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EPIPHYTES GROWING ON POTAMOGETON PECTINATUS L. IN LAKE BOROLLUS (EGYPT).

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ABSTRACT

The estimation of epiphytes growing on **Potamogeton pectinatus** L. in Lake Burollus was carried out monthly for one year. Alotgether, about 45 species were recorded. Diatoms were predominant (27 species) while cyanophytes (12 species) were less frequent. Chlorophytes (5 species) and rhodophytes (one species) appeared mostly as rare forms. The highest frequency of diatoms was in the winter and less in the other seasons. For cyanophytes, they were more frequent in the summer and autumn.

Results indicate that the growth of epiphytes on **P. pectinatus** was inversely correlated with the growth periods of the host plant.

INTRODUCTION

The estimation of epiphytic communities growing on hydrophytes in the Egyptian Delta lakes is of prime importance in assessing the organic production in these lakes. They are shallow and usually sustain extensive areas covered with dense growth of hydrophytes which in turn serve as good support for epiphytes.

The hydrophytes in Lake Burollus are represented mainly by **Potamogeton pectinatus** L. which constituted over 85% of the submerged plants in the Lake (El-Sherif, 1983). Its distribution was confined to the southern margins beside the outlets of the land drains as well as in the eastern sector. Other submerged plants of minor importance comprised **Potamogeton crispus** L., **Ceratophyllum demersum** L. amd **Najas armata** Lind. F. The aim of the present study is to enumerate the epiphytes growing on **P. pectinatus** throughout the differnt months.

MATERIAL AND METHODS

Estimation of epiphytes growing on **Potamogeton pectinatus** L. was carried out during the different months of 1978 and 1979 by collecting the plants with their epiphytic coat, then they were fixed with 4% formaline solution. In the laboratory, the hydrophytes were rubbed gently into small amounts

of water. The washing containing the epiphytes was allowed to settle and the water was decanted. The sedimented epiphytes were then examined microscopically to enumerate the community composition. The percentage frequency of the different species of epiphytes was roughly estimated as dominant (>25% of the total community), frequent(>5 %), rare (>1%) and very rare (less than 1%).

RESUTS

Potamogton pectinatus L. supports a rich epiphtic fiora. Most of them are limnetic froms can survive both planktonic or attached. Altogather about 45 species were recorded which included members of Bacillariophyceae (27 species), Chlorophyceae (12 species), Cyanophyceae (5 species) and Rhodophyceae (one species). The frequency of the different species during the successive months of the year is illustrated in (Fig. 1).

Bacillariophyceae:

Diatoms represented the main group of epiphytic algae. The more dominant species comprised **Cocconeis placentula** Ehr., **Mastogloia elliptica** (Ag.) Cleve, **Mastogloia smithii** Thw., **Rhopalodia gibba** (Ehr.) O. Mull., **Rhopalodia gibberula** (Ehr.) O. Mull. and **Synedra ulna** Ehr., while **Nitzschia frustulm** (Kutz.) Grun., **Nitzschia microcephala** Gurn, **Nitzschia sigma** (Kutz.) Sm. and **Epithemia sorex** Kutz remained frequent. The other species persisted as rare forms. All these diatoms were also recorded in the plankton of the lake (El-Sherif,1983).

Cocconeis placentula was the most dominant species. It appeared all the year round with a maximum frequency in the winter and early spring. It grows firmly attached to the substratum by a gelatinus pad which resists strong water currents (Allen,1920). The species is cosmopolitan, oligohalobus-halophilous form (Salah, 1960).

Mastogloia smithii and **M. elliptica** were frequently met with all the year round but attaining high peaks on the host plant in May. **M. smithii** is regarded as indifferent form(Peterson, 1943) while **M elliptica** is considered as a mesohalobous species (Hustedt, 1939).

Rhopalodia gibba appeared as a dominant epiphyte in April and June while it persisted as a frequent or rare diatom in the other months. **Rhopalodia gibberula** was also dominant in June, otherwise it was rarely observed throughout the rest of the year. The two species were rarley recorded in the plankton. **R gibba** is regarded as oligohalopous halophilous diatom (Salah, 1960) and **R gibberula** as indifferent form (Peterson, 1943).

Synedra ulna was more frequent on the host plant in late autumn and early winter. It appeared also frequently in the plankton. The species is regarded as indifferent form (Peterson, 1943).

The frequent species of the genus **Nitzschia** comprised **N. frustulum, N. microcephala** and **N. sigma.** The first one was more frequent in May, September and October, the second in November and the third during the

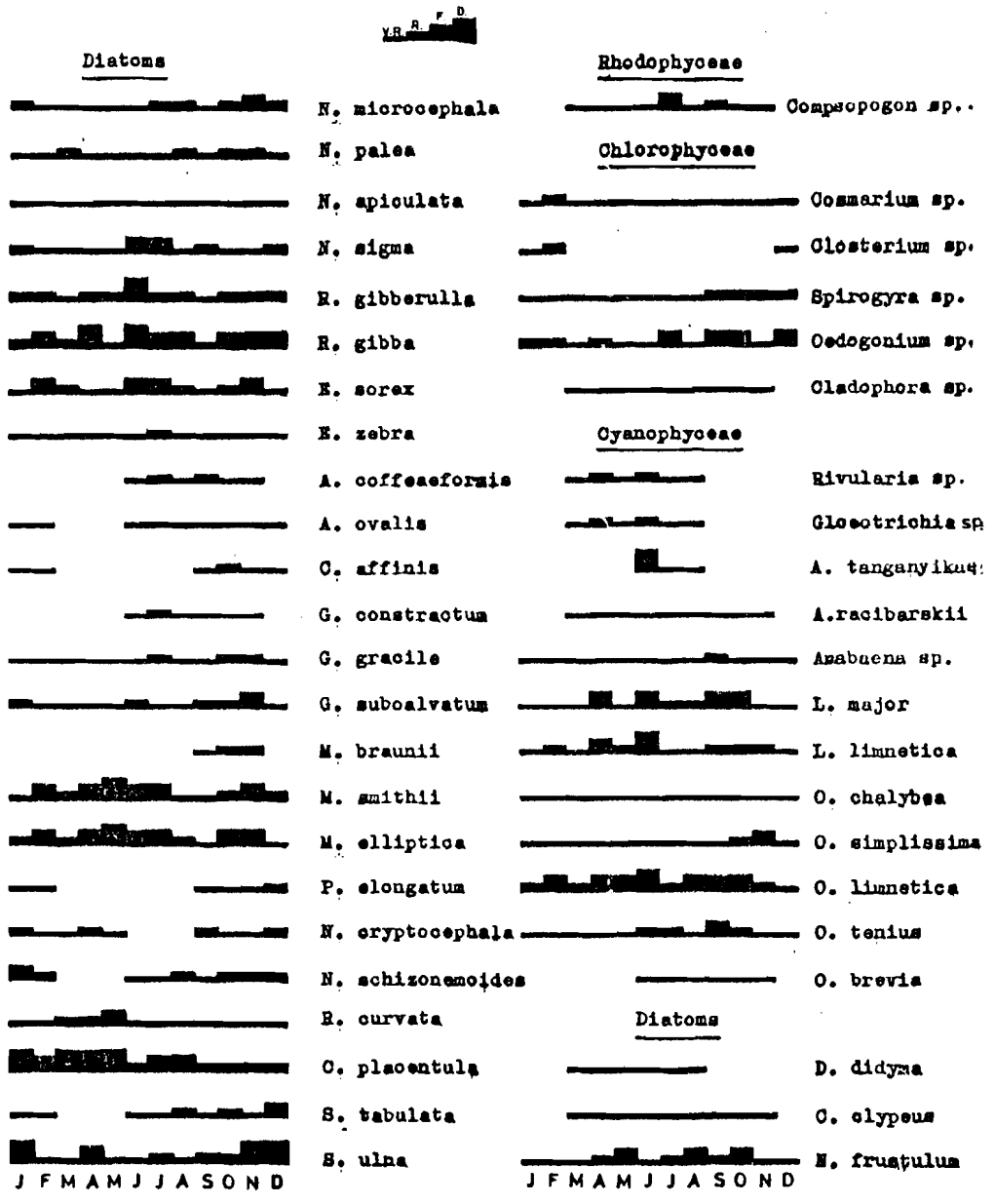


FIG. 1
Relative frequency of the epiphytic algae growing on **P. pectinatus** in the different months.
(D: dominant, F: Frequency, R: rare, Vr: very rare).

period JuneJuly. The three species were also frequently observed in the plankton. **N. microcephala** and **N. frustulum** are regarded as oligohalobous halophilous diatoms while **N. sigma** is considered as mesohalobous (Salah, 1960).

Epithemia sorex appeared also frequently on **Potamogeton** during February, June, July and November while it remained rare in the other months. The species is regarded as an oligohalobous halophilous diatom (Foged, 1947-1948).

Other diatoms persisted as rare epiphytes throughout most of the year. These comprised **Synedra tabulata** Kutz., **Rhoicosphenia curvata** Grun., **Nitzschia palea** (Kutz) W. Sm., **Nitzschia apiculata** (Greg.) Grun., **Epithemia Zebra** (Ehr.) Kutz. **Amphora coffeoformis** Ag., **Amphora ovalis** Kutz. **Cymbella affinis** Kutz, **Gomphonema constrictum** Ehr., **Gomphonema subculvatum** Grun, **Gomphonema gracile** Ehr., **Mastogloia braunii** Grun, **Pleurosigma elongatum** Sm., **Navicula cryptocephela** Kutz. **Navicula schizonemoides** H. Van Heurck, **Campylodiscus clypeus** Fhr. and **Diploneis didyma** Ehr. Most of them are oligohalobous halopilous species except **S. tabulata, N. apiculata, A. coffeoformis** and **M. braunii** which are mesohalobous species.

Cyanophyceae:

The epiphytic cyanophytes belonged mostly to the order Oscillatoriales and were represented by the genera **Oscillatoria** Vaucher, **Lyngbya** Agardh, **Anabaena** Bory, **Anabaenopsis** (Wolosz) V. Miller, **Gloeotrichia** Agardh and **Rivularia** (Roth.) Agardh. About 5 species of **Oscillatoria** were recorded on **P. pectinatus,** namely, **O. brevis** (Kutz.) Goment., **O. tenius** Agardh., **O simplissima** Gomont., **O. chalybea** Mert., and **O. limnetica** Lemm. The later species dominated the other cyanophytes particularly in the summer (June). **Lyngbya limnetica** Lemm. and **Lyngbya major** Menegh appeared as frequent epiphytes in the spring but remained rare in the other seasons. The other species appeared as rare or very rare epiphytes during the whole year except **Anabaenopsis tanganyikae** (G.S.West.) Wolosz. which showed a peak in June.

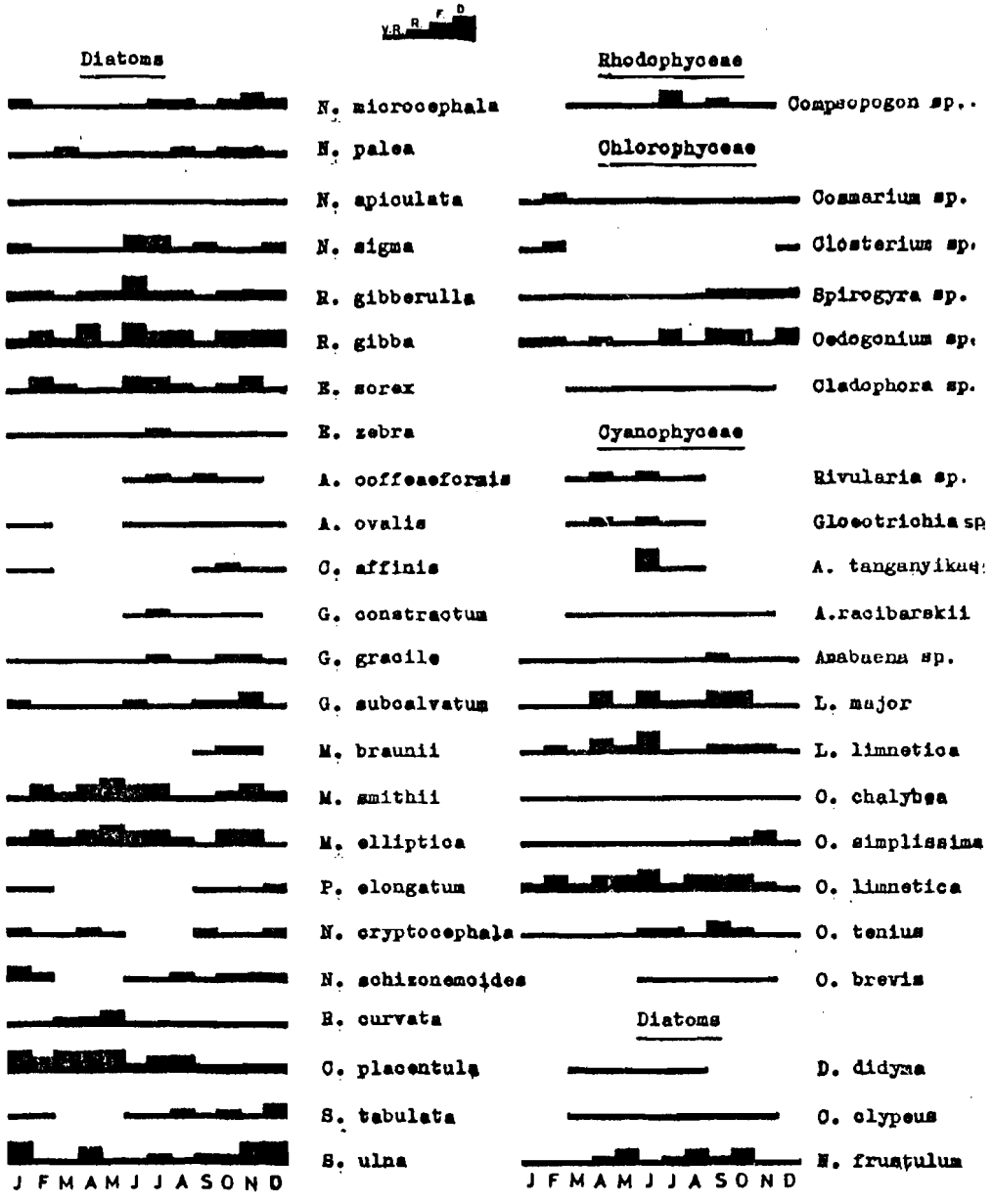
Chlorophyceae:

The epiphytic green algae in the Lake were represented by the filamentous forms **Oedogonium** sp., **Spirogyra** sp. and **Cladophora** sp. as well as two cellular species **Closterium** sp. and **Cosmarium**

sp. **Oedogonium** appeared frequently in the summer and autumn, and it remained as a rare form in the other seasons. The other chlorophytes persisted as rare or very rare epiphytes throughout most of the year except **Closterium** sp. which showed restricted distribution to the winter.

Rhodophyceae:

Compsopogon sp. was the only red alga recorded in the epiphytic community. It was frequent in July, otherwise it persisted as a rare form during most of the year and disappeared totally in the winter.



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Rhodophyceae:

Compsopogon sp. was the only red alga recorded in the epiphytic community. It was frequent in July, otherwise it persisted as a rare form during most of the year and disappeared totally in the winter.

Autumn community:
Dominant: **Synedra ulna**
Frequent: **Synedra tabulata, Mastogloia elliptica, M.smithii, Gomphonema subcalvatum, Rhopalodia dibba, Nitzschia microcephala, N. frustulum, Oscillatoria limnetica, O. simplissima, Lyngbya major, Oedogonium** sp.

In general the maximum frequency of the total epiphytes occurred in winter, mainly due to diatoms and during the summer where it consisted chiefly of diatoms and blue green algae. Another smaller peak occurred in autumn and was also dominated by diatoms and cyanophytes. These peaks coincided with the minimum growth periods of **Potamogeton** and consequently reflect an inverse relation that exists between the growth rates of these two forms of plant life.

Results of the present investigation emphasize the importance of epiphytic flora in the Egyptian Delta lakes as they contribute in the biological productivity of these lakes. They also constitute important food items for the genus **Tilapia** which represents the most dominant fish inhabiting these lakes (Elster and Jensen, 1960; AlKholy and Abdel-Malek, 1972 and El-Sarraf, 1976).

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DISCUSSION

The importance of epiphytic algae in the biological productivity of Lake Burollus lies on the fact that they share in the organic production of the Lake and inturn serve as favourable food items for the dominant fish **Tilapia** spp. Lake Burollus is a shallow slightly brackish water lake which harbours a dense growth of **Potamogeton pectinatus**, particularly along the southern margins as well as in the eastern sector. This plant supports a rich epiphytic flora particularly during period of their minimum growth.

The epiphytes growing on **Potamogeton pectinatus** consisted mostly of diatoms while chlorophytes and cyanophtes appeared less frequent. This agrees with the previous records on epiphytes in Lake Edku (El-Sarraf, 1976) and Lake Mariut (Samaan, 1966).

The Lakes water is slightly brackish, with chlorosity values ranging between 0.3 and 2.4 gm Cl/l. On rare occassions the chlorosity may exceed 10 gm Cl/l at the neighbouring of the lake-sea connection. Referring to the halopian system given by Kolbe (1927) and later developed by Krasske (1939), Peterson (1943) and Foged (1949), most of the epiphytic diatoms growing on **P. pectinatus** are oligohalobous halopholous forms which can tolerate water salinity up to 5‰, except of few species which are mesohalopous. Also, the recorded chlorophytes and cyanophytes are mainly fresh water euryhaline species.

The monthly water temperature fluctuates between 12.5°C in winter and 30°C during the summer. Such variations appear to affect the periodicity of epiphytes. Thus, although most of the dominant or frequent species appeared throughout the whole year, yet they showed noticeable peaks during certain seasons. The main components of epiphytes recorded in the different seasons can be summarized as follows:

Winter community
Dominant: **Synedra ulna, Cocconeis placentula.**
Frequent: **Mastogloia elliptica, M. smithii, Navicula Schizonemoids, Epithemia sorex, Rhopalodia gibba, Oscillatoria limnetica.**

Spring Community:
Dominant: **Coccneis placentula, Mastogloia elliptica, M. smithii, Rhopalodia gibba.**
Frequent: **Rhoicosphenia curvata, Nitzschia frustulum, Oscillatoria limnetica, Lyngbya limnetica, L. major.**

Summer community:
Dominant: **Rhopalodia gibba, R. gibberula, Oscillatoria limnetica, Lyngbya limnetica, Anabaenopsis tanganyikae.**
Frequent: **Mastogloia elliptica, M. smithii, Nitzschia sigma, Lyngbya major, Oedogonium sp., Compsopogon sp.**

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