

OCCURRENCE OF MICROORGANISMS IN THE MYA KAN THAR LAKE, LOILEM TOWNSHIP, SOUTHERN SHAN STATE

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Abstract

The present study revealed that the composition and amount of microorganisms in the water sample of Mya Kan Thar Lake, Loilem Township. There are four groups of microorganisms such as phytoplankton's groups (Phyla Chlorophyta and Euglephyta), diatoms groups (phylum Chrysophyta), cyanobacteria groups (phylum Cyanophyta) and zooplanktons groups (Phyla Protozoa, Rotifera, Ciliophora, Arthropoda and Ascheminthes) were divided from the results of present study. The study period lasted from June, 2016 to November, 2016. Recorded microorganisms including nine phyla, 18 classes, 23 orders, 29 families, 51 genera and 38 species were found. Among four groups the largest total numbers and percentage (%) of recorded zooplanktons group were 100-140 and 52.46% during study period. The second largest total numbers and percentage (%) of recorded Diatoms group were 80-140 and 21.28%. The total numbers and percentage (%) of recorded phytoplanktons group were 80-100 and 18.43% during study period. The lowest total numbers and percentage (%) of recorded cyanobacteria group were 15-80 during study period. According to the results it may be therefore concluded that Mya Kan Thar Lake can be assumed non-polluted still now. On the other hand the results indicated that the water of this Lake is oligotrophic condition. The results will also provide a tool for biomonitoring of aquatic status and environmental health in natural aquatic ecosystem and to know about this Lake is suitable for resort people coming in the Mya Kan Thar Park, Loilem Township.

Key words: microorganisms, phytoplankton's groups, diatoms, cyanobacteria and zooplanktons

Introduction

Aquaculturists in many countries were investigated microorganisms in the water of Nature Lake. Most microorganisms could be easily abundance in nature water under favorable conditions. Although they were often abundantly found in nature water, it is important to examine. However the over abundantly growth of these microorganisms in Nature Lakes, may

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also lead to pollution. Water pollution is one of the main crises faced by millions of people and majority of water-borne diseases are spreading because of the poor quality of water (El-Adly *et al.*, 2008).

Theoretically, one factor of water pollution is based on various types of microorganisms. There is a need to know the abundance community of microorganisms to exist in Lakes. Therefore, it is necessary to study of the microorganisms which are favorable for the good condition in Nature Lakes. In addition, the significantly influenced of microorganisms may lead to conclude the quality and quantity of Lakes water. Many researchers were carried out the examining of microorganisms in Lake Protection and Management (Prok and Elleby, 2004).

It is therefore the examining of microorganisms should be carried out in Mya Kan Thar Lake, Loilem Township. The research should also be investigated generally microorganisms are relatively abundant or not and beneficial or harmful in it. In aquatic environments such as ponds, lakes, rivers and innumerable living beings have their home (Carboni, 2009). Microorganisms including protozoa, zooplanktons, cyanobacteria and microalgae are beneficial as well as harmful to aquatic organisms, domestic animals and human.

The previous studies of microorganisms in Mya Kan Thar Lake, Loilem Township was lacking to date in Department of Zoology, Panglong University. It is therefore, under taken on the community and quantity of microorganisms in this Lake according to the following objectives:

- to study and record the microorganisms found in Mya Kan Thar Lake, Loilem Township,
- to understand the water quantity of its Lake,
- to know about whether or not the suitable Lake for resort people located in the Mya Kan Thar Park, Loilem Township.

Materials and methods

Study site and period

The field study site is Mya Kan Thar Lake, Loilem Township which situated southern part of Shan State in Myanmar (Fig 1). The study period was carried out from June 2016 to November 2016.

Sample collections

The water samples containing microorganisms were collected monthly from the study site of Mya Kan Thar Lake, Loilem Township for examine. There were four study sites divided on this Lake: Site I, Site II, Site III and Site IV was east, west, south and north of Mya Kan Thar Lake, Loilem Township respectively (Plate). From each study sites, the water sample put into the sterile-bottles and immediately taken to the laboratory of Zoology Department, Panglong University.

Equipments and preparation methods

Light microscope, beaker, micropipette and pointer were used. Firstly, each collected water sample of sterile plastic bottles was place settable for sedimentation. Secondly, after sedimentation of these water samples the supernatant and bottom water of each sterile plastic bottles were carefully put in beaker. Thirdly, after carefully stirring water sample in beaker, 0.1 ml (one drop of water) was collected with micropipette and placed on a glass slide and then covered by cover slip for the observation of microorganisms.

Identification methods

The taxonomic identification was made immediately after preparation of water sample. This involved identification of dominant microorganism in the water sample as well as the composition of its. Carefully examined by counting the number of cells under light microscope (with the magnification of x100 and x 400); at least 5 slides were observed. The average percentage (amount and compositions) of microorganisms on the glass-slide were also studied.

The occurrence and quantity of microorganisms were roughly recorded on each slide by the method of Jochem (2001) and Elder (2003). Microorganisms were identified down to the genus and species level according Desikachary (1959), Edmondson (1966) and Bellinger and Sigege (2010). The recorded microorganisms on the glass-slide were taken microphotographs (with the magnification of x40, x100 and x400) camera attached digital microscope at Department of Zoology, Taunggyi University and Mandalay University.

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Results

List of recorded microorganisms found in Mya Kan Thar Lake, Loilem Township was shown in Table. The total numbers of recorded microorganisms in Mya Kan Thar Lake, Loilem Township and the total percentage (%) of recorded microorganisms in Mya Kan Thar Lake, Loilem Township were shown in Fig 2 and 3.

In the present study, there were 9 phyla, 18 classes, 23 orders, 29 families and 51 genera and 38 species of microorganisms were recorded in Mya Kan Thar Lake. In these the largest numbers of genera was found under the phylum Chlorophyta (14 genera), followed by Chrysophyta (12 genera), Protozoa (8 genera), Cyanophyta (4 genera), Ciliophora (4 genera), Rotifera (4 genera), Arthropoda (2 genera), Euglenophyta (2 genera), and Achelminthes (1 genus).

Discussion

The present study revealed that the composition and amount of microorganisms in the water sample of Mya Kan Thar Lake, Loilem Township. There are four study sites divided in collected and microorganisms are found float and wiggle in drops of water of all study sites. Microorganism's populations in a Mya Kan Thar Lake were observed different kinds of species that live in horizontal band or zone near the water surface. Phytoplanktons are microscopic plants that live in all healthy aquatic systems including freshwater ponds and lakes (Conte and Cabbage, 2001).

There are four groups or types of microorganisms such as phytoplankton's groups (Phyla Chlorophyta and Euglephyta), diatoms groups (phylum Chrysophyta), cyanobacteria groups (phylum Cyanophyta) and zooplanktons groups (Phyla Protozoa, Rotifera, Ciliophora, Arthropoda and Ascheminthes) were divided from the results of present study.

Among nine phyla, the highest of 19 genera are recorded in the phyla Protozoa, Ciliophora, Rotifera, Arthropoda and Aschelminthes (Zooplanktons group) than others. This result indicated that microorganisms including zooplanktons may be due to dominance species than others in Mya Kan Thar Lake, Loilem Township.

The second highest of 16 genera are recorded in the phylum Chlorophyta and Euglenophyta (phytoplanktons group) this is may be possible that eutrophication or fertilized water body of Loilan Lake, because

some species of water birds found in it and maintenance of better water quality and greater abundance of plankton. Both cow dung and poultry excreta, through maintenance of better water quality and greater abundance of plankton in the system (Jha, *et al.*, 2004).

The third highest of 12 genera are recorded in the phylum Chrysophyta (diatoms group) and found in all study sites of water column. Diatoms (Class: Bacillariophyceae) are a type of mainly aquatic photosynthetic algae which can be found in a variety of habitats both acidic and basic water (Moe Kyi Han, 2010). This is may be possible that they are found in each water sample of water column.

The lowest of four genera are recorded in the phylum Cyanobacteria (cyanobacteria group). To date there are different kinds of cyanobacteria used for supplement live fish feed because of their excellent nutrient composition and digestibility. They have also high protein content not only which is abundance occur in nature. In addition cyanobacteria can affect the production of zooplankton and consequently the production of fish. Thus the herbivores and omnivorous fish in this Lake are ready to fed natural live feed.

Among four groups the largest total numbers and percentage (%) of recorded zooplanktons group were 100-140 and 52.46% during study period. It is because of the rotifer and protozoa may be suspended in water and have the power of locomotion. Aquatic micro-organisms, many of which are active swimmers, play a vital role in life on earth. It should be assumed that, it may be abundantly valuable live food for the nutritional value of some fish in Lake.

The second largest total numbers and percentage (%) of recorded Diatoms group were 80-140 and 21.28%. This result indicated that the water of Mya Kan Thar Lake is oligotrophic condition. Phylum Chrysophytes have traditionally been held to indicate oligotrophic contions (bellinger and Sige, 2010). The diatoms populations are support for supplement live food for fish species in Lake. Diatoms are a plantlike form of microscopic life found in oceans and lakes and they are an important part of plankton, which many aquatic animals rely on for food (Carboni, 2009).

The total numbers and percentage (%) of recorded phytoplanktons group were 80-100 and 18.43% during study period. Although algal toxins can cause problems in the freshwater aquaculture of both vertebrates (fish)

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and invertebrates (shellfish), Nwe Nwe Yin, *et al.* (2006) studied that 26 species of fish were collected from Loilem Lake.

The lowest total numbers and percentage (%) of recorded cyanobacteria group were 15-80 and 7.84% during study period. The lowest numbers were found in the water of all study sites. However, some cyanobacteria (blue-green algae) produce toxins poisonous to fish and aquatic animals. Over growth and abundance of cyanobacteria can caused blooming condition in Lake and this may be due to pollution water. Although cyanobacteria are valuable live and supplement feed including fishes for aquatic organisms, it may be chosen. The results concluded that the water of Mya Kan Thar Lake is non pollution condition.

The results of recorded microorganisms were different in numbers and percentage of microorganisms may be assumed that the duration of research period, temperature and environmental conditions vary and depended on the content of microorganisms in collected water sample at different sites. This is depending not only with the period of the reproduction, but also with the light intensity of the temperature, humidity and rainfall. It is may be possible that whether there may be scarcely present in Mya Kan Thar Lake or these microorganisms might not be seen under light microscope when examined. Nevertheless many microorganisms community are altogether observed in this Lake. The phytoplankton serves as the base of the aquatic food web, providing an essential ecological function for all aquatic life.

Conclusion

Therefore it may be concluded that Mya Kan Thar Lake, Loilem Township can be assumed non-polluted still now. On the other hand the results indicated that the water of Loilem Lake is oligotrophic condition. The results will provide a tool for biomonitoring of aquatic status and environmental health in natural aquatic ecosystem and to know about this Lake is suitable for resort people coming in the Mya Kan Thar Park, Loilem Township. But we may also be needed for future studies of this Lake.



Fig. 1 Map of Loilem Township (Source google earth)

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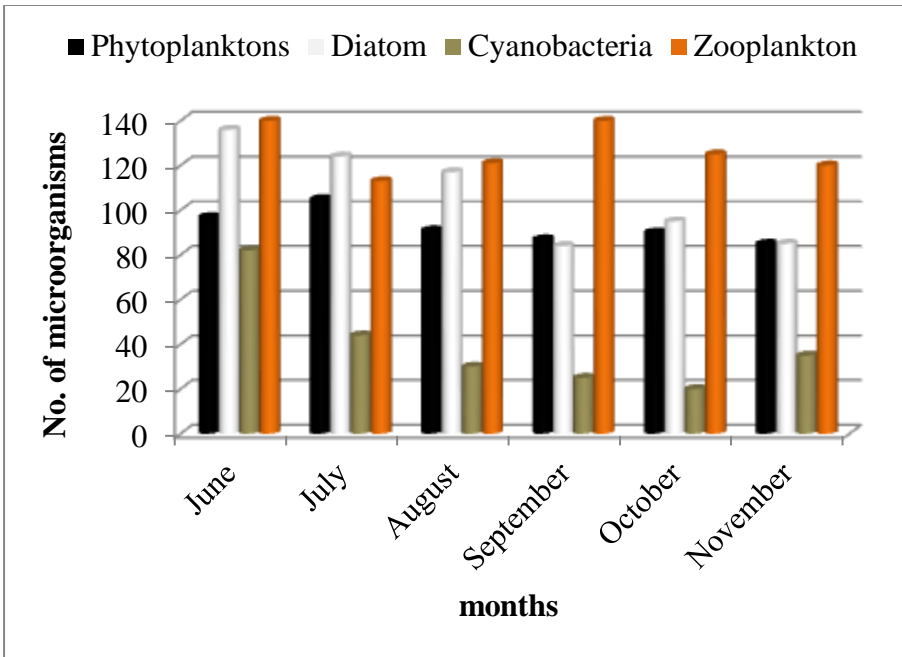


Fig. 2 The total numbers of recorded microorganisms in Mya Kan Thar Lake, Loilem Township

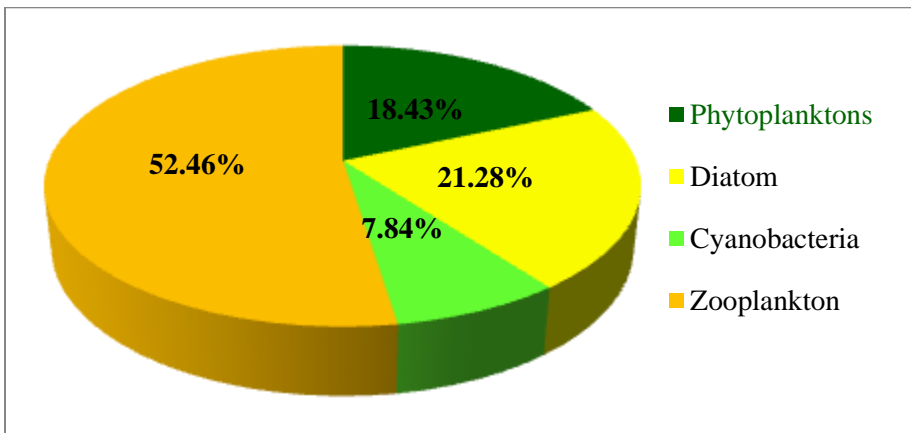


Fig. 3 The total percentage (%) of recorded microorganisms in Mya Kan Thar Lake, Loilem Township



(A) East portion of Lake (Site I)



(B) West portion of Lake (Site II)



(C) South portion of Lake (Site III)



(D) North portion of Lake (Site IV)

Plate Sampling sites of Mya Kan Thar Lake, Loilem Township

Table List of recorded microorganisms in Mya Kan Thar Kake, Loilem Township

Phylum	Class	Order	Family	Genus	Species	
Chlorophyta	Chlorophyceae	Chlorococcales	Chlorococceae	<i>Chlorococcum</i>	<i>C. humicola</i>	
				<i>Eudorina</i>		
			Hydrodictyceae	<i>Pediastrum</i>	<i>P. duplex</i>	
			Oocystaceae	<i>Westella</i>		
				<i>Tetraedron</i>	<i>T. trilobulaton</i>	
				<i>Oocystis</i>		
			Coelastraceae	<i>Coelastrum</i>	<i>C. asteroideum</i>	
					<i>C. microporum</i>	
			Scenedesmaceae	<i>Scenedesmus</i>	<i>S. obliquus</i>	
			Zygnematales	Desmidiaceae	<i>Cosmarium</i>	<i>C. perpusillum</i>
					<i>Closterium</i>	<i>C. parvulum</i>
			Tetrasporales	Palmellaceae	<i>Sphaerocystis</i>	
			Cladophorales	Cladophoraceae	<i>Pithophora</i>	
Chrysophyta	Bacillariophyceae	Bacillariales	Cryptococcales	Cryptomonadaceae	<i>Cryptomonas</i>	
					<i>Rhodomonas</i>	
			Naviculaceae	<i>Stauroneis</i>	<i>S. phoenocentron</i>	
				<i>Neidium</i>	<i>N. hitchcockii</i>	
				<i>Caloneis</i>	<i>C. amphisbaena</i>	
				<i>Gyrosigma</i>	<i>G. spenceri</i>	
			Fragilariaceae	<i>Fragilaria</i>		
				<i>Synedra</i>	<i>S. ulna</i>	
			Epithemiaceae	<i>Epithemia</i>	<i>E. zebra</i>	
			Gomphonemaceae	<i>Gomphonema</i>	<i>G. herculeana</i>	
			Ochromonadaceae	<i>Pinnularia</i>	<i>P. gentilis</i>	
					<i>P. nobilis</i>	
				Cymbellaceae	<i>Cymbella</i>	<i>C. aspera</i>
		<i>Amphora</i>				
Cyanophyta	Cyanophyceae	Chroococcales	Nitzschiaceae	<i>Nitzschia</i>	<i>N. longissima</i>	
			Chroococcaceae	<i>Chroococcus</i>		
				<i>Merismopedia</i>	<i>M. tenuissima</i>	

Table List of recorded microorganisms in Mya Kan Thar Kake, Loilem Township (continued)

Phylum	Class	Order	Family	Genus	Species
Cyanophyta	Cyanophyceae	Chroococcales	Oscillatoriaceae	<i>Oscillatoria</i>	<i>O. formosa</i> <i>O. terebriformis</i>
Euglenophyta	Euglenophyceae	Hormogonales Euglenales	Euglenaceae	<i>Lyngbya</i> <i>Euglena</i> <i>Phacus</i>	<i>E. mutabilis</i> <i>E. viridis</i> <i>P. longicauda</i> <i>P. denisii</i>
Protozoa	Rhizopoda Rhizopoda Sarcodina Phytomastigophorea Filosa	Actinophyridia Actinophyridia Amoebida Euglenida Chrysomonodina Testaceafilos	 Amoebidae Eyglyphidae	<i>Actinosphaerium</i> <i>Acanthocystis</i> <i>Actinophrys</i> <i>Amoeba</i> <i>Peranema</i> <i>Dinobryon</i> <i>Euglypha</i>	 <i>A. proteus</i> <i>P. trichophorum</i> <i>E. tuberculata</i>
Ciliophora	Ciliata	Tricladida Holotrichida Hymenostomatida Hypotrichida Peritrichida	Diffugiidae Holophyridae Tetrahymenidae Vorticellidae	<i>Diffugia</i> <i>Coleps</i> <i>Tetrahymena</i> <i>Euplotes</i> <i>Vorticella</i>	<i>C. hirtus</i> <i>E. patella</i>
Rotifera	Monogononta	Ploima	Brachionidae	<i>Notholca</i> <i>Lepadella</i> <i>Argonotholca</i> <i>Monostyla</i>	<i>N. acuminate</i> <i>N. caudata</i> <i>N. labis</i> <i>L. ovalis</i> <i>L. patella</i> <i>A. foliacea</i> <i>M. bulla</i>
Arthropoda	Branchiopoda Crustacea	Cladocera	Lecanidae Cyclopidae	<i>Cyclops</i> <i>Daphnia</i>	
Aschelminthes	Gastrotricha	Chaetonotida	Chaetonotidae	<i>Chaetonotus</i>	<i>C. anomalus</i>

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