

Chlorophylls and phaeopigments of the phytoplankton in lake Manzalah, Egypt.

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#### Abstract

Monthly measurements of chlorophyll a, b and phaeopigments were carried out on the phytoplankton of the brackish waters of lake Manzalah. The results are discussed in relation to the composition of the phytoplankton populations in the different zones of the lake.

#### Introduction

Lake Manzalah is the largest and most productive northern Delta lake in Egypt. The surface area of the lake is about 900 km<sup>2</sup>, average depth 110 cm, and its average salinity is about 2‰ varying between 0.2‰ and 18‰. The lake lies in the northeastern part of the Nile Delta between Damietta branch and the Suez Canal. It is connected to the Mediterranean Sea through a narrow and shallow channel, known as Boughaz EL Gamil, through which marine fishes enter the lake for feeding. The lake receives annually about 6680 X 10<sup>6</sup> m<sup>3</sup> of brackish water from several drains which discharge into the southern part. In the present study the main part of the lake was divided into 5 more or less well defined zones with different ecological conditions (Zones I-V) (Fig. 1). In the framework of the lake Management project funded by the US AID (grant No. A/D/NE-CA- 1706), monthly samples from about 50 stations distributed in the lake were collected during 1982, for the determination of chlorophyll a, b and phaeopigments (Strickland and Parsons, 1972). Quantitative (1 liter) water samples were also taken for the numerical assessment and species composition of the phytoplankton populations.

## Results and Discussion

Chlorophyll a is the dominant plant pigment in the lake although its concentration varied in the different zones. The lowest values were recorded in zones I and II, the annual mean being 7.25 and 7.39  $\text{mg}\cdot\text{m}^{-3}$ , respectively. The average concentrations of chlorophyll a in zones III and IV were 23.21 and 19.48  $\text{mg}\cdot\text{m}^{-3}$ , respectively. On the other hand, the highest concentration of chlorophyll a was recorded in zone V where the values varied between 61.81  $\text{mg}\cdot\text{m}^{-3}$  in summer and 40.38  $\text{mg}\cdot\text{m}^{-3}$  in autumn the annual mean being 46.80  $\text{mg}\cdot\text{m}^{-3}$ . The zonal variations of

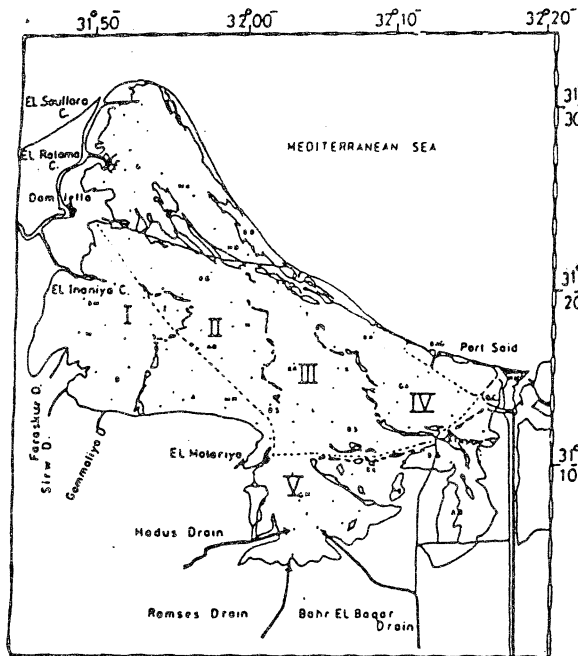


Fig (1): Map of Lake Manzalah showing different zones and sources of land drainage.

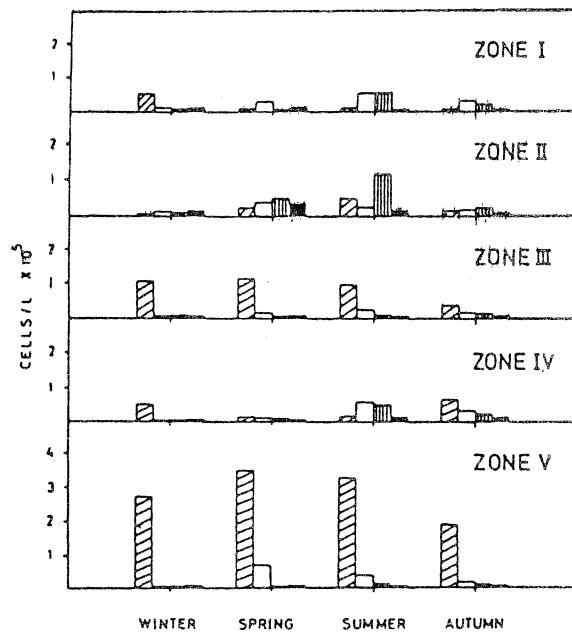


Fig.(2): Seasonal variations of the different components of the phytoplankton populations in different zones of Lake Manzalah during 1982.

chlorophyll a is directly correlated with the abundance of nutrient salts in the lake. The highest concentrations of phosphate, nitrate and silicate occur in zone V and the lowest in zones I and II (Dowidar and Abdel Moati, 1983). As shown in Figure 3. The phytoplankton in zones III, IV and V is dominated by chrysophyta which constitute 71%, 46% and 85% of the total phytoplankton in the three zones respectively. In zone I chlorophyta was the dominant group 39.5% while cyanophyta dominated the phytoplankton 40.5% in zone II.

Apart from the condition in zone I the contribution of chlorophyta and phytoflagellata to the total phytoplankton of the lake is of secondary importance; both groups contain chlorophyll *b* in addition to chlorophyll *a* (Trainor, 1978). The relative abundance of chlorophyta in zone I may explain the comparatively high values of chlorophyll *b* (average  $4.41 \text{ mg.m}^{-3}$ ) in that zone. In the other zones the concentration of chlorophyll *b* was lower and varied between  $2.39 \text{ mg.m}^{-3}$  in zone II and  $3.63 \text{ mg.m}^{-3}$  in zone III. Except for zone V the concentration of phaeopigments were low varying between  $1.84 \text{ mg.m}^{-3}$  in zone II and  $2.82 \text{ mg.m}^{-3}$  in zone III. In zone V the concentration of phaeopigments was relatively high, average  $8.09 \text{ mg.m}^{-3}$ , and is mostly derived from chlorophyll *a* which is, by far, the dominant pigment. In general the high values of phaeopigments coincided with or shortly followed peaks of chlorophyll *a*.

#### References

Dowidar N.M. and M.R. Abdel Moati  
(1983) Distribution of nutrient  
salts in lake Manzalah "Egypt"  
Rapp. comm. int expl. Mer.Medit.  
28,1.

Strickland J.D.H. and Parsons  
T.R. (1972), A manual of sea  
water analysis. Bull. Fish.  
Res. Bd. Canada No. 125, p.311.

Trainor F.R. (1978) Introduc-  
tory phycology. John Wiley &  
Sons, Inc. Canada P. 525.

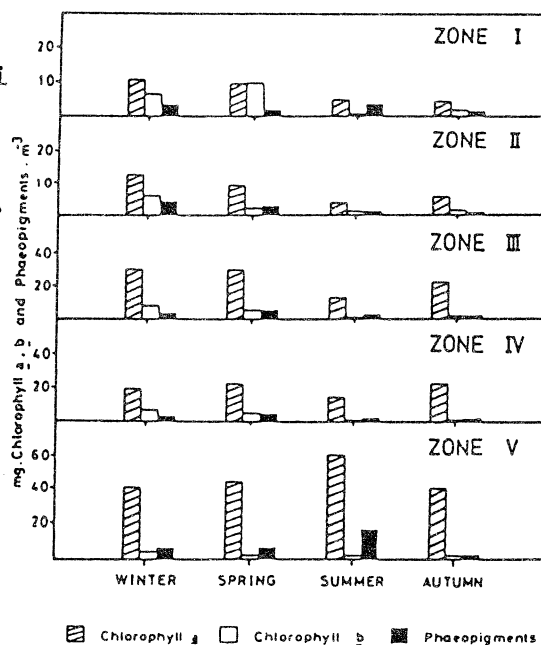


Fig. (3): Seasonal variations of chlorophyll *a*, *b* and phaeopigments in the different zones of Lake Manzalah during 1982.

