	D								
Dinobryon												
Elakatothrix					P							
Euglena												
Kirchneriella												
Melosira			P	P	D		D	D	D	P		
Merismopedia												
Microcystis		P	P	P								
Oocystis		P	P	P			P	P	P	P		
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus			P		P			P				
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum				P					P			
Trachelomonas										P		
Volvox												
Diatoms										D		

P = Present D = Dominant

TABLE 25: Vaal

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D*
	Not Sampled			Not Sampled						Not Sampled		
Actinastrum												
Anabaena			P		P							P
Ankistrodesmus												
Ceratium												
Chlamydomonas			P		P	D	D	P				
Chroococcus												
Closteriopsis							P	P				P
Coelastrum												
Cosmarium												
Crucigenia												
Cryptomonas			D		D	P	P	D	P			
Cyclotella			P					P	D			
Dinobryon												
Elakatothrix								P				
Euglena												
Kirchneriella												
Melosira								P	P			P
Merismopedia												
Microcystis			P									
Oocystis			P		P				P			
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus												
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum												
Trachelomonas					P			P				
Volvox												

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 26: Vaalkop

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S*	O*	N	D
	Not Sampled			Not Sampled								
Actinastrum												
Anabaena		P	P			P	P			P		P
Ankistrodesmus						P	P	P				
Ceratium		P	D		D	P	P	D	P			
Chlamydomonas						D	D	P				
Chroococcus							P	P	P		P	P
Closteriopsis		P	P			P	P	P				
Coelastrum										P	P	
Cosmarium											P	
Crucigenia											P	
Cryptomonas		P			P	P	P	P	P	P	P	
Cyclotella		P				P	P			P	P	D
Dinobryon												
Elakatothrix						P						
Euglena						P	P	P				
Kirchneriella												
Melosira		P				P	P	P	P	P		
Merismopedia												
Microcystis		P	P			P	P	P	P		D	
Oocystis						P	P	P	P	?	P	P
Oscillatoria		D				P					P	P
Pandorina												
Pediastrum											P	P
Peridinium								P	P		P	
Scenedesmus								P		P	P	
Schroederia										P		
Selenastrum												
Sphaerocystis						P		P	P		P	P
Spirulina												
Staurastrum											P	
Trachelomonas										P		
Volvox												

P = Present D = Dominant *Samples contained high sediment concentrations.

TABLE 27: Voëlvlei

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	Not Sampled						Not Sampled					
Actinastrum												
Anabaena					P							
Ankistrodesmus												
Ceratium												
Chlamydomonas												
Chroococcus											P	P
Closteriopsis				P					P	P		P
Coelastrum												
Cosmarium												
Crucigenia											P	
Cryptomonas									P	P	P	
Cyclotella				P						P	P	P
Dinobryon												
Elakatothrix									P			
Euglena												
Kirchneriella												
Melosira				D	D	D			D	P	D	D
Merismopedia												
Microcystis												
Oocystis					P	P			P	D	P	P
Oscillatoria												
Pandorina												
Pediastrum										P		
Peridinium												
Scenedesmus										P		P
Schroederia									P		P	
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum				P						P	P	
Trachelomonas												
Volvox												

P = Present D = Dominant

TABLE 28: Wemmershoek

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D*
	Not Sampled					Not Sampled						
Actinastrum												
Anabaena				P								
Ankistrodesmus				P	P			P	P		P	
Ceratium												
Chlamydomonas				P					P	P	D	
Chroococcus												
Closteriopsis												
Coelastrum												
Cosmarium												
Crucigenia											P	
Cryptomonas				D	D			D	P	P		
Cyclotella				P	P							
Dinobryon										P		
Elakatothrix								P	P			
Euglena												
Kirchneriella										P	P	
Melosira									P			
Merismopedia												
Microcystis					P							
Oocystis					P				D			
Oscillatoria									P			
Pandorina												
Pediastrum									P			
Peridinium												
Scenedesmus									P			
Schroederia									P			
Selenastrum												
Sphaerocystis										P		
Spirulina												
Staurastrum					P			P	P	P	P	P
Trachelomonas												
Volvox												
Diatoms										D		

P = Present D = Dominant *Sample contained high sediment concentrations.

TABLE 29: Witbank

MONTHS OF THE YEAR (1986)

Algal Genera	J	F	M	A	M	J	J	A	S	O	N	D
	Not Sampled		- Not Sampled -					Not Sampled				
Actinastrum		P										
Anabaena		P										
Ankistrodesmus							P		P	P	P	P
Ceratium							P					
Chlamydomonas							P		P		D	D
Chroococcus												
Closteriopsis							P		P	P	P	P
Coelastrum											P	
Cosmarium												
Crucigenia							P		P	P	P	P
Cryptomonas							P		P	P	P	
Cyclotella							P		D	D	P	P
Dinobryon												
Elakatothrix									P			
Euglena											P	
Kirchneriella												
Melosira							D		P	P	P	P
Merismopedia												
Microcystis		D									P	P
Oocystis							P		P		P	P
Oscillatoria												
Pandorina												
Pediastrum												
Peridinium												
Scenedesmus									P	P	P	P
Schroederia												
Selenastrum												
Sphaerocystis												
Spirulina												
Staurastrum							P		P		P	
Trachelomonas									P	P	P	P
Volvox												

P = Present D = Dominant

GLOSSARY

Terms relating to algae

1. Akinete - A non-motile spore produced by some blue-green algae from a vegetative cell which has developed a thick wall, containing oil or other food reserves. Resting stage during unfavourable conditions.

2. Amoeboid - Creeping by pseudopodia (root-like extension of protoplasm).

3. Anisogametes - Sex cells that are slightly dissimilar in size, shape and behaviour.

4. Apical - The top or anterior end.

5. Aplanospore - A non motile spore formed from the protoplast of a vegetative cell.

6. Arcuate - Arched, bow-shaped.

7. Blepharoplast - An organelle associated with the nucleus from which the flagellum arises.

8. Carotene - An orange-coloured pigment, usually associated with chlorophyll.

9. Chloroplast - An organelle in the cell containing chlorophyll as the predominating pigment.

10. Coenocytic - Multinucleated and without transverse walls.

11. Coenobium - A colony in which a definite number of cells are arranged in a specific way.

12. Costae - Ribbed structure.

13. Cyst - Vegetative reproductive cell, usually with a heavy wall.

14. Discoid - Disc shaped.

15. Endospore - A spore formed within a cell.

16. Epicone - The upper or anterior half of a Dinoflagellate cell.

17. Epizoic - Attached to or growing on animals.

18. Euplankton - True or open-water plankton, floating and drifting freely.

19. Eutrophic - Highly productive, enriched with nutrients.

20. Flagella - Stout, whip-like organs of locomotion which arise within the cell.

21. Fragmentation - The breakup of parental segments to form new individuals.

22. Frustule - The shell of diatoms.

23. Fusiform - An elongate figure broadest in the middle and tapering at each end; spindle-shaped.

24. Heterocyst - A specialized enlarged cell of certain groups of blue-green algae (Cyanobacteria). Usually larger and different in shape from the vegetative cells.

25. Heterogametes - Reproductive cells that are morphological not identical.

26. Isogametes - Reproductive cells which shows no detectable sexual differentiation.

27. Lamellate - Layered.

28. Lorica - A firm covering that is not connected to the protoplast and contains an opening.

29. Lunate - Moon-shaped.

30. Obovoid - Inversely ovoid, with the broader end anterior.

31. Parietal - Lying along the wall.

32. Pellicle - A thin external membrane.

33. Periphyton - The community of organisms that are attached to or live upon submerged surfaces.

34. Periplast - The outer membrane of a cell which has no true cell wall (Euglena).

35. Phytoplankton - The plant component of the plankton.

36. Plankton - The community of suspended or floating organisms that drift passively with water currents.

37. Plastid - Any one of the bodies in the cytoplast of a cell.

38. Protoplast - The living contents of a cell — nucleus, cytoplasm and plasma membrane.

39. Pseudocilia - False cilia, similar to flagella but not used for locomotion.

40. Pyrenoid - A protein granule which collects starch.

41. Pyriform - Pear-shaped with the narrow end foremost.

42. Reniform - Bean-shaped, kidney-shaped.

43. Reticulate - Like a network.

44. Saccate - Balloon-shaped.

45. Semicell - A cell-half in which the cell wall is in 2 parts and the cell contents paired, usually with a constriction in the midregion.

46. Seta - A hair or bristle.

47. Stellate - Star-shaped.

48. Striate - Delicate markings on the frustules of diatoms.

49. Trapezoid - A plane figure which has 2 parallel sides.

50. Trichocyst - Organelle either immediately within a cell membrane or scattered.

51. Trichome - The thread-like series of cells containing within a gelatinous sheath.

52. Truncate - Flat at the top, flatly rounded.

53. Tychoplankton - Free-floating organisms in shallow water intermingled with vegetation, usually near the shore.

54. Vegetative - Non-reproductive cells.

55. Zoospore - An asexual, motile spore, with 1 or more flagella, and usually with an eye-spot.

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