

Phytoplankton seasonal trend in the coastal waters of the Northern Adriatic Sea
(Alpe Adria Project, March - July, 1990)

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In the frame of the Alpe Adria Project, a serie of 10 cruises was carried out by the Institutes of the Adriatic Regions during the period March-July, 1990, on 10 stations located in the coastal waters of the Northern Adriatic Sea (see fig. 1). This paper deals with the phytoplankton observations performed in this period.

The meteorological and hydrological conditions of 1990 were characterized by low freshwater inputs coming from major rivers into the basin; therefore, the absence of an evident diluted surface layer favoured the intrusion of high salinity waters from south, so influencing not only the intermediate and deep layers but the surface waters too. Nutrients are generally present with low concentrations, only showing an increase in the western diluted waters in the samples of May (FRANCO, 1990).

Phytoplankton abundance reflects the hydrological dynamics: in the whole basin, during the early spring (March and April), phytoplankton communities were present in low cell numbers, mainly dominated by microflagellates. In the first part of May, a diatom growth was observed in the whole sampling area: this phenomenon was more evident in the S-W portion of the basin, strictly influenced by the Po and Adige rivers (more than 10^7 cells/l). Moving clockwise, till the southern part of Gulf of Trieste, diatom number decreases (from 2 to $0.7 \cdot 10^6$ cells/l). As species composition, *Cyclotella* sp., *Nitzschia delicatissima* complex and *Nitzschia seriata* complex were diffused everywhere.

After the diatoms drop, microflagellates increase till the end of June, showing peaks of 3.3, 2.4, and $4.7 \cdot 10^6$ cells/l, respectively in the plume of the Po river, in the northern and southern waters of the Gulf of Trieste. The month of July was characterized by a reduction of phytoplankton biomass and by a high species diversity, most of them representative of summer Adriatic communities, as *Rhizosolenia alata*, *Cerataulina pelagica*, *Chaetoceros* sp, in addition to *Nitzschia delicatissima* and other entities already observed.

During the sampling period, dinoflagellates increase, reaching 15% of the total; they are mainly represented by unarmoured forms, as *Gymnodinium* and *Gyrodinium* spp and by species belonging to the *Prorocentrum* genus, as *Prorocentrum micans*, *Prorocentrum minimum* and *Prorocentrum aporum*.

As conclusions, we can assess that, during the 1990 spring, phytoplankton communities were dominated by microflagellates, according to previous reports (SOCAL *et al.*, 1982), with highest abundances in the eastern waters (FANUKO, 1980). The diatom bloom was limited to a short period, with maxima in the S-W waters influenced by the Po river (see SOCAL and BIANCHI, 1989).

Phytoplankton vertical distribution, referred to the stability of the water column, was more evident in the western waters, showing higher abundances in the narrow surface layer, directly influenced by river outputs. In these waters, the high observed variability suggests that mesoscale processes are more significant here than in other coastal areas.

During the sampling period, no gelatinous aggregates were observed; the only exception was a report about some filamentous materials noticed in the Gulf of Trieste (end of June).

The general oceanographic conditions are not comparable with those recorded earlier (1988 and 1989) and later (1991), during which periods widespread "dirty sea" phenomena were observed (BRAMBATI, 1988; MARCHETTI *et al.*, 1989).

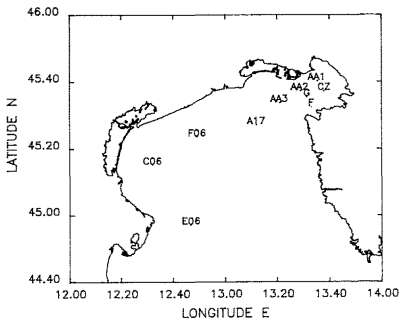


Fig. 1.- Sampling stations.

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