

PLANKTONIC PRIMARY PRODUCTIVITY IN DIFFERENT SECTORS  
OF THE MEDITERRANEAN AND BLACK SEA DURING MAY-JULY 1985

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Abstract

New data on the planktonic primary productivity in four sectors of the Mediterranean (0.5 to 11.3 mg C m<sup>-3</sup>d<sup>-1</sup>, 0.06 to 0.48 g C m<sup>-2</sup>d<sup>-1</sup>) and one sector of the Black Sea (9.4 to 14.7 mg C m<sup>-3</sup>d<sup>-1</sup>, 0.78 g C m<sup>-2</sup>d<sup>-1</sup>), during May-July 1985, are presented.

Résumé

On présente des nouvelles données concernant la productivité primaire planctonique dans quatre secteurs de la mer Méditerranée (0,5 - 11,3 mg C m<sup>-3</sup>jour<sup>-1</sup>, 0,06 - 0,48 g C m<sup>-2</sup>jour<sup>-1</sup>) et dans un secteur de la mer Noire (9,4 - 14,7 mg C m<sup>-3</sup>jour<sup>-1</sup>, 0,78 g C m<sup>-2</sup>jour<sup>-1</sup>) pendant les mois mai-juillet 1985.

Researches concerning the level, and spatial and temporal distribution of primary productivity in the Mediterranean and Black Sea, of current interest, have been carried out during the 19<sup>th</sup> cruise of the R/V "Professor Vodyanitskiy".

MATERIAL AND METHOD

Phytoplankton samples for estimating the primary productivity were collected in the Mediterranean Sea from the Strait of Sicily (37°08'N, 12°50'E; 38°02'N, 11°01'E), the Balearic Sea (41°10'N, 06°16'E) and the Aegean Sea (36°14'N, 23°36'E), and in the Black Sea off Cape Caliacra (42°52'N, 28°50'E). The euphotic zone was determined by the Secchi disc. One to four vertical profiles were performed for all sectors to 70 m. In total, 255 samples were analyzed.

Primary productivity was determined *in situ* by means of the <sup>14</sup>C method (STEEMANN NIELSEN, 1952).

Computation of primary productivity was carried out by means of the usual formula (VINBERG *et al.*, 1960). Total inorganic carbon content of the sea water was considered for the Mediterranean as equal with that of oceanic water = 25 mg l<sup>-1</sup> (VINBERG *et al.*, 1960) and for the Black Sea = 40 mg l<sup>-1</sup> (BOLOGA *et al.*, 1984). Values for the water column were calculated according to the scheme generally adopted for the Black Sea (MOROZOVA-VODYANITSKAYA, 1954).

RESULTS AND DISCUSSION

In the mentioned sectors of the Mediterranean Sea the primary productivity ranged between 0.5 to 11.3 mg C m<sup>-3</sup>d<sup>-1</sup> and between 0.06 to 0.48 g C m<sup>-2</sup>d<sup>-1</sup>. Very high values of the <sup>14</sup>C dark fixation, sometimes more than 50% of those in the light bottles, indicate the low productive level of these waters and suggest the relative importance of chemosynthesis and/or heterotrophy. The results obtained are a little higher than previous data from the Mediterranean (KONDRATEVA, 1973; BOLOGA, *in press*) and Aegean Sea (BEGACOS-KONTOS, 1977, 1981). These data indicate, according to a recent classification of pelagic plant communities (KOBLENTS-MISHKE, 1982), the oligo- and mesotrophic nature of these marine communities. Vertically, the highest primary productivity values occurred at the surface (e.g. Aegean Sea) or at the lower limit of the euphotic zone at 60 to 70 m (e.g. Strait of Sicily, Balearic Sea).

In the Caliacra sector the primary productivity ranged between 9.4 to 14.7 mg C m<sup>-3</sup>d<sup>-1</sup> and reached 0.78 g C m<sup>-2</sup>d<sup>-1</sup>. These results obtained at the beginning of the summer season, lower compared with others from the same sector in May 1982 (BOLOGA *et al.*, 1983), indicating the presence of mesotrophic planktonic communities. A typical vertical distribution of primary productivity for the western part of the Black Sea characterized this sector, with the highest values in the upper 0 to 10 m water layer.

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NUTRIENTS AND CHLOROPHYLL IN THE BAY OF KOPER, NORTHERN ADRIATIC

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Since 1979 the shallow, land-locked Bay of Koper has been receiving the sewage effluents from the river Rižana. In order to assess the impact of the outfall on the marine environment, the sampling site in the middle of the bay was chosen, 1 km off shore. Phosphate, nitrate and chlorophyll *a* concentrations were measured monthly at the

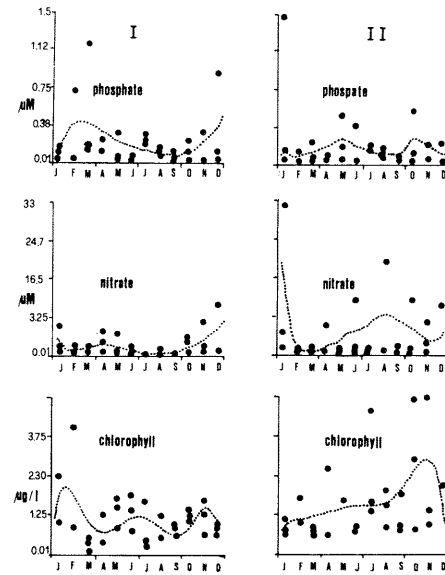


Fig. 1. Surface nutrients and chlorophyll

surface from 1979 to 1984. The period was divided in two parts, I: from 1979-81 and II: from 1982-84. The data were compared and some trends were observed. The average 3-yr concentration of phosphate dropped slightly and that of nitrate was doubled in the second period, although none of them significantly.

On the contrary, chlorophyll *a* biomass was almost twice higher in the last period ( $p < 0.05$ ). The extreme values were higher in the II. period (Fig. 1.) and also was the chlorophyll dynamics altered. The curve with 3 annual maxima from the I. period, typical for the northern-adriatic phytoplankton (Gilmartin *et Revelante*, 1983) has been transformed into the curve with only one maximum in the second period.

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