Zooplankton Grazing in the Inner Part of Izmir Bay

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ABSTRACT: Chlorophyll-a and phaeo-pigment concentrations were measured at one station through the year in the inner part of Izmir Bay which has been polluted. It was tried to obtain the information about the zooplankton grazing. The phaeo-pigment concentrations had shown that the grazing only was unimportant during March diatom bloom and was important during the other phytoplankton blooms in April, June and September.

INTRODUCTION: Chlorophyll-a concentrations in the seawater have been used as a measurement of phytoplankton biomass (YENTSCH,1966). Phaeo-pigment concentrations have determined the zooplankton grazing (YENTSCH,1965). At the pH of digestive track, the phaeo-pigment have been formed releasing Mg atom from the chlorophyll-a of phytoplankton which is taken by filtration of herbivor zooplankton (LORENZEN,1967). LORENZEN(1967) had reported that bacterial effect on the chlorophyll-a was unimportant and phaeo-pigments have been formed as a residue of zooplankton grazing. The aim of this investigation was to state the fluctuations of phytoplankton biomass and zooplankton grazing activity through the year.

RESULTS & DISCUSSION: The trends of the nutrients and pigments were given in the figure 1. Total inorganic nitrogen decreased to minimum levels from January to March, April and phytoplankton biomass also followed the same trend. As a result of the bloom of phytoplankton in fall, phytoplankton biomass decreased with the effect of decreasing the level of nutrients. This situation fits well the reports before(BÜYÜKIŞIK,1988).

In March, low phaeo-pigment concentrations comparing chlorophyll-a indicated that the grazing on the diatom bloom were relatively unimportant. It is probably due to the low water temperature which may caused decreasing activity of zooplankton.

Increased phaeo-pigment concentrations in April, June and September reflected the effect of zooplankton grazing on the phytoplankton community, although it was not coincident to this condition regularly. The growth of phytoplankton had been also affected positively by increased turnover rate due to the direct regeneration.

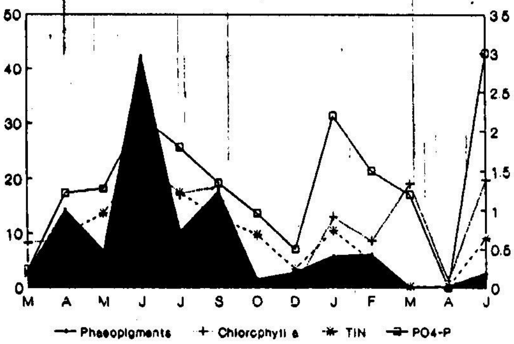

Figure 1. Monthly fluctuations of chlorophyll-a(µg/l.), phaeo-pigments(µg/l.), Total Inorganic Nitrogen (µg-atN/l.) and reactive phosphate(µg-atP/l.). TIN and pigments were explained on the left scale and phosphate on the right scale.

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Fluorescence Characteristics Due to Phytoplankton Chlorophyll and Optical Transparency of Northeastern Mediterranean Waters

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In situ fluorescence and light data together with the hydrological data collected during the two expeditions (July 1988, March 1989) to Northeastern Mediterranean are presented and discussed. Continuous *in situ* profiles of fluorescence could be particularly valuable for estimating biomass and productivity in coastal waters where particulate matter and Gelbstoff limit the use of satellite imagery (Mackey, *et al.*, 1989).

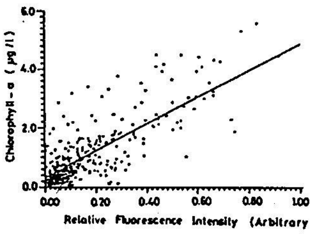

Figure 1. Calibration curve of *in situ* fluorescence and extracted chlorophyll-a (The data from The Sea of Marmara and The Black Sea were influnced for extra support)

Calibration of fluorescence against chlorophyll-a determined on discrete samples collected from depths was performed and extracted chlorophyll concentrations were well-correlated to chlorophyll fluorescence (Figure 1) by a linear equation of:

$$Chll\text{-}a = 4.85\ (Fluo) + 0.32\ (n=390).$$

Subsurface chlorophyll-a maxima observed in the NE Mediterranean (Yılmaz *et al.*, 1988; Salihoğlu *et al.*, 1989) was clearly and statistically confirmed by *in situ* fluorescence data. As summarized in Table 1, max fluorescence due to chlorophyll-a was measured as deep as 120 m and the max depth of zero fluorescence determined as 135 m. The depth of max fluorescence is more deeper in summer than the depth measured in early spring because of light inhibition. On the other hand the quantitative fluorescence values are relatively higher in spring since the bloom time is determined as February-March in the NE Mediterranean. The deepest 1 % light transmission was measured as 120 m (average being 105 m) in the region so the euphotic zone is thick and the photosynthetic activity is observed in the deeper parts of euphotic layer.

Table 1. Relative Surface Fluorescence(SF), Maximum Fluorescence Intensity (MFI), Depth of Maximum Fluorescence (DMF) and Depth of Zero Flourescence (DZF) in the Northeastern Mediterranean

	July, 1988			March, 1989		
	Min.	Max.	Ave.	Min.	Max.	Ave
F($X10^{-2}$, arbitrary unit)	0	5	2 (n=63)	0	14	5 (n=40)
MFI(")	3	10	5 (n=61)	7	34	14 (n=40)
DMF (m)	57	120	88 (n=59)	10	88	52 (n=40)
DZF (m)	57	135	113 (n=57)	70	130	104 (n=41)

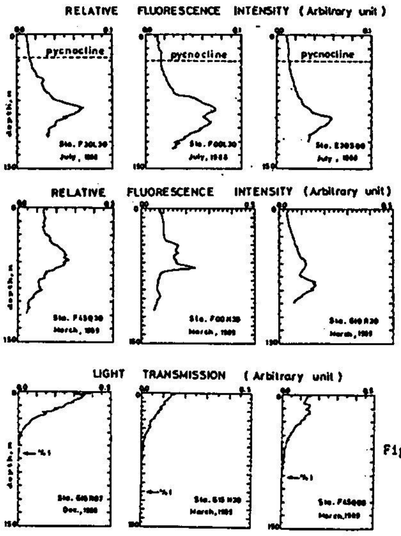

Figure 2. Continuous *in situ* profiles of relative fluorescence and light penetration at selected stations in the Northeastern Mediterranean

Some specific examples of deep chlorophyll-a maxima which were obtained by continuous fluorescence measurements in the water column and the vertical profiles of light penetration are illustrated in Figure 2. As is seen from the figure there is no match with pycnocline and the max fluorescence (summer examples). Euphotic layer is hydrologically homogeneous due to the presence of convective mixed layer caused winter cooling in March examples but still the deep fluorescence peaks were clearly observed.

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