

A Study on Some Members of Chlorophyta Found in Taung-Tha-Man Lake

Thet Naing Htwe*

Abstract

Algae are photosynthetic organisms that occur in most habitats, ranging from marine and freshwater to desert sands and from hot boiling springs to snow and ice. The term algae refer to a large and diverse assemblage of eukaryotic organisms that contain chlorophyll. They are classified into eight divisions, namely Cyanophyta, Chlorophyta, Euglenophyta, Xanthophyta, Bacillariophyta, Pyrrophyta, Phaeophyta and Rhodophyta. This study emphasized only on the Chlorophyta. Algae specimens were collected from Taung-tha-man Lake which is located at the East of Amarapura Township, Mandalay Division. 18 genera of Chlorophyceae have been identified and described in this paper. All specimens were described with colourful photographic records.

Key words: Algae, Chlorophyta, Taung-tha-man Lake.

Introduction

Algae grow almost everywhere in the world. They are a vital part of the aquatic ecosystem providing food and shelter to other organisms. They play a crucial role in the ability of an aquatic ecosystem to absorb nutrients and heavy metals. Algae vary from small, single-celled forms complex multicellular forms, such as the giant kelps of the eastern Pacific that grow to more than 60 meters in length and form dense marine forests. They exhibit a wide range of reproductive strategies, from simple, asexual cell division to complex forms of sexual reproduction.

Algae are classified into eight divisions. Among them, the Chlorophyta were studied in this research. The Chlorophyta (green algae) are great diversity than other algae enjoy a wide range of distribution in aquatic (both fresh water and marine) and terrestrial habitats. All are eukaryotic, possessing definite nuclei, contain the pigment chlorophyll a and chlorophyll b, β -carotenes and xanthophyll.

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Both motile and non-motile forms occur, and both sexual and asexual reproductions take place. Both branched and unbranched filamentous forms and both flagellate and non-flagellate cells occur. Flagella are whiplash type. The reserve carbohydrate food is stored as starch.

Nowadays, algae are widely used in many purposes all over the world. They are used as human nutrition, animal feed, aquaculture and biofertilizer. Starch, often accompanied by oil in the green algae utilized as fish food. A culture of *Scenedesmus* is often exclusively used as a daily dose of fish meal of for the culture *Tilapia mossambica*. Species of *Chlorella*, *Chlamydomonas* and *Acetabularia* are used as tools for solving fundamental biochemical and genetically problems. Witch (1959) stated that Vitamin B value of young cultures of *Chlorella* equals that of lemon juice.

Many researchers worked on the algal flora in many places. Skuja (1949) treated on the algal flora of Burmas with about 600 species. Prescott (1962) worked on the algal flora with about 1000 species in eastern great lake area. In 1989-2000, freshwater algae of the Southeastern United States were done by Dillard. Similarly, in Myanmar, algal flora were done by Win Kyi (1973), Mya Mya Aye (1976), Mu Mu Thein (1976), Khin San Kywe (1982), Khin Phyu Phyu Aye (1982), Khin Myint Myint Tin (1992), Khin Nilar Than (1994), Lwin Lwin Oo (1995), Ni Ni Khaing (1995), Kyi Kyi Nyunt (1995), Theingi Htay (1997), Tin Tin Moe (2007), Saw Ohnmar Win (2008).

Algae are extremely important not only economically but also phylogenetically. In this research 18 genera of Chlorophyceae have been identified and described. The aim of the present study is to record the algae which grown in Taung-tha-man Lake, to study the algae which are important and to know the beneficial algae.

Materials and Methods

Algae specimens were collected from Taung-tha-man Lake during November, 2012 to January, 2013. The specimens were collected from the upper surface of the water. The fresh specimens mixed with water were put in the water bottle leaving air space. The collected algae specimens were studied under compound microscope (Olympus) in laboratory, Department of Botany, Yadanabon University. The specimens were classified by Prescott (1962), Philipose (1967), Dillard (1991), John *et al.* (2002).

Results

Algal Flora

The samples of algae were collected in Taung-tha-man Lake. Among them, 18 genera of Division Chlorophyta have been identified, described and recorded.

***Pandorina* Bory**

Colony ovate or obovoid, composed of 8-16-32 globose or pyriform cells compactly arranged and enclosed by a common mucilagenous envelope; cells with the broad anterior and directed outward, the posterior end of the cells are somewhat narrowed. Chloroplast a parietal cup with 1 basal pyrenoid; pigment - spot anterior and lateral. The colony swimming in a rolling or tumbling fashion.

***Kirchneriella* Schmidle**

Colonies free floating with the cells enclosed within a homogeneous gelatinous envelope. Cells strongly curved, lunate, sickle-shaped or spirally twisted with their pointed or rounded ends, irregularly arranged within the envelope; chloroplast a parietal plate along the convex wall, with 1 pyrenoid.

***Oocystis* Naegeli in A. Braun**

Unicellular or in colonies of 2-16 individuals enclosed by the persistent and much swollen mother wall of the previous generation; cells ovoid, ovoid-ellipsoid, or rarely subcylindric, with rounded poles which may be smooth or furnished; chloroplasts 1 or many mostly parietal, ovoid discs, irregular star-shaped plates; 1 pyrenoid in each chloroplast.

***Tetraedron* Kuetzing**

Cells solitary and not attached of various shapes, triangular and flat, pyramidal, polyhedral; the angles entire, with or without spines or variously lobed to form dichotomous or trichotomous spine-tipped processes; chloroplast one to many parietal disc or plates; with or without pyrenoids.

***Botryosphaella* P.C Silva**

Colonies spherical or grape-like, consisting of cells embedded along the periphery of mucilagenous masses or united by irregularly fused mucilagenous

strands; cells spherical or broadly ovoid; chloroplast parietal, cup-shaped, without pyrenoids.

Coelastrum Naegeli

A hollow spherical, free-floating colony of as many as 128 globose, ovoid, or pyramidal cells which either are closely adjoined and compressed or interconnected by narrow processes to form a fenestration. Daughter colonies are formed within the parent cells; the wall of the parent cells may persist about the new colonies.

Golenkiniopsis korshikov

Cell solitary, spherical to almost ovoid, thin-walled, regularly covered by thin and sometimes slightly basally-thickened spines, with or without a mucilaginous envelope; chloroplast parietal, often cup-shaped; pyrenoid spherical to ellipsoidal, with a distinct starch sheath.

Pediastrum Meyen

Coenobium a free-floating, circular monostromatic disc of cells which may be continuous or perforate; peripheral cells of the disc with 1 to 2 lobes or processes, or merely emarginate without processes; interior cells either the same shape as the marginal ones or different; chloroplast a parietal reticulum, covering the wall, with 1 pyrenoid; cells multinucleate.

Scenedesmus Meyen

Colonies of 2-4-8-32 ovoid, fusiform, crescent-shaped, or oblong cells lying side by side in a single, or in a double row with the cells alternating; cell walls smooth or with spines, teeth and ridges; chloroplast a parietal plate covering most of the cell wall and often showing a median lateral notch; 1 pyrenoid.

Schroederia Lemmermann

Cells solitary, free-floating, straight or curved, spindle-shaped with both ends drawn out into spines or setae. Chloroplast single, parietal, and with one or more pyrenoids; older cells may have more than one chloroplast, each with a pyrenoid.

Microspora Thuret

Plants unbranched, unattached filaments of uniseriately arranged cylindrical, or slightly swollen cells. Filament fragmenting readily when mature by the separation of the walls at their point of juncture, so that H-shaped sections

and fragments are formed. Chloroplast either a dense and irregularly padded parietal plate or net or form of reticulum; pyrenoids lacking.

***Ulothrix* Kuetzing**

Simple, unbranched, slender thread-like filament, comprise of a single row of cylindrical cells placed end to end, often showing basal differentiation and arising from a special holdfast cell; chloroplast a parietal band which extends 2/3 to 3/4 of the way around the cell.

***Cladophora* Kuetzing**

A repeatedly - branched filamentous thallus with basal-distal differentiation; attached when young but in some species becoming free-floating, forming feathery tufts on substrates, especially in flowing water; branching alternate, opposite, or sometimes di- or trichotomous, the branches smaller than the main axis, tapering slightly toward the apices; cells cylindrical or swollen; walls thick and lamellate in most species, sometimes thin and firm; chloroplast a parietal reticulum, pyrenoids present.

***Trentepohlia* Martius**

An irregularly branched filament with a prostrate portion from which erect branches arise, forming velvety or cushion-like expansions on moist soil, rocks, logs, and tree trunks. Cells cylindrical or slightly swollen, the walls frequently thickened and roughened externally. Chloroplast a parietal band, without pyrenoids. Branches but very little less in diameter than the main axis and slightly tapering toward the apical region. Terminal cell bluntly rounded at the apex.

***Spirogyra* Link**

Filaments long and unbranched, usually without basal-distal differentiation but sometimes with rhizoidal branches developing laterally where the filament comes in contact with substrate. Cells cylindrical, short to very long in some species, with plane, replicate, or colligate end walls. Chloroplast a parietal band or ribbon which may be spirally twisted or may be nearly straight, 1 to several chloroplasts in each cell, each bearing 1 to several pyrenoids.

***Closterium* Nitzsch**

Cells solitary, this desmids are elongate, without a median constriction, lunate, bow-shaped, rarely straight, attenuated from the mid-region to narrow, bluntly to sharply rounded, acute or truncate apices; cell wall smooth, striated,

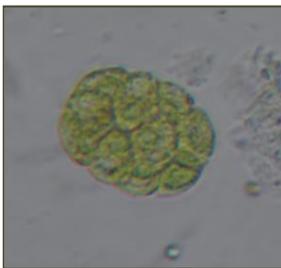
costate or punctate; chloroplasts 2, one in each semicell, connate with a number of longitudinal ridges, with 1 to many scattered or linearly arranged pyrenoids. The nucleus lies in a bridge of cytoplasm connecting the two chloroplasts.

***Cosmarium* Cordaex Ralfs**

Cells solitary, with an obvious median constriction that is wide and shallow or deep linear and closed depending upon the species, form a short isthmus and two semicells, that are rounded in front view, but flattened, oval or elliptical in side view; the margin of the semicell is smooth, undulate, granulate, dentate, scrobiculate, or in some species, some combination of ornamentation; chloroplast 1-2 in each semicell, axile or parietal, with 1-2 conspicuous pyrenoids in each chloroplast.

***Cosmocladium* Brebisson**

Cells with a median constriction, usually compressed, symmetrical in three planes at right angles to each other, aggregated into microscopic colonies, the cells interconnected by single or double mucilaginous threads, usually in the vicinity of the sinus; semicells hexagonal, subpyramidal, elliptic or subreniform; cell wall smooth; chloroplast axial, usually 1 in each semicell, with a central pyrenoid and 4 projecting lobes; rarely with 1 chloroplast in each cell; thick walled, usually spinose.



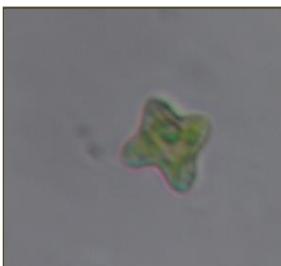
A. *Pandorina* Bory



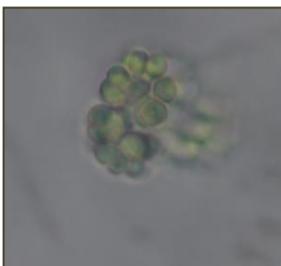
B. *Kirchneriella* Schmidle



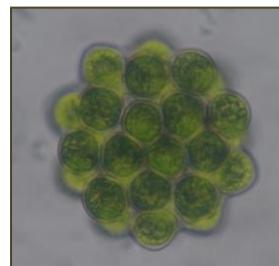
C. *Oocystis* Naegeli



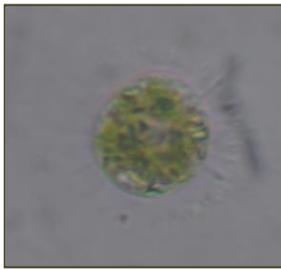
D. *Tetradron* Kuetzing



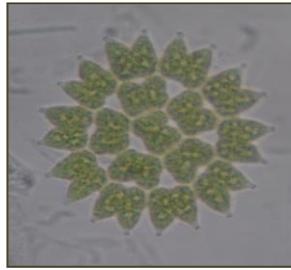
E. *Botryosphaella* P.C. Silva



F. *Coelastrum* Naegeli



G. *Golenkiniopsis* Korshikov



H. *Pediastrum* Meyen



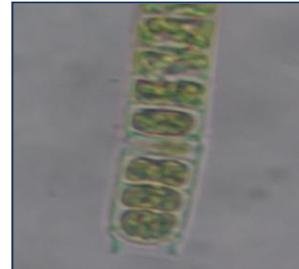
I. *Scenedesmus* Meyen



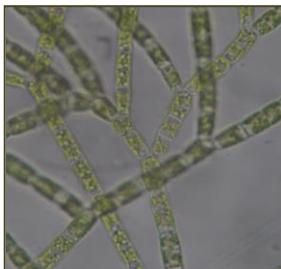
J. *Schroederia* Lemmermann



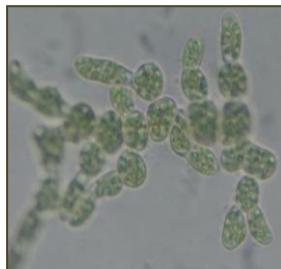
K. *Microspora* Thuret



L. *Ulothrix* Kuetzing



M. *Cladophora* Kuetzing



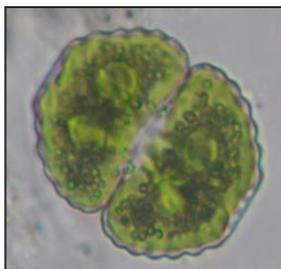
N. *Trentepohlia* Martius



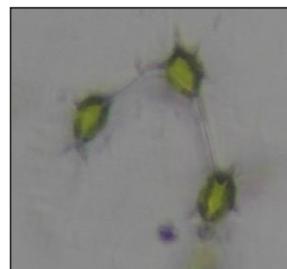
O. *Spirogyra* Link



P. *Closterium* Nitzsch



Q. *Cosmarium* Cordaex Ralfs



R. *Cosmocladium* Brebisson

Discussion and Conclusion

Many varieties of algae are found abundantly in Taung-tha-man Lake, which is situated in the Amarapura Township. In the present study, Chlorophyta were studied only. In this research, 18 genera of Chlorophyceae had been identified, described and recorded.

Chlorophyta are used as food by many coastal peoples and are ground into livestock meal. So, algae are also the main source of food for man and other aquatic life.

In this research, *Pediastrum*, *Closterium* and *Oocystis* were commonly occurred in December. In January, *Cosmarium*, *Kirchneriella*, *Tetraedron*, *Golenkiniopsis*, *Cladophora* were commonly found. *Pandorina*, *Coelastrum*, *Pediastrum*, *Scenedesmus*, *Spirogyra* and *Closterium* were occurred in both December and January.

Coelastrum, *Pediastrum*, *Scenedesmus*, and *Closterium* were abundantly occurred but *Golenkiniopsis*, and *Botryosphaerlla* were rarely occurred. *Trentepohlia* and *Cosmocladium* occurred just one time throughout the study period.

Among them *Spirogyra*, *Cladophora* and *Ulothrix* are edible algae. In Myanmar, *Spirogyra* is eaten in Shan State and *Cladophora* in Kachin State.

This research aims to provide information on the green algae and their morphology characters. It is expected that these results will be useful not only to get edible algae from their environment for local people but also for the researchers who are working in the fields of Phycology.

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