Some Microalgae found in Meiktila University Campus

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Abstract

Algae specimens were collected from Meiktila University Campus during the year 2019. This area is located in dry zone but a plenty of water and ponds are present in there. Therefore, many algae can be found in this area. All the specimens were collected from shallow area and upper surface of lakes, ponds, ditches and on moist soil. All the collected specimens had been listed by the classification system of John *et. al* (2002). Twenty-four species belonging to 16 genera, 12 families and 4 divisions were described. Chlorophyta was the most abundantly found in eastern lake and Cyanophyta was abundant in western lake. Their morphological characters were described together with colour photograph for each taxon.

Key words: Microalgae

Introduction

Algae, Latin for Seaweed, are a large and diverse group of simple, typically autotrophic organisms. The study of algae is called phycology. Phykos was the Greek word for an alga. The Romans called it fucus and Chinese named it Tsao. The ancient Hawanians used algae as food and called them Limu. Algae are very diverse photosynthetic plants that have neither roots nor leafy shoots and which also lack vascular tissue. Algae are extremely diverse. Many species are single-celled microorganisms but some are multi-celled. Their sizes are ranging from a few µm to giant kelp that grows to 65 meter in length. Algae can be found nearly everywhere on earth oceans, rivers, lakes, the snow of mountaintops, on forest and desert soils, on rocks, on plants and animals, or even on other algae. They are involved in diverse interactions with other organisms, including symbiosis, parasitism, and epiphytism.

Algae are the fastest growing plant organisms in nature and have the ability to convert large amounts of carbondioxide into oxygen. Before algae evolved, the earth's atmosphere had no oxygen but instead consisted of carbondioxide and methane. Photosynthetic algae converted carbondioxide into biomass and released oxygen into the atmosphere; about 70 % of the oxygen breaths are produced by algae. Algae also form an important food source for many animals such as little shrimps and huge whales. Thus they are the basic food chain for many living things. Algae provide many vitamins including A, B1, B2, B6, niacin and C, and are rich in iodine, potassium, ion, magnesium and calcium. In the prehistoric times, several seaweeds had been used as direct source of food to human beings. Several fresh water algae have also been utilized in the preparation of various kinds of vitaminized food. Due to the presence of potassium chloride in algae, they are used as fertilizer in many countries. Nitrogen fixation with microalgae is important for rice production in tropical and subtropical agriculture. Substances or extracts of blue green algae which promote germination leaf or stem growth, or flowering. Moreover, they are used in aquaculture, environmental application, antimicrobial purposes, cosmetics and biofuel production.

Due to its useful effects, many researchers observed the algae in many different ways. Some worked as algal flora, others as algal culture and others used as biofertilizers in various experiments. As the algal flora, various workers have done

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researching the different locations all over the world. In Myanmar, many algal floras were made by many researchers. In this paper, Meiktila University campus was selected as a study area. It is located in Mandalay Region. Although it is situated in dry zone there are ponds and lakes which are filled with water all round year. In addition some moist soil can be found in this area. So, a plenty of algae were occurred in this study area. This paper may be regarded as the basic step for other applied algal researchers.

Materials and Methods

Algal specimens were collected from Meiktila University Campus. It is located in Mandalay Region. Some specimens were collected from water, moist soil and others from the substrates as attached algae. These specimens were taken with plastic bottle to the Department of Botany, Meiktila University. They were studied under the microscope and were recorded by digital camera. And then they were measured with micrometer. After that they were identified and classified by Prescott (1962), Philipose (1967), Dillard (2000) and John *et al*. (2002). Specimen collection sites were shown in Figure 1.

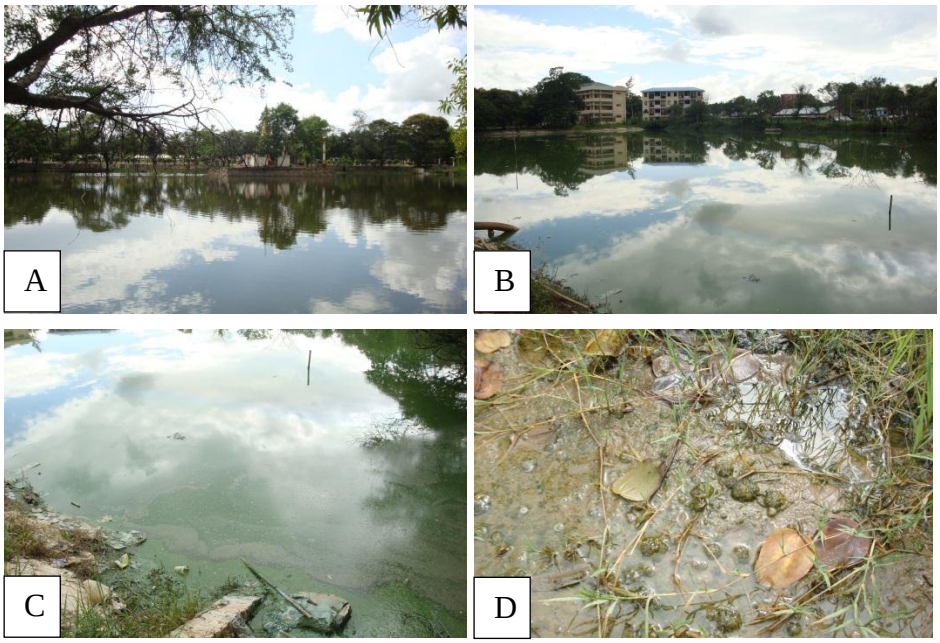

Figure 1. Specimens collection sites
A. Eastern lake
B. Western lake
C. Algal bloom in western lake
D. *Aphanothece* bloom

Results

The algae specimens were collected from Meiktila University Campus. From this study area, 24 species, 16 genera, 12 families and 6 orders belonging to the four divisions of algal specimens were observed. These are described in Table 1.

Table 1. Classification of some microalgae found in Meiktila University Campus

Division	Class	Order	Family	Genus	Species
Cyanophyta	Cyanophyceae	Chroococcales	Microcystaceae	*Aphanothece*	*A. gelatinosa*
				Gloeothece	*G. rupestris*
				Merismopedia	*M. elegans*
			Chroococcaceae	*Chroococcus*	*C. turgitus*
		Oscillatoriales	Phormidiaceae	*Spirulina*	*S. nordstedtii*
			Oscillatoriaceae	*Oscillatoria*	*O. limosa*
Euglenophyta	Euglenophyceae	Euglenales	Euglenaceae	*Euglena*	*E. convoluta*
				Phacus	*P. acuminatus*
Bacillariophyta	Bacillariophyceae	Pennales	Cymbellaceae	*Cymbella*	*C. affinis*
				Rhopalodia	*R. gibba*
			Naviculaceae	*Navicula*	*N. rhyncocephala*
Chlorophyta	Chlorophyceae	Chlorococcales	Hydrodictyaceae	*Pediastrum*	*P. duplex*
					P. ovatum
					P. simplex var. *duodenarium*
					P. tetras
			Oocystaceae	*Tetraedron*	*T. minimum*
			Scenedesmaceae	*Scenedesmus*	*S. armatus* var. *bicaudatus*
					S. dimorphus
					S. quadricauda
					S. quadricauda var. *bicaudatus*
					S. quadricauda var. *westii*
		Zygnematales	Zygnemataceae	*Spirogyra*	*S. gratiana*
			Desmidiineae	*Staurastrum*	*S. chaetoceros*
					S. subphygmaeum

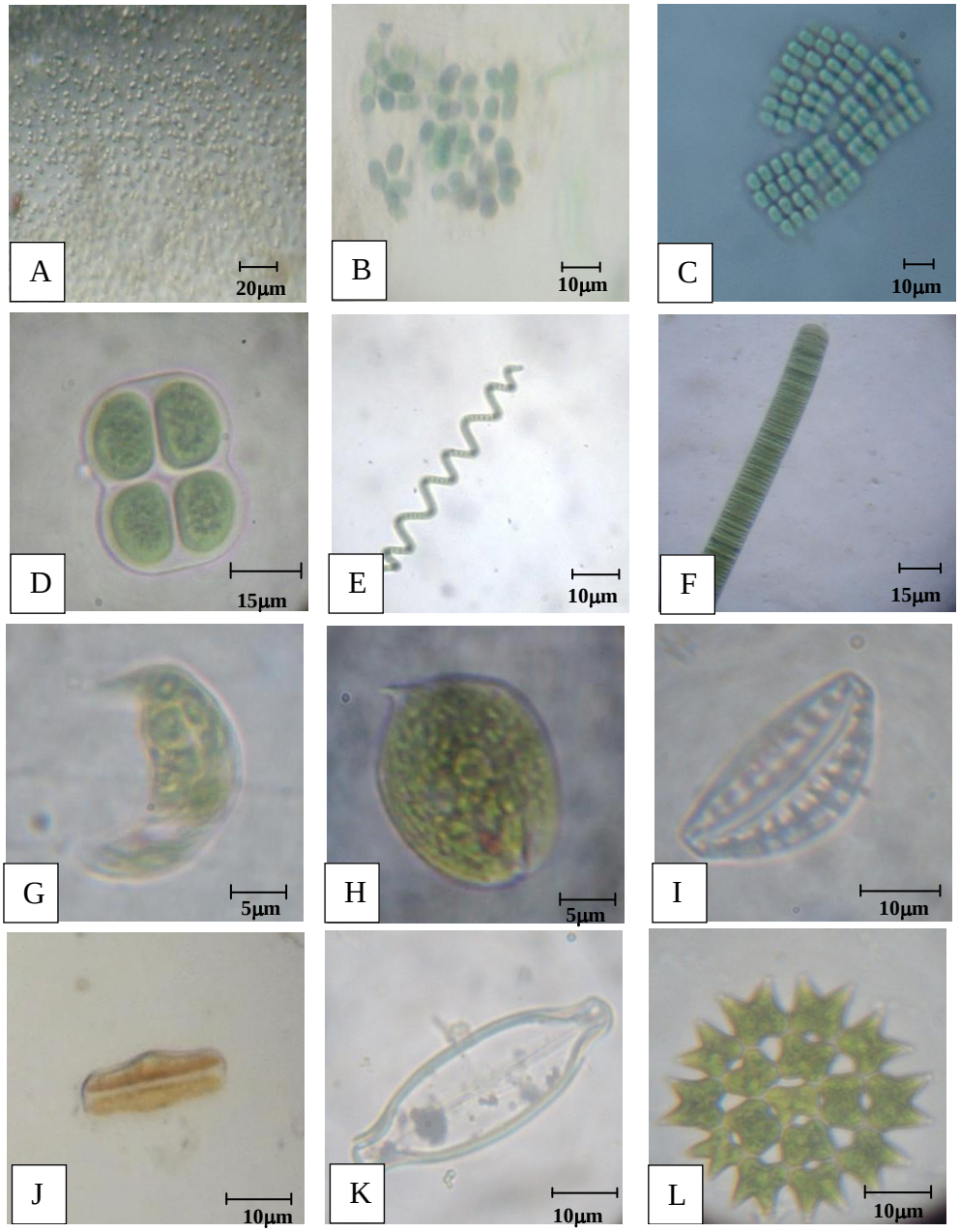

Figure 2.
A. *Aphanothece gelatinosa* (Henn.) Lemmermann
B. *Gloeothece rupestris* (Lyngb.)Bornet
C. *Merismopedia elegans* Braum ex Kutzing
D. *Chroococcus turgitus* (Kuetz) Naegeli
E. *Spirulina nordstedtii* Gomont
F. *Oscillatoria limosa* (Roth) C.A. Agardh
G. *Euglena convoluta* Korshikov
H. *Phacus acuminatus* Stokes
I. *Cymbella affinis* (Ehr.) Brun.
J. *Rhopalodia gibba* (Ehr.) O. Muller
K. *Navicula rhyncocephala* Kutz.
L. *Pediastrum duplex* Meyen

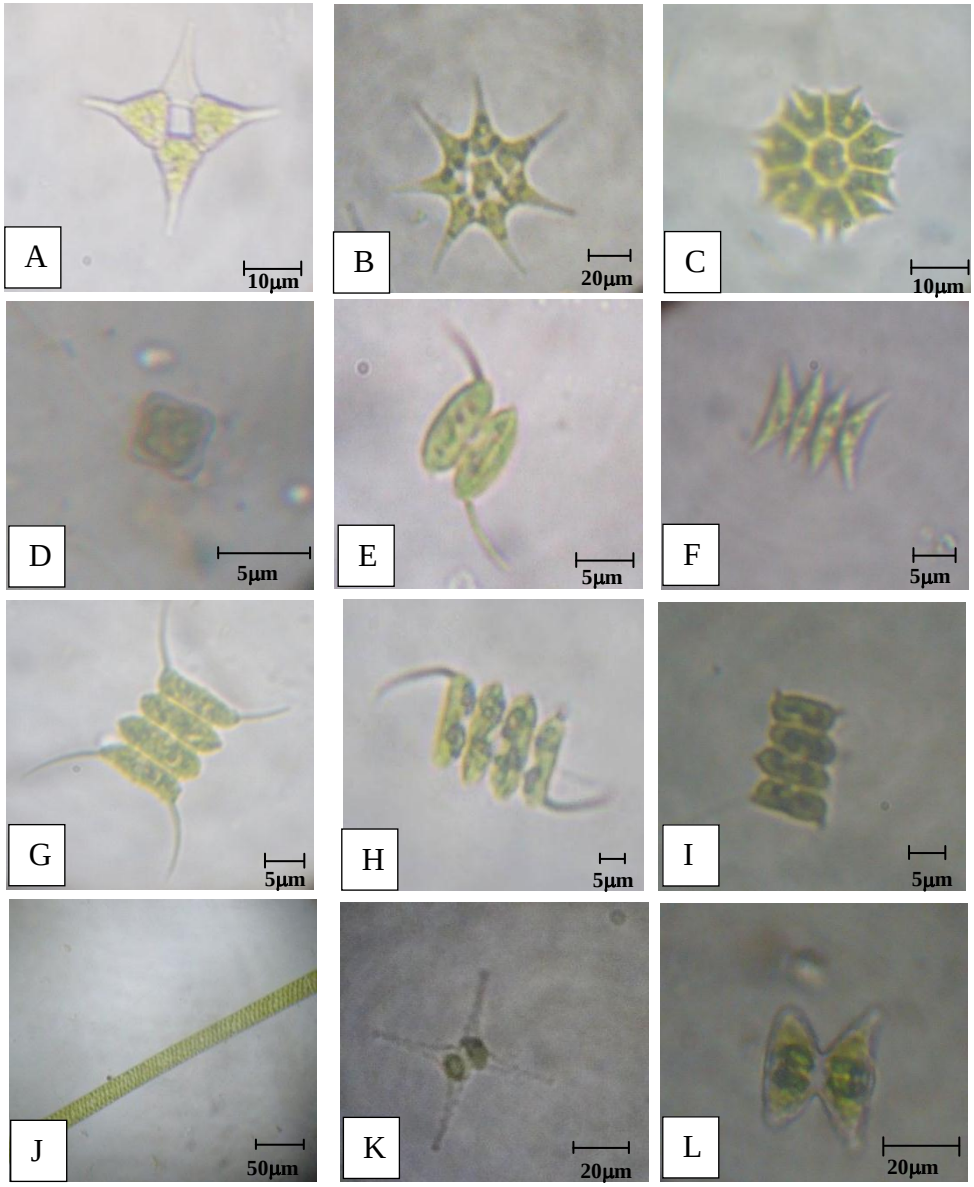

Figure 3.

A. *Pediastrum ovatum* (Ehr.) A. Braum
B. *Pediastrum simplex* var. *duodenarium* (Bailey) Rabenhorst
C. *Pediastrum tetras* (Ehrenb.) Ralfs.
D. *Tetraedron minimum* (A. Braun) Hansgirg
E. *Scenedesmus armatus* var. *bicaudata* G.M. Smith
F. *Scenedesmus dimorphus* (Turp.) kuetzing
G. *Scenedesmus quadricauda* (Turp.) Brebisson
H. *Scenedesmus quadricauda* var. *bicaudatus* Hansging
I. *Scenedesmus quadricauda* var. *westii* G.M. Smith
J. *Spirogyra gratiana* Transean
K. *Staurastrum chaetoceros* (Schroceder) G.M. Smith
L. *Staurastrum subphygmaeum* West

Discussion and Conclusion

Algae are very important not only ecologically but also phylogenitically. Nowadays, they are widely used in many purposes all over the world such as medicine, functional food, alcoholic beverages, biofertilizer, cosmetic production, and biofuel production. Therefore, many researches were made in various ways.

In this study area many different kinds of algae were found. Of these *Scenedesmus* and *Pediastrum* were more commonly occurred. According to Lund J. W. G. 1995, water is rich in plant nutrients, particularly shallow ones often are coloured green, by a mixed plankton containing *Scenedesmus.* In the present study the water containing *Scenedesmus* was green. This observation is agreed with Lund 1995. In the book of 'Algae as ecological indicators' edited by Elliot Shubert 1984, expressed that *Scenedesmus quadricauda* is the most tolerant to pollutants. According to Philipose (1967), generally most of the planktonic Chlorococcales are observed in shallow ponds and tanks. Planktonic Chlorococcales are usually rare in brackish and salt water. In the present study, members of Chlorococcales were found in shallow area of the study area. Therefore, this finding is agreed with Philipose (1967).

Staurastrum chaetoceros and *S. subpygmaeum* were collected from the present study area but they were found rarely. These algae are commonly called desmids. Smith (1950) stated that collection of desmids rich in species and in number of individuals is usually made only where the waters have a pH of five to six. According to this statement, the water in this area was not probably acidic water. There was an interesting fact that within this study area eastern lake was dominant with Chlorophyta and western lake was only Cyanophytes. Based on this algal taxonomy other applied researches can be continued successfully. It was concluded that this paper may play a fundamental role in other applied researches.

Acknowledgements

I am thankful to Dr May Kyawt Khaing, Professor and Head, Department of Botany, Sagaing University, for providing all the departmental facilities. Moreover, my special thanks are due to Dr Khin Palè, Professor, Department of Botany, Sagaing University, for offering suggestion in my work. I would like to express my thanks to all my friends for encouraging me to do this research.

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