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 Km². 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.
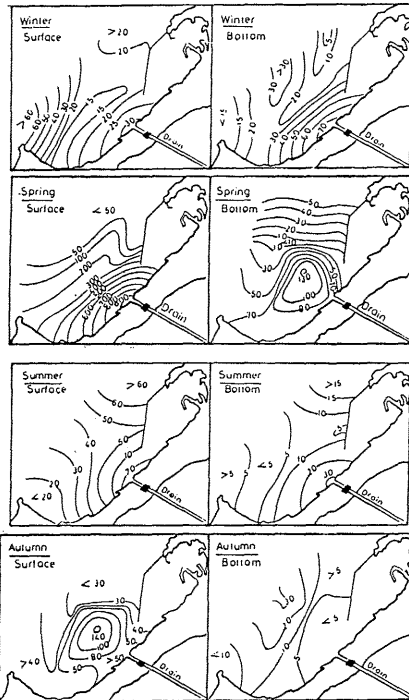

Fig.1

Horizontal distribution of phytoplankton (thousand u/1) 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 %₀. and 32.7 %₀. The near bottom layer was less affected and the salinity was always over 37.6 %₀. 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.

Biological Investigations on Zooplankton Composition in three Lagoons from Western Greece

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Several publications exist on the composition and spatial distribution of the zooplankton in the lagoons and closed bays in the Mediterranean Sea (Comaschi Scaramuzza & Martino, 1981; Specchi & Fonda Umani, 1981; Ferrari et al, 1982; 1985; Siokou Frangou, 1986). However most of these studies have been conducted using a particular sampling method and a special design net without previously performing test to assess the efficiency of the sampling gear. On the other hand, the differences on the sampling equipments that have been used contribute to the lack of information and confusion since the obtained results are rarely comparable.

Zooplankton was collected from three lagoons (Logarou, Tsoukalio and Rhodia) in the area of Amvrakikos Gulf (Western Greece). Four different nets were used (two conical with 132 and 200um mesh size gauze and two rectangular with 63 and 132um gauze) for a period of 6 months during 1987 at 4 stations in these lagoons. On the total 94 samples were collected. The abovementioned gear was chosen in order to give a global picture of the zooplankton composition and biomass values in these different sites using the described nets. In addition, an approach was made to clarify problems related to zooplankton sampling in very shallow waters and provide the tool to facilitate any decision to choose the appropriate sampling gear in these habitats.
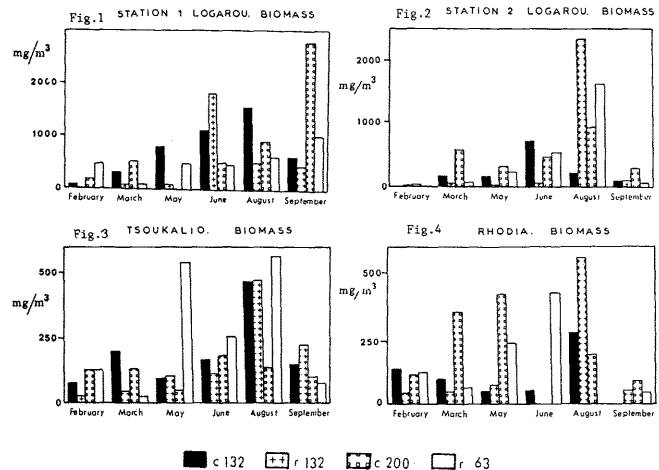
BIOMASS VALUES USING THE FOUR MESH-SIZE NETS.

c132 : 132µm conical net; r132 : 132µm rectangular net;
c200 : 200µm conical net; r63 : 63µm rectangular net.

Biomass values were relatively higher in Logarou than in the other lagoons for the whole sampling period with values sometimes exceeding an order of magnitude (Figs 1, 2, 3, 4). Densities of organisms in the samples expressed as number per m³ were fluctuating between months, having generally a good relation with the biomass values. Some major differences in the total density between samples and between stations during the sampling period were observed, showing that the most productive lagoon was the largest lagoon (Logarou). The number of zooplankton groups and their abundance varied in relation with the net type. Important differences exist between samples collected with different mesh-size nets. High abundance of copepods was generally observed in samples collected with the 200 um net, while copepod nauplii and bivalve larvae were abundant in samples collected with the 63 um net. Not statistical differences were observed when different type nets with the same mesh-size were applied for sampling (conical and rectangular 132um). The use of only one net type is not the appropriate method for sampling in the lagoons and in order to give a representative estimation of zooplankton abundance, several mesh size nets should be used.

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