

Some members of Cyanophyta found in Kaung-hmu-taw Fishery Pond, Sagaing

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Abstract

The studies of algae specimens were collected from Kaung-hmu-taw Fishery pond located in Sagaing Township, during June to August, 2016. In this research, 4 families, 7 genera and 12 species of Cyanophyta were identified, recorded and described. *Aphanocapsa*, *Merismopedia*, *Oscillatoria* and *Anabaena* were abundantly occurred in the study area. But *Nostoc* and *Cylindrospermopsis* were scarcely found.

Keywords : Cyanophyta, Taxonomic description

Introduction

The algae have been on interesting group for investigation because of their very primitive nature and a world-wide distribution. Algae were considered as important biological organisms. They are the source of oxygen and the first ring of the food chain in aquatic systems. Algae might be more than 25,000 species found living everywhere, rivers, lakes, ponds, puddles, rock and damp soil. Algae could take place photosynthesis by the sunlight like higher plants because algae possess chlorophyll (Graham & Wilcox 2000). The internal cell structure of algae varies greatly. The Cyanobacteria or blue-green algae have a prokaryotic cell structure and closely resemble bacteria. (Lee 2008).

The division Cyanophyta contained about 150 genera and 2000 species. They were found in the most diverse habitats; in freshwater and in the sea, on damp soil, and even in such extreme and inhospitable places as glaciers, deserts and hot springs. Most, however, lived in freshwater (Hoek *et al.* 1995).

Algae of eastern great lake area were done by Prescott (1962). In 1982-2000, Dillard treated the flora of fresh water algae of the Southeastern United States, Myanmar algal floras were done by West and West (1907) and Skuja (1949). Similarly, many algal flora were done by native researchers such as Win Kyi (1973), Mu Mu Thein (1976), Khin San Yee (1982), Khin Myint Myint Tin (1992), Khin Nilar Than (1994), Lwin Lwin Oo (1995), Ni Ni Khaing (1995), Theingi Htay (1997), Saw Ohnmar Win (2008), Theingi Htay (2010), Khin Myo Win (2010), Hkawn Tsin (2015) and Phyu Phyu Aung (2016).

In this study, algae specimens were collected from Kaung-hmu-taw fishery pond from July to August, 2016. The aim of the present study is to know and record the algae in Kaung-hmu-taw fishery pond and to provide the information of other applied algal researchers.

Materials and Methods

Study Area

Kaung-hmu-taw fishery pond is situated in the Sagaing Region. It lies between 21°51' to 21°57' N Latitude, between 95°53' to 96°50' E Longitude, the water body is approximately 3511759.9 m². The study area is shown in Figure 1.

Collection and Identification

Algae specimens were collected from four sampling sites. Collections of algal samples were done during July to August, 2016. Algal samples were collected from the upper surface of the water. Some of the collected samples were used in fresh for laboratory observations in the Department of Botany, Yadanabon University.

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Data Collection of pH, GPS and Water Temperature

The positions of all sampling sites were measured by Global Positioning System (GPS), temperature of water was measured by thermometer and pH of water was measured by pH meter in the fields.

Laboratory Observation and Classification of Algae

Laboratory Observations on algae samples were made by using compound microscope (Olympus) at Department of Botany, Yadanabon University. The size of algae was measured by using micrometer. All species were presented by photomicrographs. The identification and taxonomic description have been based on Desikachary (1959), Prescott (1962) and Skuja (1949), Hoek *et al.* (1995), Komarek (1985-1989), Dillard (1982-2000), Graham & Wilcox (2000), John *et al.* (2002).



Figure 1. Study area of Kaung-hmu-taw Fishery Pond

Results

Algal Flora

The specimens of algae were collected from four sampling sites in Kaung-hmu-taw Fishery Pond. The identified specimens were expressed. The total 12 species, 7 genera, 4 families belong to 3 orders of Cyanophyceae had been described and recorded. The classification of algae was mentioned in Table 1.

Table 1. Classification of Cyanophyta found in Kaung-hmu-taw Fishery Pond

Class	Order	Family	Genus	Species
Cyanophyceae	1. Chroococcales	1.Chroococcaceae	1. <i>Aphanocapsa</i>	<i>A. elachista</i>
			2. <i>Merismopedia</i>	<i>M. punctata</i>
	2.Oscillatoriales	2.Oscillatoriaceae	3. <i>Oscillatoria</i>	<i>O. limosa</i>
				<i>O. nigra</i>
				<i>O. prolifica</i>
	3.Nostocales	3.Phormidiaceae	4. <i>Spirulina</i>	<i>S. major</i>
				<i>S. subsalsa</i>
	3.Nostocales	4.Nostocaceae	5. <i>Anabaena</i>	<i>A. affinis</i>
				<i>A. macrospora</i>
				<i>A. smithii</i>
6. <i>Nostoc</i>			<i>N. calcicola</i>	
7. <i>Cylindrospermopsis</i>			<i>C. philippinensis</i>	

1. *Aphanocapsa elachista* West & West 1895 (Figure 2, A)

Colonies spherical, free-floating, small and few-celled, the colonial mass pale blue-green; cells small, globose; cells 2.5 – 5.0 µm in diameter.

2. *Merismopedia punctata* Meyen 1839 (Figure 2, B)

A rectangular plate of 15 ovate cells, loosely arranged, sometimes in compact groups of 4 individuals; cells 2.5 – 5.0 µm in diameter.

3. *Oscillatoria limosa* (Roth) Agardh 1812 (Figure 2, C)

Trichomes usually forming a very dark blue-green or brownish plant mass, with distinct cross wall straight, slightly tapering toward the apex, apical cell round and without a calyptra; cells 17.5 – 22.5 µm in diameter, 2.5 – 5.0 µm long.

4. *Oscillatoria nigra* Vaucher 1803 (Figure 2, D)

Trichomes without conspicuously thickened cross-walls, dark-green in colour slightly tapering toward the apex and apical cell round, not capitate and without a calyptra, cells 7.5 – 10.0 µm in diameter, 1.3 – 2.5 µm long.

5. *Oscillatoria prolifica* (Greville 1828) Gomont 1892 (Figure 2, E)

Trichomes blue green straight or flexuous, usually slightly attenuated towards apex; cells quadrate or slightly longer than wide; cross walls not narrowed; ends cell capitate, with calyptra; cells 1.3 – 2.5 µm in diameter, 2.5 – 5.0 µm long.

6. *Spirulina major* Kutzing 1843 (Figure 2, F)

Trichomes loosely spiralled, scattered among other algae, or when aggregated forming a dark, blue-green mass; trichomes 1.3 – 2.5 µm in diameter, spiral 2.5 – 5.0 µm wide, distance between spirals 2.5 – 5.0 µm wide.

7. *Spirulina subsalsa* Oersted 1842 (Figure 3, A)

Trichomes closely spiralled about 2.5µm in diameter; often so tightly coiled that there is no space between the spirals; spirals 2.5 – 5.0 µm in diameter.

8. *Anabaena affinis* Lemmermann 1897 (Figure 3, B)

Trichomes straight, solitary and free-floating, inclosed in a thin sheath; cells spherical, 5.0 – 7.5 µm in diameter; heterocysts spherical, 5.0 – 7.5 µm in diameter, akinete ovate.

9. *Anabaena macrospora* Klebahn 1895 (Figure 3, C)

Trichome straight, cells spherical, apical cell rounded, heterocysts spherical, akinetes short cylindrical; cells 5.0 – 7.5 µm in diameter, 2.5 – 5.0 µm long.

10. *Anabaena smithii* (Komarek) stat.nov. (Figure 3, D)

Trichome free-floating, solitary, straight, cells with gas vesicles, spherical, 5.0 – 10.0 μm in diameter; heterocysts spherical, 7.5 – 12.5 μm in diameter, akinetes spherical.

11. *Nostoc calcicola* Brebisson 1886 (Figure 3, E)

Colony gelatinous, irregularly expanded, filaments flexuous, heterocyst subspherical or oblong, akinetes ellipsoidal to oblong-cylindrical; cell wall smooth, brown colour; cells 2.5 – 5.0 μm in diameter, 5.0 – 10.0 μm long.

12. *Cylindrospermopsis philipinensis* (Taylor) Komarek 1984 (Figure 3, F)

Trichome coiled, twisted in wide regular spiral, heterocysts with both ends; cells 2.5 – 5.0 μm in diameter, 7.5 – 10.0 μm long.

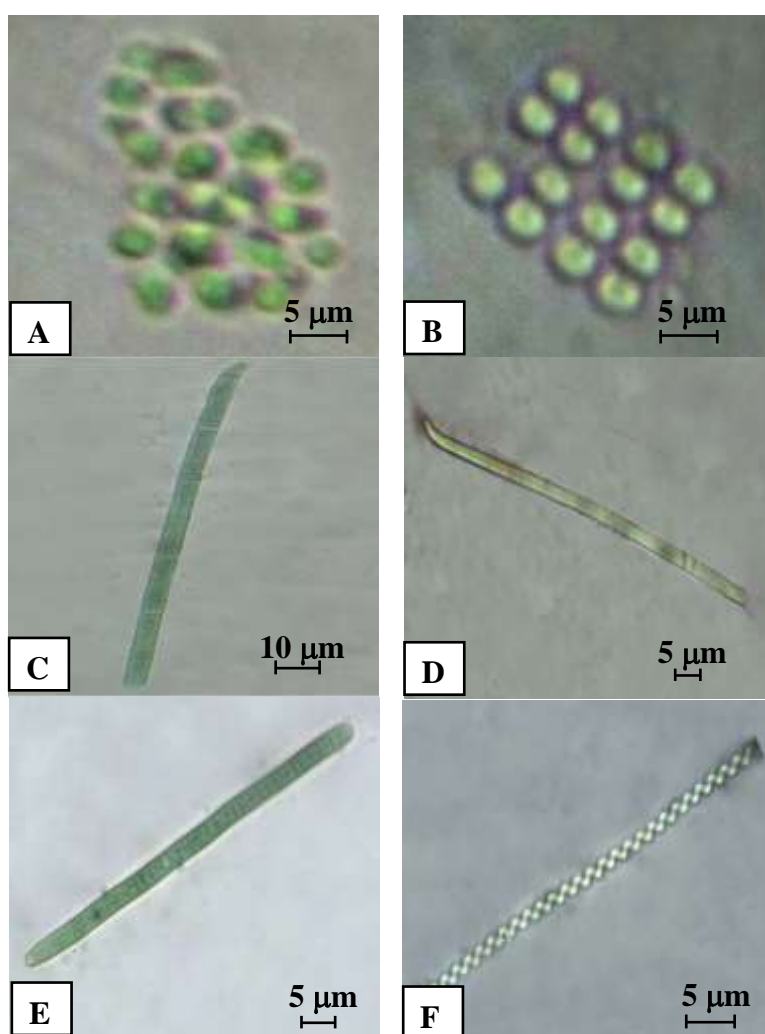


Figure 2. A. *Aphanocapsa elachista* West & West
 B. *Merismopedia punctata* Meyen
 C. *Oscillatoria limosa* (Roth) Agardh
 D. *Oscillatoria nigra* Vaucher
 E. *Oscillatoria prolifica* (Greville) Gomont
 F. *Spirulina major* Kutzing

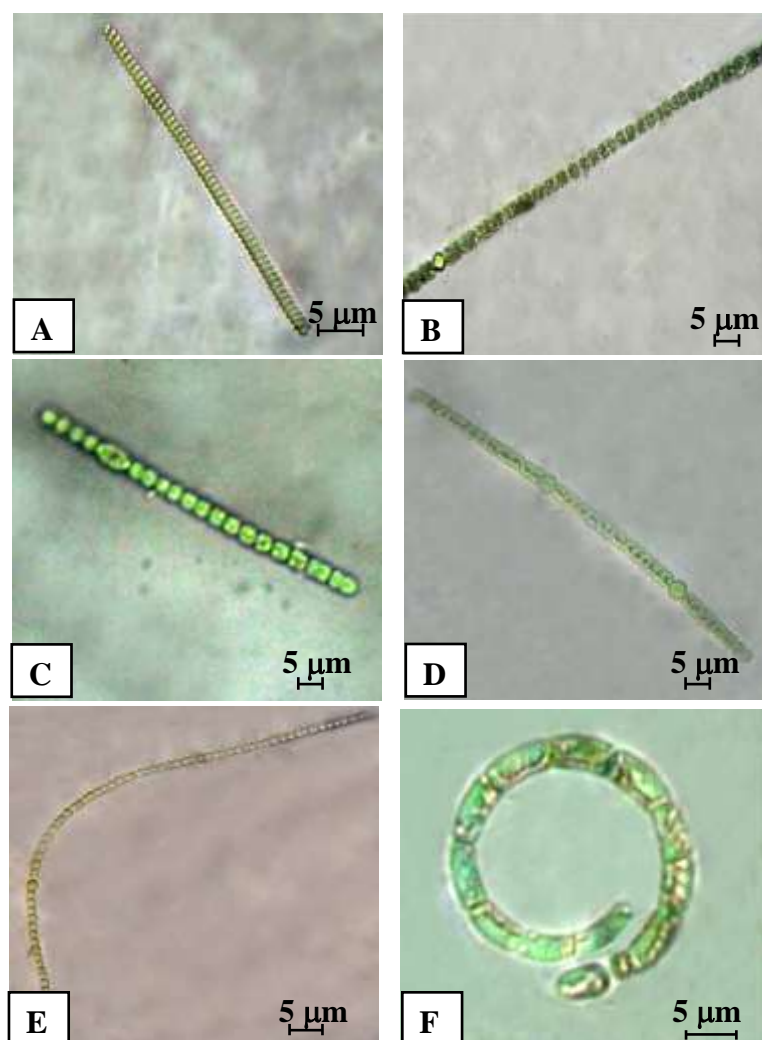


Figure 3. A. *Spirulina subsalsa* Oersted
B. *Anabaena affinis* Lemmermann
C. *Anabaena macrospora* Klebahn
D. *Anabaena smithii* (Komarek) stat.nov.
E. *Nostoc calcicola* Brebisson
F. *Cylandropermopsis philippinensis* Komarek

Discussion and Conclusion

In the present study, algae samples were collected from Kaung-hmu-taw fishery pond. All of the collected 12 species, 7 genera, 4 families belong to 3 orders of Cyanophyta were observed.

During the study period, *Aphanocapsa*, *Merismopedia*, *Oscillatoria* and *Anabaena* were abundantly occurred in the present study area. The water temperature ranges were (29°C – 33°C) and pH (7.5 – 8.3) during this period.

According to Graham & Wilcox (2000), *Oscillatoria*, the optimal temperature for growth of most polar isolates ranged from 15°C – 35°C. The algae were not specifically adapted for growth at the low temperature. In the present study, the water temperature in the study period was 25°C – 29°C. *Oscillatoria* was abundantly occurred in this period.

In 1995, Ni Ni Khaing recorded many Cyanophyta at Kaung-hmu-taw Inn and Kaung-hmu-taw Fishery Pond. This research showed that *Merismopedia*, *Oscillatoria*, *Spirulina* and *Anabaena* were abundantly observed. *Chroococcus*, *Microcystis*, *Aphanothece*, *Arthrospira* and *Lyngbya* not found in the present study. It can be concluded that, the collected species were changed due to environmental factors; pH, temperature and periodic condition.

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