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## **The Study of Selected Hydrophytes in Lake-pya-kan, Bago Township**

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### **Abstract**

The research area, Lake-pya-kan is a very famous and nice place which is located in the centre of Bago. The specimens were collected from seasonally, mostly twice a year in the raining and summer. A total of 14 species of vascular hydrophytes belonging to 12 genera of 10 families were collected from this area and 15 species of nonvascular hydrophytes were also undertaken. The salient morphological characteristics of each and every species have been identified. The morphological descriptions, photographic records and the location map are also given.

### **Aims and Objectives**

- To know the vegetation types of this area
- To identify the plants and phytoplankton of the research area
- To document the morphological characteristics of the plants
- To find the medicinal and commercial value of the plants in this region.

### **Introduction**

Lake-pya-kan is one of the famous places of Bago which is located in the centre of the town, bounded to the west by Komin-kochin Road, to the east by nursery school, to the south by Auto-exchange and to the north by Thanatpin Road.

The hydrophytes are defined as the plants grow in water or in wet-soil which is saturated with water or is covered with water. These are divided into nonvascular hydrophytes (phytoplankton) and vascular hydrophytes.

Algae or phytoplankton are found in free floating or attached at the bottom of the pool; a few grasses and aquatic angiosperms are growing along the periphery region of the research area. Some of them are abundant in the middle region.

Intensive collections of the specimens were made monthly covering all seasonal variations.

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The present study includes a total of 15 species of algae belonging to 11 families and 14 species of grasses and aquatic angiosperms belonging to 12 genera and 10 families.

### **Materials and Methods**

All the specimens in this study were collected from deep and shallow water of the pool, during the months of April to November in 2004 and 2005.

The materials as algal samples which are free floating, free swimming, growing attached to the bottom and submerged were collected in visible state in natural habitat. The algal specimens were initially fixed and preserved in 5% formalin solution and mounted on the glass slides by glycerin method (John E. sass, 1964). The observations were carried out with light microscope. Measurements of the microscopic algae were generally taken from the slide preparation by using stage and ocular micrometers. The photomicrographic records were taken by using Leitz Periplan GF Microscope.

The morphological description, classification and nomenclature were done according to Prescott (1964), Pantastico (1977), Vashishta (1983).

In the study of vascular hydrophytes, after the collection, both the vegetative and reproductive parts of the fresh specimens were measured and recorded in detail for taxonomic description.

The specimens were properly dried, pressed and mounted on herbarium sheets using standard techniques. The specimens were identified according to the method of Lawrence (1951), Hooker (1964) and Hundley and Chit Ko Ko (1987). Photographic records are also presented.

### **Results**

#### **List of Genera**

Fifteen genera of algae and twelve genera of vascular hydrophytes were investigated during the study periods. The algae included 6 genera of Cyanophyta, 1 genus of Euglenophyta, 7 genera of Chlorophyta and 1 genus of Chrysophyta. Vascular hydrophytes included 14 species, belonging to 12 genera and 10 families.

Table 1. List of Genera Collected (Algae)

No	Name of Genera	Amount / drop
1	<i>Chroococcus</i>	Abundant
2	<i>Gloeocapsa</i>	/
3	<i>Synechococcus</i>	/
4	<i>Oscillatoria</i>	/
5	<i>Anabaena</i>	/
6	<i>Scytonema</i>	/
7	<i>Euglena</i>	/
8	<i>Chlamydomonas</i>	/
9	<i>Volvox</i>	/
10	<i>Ulothrix</i>	/
11	<i>Zygnema</i>	Sparse
12	<i>Spirogyra</i>	Abundant
13	<i>Closterium</i>	Sparse
14	<i>Cosmarium</i>	/
15	<i>Navicula</i> (Diatoms)	Common

Table 2. Classification of Genera (Algae)

	Division	Class	Order	Family	Genus
Monera (Prokaryotes)	Cyanophyta	Cyanophyceae (Cyanobacteria)	Chroococcales	Chroococcaceae	<i>Chroococcus</i>
	/	/	/	/	<i>Gloeocapsa</i>
	/	/	/	/	<i>Synechococcus</i>
	/	/	Hormogonales	Oscillatoriaceae	<i>Oscillatoria</i>
	/	/	/	Nostocaceae	<i>Anabaena</i>
	/	/	/	Scytonemataceae	<i>Scytonema</i>
Protista	Euglenophyta	Euglenophyceae	Euglenales	Euglenaceae	<i>Euglena</i>
Plantae	Chlorophyta	Chlorophyceae	Volvocales	Chlamydomonadaceae	<i>Chlamydomonas</i>
	/	/	/	Volvocaceae	<i>Volvox</i>
	/	/	Ulotricales	Ulotricaceae	<i>Ulothrix</i>
	/	/	Zygnematales	Zygnemataceae	<i>Zygnema</i>
	/	/	/	/	<i>Spirogyra</i>
	/	/	/	Desmidiaceae	<i>Closterium</i>
	/	/	/	/	<i>Cosmarium</i>
Chrysophyta	Bacillariophyceae	Pennales	Naviculaceae	<i>Navicula</i> (Diatoms)	



Table 3. Classification of Species (Vascular Hydrophytes)

Kingdom	Division	Class	Order	Family	Genus	Species
Plantae	Anthophyta	Angiospermae	Alismatales	Butomaceae	<i>Limnocharis</i>	<i>flava</i>
			Cyperales	Cyperaceae	<i>Cyperus</i>	<i>halpan</i>
			Arales	Araceae	<i>Colocasia</i>	<i>esculenta</i>
			Arales	Araceae	<i>Pistia</i>	<i>stratiotes</i>
			Arales	Lemnaceae	<i>Spirodela</i>	<i>polyrhiza</i>
			Arales	Lemnaceae	<i>Lemna</i>	<i>minor</i>
			Commelinales	Commelinaceae	<i>Commelina</i>	<i>nudiflora</i>
			Liliales	Pontederiaceae	<i>Eichhornia</i>	<i>crassipes</i>
			Polygonales	Polygonaceae	<i>Polygonum</i>	<i>tomentosum</i>
			Nymphaeales	Nymphaeaceae	<i>Nymphaea</i>	<i>pubescens</i>
			Nymphaeales	Nymphaeaceae	<i>Nymphaea</i>	<i>rubra</i>
			Myrtiliflorae	Onagraceae	<i>Jussiaea</i>	<i>repens</i>
			Convolvulales	Convolvulaceae	<i>Ipomoea</i>	<i>pilosa</i>
			Convolvulales	Convolvulaceae	<i>Ipomoea</i>	<i>alba</i>

### Discussion and Conclusion

In this research, a total of 15 genera of nonvascular hydrophytes (algal flora) and 12 genera of vascular hydrophytes (angiosperms) were collected from Lake-pya-kan, Bago Township. The algae represented 6 genera of Cyanobacteria, 1 genus of Euglenophyta, 7 genera of Chlorophyta and 1 genus of Chrysophyta (Table 1 and 2).

Of the above 6 genera of Cyanobacteria, *Chroococcus*, *Gloeocapsa*, *Synechococcus*, *Oscillatoria*, *Anabaena* and *Scytonema*; 1 genus of Euglenophyta, *Euglena*; 7 genera of Chlorophyta including *Chlamydomonas*, *Volvox*, *Ulothrix*, *Zygnema*, *Spirogyra*, *Closterium* and *Cosmarium*; 1 genus of Chrysophyta namely *Navicula* occurred throughout the study period from July, 2005 to July, 2006.

Blue green algae, Cyanobacteria such as *Chroococcus*, *Gloeocapsa*, *Synechococcus*, *Oscillatoria*, *Anabaena* and *Scytonema* could be seen abundantly in Lake-pya-kan (Plate 1-6).

*Anabaena* trichomes had heterocysts. This was indicative of effective nitrogen fixation. *Oscillatoria* reproduced vegetatively by hormogonia. Although *Oscillatoria* was non heterocystous form among those of *Anabaena* and *Scytonema* were heterocystous forms. The development of heterocyst cells were structurally modified and functionally specialized was the most important characteristic of Cyanobacteria and capable of fixing atmospheric nitrogen (Fay et.al, 1968). Non heterocystous forms were also showed to exhibit nitrogenous activity (Steward and Lex, 1970) through only under anaerobic conditions.

*Euglena* could be found abundantly as unicellular, uniflagellate, motile forms (Plate 7); *Chlamydomonas* was biflagellate, unicellular, motile forms (Plate 8); *Volvox* was motile coenobial forms (Plate 9-10) and these 3 genera are green and free swimming.

*Ulothrix*, *Zygnema* and *Spirogyra* were un-branched filamentous forms. Although *Zygnema* and *Spirogyra* were free floating masses, *Ulothrix*, attached to the substratum (Plate 11, 12, 13, 14).

*Closterium* and *Cosmarium* were unicellular forms, *Closterium* tapering to sharp point at both ends and *Cosmarium* having a deep median constriction with large pyrenoid (Plate 15, 16). Pennate type diatom *Navicula* arrange striations in pennate manner in the raphe (Plate 17, 18).

The ten families of vascular hydrophytes Butomaceae, Cyperaceae, Araceae, Lemnaceae, Commelinaceae, Pontedriaceae, Polygonaceae Nymphaeaceae, Onagraceae and Convolvulaceae are abundant in Lake-pyakan. Among them the economically important species are as follow; Tet-pya (*Limnocharis flava*) and Pein (*Colocasia esculenta*), the leaves and stems are used as vegetables, Ye-za-lat (*Pistia stratiotes*) is cultivated as ornamental, Be-za-gyi (*Spirodela polyrhiza*) and Be-za-lay (*Lemna minor*) are used as fodder for duck, Myet-kyut (*Commelina nudiflora*) is used as medicine, Beda (*Eichhornia crassipes*) is grown as aquatic ornamental and used for making furniture, Kya-phyu (*Nymphaea pubescens*), Kya-ni (*Nymphaea rubra*) are ornamental, aquatic herbs and young leaves are eaten as vegetables, Kya-hin-nyut (*Ipomoea alba*) is also used as vegetable. Some local people offer Ye-ka-nyut (*Jussiaea repens*) for their traditional affairs.

In Cypraceae family stems four-angled, the blades well developed, in Polygonaceae, the family is distinguished by its stems terete, rooting at

the lower joints, inflorescences terminal and densely numerous flowered, stamens 6–8, free, ovary superior, unilocular with basal ovules.

Hydrophytes of Lake-pya-kan, Bago Township, constitutes diversity of plants with versatile uses as ornamental, vegetables, medicinal, traditional and other economic purposes.

### **Acknowledgement**

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I wish to express thanks to all of my teachers, friends and colleagues for their help and cooperation through this research work.



Plate 1 *Chroococcus* sp



Plate 2 *Gloeocapsa* sp.



Plate 3 *Synechococcus* sp



Plate 4 *Oscillatoria* sp

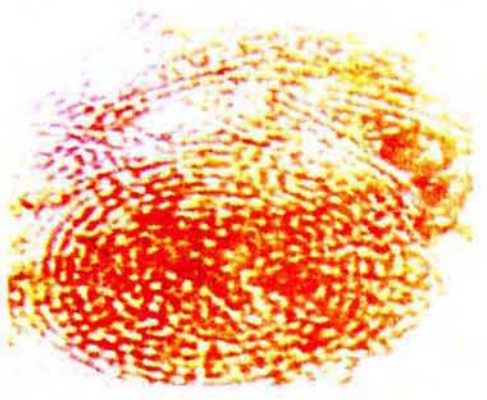


Plate 5 *Anabaena* sp

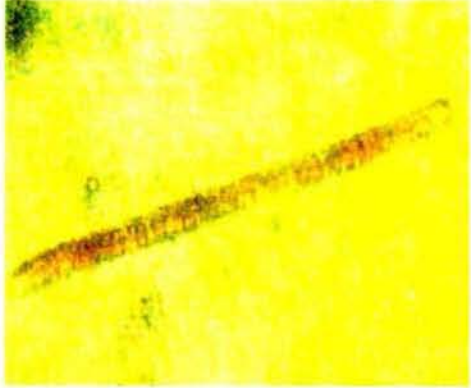


Plate 6 *Scytonema* sp



Plate 7 *Euglena* sp.



Plate 8 *Chlamydomonas* sp.

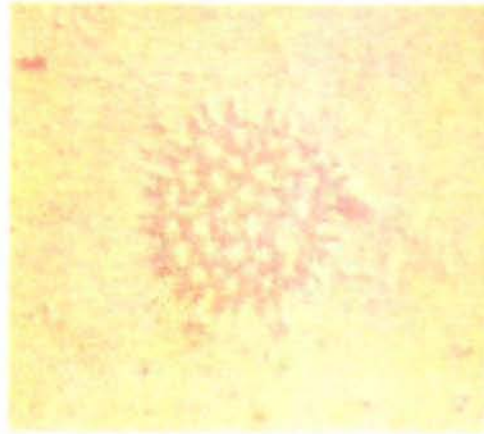


Plate 9. *Volvox* sp.

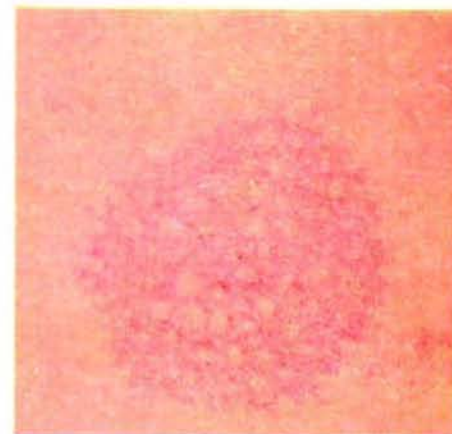


Plate 10 *Volvox* sp.



Plate 11. *Ulothrix* sp.



Plate 12. *Zygnema* sp.

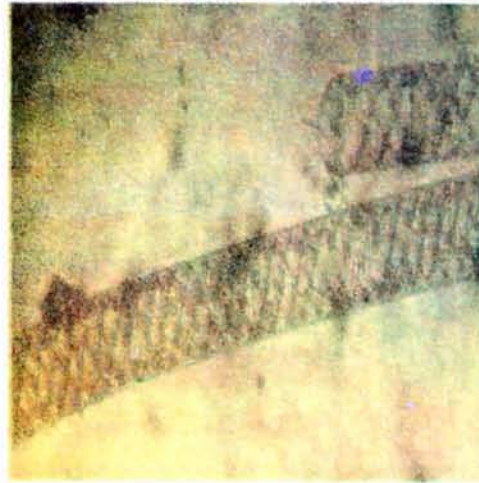


Plate 13 *Spirogyra* sp



Plate 14. *Spirogyra* sp

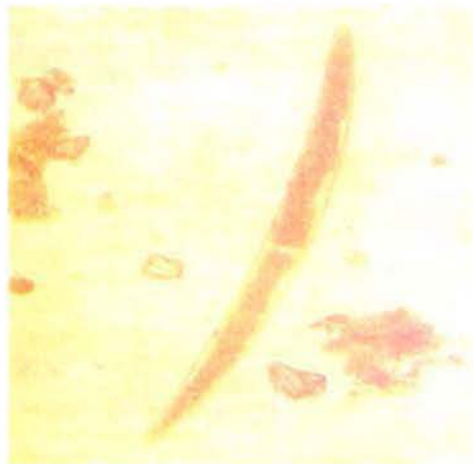


Plate 15 *Closterium* sp

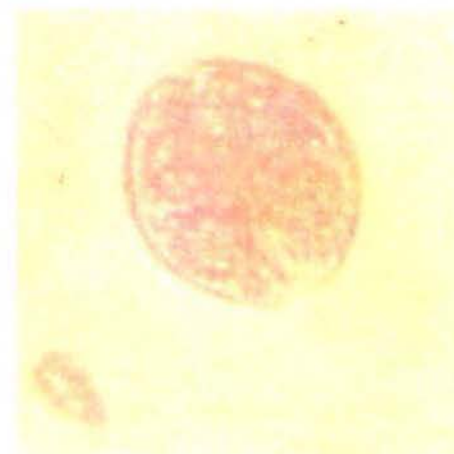


Plate 16 *Cosmarium* sp

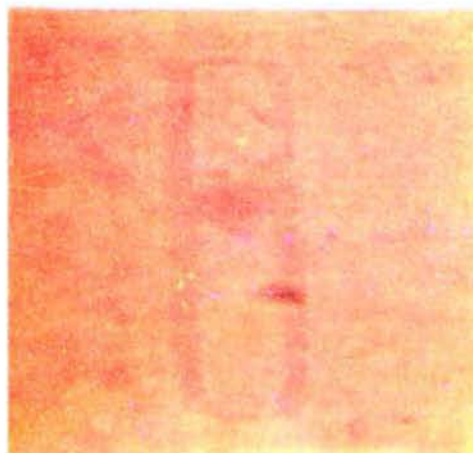


Plate 17 *Navicula* sp



Plate 18 *Navicula* sp .( valve view )

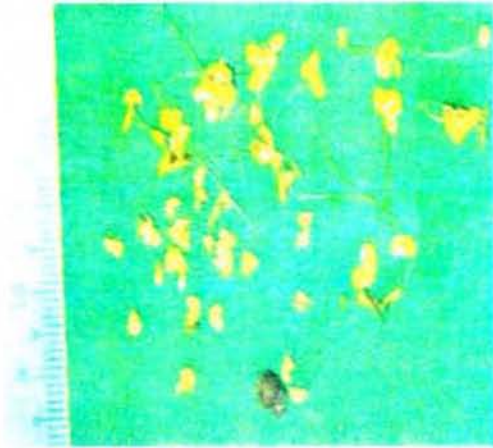
Plate 19. *Limnocharis flava*Plate 20 *Cyperus halpan*Plate 21. *Colocasia esculenta*Plate 22. *Pistia stratiotes*Plate 23 *Spirodela polyrhiza*Plate 24 *Lemna minor*Plate 25 *Commelina nudiflora*



Plate 26. *Eichhornia* spp.



Plate 27. *Polygonum* spp.



Plate 28. *Nymphaea pubescens*



Plate 29. *Nymphaea rubra*



Plate 30. *Jussiaea repens*



Plate 31. *Ipomoea pilosa*

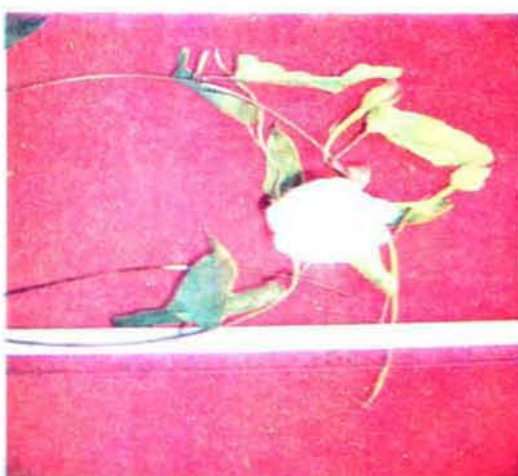


Plate 32. *Ipomoea alba*



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