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Distribution and Ecology of Phytoplankton in El-Mex Bay (Egypt)

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El-Mex Bay represents a shallow sheltered estuary, lying west of Alexandria at longitude 29° 50' E and latitude 31° 10' N. It extends parallel to the coast line for about 7 Km between El-Agamy headland and the western Harbour and has an average width of 3 Km (Fig. 1). Its total area amounts to about 20 Km^2. The depth of water in the bay fluctuates between 1.5 and 15 meters, being more shallow near to the shore and the depth increases gradually seawards.

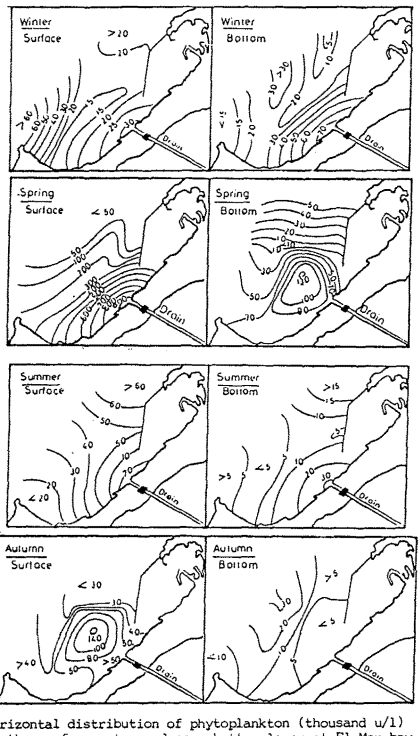

Fig.1

Horizontal distribution of phytoplankton (thousand u/l) in the surface water and near bottom layer at El-Mex bay

The bay receives large amounts of drainage water contaminated with sewage and industrial wastes from the Umum Drain. The salinity of the surface water is highly reduced particularly infront of the outlet of the drain and it fluctuated between 6.7 ‰. and 32.7 ‰. The near bottom layer was less affected and the salinity was always over 37.6 ‰. Quantitative and qualitative estimations of phytoplankton at both the surface and near bottom layer have been carried out in the bay for four seasons. According to the high load of nutrients discharged with the drain water, the bay is highly eutrophic. The highest density of phytoplankton was recorded at the surface around the opening of the Umum Drain (Fig. 1), while it decreased gradually towards the offshores. The near bottom layer was less productive throughout most of the year except in winter. The average annual standing crop for the whole bay amounted respectively 96,560 and 26,980 units/l in the surface water and near bottom layer. The phytoplankton community included both allogenetic fresh and brackish water species introduced with thethe Umum Drain water and autogentic forms of marine origin. The former comprised green algae, euglenophytes, cyanophytes as well as many diatom species, while the latter included marine diatoms and dinoflagellates.

Chlorophytes constituted about 54.7 % of the total phytoplankton in the bay (average 33,805 cells/l). They were dominated by members of the genera Scenedesmus, Closterium and Chlorella. Diatoms ranked as the second important class with about 24.3 % of the total phytoplankton counts (average 15,015 cells/l). They were dominated by Cyclotella, Nitzschia, Melosira and Chaetocerous. Euglenophytes (Euglena spp.) appeared less frequent and they averaged 7,250 cells/l, forming about 12.2 % of the total phytoplankton counts. They are indicators of water pollution. Dinoflagellates and cyanophytes were infrequently recorded.

The phytoplankton community showed an outstanding peak of 257,630 units/l in the surface water during the spring, mainly due to green algae, while it remained at lower values in the other seasons, which amounted 26,040; 44,330 and 58,220 units/l in winter, summer and autumn respectively.

The bay is considered among the eutrophic marine habitats. Nevertheless, the polluted water of the Umum Drain should be treated to improve its quality before being discarded into the bay.