

## A STUDY ON GREEN ALGAE SPECIES IN DAGON MYOTHIT (EAST) TOWNSHIP, YANGON REGION

Khin Khin Phyu<sup>1</sup>, Htay Htay Myint<sup>2</sup>

### Abstract

The sample species were collected from four different sites in Dagon Myothit East Township from November 2018 to May 2019. The present investigation is an attempt to record existing green algal species in study area by following proper methodology and identification procedures. All together 24 taxa of green algae belong to 16 Families, 9 Orders, 4 Classes in Division Chlorophyta were identified, described and recorded. The habitat characters of collected species were aquatic, aerial and attachment. *Bracteacoccus*, *Apatococcus* and *Chlorella* were found as aerial algae. *Characium*, *Oedogonium*, *Chaetophora*, *Stigeoclonium* and *Protoderma* were found attachment algae. *Chloromonas*, *Pandorina*, *Asterococcus*, *Pyrobotrys*, *Pediastrum*, *Scenedesmus*, *Gloeocystis*, *Microspora*, *Rhizoclonium*, *Pithophora*, *Mougeotia*, *Spirogya* and *Cosmarium* were found as aquatic algae. The results of this study give information about habitats characters of existing green algae in Dagon Myothit (East).

**Keywords:** Green algae, aquatic, aerial, attachment algae

### Introduction

Algae are plants. Some consist of only a single cell, single filament, or branched filaments. Many species are capable of self – locomotion by twisting, bending, gliding, and swimming and motile spores and gametes develop in many species.

About 5000 species of green algae have been described and named. As a group of plants, they are quite varied in structure, in appearance, and in several other ways. They are usually predominantly green in color during the vegetative phase, containing chlorophyll, Xanthophyll, and carotene in about the proportion found in the seed plants. They grow chiefly in water, both fresh and marine, but occur also on and in the soil and on many other kinds of moist substrates. (Pooja, 2011).

Chlorophyceae is one of the most dominant groups of phytoplankton in integrated fishponds. Many species of Chlorophyceae are direct or indirect food for fish. For instance, Filamentous species are good for common crop and Tilapia. (Weimin 2002).

The members of Chlorophyta or green algae are abundantly found in fresh water, brackish water and marine water environments. The water body harboring them may be lentic or lotic. The lentic environment may be characterized by a static pond, more stable permanent pools, ponds and lakes in the form of natural and man-made sources. Lotic systems comprise all kinds of flowing water from a small stream to huge rivers. Besides these, any moist surface such as wet soil, rocks, tree trunks, walls of old buildings can also support growth of algae. The algal thallus ranges from unicellular mucilaginous colonies to multicellular compact forms which show considerable diversity in form and adaptation to their distinctive environment (Krishnamurthy, 2000).

Chlorococcales are economically important as food of fish. It is generally known that a number of aquatic algae from the food of fish either directly or indirectly.

Therefore, this study gives information of some epiphytic species, free floating species, subarial species of Chlorophyta in Dagon Myothit (East).

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## Material and Methods

### Study Area

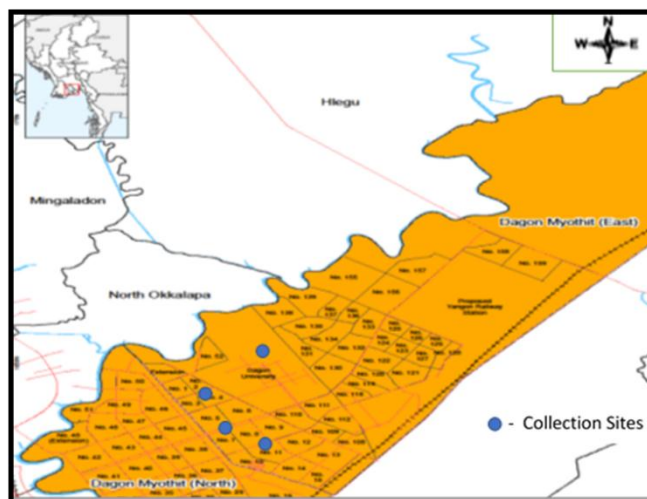
Specimens were collected from 4- Sites in Dagon Myothit (East) during November 2018 to May 2019 at Latitude 16° 53' N and Longitude 96° 17'. The site - 1 Dagon University Campus, the site - 2 is ornamental lake in 8- Quarter, the sites - 3 channels in 3 quarter and site – 4 is shallow water ponds in 5 quarter.

### Collection of the Algal Specimens

The algae samples were collected from 4 sites in Dagon Myothit (East). The samples were taken from tree trunk, surface water, aquatic plants and cement wall in Dagon Myothit (East) which were measured by Global Position System (GPS), temperatures were measured by thermometer and pH of water was measured by using pH meter. The collected algal specimens were examined by using electron microscope and recorded by camera in Laboratory, Department of Botany, Dagon University.

### Identification and Classification of Algae

Then they were identified on the basic of thallus shape, size, color, chloroplast, pyrenoids and sinus structure. The microscopically description and nomenclature, identification of the algal species were done according to Smith (1950), Prescott (1962), John *et al.* (2008) and other cited literatures. Moreover, the specimens were arranged by taxonomic procedures according to John *et al.* (2008).



**Figure 1** Location Map of Dagon Myothit (East) Area

## Results

Specimens were collected from different habitats such as aquatic algae, arial algae and unusual algae from different 4- Sites in Dagon Myothit (East) during November 2018 to May 2019. The site - 1 Dagon University Campus, the site - 2 is ornamental lake in 8- Quarter, the sites - 3 channels in 3 quarter and site – 4 is shallow water ponds in 5 quarter. The study period included the cold season and the hot season. The highest average temperature of study period in Dagon Myothit East is 33 ° C. The lowest average temperature of study period in Dagon Myothit East is 20 ° C. In this study, a total of 24 green algae taxa collected. Among them, 21 taxa were to species level and 3 taxa were identified to genus level on the basic of their microscopically

characteristics. Systematic Enumeration of Identified algal specimens were shown in Table -1. Occurrence of Conducted Algae in Collection Sites were shown in Table -2 The photomicrograph of conducted algal were showed in Plate - 1 to Plate - 4.

**Table 1 Systematic Enumeration of Identified algae**

Chlorophyceae	Chlamydomonadales	Chlamydomonadaceae Volvocaceae Palmellopsidaceae Spandylomoraceae	1. <i>Chloromonas serbinowi</i> 2. <i>Pandorina morum</i> 3. <i>Asterococcus siderogloeus</i> 4. <i>Pyrobotrys casinoensis</i>
	Chlorococcales	Chlorococcaceae Characiaceae Hydrodictyaceae Scenedesmaceae	5. <i>Bracteacoccus cohaerans</i> 6. <i>Characium angustum</i> 7. <i>Pediastrum obtusum</i> 8. <i>Scenedesmus arcuatus</i> 9. <i>Scenedesmus ecornis</i> 10. <i>Scenedesmus plantonicus</i>
	Oedogoniales	Oedogoniaceae	11. <i>Oedogonium sp</i>
Ulvophyceae	Chaetophorales	Chaetophoraceae	12. <i>Chaetophora pisiformis</i> 13. <i>Stigeoclonium farctum</i> 14. <i>Protoderma viride</i>
	Sphaeropleales	Radiococcaceae Microsporaceae	15. <i>Gloeocystis ampla</i> 16. <i>Microspora amoena</i>
	Cladophorales	Pithophoraceae	17. <i>Rhizoclonium hieroglyphicum</i> 18. <i>Rhizoclonium riparium</i> 19. <i>Pithophora mooreana</i>
Trebouxiophyceae	Chlorellales	Chlorellaceae	20. <i>Apatococcus lobatus</i> 21. <i>Chlorella vulgaris</i>
Conjugatophyceae	Zygnematales	Zygnemataceae	22. <i>Mougeotia sp</i> 23. <i>Spirogya sp</i>
	Desmidiales	Desmidiaceae	24. <i>Cosmarium granatum</i>

**Table 2 Occurrence of Conducted Algae in Collection Sites**

No.	Scientific Name	Site 1	Site 2	Site 3	Site 4
1.	<i>Chloromonas serbinowi</i>				✓
2.	<i>Pandorina morum</i>				✓
3.	<i>Asterococcus siderogloeus</i>			✓	
4.	<i>Pyrobotrys casinoensis</i>		✓		
5.	<i>Bracteacoccus cohaerans</i>	✓			
6.	<i>Characium angustum</i>	✓			
7.	<i>Pediastrum obtusum</i>		✓		
8.	<i>Scenedesmus arcuatus</i>			✓	
9.	<i>Scenedesmus ecornis</i>				✓
10.	<i>Scenedesmus plantonicus</i>		✓		
11.	<i>Oedogonium sp</i>	✓			
12.	<i>Chaetophora pisiformis</i>	✓			
13.	<i>Stigeoclonium farctum</i>	✓			
14.	<i>Protoderma viride</i>	✓			
15.	<i>Gloeocystis ampla</i>		✓		
16.	<i>Microspora amoena</i>		✓		
17.	<i>Rhizoclonium hieroglyphicum</i>		✓		
18.	<i>Rhizoclonium riparium</i>		✓		
19.	<i>Pithophora mooreana</i>		✓		
20.	<i>Apatococcus lobatus</i>			✓	
21.	<i>Chlorella vulgaris</i>			✓	
22.	<i>Mougeotia sp</i>				✓
23.	<i>Spirogya sp</i>		✓		
24.	<i>Cosmarium granatum</i>			✓	

### Taxonomic Description of Identified algae specimens

#### 1. *Chloromonas serbinowi* Starr & Zeikus, 1987

Cell solitary, spherical, covered by layer of mucous sheath, chloroplast cup shaped, cell 20µm in wide.

Habitat- aquatic, Occurrence - shallow water pond

#### 2. *Pandorina morum* (O.F.Muller) Bory, 1827

Colony globose; cell pyriform; compactly arranged and enclosed by a common gelatinous envelope; 68 µm in wide.

Habitat- aquatic, Occurrence - shallow water pond

#### 3. *Asterococcus siderogloeus* Pascher & R. Johoda Novakova, 1964

Cell ovoid, 4- celled enclosed by gelatinous envelope, chloroplast stellate, pyrenoid central, cell 30 µm wide, colony 87 µm wide.

Habitat-aquatic, Occurrence – Channel

**4. *Pyrobotrys casinoensis* (Playfair) P.C. Silava, 1972**

Coenobia 25µm in wide, with cells and flagella all pointing in same direction; cells pear – shaped and narrowed basally, 7.5 µm in wide, 25µm in long.

Habitat-aquatic, Occurrence - lake

**5. *Bracteacoccus cohaerans* H.W. Bischoff & H.C. Bold, 1963**

Cell spherical, unicellular but aggregate, chloroplast numerous, cell 8 µm wide.

Habitat- aerial, Occurrence – cement wall

**6. *Characium angustum* A. Braun, 1855**

Cells solitary, lance – shaped, narrowed to sharp point anteriorly, short thick stipe with a basal attaching disc, 7.5 µm in diameter, 25 µm long

Habitat- epiphytic, Occurrence – lake

**7. *Pediastrum obtusum* Lucks, 1907**

Colony entire; inner cells with 8 straight sides but with one margin deeply incised; peripheral cells crenate with a deep incision in the outer free margin, their lateral margins adjoined along of their length. Cells 7.5 µm wide.

Habitat- aquatic, Occurrence - lake

**8. *Scenedesmus arcuatus* Lemmmermann, 1899**

Coenobia are composed of 4 - 8 cells in 2 rows; cells ovoid to slightly cylindrical, with broadly round apices, cell wall usually smooth; cells 5 µm wide, 10 µm long.

Habitat- aquatic, Occurrence – Channel

**9. *Scenedesmus ecornis* (Ehrenberg) Chodat, 1926**

Coenobia are composed of 4 cells joined side by side, arranged linear; cells ellipsoidal, tapered at the poles, cell wall usually smooth; cells 8 µm wide, 15 µm long.

Habitat-aquatic, Occurrence – shallow water

**10. *Scenedesmus planctonicus* (Korshikov) Fott, 1973**

Coenobia are composed of 3 cells joined side by side, arranged linear; cells broadly ovoid, inner wall straight and outer wall convex, apices broadly rounded, cell wall usually smooth; cells 8 µm wide, 15 µm long.

Habitat- epiphytic, Occurrence - Channel

**11. *Oedogonium* sp Link ex Hirn, 1900**

Macrandrous; vegetative cells cylindrical, 10 µm in wide, 50 µm in long.

Habitat- epiphytic, Occurrence – Attached on *Pithophora* sp

**12. *Chaetophora pisiformis* (Roth) C.A. Agardh, 1812**

Plants attached, dichotomously branched filaments radiated from a common center, apical cells sharply pointed, main axis 10 µm in wide, 25µm long, cells of the branches only slightly narrower and shorter.

Habitat- epiphytic, Occurrence – aquatic plant in pond

**13. *Stigeoclonium farctum* Berthold, 1878**

Prostrate system pseudoparenchymatous and disc like, chloroplast and pyrenoid at same level in all radiating filaments forming the pseudoparenchymatous system, erect system absent; cells 7.5 µm wide and 1 times longer than wide.

Habitat- aerial, Occurrence - rock

**14. *Protoderma viride* Kuetzing, 1894**

Thallus an attached disc, irregular in outline, made up of branched filaments which are compact and parenchymatous internally but semi-radiate and spreading at the margin; terminal cells slightly narrowed; chloroplast a parietal disc with 1 pyrenoid; cells 6.25 µm in wide, 10 µm long.

Habitat- epiphytic, Occurrence – stem of aquatic plants

**15. *Gloeocystis ampla* (Kuetzing) Rabenhorst 1863**

Colonies spherical; cells ovoid; chloroplast parietal, without pyrenoid; Cells 5 µm wide, 6 µm long.

Habitat- aquatic, Occurrence - lake

**16. *Microspora amoena* (Kuetzing) Rabenhorst 1868**

Filamentous, uniseriate, unbranched, cells cylindrical, not constricted at the cross walls, thick walled; chloroplast net-like, filling entire cell; 22.5 µm in wide, 50 µm long.

Habitat- aquatic, Occurrence – lake

**17. *Rhizoclonium hieroglyphicum* (C. Agardh) Kuetzing, 1845**

Filamentous very coarse, uniseriate, unbranched, cells cylindrical to swollen, constricted at the cross walls, cell wall thickness; chloroplast granular and very dense; 15 µm in wide, 25 µm in long.

Habitat-aquatic, Occurrence – lake

**18. *Rhizoclonium riparium* (Roth) Harvey 1849**

Filamentous very coarse, uniseriate, unbranched, cells cylindrical, not constricted at the cross walls, cell wall slightly thick; chloroplast net-like, filling entire cell; 25 µm in wide, 1 times longer than wide.

Habitat-aquatic, Occurrence – lake

**19. *Pithophora mooreana* Collins 1912**

Branched macroscopic thallus; Filaments of cylindrical cells; with rounded extremity; from one to two intercalary akinetes, tonal shaped, terminal rounded; cells 75 µm in wide, 200 µm long.

Habitat-aquatic, Occurrence – lake

**20. *Apatococcus lobatus* (Chodat) J.B. Petersen 1928**

Cells forming 2-4 packets, clustered together; cell compressed; chloroplast lobed or without pyrenoid; cell 7.5 µm in wide.

Habitat- aerial, Occurrence – tree trunk

**21. *Chlorella vulgaris* Beyerinck (Beijerinck) 1890**

Cells spherical, irregular clumps; chloroplast parietal cup, without pyrenoid, cell 5-7.5  $\mu\text{m}$  in wide.

Habitat- aerial, Occurrence - cement wall

**22. *Mougeotia* sp C. Agarddddh, 1824**

Filamentous, unattached, cells cylindrical with plane end wall; chloroplast filling length of cell with several pyrenoids, filling entire cell; 27.5  $\mu\text{m}$  in wide, 125  $\mu\text{m}$  long.

Habitat- aquatic, Occurrence – shallow water pond

**23. *Spirogya* sp Link, 1820**

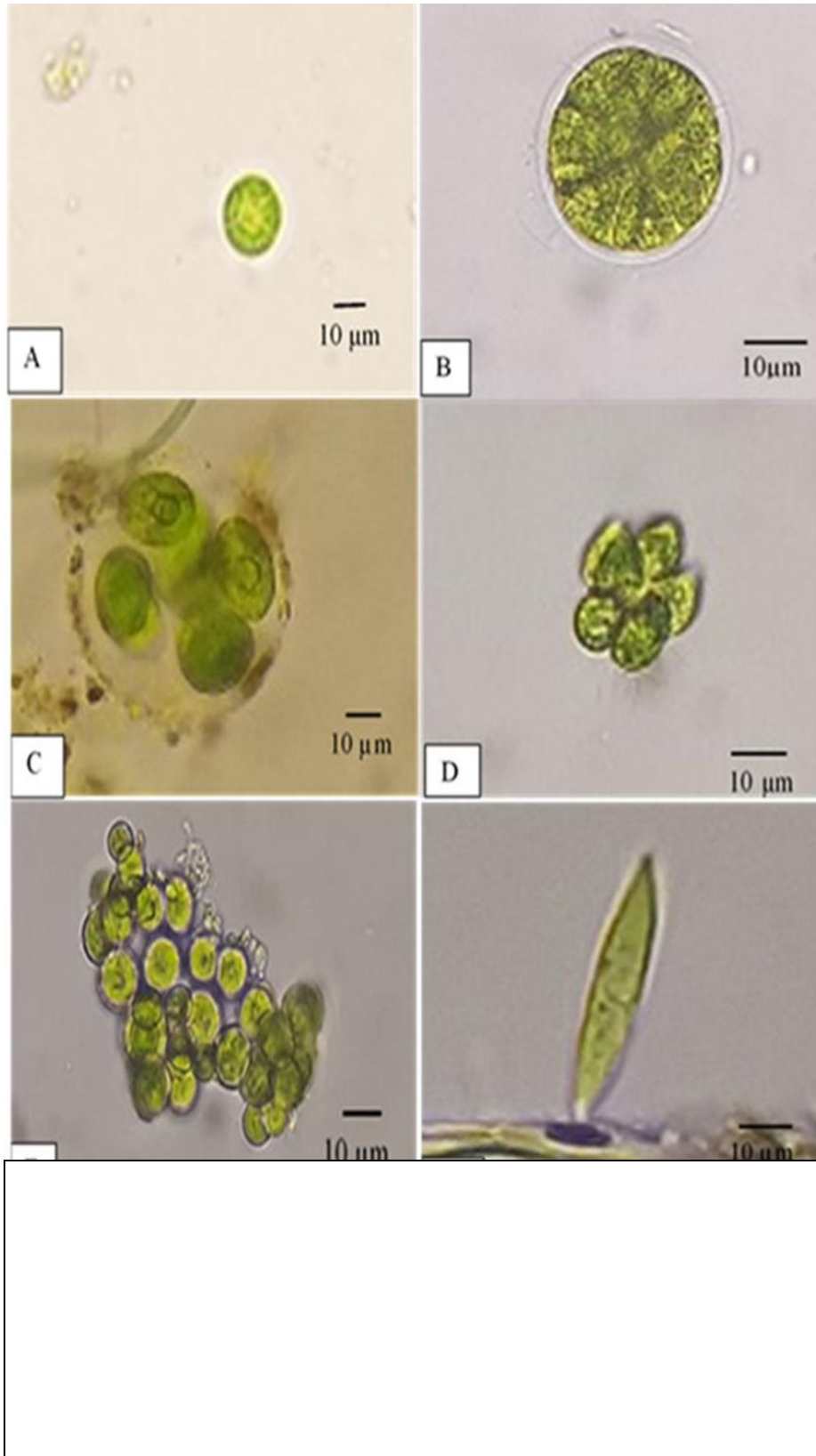
Filaments of short cells, 37.5  $\mu\text{m}$  in wide and 137.5  $\mu\text{m}$  in long, with plane end walls, chloroplast solitary, making 7 turns, conjugation not occur.

Habitat – aquatic, Occurrence - lake

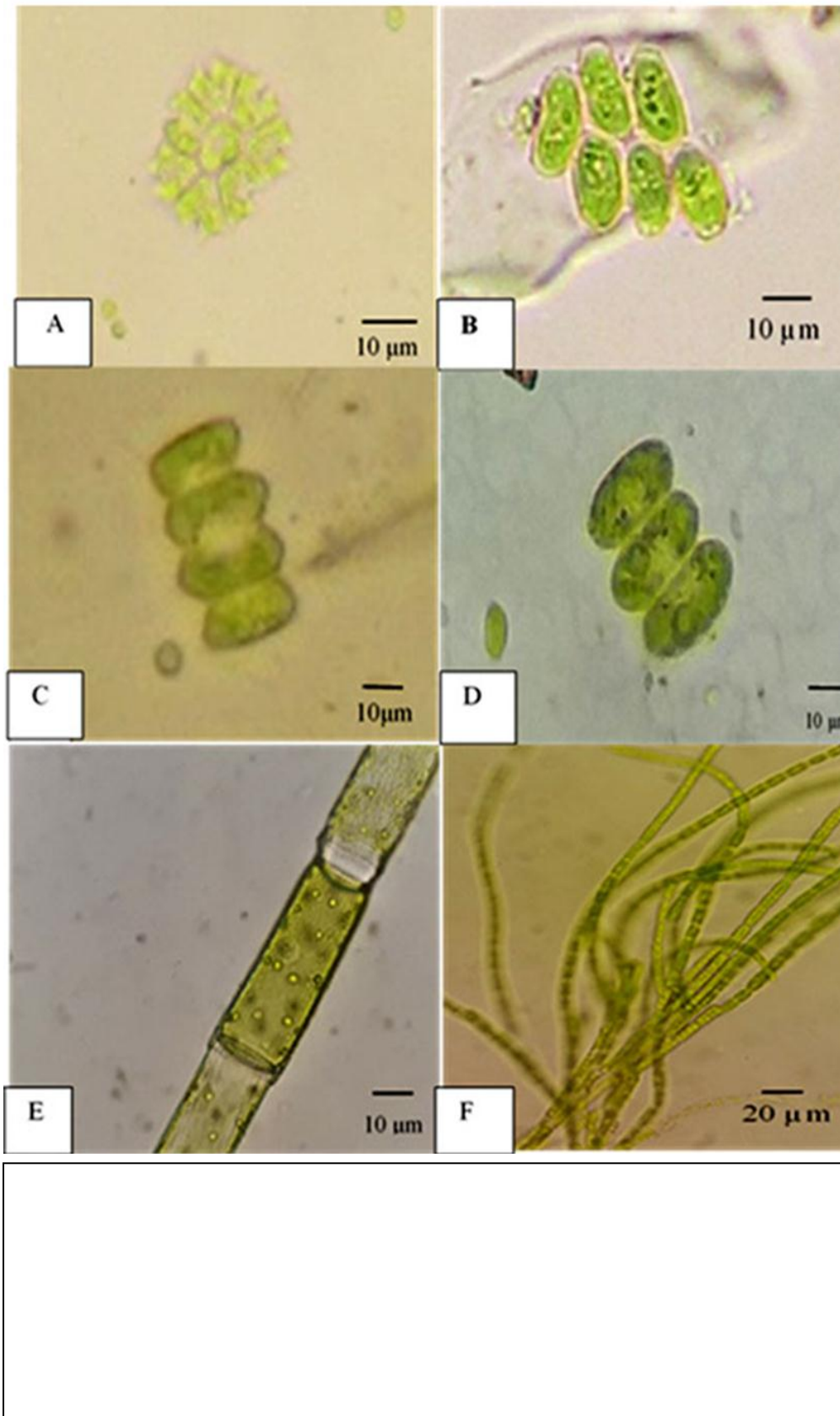
**24. *Cosmarium granatum* Brebisson ex Ralfs, 1848**

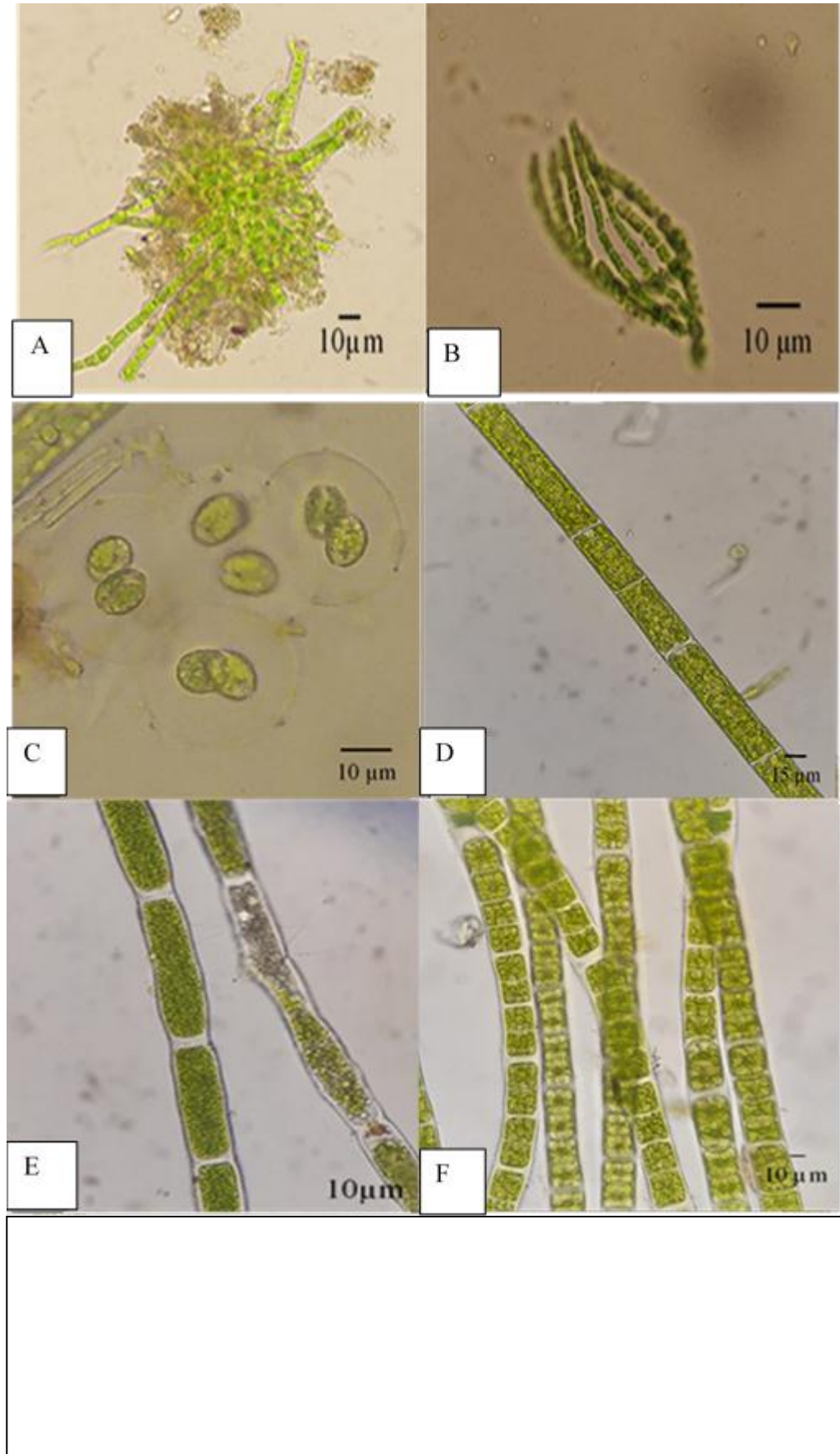
Semicells trapeziform, basal angled founded; lateral margin curving inward to broad, truncate apex, wall smooth sinus shallow and narrow. cells 30  $\mu\text{m}$  wide and 40  $\mu\text{m}$  long.

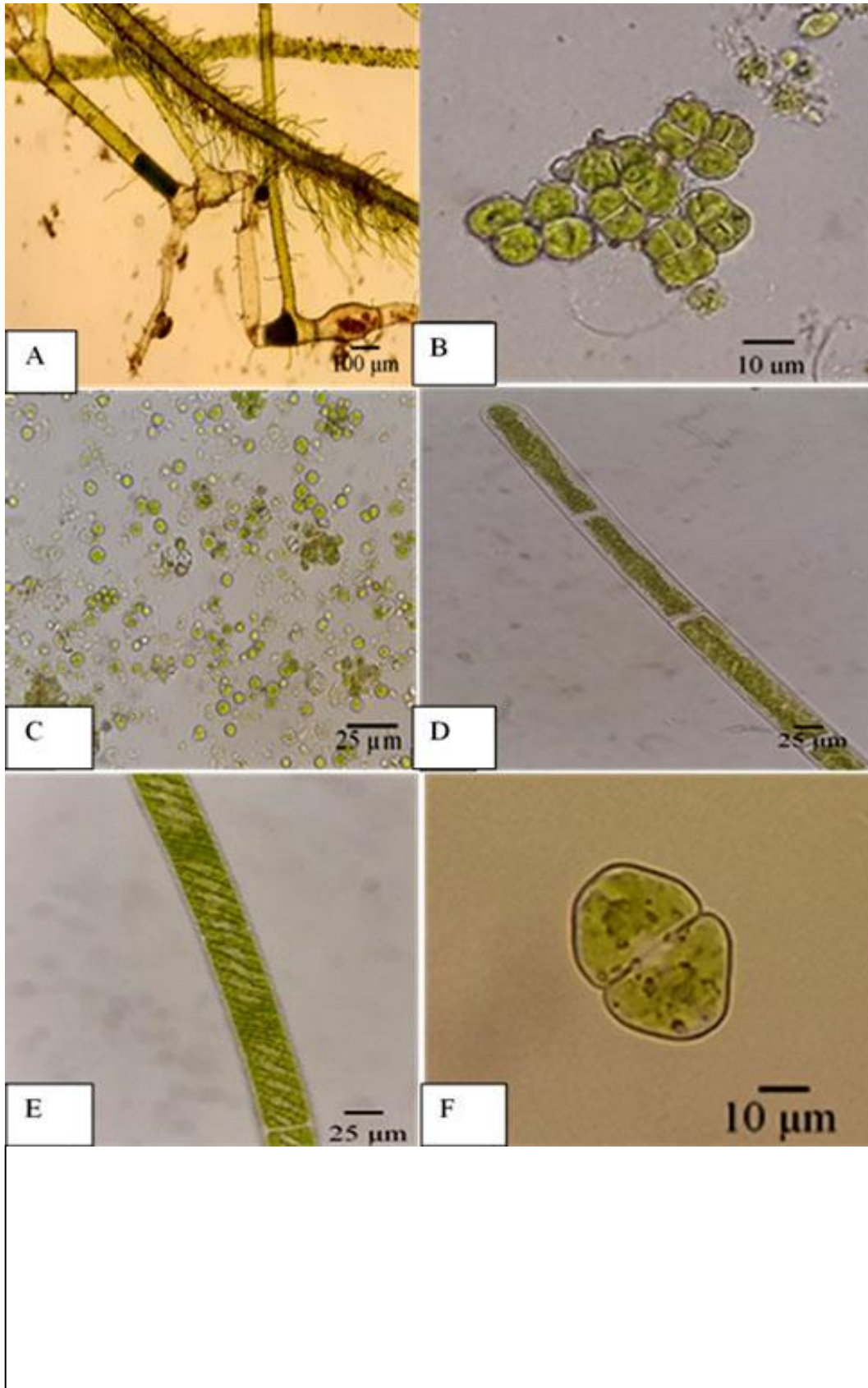
Habitat – aquatic, Occurrence- Channel











## Discussion and Conclusion

In this Study, the microscopical characters of 24 taxa belong to 16 Families, 9 Orders, 4 Classes in Division Chlorophyta were identified, described and recorded by the following literatures viz. Smith (1950), Presscott (1962), Sigeo (2004) and John *et al.* (2008).

In collection site – 1, *Bracteacoccus cohaerans*, *Characium angustum*, *Oedogonium sp*, *Chaetophora pisiformis* *Stigeoclonium farctum*, *Protoderma viride* were found. *Pyrobotrys casinoensis*, *Pediastrum obtusum*, *Scenedesmus planctonicus*, *Gloeocystis ampla*, *Microspora amoena*, *Rhizoclonium hieroglyphicum*, *Rhizoclonium riparium* and *Pithophora mooreana* were found on site -2. *Asterococcus siderogloeus*, *Scenedesmus arcuatus*, *Apatococcus lobatus*, *Chlorella vulgaris* and *Cosmarium granatum* were found on site -3. *Chloromonas serbinowi*, *Pandorina morum*, *Scenedesmus ecornis* and *Mougeotia sp* were found on site -4.

Smith, 1950 stated that the habitats of algae are mainly classified into three categories viz. aerial habitats, aquatic habitats and unusual habitats. Aerial algae have been defined as algae that obtain their water wholly or in large part from moisture in the air. Strictly aerial algae are found on the bark and leaves of trees, on wood, stones, and rock and on soil surface.

According to Smith (1950), *Bracteacoccus cohaerans*, *Scenedesmus planctonicus*, *Stigeoclonium farctum*, *Apatococcus lobatus* and *Chlorella vulgaris* were found as aerial algae.

Sambamurty, 2005 stated that aquatic algae are generally growing on floating waters, ponds, lakes, pools, ditches, bogs and swamps. The algae of running water are more diversified than those of any other aquatic habitats and include a larger percentage of species restricted to the particular habitat. Finally, algae growing on unusual habitats are broadly classified into the following categories - cryophytes or snow algae, thermal algae, halophytic algae, lithophytes, epiphytes and symbiotic algae.

In this study, *Characium angustum*, *Oedogonium sp*, *Chaetophora pisiformis* and *Protoderma viride* were seen as epiphytic algae. The habitats character of *Chloromonas serbinowi*, *Pandorina morum*, *Asterococcus siderogloeus*, *Pyrobotrys casinoensis*, *Pediastrum obtusum*, *Scenedesmus arcuatus*, *Scenedesmus ecornis*, *Gloeocystis ampla*, *Rhizoclonium hieroglyphicum* , *R. riparium* , *Microspora amoena*, *Pithophora mooreana* , *Mougeotia sp* , *Spirogya sp* , and *Cosmarium granatum* were also agreed with Sambamurty (2005).

The present study the green algal flora presented some existing green algal species in Dagon Myothit East township. The results emphasize the habitats characters of some green algae existing in study area. It is also hope that the present study will be proceed to identify the more species belong to Chlorophyta existing in this area.

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## References

- Chandrakant Pathak., (2013). A Textbook of algae. Black prints India. INC., New Delhi.
- Dillard, G. E., (1989-2000). Freshwater Algae of the Southeastern United States (Part 1to 7). Gebruder Borntrager, Berlin.
- Krishnamurthy, V. (2000) Algae of India neighbouring Countries I. Chlorophycota- Oxford and IBH Publishing Co. Pvt. Ltd.
- Kutzing, F.T. (1845) Phycologia Germanica 205 pp. Nordhausen
- John, David M; Whitton, Brian A and Brook, Alan J, (2008). The Freshwater Algal Flora of the British Isles. Cambridge University Press, UK.
- Pooja, (2011). Understanding Lower Plants. Discovery Publishing house PVT. LTD. Darya Ganj, New Delhi.
- Prescott, G.W., (1962). Algae of the Western Great Lakes Area. W.M.C. Brown Co. Inc., Dubuque, Iowa, U.S.A.
- Prescott, G.W., (1964). How to know the fresh-water Algae? W.M.C. Brown Co. Inc., Dubuque, Iowa, U.S.A. 1-293.
- Sambamurty, A. V. S. (2005) A textbook of Algae- I. K. International, p. 22.
- Satpati, G. G., Barman, N., Chakraborty, T. and Pal, R. (2011) Unusual habitat of algae, *J. Algal Biomass Utln.* 2 (4): 50-52.
- Satpati, G. G., Barman, N. and Pal, R. (2012) Morphotaxonomic account of some common seaweeds from Indian Sundarbans mangrove forest and inner island area, *J. Algal Biomass Utln.* 3(4): 45-51.
- Sigeo, D.C., (2004). Freshwater Microbiology. John Wily & Sons Ltd, The Atrium, Southern Gate, Chi Chester, West Sussex PO19 8SQ, England.
- Smith, G. M. (1950) The fresh water algae of United States- McGraw-Hill Book Company, INC, New York, London.

