Some Algal Flora and Related Water Quality of Oattayar yarma Monastery, Minkyi Village, Wetlet Township

Nu Nu Tin[1], Tin Tin Moe[2], Theingi Htay[3]

Abstract

Algae specimens were collected from four sampling sites of Oattayar yarma Monastery, Minkyi Village, Wetlet Township during the periods October 2017 and September 2018. All the collected specimens had been listed by the classification system of John *et.al* (2002). The identified specimens were expressed. The total 18 algal species were found in this study area. Among them, 5 species, 3 genera, 3 families, belong to 2 orders of Cyanophyceae; 2 species, 2 genera, 1 family, belong to 1 order of Euglenophyceae; 3 species, 3 genera, 3 families, belong to 1 order of Bacillariophyceae; and 8 species, 5 genera, 4 families, belong to 2 orders of Chlorophyceae had been described and recorded. Moreover, the water quality was analyzed and recorded. Therefore, the results indicated that algal flora Oattayar yarma Monastery, Minkyi Village, Wetlet Township related with its water quality.

Key words: Algal flora and water analysis

Introduction

Algae are considered as important biological organisms. They are the source of oxygen and the first ring of the food chain in aquatic systems. Algae may be found living everywhere such as rivers, lakes, ponds, puddles, rock and damp soil. Algae could take place photosynthesis by the sunlight like higher plants because algae possess chlorophyll (Graham and Wilcox, 2000).

The study of the algae in all the environments is the prime object of algal ecology; some important aspects are the recognition, delimitation and classification of the algal habitats within the environments; a study of the composition of the flora within each habitat; the relationship between these floras and the biological, physical and chemical factors operating directly or indirectly in the habitat; the study of individual species within the populations and of the factors controlling their growth; the productivity of the population and of individual species. These approaches start with a consideration of the physical and chemical factors of the environment and lead ultimately to experiments on selected species within the environment or under controlled environmental condition (Round 1973).

In this study, algal specimens were collected from surface water bodies of the four stations in pond of Oattayar yarma Monastery, Minkyi Village during October 2017 and to September 2018. It is situated between North Latitude 22°38' and 22°39' and East Longitude 95° 37' and 95° 38'. It has an approximately 15.285 k m^2. The temperature has 24°C - 36°C and pH has 6.8 - 7.2.

The four classes are found in the study area. They are Cyanophyceae, Euglenophyceae, Bascillariophyceae and Chlorophyceae. Many species of Cyanophyceae are filamentous, forming long, straight chains of cells or many branching chains. Euglenophyceae is a unicellular aquatic algae. They are motile with the use of flagella. The algae of family Bacillariophyceae are commonly known as diatoms. The species of class Chlorophyceae are freshwater or marine algae with unicellular or multicellular body. The aims of this study are to record the some algal species found in study area and to analyze physico-chemical parameters of pond of Oattayar yarma Monastery, Minkyi Village, Weltet Township.

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Materials and methods

Study Area

Water samples containing algae were collected from the upper surface of four sites in pond of Oattayar yarma Monastery, Minkyi Village, Weltet Township during October 2017 and to September 2019. It lies between North Latitude 22° 38′ and 22° 39′ and East Longitude 95°37′ and 95° 38′. The location map of in study area was shown in Figure 1 and sampling sites in pond of Oattayar yarma Monastery, Minkyi Village were shown in Figure 2.

Collection of Algal Specimens

Algae samples were collected from upper surface of four sites in Pond of Oattayar yarma Monastery, Minkyi Village, Weltet Township. The positions of all sampling sites were measured by Global Position System (GPS), temperature of water was measured by thermometer and pH of water was measured by pH meter. The collected algal specimens were examined by using compound microscope (Olympus) in laboratory, Department of Botany, Shwebo University. The measurements of algae were taken by using micrometer and the images of them were recorded by digital camera. Algal populations were counted on Fuchs - Rosenthal haemocytometer by using microscope and are calculated by Lavens & Sorgeloos (1996).

Classification of Algae

The samples were identified on the thallus shape, size, colour, chloroplast, pyrenoids and sinus structure. Some collected specimens had been listed by the classification system of John *et al*. (2002). The first step in identifying an unknown sample is to determine to which family it belongs. The second step in identifying the unknown sample is to decide to which genus it belongs, and lastly to identify species, The taxonomic description of algae have been done by the references, Skuja (1949), Smith (1950), Desikachary (1959), Prescott (1962), Philipose (1967), Vinyard (1979), Komarek & Anagnastis (1985-1989), Dillard (1982-2000), Round *et al.*, (1990), and John *et al*. (2002). Then, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), temperature, pH, colour, total solids, total hardness, total alkalinity, calcium, magnesium, chloride, sulphate values, information on the report of analysis of water were analyzed at the Water Laboratory; Water and Sanitation Department Committee, Public Health Laboratory, Mandalay.

Fig. 1. Location map of Study area

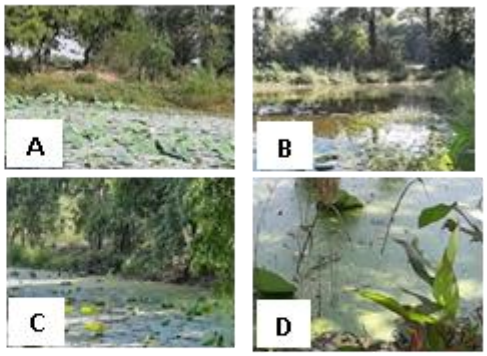

Fig. 2. Sampling site of pond of Oattayar yarma Monastery
A. Site 1 (North part of pond)
B. Site 2 (East part of pond)
C. Site 3 (South part of pond)
D. Site 4 (West part of pond)

Result

Algae specimens were collected from four sampling sites of pond of Oattayar yarma Monastery, Minkyi Village, Weltet Township during the periods of October 2017 and to September 2018. The total 18 algal species were found in this study area. Among them 5 species, 3 genera, 3 families, belonging to 2 orders of Cyanophyceae; 2 species, 2 genera, 1 family, belonging to 1 order of Euglenophyceae; 3 species, 3 genera, 3 families, belonging to 1 order of Bacillariophyceae; and 8 species, 5 genera, 4 families, belonging to 2 orders of Chlorophyceae had been identified, described and recorded with photomicrographs (Figure 3). The classification of algae was mentioned in Table 1. The water quality was analyzed and recorded (Figure 3-9).

Table 1. Classification of some species found in Oattayar yarma Monastery, Minkyi Village

Division	Class	Order	Family	Genus	Species
Cyanophyta	Cyanophyceae	Oscillatoriales	Oscillatoriaceae	*Lyngbya*	1. *Lyngbya connectens* Bruhlet et Biswas
			Phormidiaceae	*Planktothrix*	2. *Planktothrix agardhii* Gomont
		Nostocales	Nostocaceae	*Anabaena*	3.*Anabaena affinis* Lemmermann
					4. *A. flos-aquae* Bréb in Born. and Flah
					5.*A. torulosa* (Carm.) Lagerheim
Euglenophyta	Euglenophyceae	Euglenales	Euglenophyceae	*Euglena*	6.*Euglena acus* var. *longa* (Johnson) Gojdics
				Phacus	7. *Phacus birgei* Prescott
Chrysophyta	Bacillariophyceae	Pinnales	Cymbellaceae	*Epithema*	8. *Epithema zebra* (Ehrenberg) Kutzing
			Eunotiaceae	*Eunotia*	9. *Eunotia pectinalis* (Kutzing) Robenhorst
			Naviculaceae	*Gyrosigma*	10. *Gyrosigma spenceri* (Qekett) Cleves
Chlorophyta	Chlorococcales	Chlorococcales	Oocystaceae	*Ankistodesmus*	11. *Ankistodesmus falcatus* (Corda) Ralfs
			Scenedesmaceae	*Scenedesmus*	12.*Scenedesmus arcuatus* Lemmermann
					13.*S. protuberans* Fritsch *et* Rich
		Zygnematales	Zygnemataceae	*Spirogyra*	14. *Spirogyra exilix* West and west
			Dismidiaceae	*Closterium*	15. *Closterium baillyanum* Brebisson
					16. *C. parvulum* Nageli
				Cosmarium	17. *Cosmarium cyclicum* Lundell
					18.*C. perpusillum* var. *namum* (Wille) Krieger & Gerloff

Figure 3. A. *Lyngbya connectens* Bruhlet et Biswas B. *Planktothrix agardhii* Gomont C. *Anabaena affinis* Lemmermann, D. *A. flos-aquae* Bréb in Born. & Flah E. *A. torulosa* (Carm.) Lagerheim F. *Euglena acus* var. *longa* (Johnson) Gojdics, G. *Phacus birgei* Prescott H. *Epithema zebra* (Ehrenberg) Kutzing I. *Eunotia pectinalis* (Kutzing) Robenhorst, J. *Gyrosigma spenceri* (Qekett) Cleves K. *Ankistodesmus falcatus*(Corda) Ralfs L. *Scenedesmus arcuatus* Lemmermann , M. *S. protuberans* Fritsch *et* Rich N. *Spirogyra exilix* West and we O. *Closterium baillyanum* Brebisson , P. *C. parvulum* Nageli Q. *Cosmarium cyclicum* Lundell R. *C. perpusillum* var. *namum* (Wille) Krieger & Gerloff

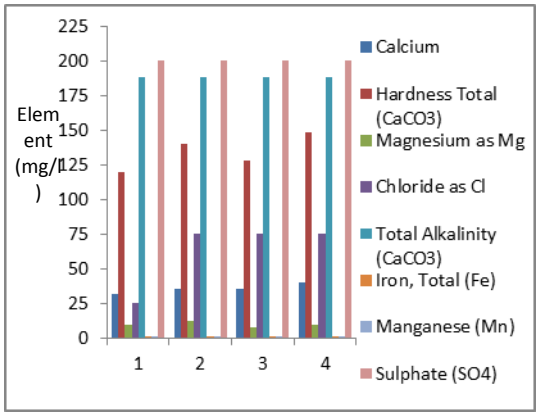

Fig.4. Physico-chemical Characteristic of Pond (Summer Season)

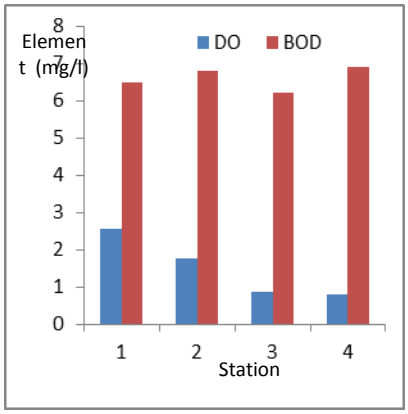

Fig.5. Distribution of DO and BOD of Pond (Summer Season)

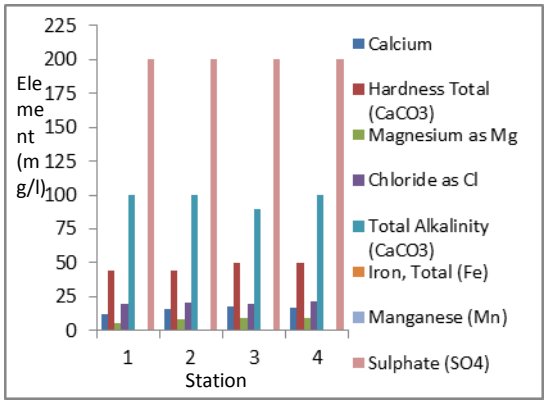

Fig.6. Physico-chemical Characteristic of Pond (Rainy Season)

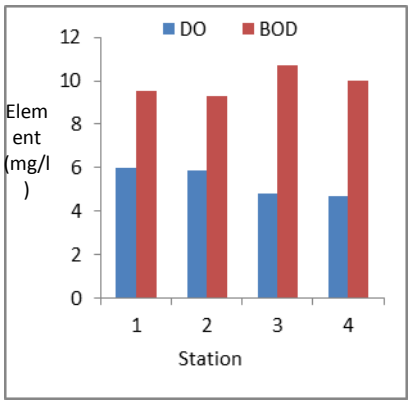

Fig.7. Distribution of DO and BOD of Pond (Rainy Season)

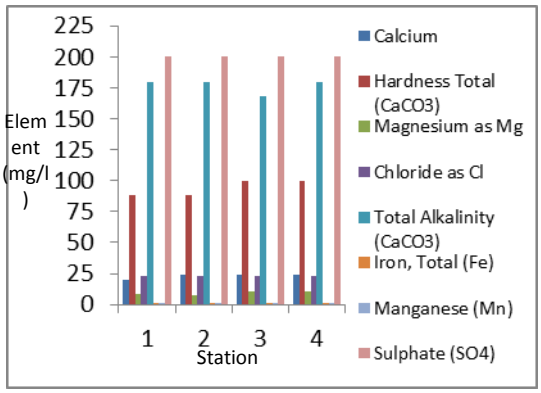

Fig.8. Physico-chemical Characteristic of Pond (Winter Season)

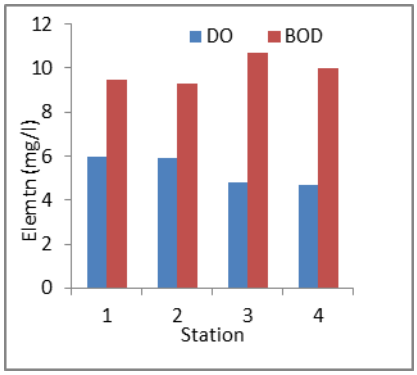

Fig.9. Distribution of DO and BOD of Pond (Winter Season)

Discussion and Conclusion

The pond of Oattayar yarma monastery, Minkyi village, Wetlet Township was selected and studied for this study. This paper mentioned the different algae and physico-chemical parameter with the graph.

In the case of total hardness in pond, the hardness valve of all sites were 88-140 mg/L longer than the desirable level 100 mg/ L but it was not more than maximum permissible level 500 mg/L. The solid remaining in water after filtrations is called “total dissolved solids”. Dissolved solids may be organic or inorganic in nature. The dissolved are composed mainly of carbonates, bicarbonates, chloride, sulphate, magnesium, phosphate, nitrate, potassium and iron (Trivedy & goel 1986).

In the present study, the members of algae such as *Lyngbya* and *Anabaena* were found. This indicates thathigher dissolved solid correlated with the growth. According to Zafar (1967), calcium is one of the important elements influencing the distribution of Bacillariophyceae. In the present investigation calcium composition was between 20 - 40 mg/L and and favouring the dominance of 3 species of Bacillariophyceae. Therefore, this observation was in agreement with finding of Zafar (1967).

The content of magnesium was 7-14 mg/L in sampling sites. Although the content of chlorine were higher than the desirable level 30mg/L, large amount of blue green algae , diatoms were found in the study area.

Sulphate is an important mineral substance for phytoplankton growth (Boney 1987). In the present study, sulphate concentration less than 200mg/L were found. Five species of Cyanophyceae and 3 species of Bacillariophyceae were occurred. The results obtained from this study were agreed with the finding of Boney (1989).

Algae are sensitive indicators of environmental conditions in lakes and rivers. Discrete algal populations of a river or lake can give important information about the biological and chemical quality of water. Algae are capable of producing taste and odour, compounds effect the quality of drinking water. Regular monitoring of algae in water bodies can provide early warnings of potential blooms and help with the management of water resources and recreational water in Merriam (2009).

It was concluded that Oattayar yarma monastery, Minkyi village was be found that between water quality and algal flora. According to water analysis report, water of Oattayar yarma monastery, Minkyi village was unfit to drink and not suitable for irrigation.

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