

Some Microalgae Found in Mandalay Main Canal, Patheingyi Township, Mandalay Region

Phyo Phyo Khaing¹, Hla Min Thein²

Abstract

Algal specimens were collected from three stations of Mandalay Main Canal during July to December, 2016. In this research, 5 species of Cyanophyceae, 3 species of Euglenophyceae, 7 species of Bacillariophyceae and 9 species of Chlorophyceae have been identified and described. In this study area, Euglenophyta was rarely occurred and Cyanophyta, Chlorophyta and Chrysophyta were abundantly occurred. But, Chlorophyta were more abundantly occurred than Cyanophyta and Chrysophyta. The collected specimens were recorded and described in figures.

Keyword : Microalgae

Introduction

Algae are widely present in freshwater environments, such as lakes and rivers, where they are typically present as microorganisms. Although relatively inconspicuous, they have a major importance in the freshwater environment, both in terms of fundamental ecology and in relation to human use of natural resources. It is needed to study algal compositions of every habitat in each area for knowing beneficial algae, harmful algae, and water quality of water bodies of that area (Smith 1950).

Algae provide much of Earth's oxygen, they are the food base for almost all aquatic life, they are a source of crude oil, and they provide foods and pharmaceutical and industrial products for humans. In addition to making organic molecules, algae produce oxygen as a product of photosynthesis. Algae produce an estimated 30 to 50 percent of the net global oxygen available to humans and other terrestrial animals for respiration that the algae have many types of life cycles (Rogers 2011).

Algae are diverse group of organisms once thought belong to a single class of plants. Originally, algae were considered to be simple or lowly plants lacking the leaf, stem, root and reproductive system of higher plants. The only features common to all global group are that their photosynthesis. In the features, they are like higher plants. Algae have a worldwide distribution, growing wherever light and water are present. Algae occur on shores, coasts, lakes and ponds, attached to the bottom (benthic species) or live suspended in the water itself (planktonic species) (Pulz 2004).

Mandalay Main Canal is located in Patheingyi Township, Mandalay Region. It is situated between North Latitude 22°19" and 22°24", between East Longitude 96°19" and 96°25". The length of the Mandalay main canal is 43281.6 m and the deepest of water is 2.84 m. Mandalay Main Canal serve as source of water for irrigation and domestic purposes. In this research, this area was chosen as a study area because it was not done yet as an algal flora. The water in Mandalay Main Canal flows into the ditches and canals along the villages and agricultural fields. Therefore, the quality of water was based on environmental factors such as occurrence of algae, chemical properties of water, anthropogenic activities and other sources.

The aims and objective of this research was carried out to classify the collected algae from three stations, to record the algae which grow in Mandalay Main

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Canal and to share the knowledge of algal composition naturally occurred in Mandalay Main Canal in Patheingyi Township.

Materials and Methods

Mandalay Main Canal is located in Patheingyi Township, Mandalay Region. Algae specimens were collected from three stations during July to December 2016. The collected specimens were studied by using compound microscope and the sizes of algae were measured by using micrometer. All species were recorded by digital camera. Then, the algae were identified up to specific level based on their morphological characters. The identification and taxonomic descriptions were done by referring on Desikachary (1959), Prescott (1962), Philipose (1967), Komárek (2013), Dillard (1982-2000), and John *et al.* (2002, 2011), Smith (1950), and Vinyard (1979).

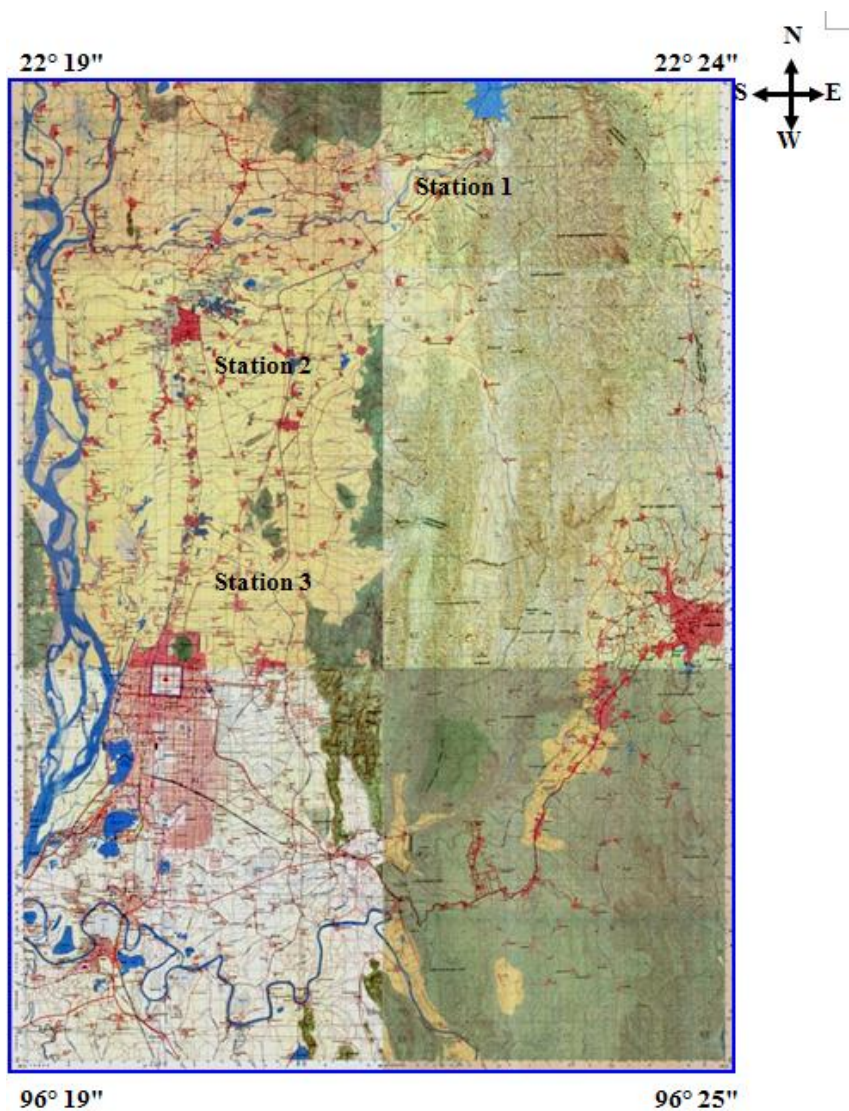


Figure 1. Location Map of Study Area

Results

Totally 24 species belonging to 21 genera of 12 families were recorded: 5 species of Cyanophyceae, 3 species of Euglenophyceae, 7 species of Bacillariophyceae and 9 species of Chlorophyceae were classified, described and recorded with photomicrographs as shown in Figure 2 and 3. The systematic classification of algae was as shown in Table 1.

Table 1. Classification of Algae Found in Study Area

Division	Class	Order	Family	Genus	Species	
Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	<i>Oscillatoria</i>	1. <i>Oscillatoria princeps</i> Vaucher ex Gomont	
				<i>Planktonthrix</i>	2. <i>Planktonthrix raciborskii</i> (Wolosz.) Anagn. and Kom	
			Phormidiaceae	<i>Spirulina</i>	3. <i>Spirulina major</i> Kuetzing ex Gomont	
				<i>Arthrospira</i>	4. <i>Arthrospira jennneria</i> (Wolosz.) Anagn. and Kom	
Euglenophyta	Euglenophyceae	Nostocales Euglenales	Nostocaceae	<i>Anabaena</i>	5. <i>Anabaena borneoana</i> Collins	
			Euglenaceae	<i>Euglena</i>	5. <i>Euglena ascus</i> (O. F. Muller) Ehrenberg	
				<i>Phacus</i>	7. <i>Phacus caudatus</i> Hubner	
Chrysophyta	Bacillariophyceae	Pennales	Cymbellaceae	<i>Cymbella</i>	9. <i>Cymbella aspera</i> (Ehrenberg) Cleve	
			Fragilariaceae	<i>Fragilaria</i>	10. <i>Fragilaria crotonensis</i> Kitton	
Chrysophyta	Bacillariophyceae	Pennales	Naviculaceae	<i>Anomoeneis</i>	11. <i>Anomoeneis sphaerophora</i> Kuetzing	
			Naviculaceae	<i>Gyrosigma</i>	12. <i>Gyrosigma elongatum</i> W. Smith	
			Naviculaceae	<i>Pinnularia</i>	13. <i>Pinnularia gentilis</i> (Donk) Cleve	
			Surirellaceae	<i>Surirella</i>	14. <i>Surirella robusta</i> Ehrenberg	
			Tabellariaceae	<i>Detonula</i>	15. <i>Detonula pumila</i> (Castracane) Gran	
			Chlorococcales	Scenedesmaceae	<i>Scenedesmus</i>	16. <i>Scenedesmus acuminatus</i> (Lagerheim) Chodat
				Hydrodictyceae	<i>Pediastrum</i>	17. <i>Pediastrum duplex</i> var. <i>reticulatum</i> Lagerheim
						18. <i>P. simplex</i> Meyen
						19. <i>P. simplex</i> var. <i>radians</i> Lemmermann
			Zygnematales	Desmidiaceae	<i>Closterium</i>	20. <i>Closterium pseudohumula</i> O. Borge
					<i>Cosmarium</i>	21. <i>C. quadrum</i> Lundell
					<i>Arthodesmus</i>	22. <i>Arthodesmus convergens</i> Ehrenberg
		<i>Staurastrum</i>	23. <i>Staurastrum natator</i> West & West			
		<i>Eurastrum</i>	24. <i>Eurastrum spinulosum</i> Delponte			

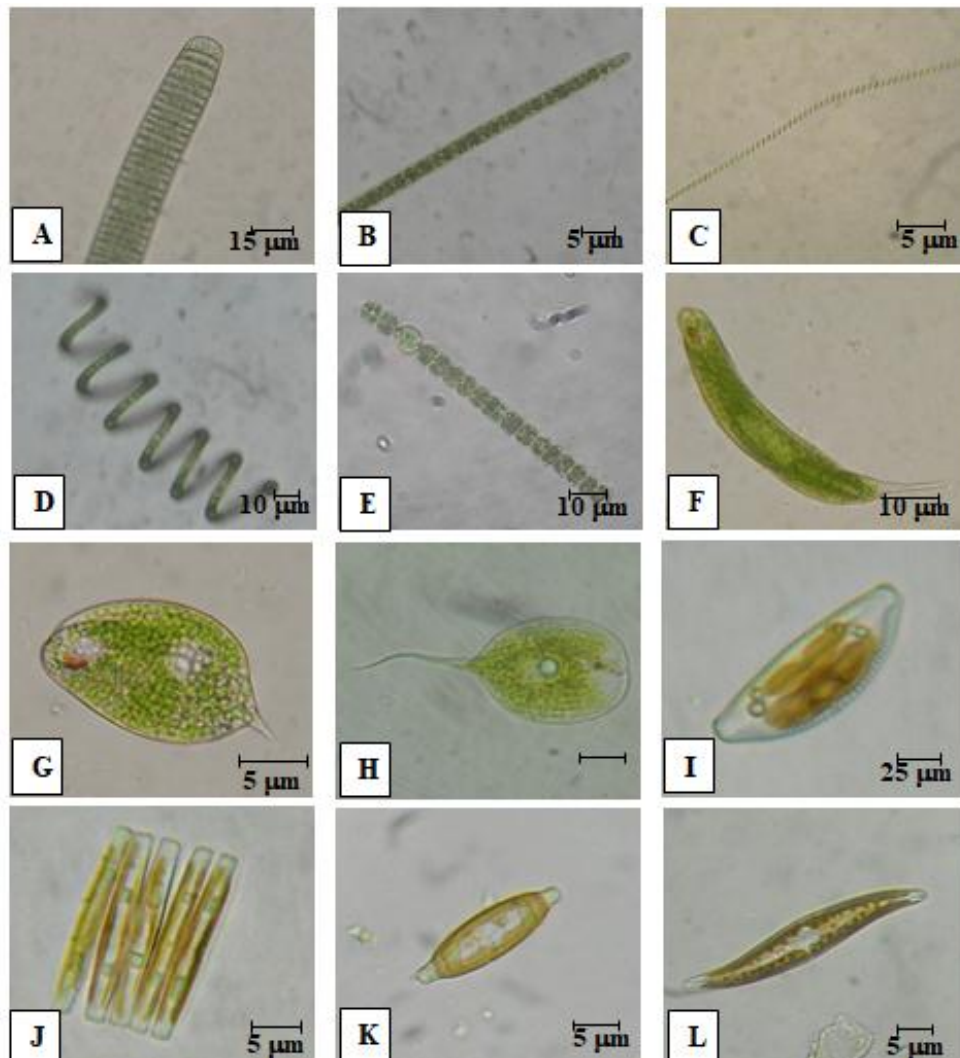


Figure 2. A. *Oscillatoria princeps* Vaucher ex Gomont
 B. *Planktonthrix raciborskii* (Wolosz.) Anagn. and Kom
 C. *Spirulinamajor* Kuetzing ex Gomont
 D. *Arthrospira jenneria* (Wolosz.) Anagn. and Kom
 E. *Anabaena bornetiana* Collins
 F. *Euglena ascus* (O. F. Muller) Ehrenberg
 G. *Phacus caudatus* Hubner
 H. *Phacus longicauda* (Ehrenberg) Dujardin
 I. *Cymbella aspera* (Ehrenberg) Cleve
 J. *Fragilaria crotonensis* Kitton
 K. *Anomoeneis sphaerophora* Kuetzing
 L. *Gyrosigma elongatum* W. Smith

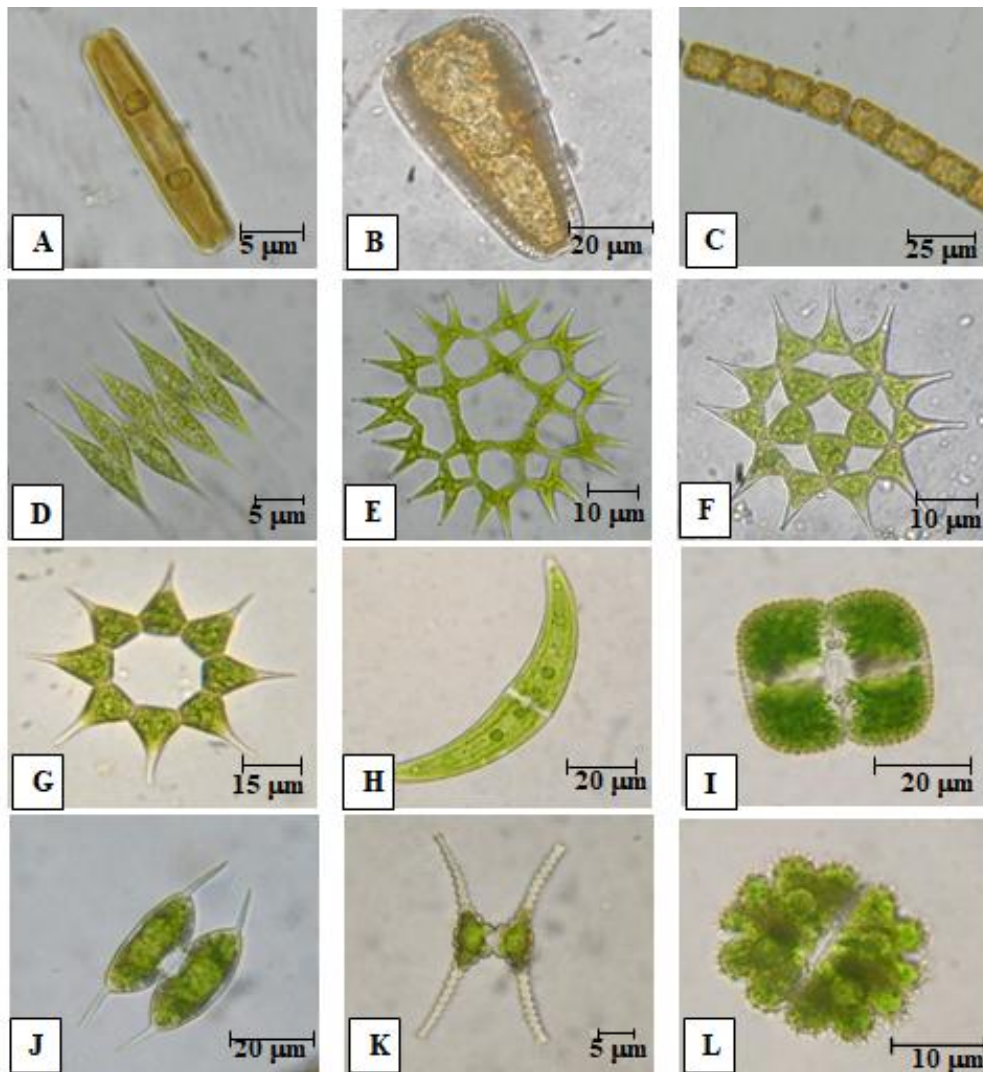


Figure 3. A. *Pinnularia gentilis* (Donk) Cleve
 B. *Surirella robusta* Ehrenberg
 C. *Detonula pumila* (Castracane) Gran
 D. *Scenedesmus acuminatus* (Lagerheim) Chodat
 E. *Pediastrum duplex* var. *reticulatum* Lagerheim
 F. *Pediastrum simplex* Meyen
 G. *Pediastrum simplex* var. *radians* Lemmermann
 H. *Closterium pseudolunula* O. Borge
 I. *Cosmarium quadrum* P. Lundell
 J. *Arthodesmus convergens* Ehrenberg
 K. *Staurostrum natator* West & G. S. West
 L. *Eurastrum spinulosum* Delponte

Discussion and Conclusion

The algal specimens were collected from three stations of Mandalay Main Canal during July to December, 2016. In this research, 5 species of Cyanophyceae, 3 species of Euglenophyceae, 7 species of Bacillariophyceae and 9 species of Chlorophyceae have been recorded.

The genera of *Oscillatoria*, *Planktonthrix*, *Athrospira* and *Anabaena* of Cyanophyta, *Cymbella*, *Fragilaria*, *Anomoenis*, *Gyrosigma*, *Surirella* and *Detonula* of Chrysophyta and *Scenedesmus*, *Pediastrum*, *Closterium*, *Cosmarium*, *Arthrodesmus*, *Staurastrum* and *Eurastrum* of Chlorophyceae were more abundantly found in three stations. The genus of *Spirulina* was rarely occurred in station I and *Euglena* and two species of *Phacus* were found in station II and III. The genus of *Pinnularia* (Diatom) was found in station I and II.

Some important nuisance algal species causing diverse problems are *Spirulina*, *Oscillatoria*, *Anabaena*, *Merismopedia* and *Chroococcus* (blue-green algae); *Phacus* and *Euglena* (Euglenoid); *Scenedesmus* and *Cosmarium* (green-algae); *Nitzschia* and *Navicula* (diatoms). They have been implicated in most problems of water quality (Goel 1997).

According to Nyggard (1949), Algae, Cyanobacteria and water quality are very closely related. Algae and Cyanobacteria are naturally occurring organisms that can cause water quality to decrease or increase significantly. Thus, algae also have been used as water quality indicators. For example, diatoms and desmids are commonly found in nonpolluted conditions. Harmful blooms are caused by blue green algae such as *Microcystis*, *Anabaena*, and *Oscillatoria*. In this study area, Euglenophyta was rarely occurred and Cyanophyta, Chlorophyta and Chrysophyta were abundantly occurred. But, Chlorophyta were more abundantly occurred than Cyanophyta and Chrysophyta. However, the number of the green algae is greater than that of blue-green algae. It is recommended that water in this study area can be used for irrigation and domestic purposes.

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