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The phytoplankton seasonal variation and community structure have been studied for the first time in Vistonis Estuary, Thrace, N. Greece. Vistonis is a shallow coastal embayment which supports fisheries and is protected by the Ramsar International Treaty for Waterfowl Habitat. Sampling was performed monthly in the area from November 1983 to October 1984 at five sampling stations (Fig. 1). Mean monthly salinity ranged from 0.56 ± 0.3 ‰ in May to 8.95 ± 3.7 ‰ in October, when the longitudinal salinity gradient at the 3 m depth was 0.88 ‰ km⁻¹. The vertical stratification was stronger near the mouth (station 4), where in October the surface to bottom salinity difference reached 10.5 ‰.

Chlorophyll-a concentrations showed a marked seasonality too (Fig. 2a); the annual maximum (August 86.0 µg/l) was 144 times higher than the annual minimum (January 0.6 µg/l). A horizontal gradient was observed, the mean annual concentration at the head (station 1) being 24.1 µg/l (2.4 times the corresponding mean value 10.1 µg/l. in the other stations). A strong vertical stratification of chlorophyll-a was observed near the head (station 1) during the warm period (May to October). The mean surface value was 54.9 µg/l and the mean bottom value was 39.0 µg/l (YIANNAKOPOULOU, 1989).

The seasonal variation of the total phytoplankton cells was similar to that of chlorophyll-a (Fig. 2b). A highly significant correlation (at the 1% level) was found to exist between these two phytoplankton biomass parameters, a fact not always holding for similar data from other Mediterranean locations (IGNATIADIS *et al.*, 1985).

Cyanobacteria dominated the phytoplankton community most of the year with micro- and nano- sized representatives (Fig. 2c). In September, when a secondary chlorophyll-a peak was observed, Cyanobacteria corresponded to the 97.5% of the total phytoplankton community mainly with the species *Lyngbya limnetica*, *Anabaena spiroides*, *Merismopedia punctata* and *M. glauca*. However, Cyanobacteria were partially responsible for the annual chlorophyll-a peak observed in August. This peak consisted of 62% Cyanobacteria and about 48% of unidentified µ Flagellates about 1-2 µm in size.

Diatoms were observed in most of the samples; at their annual peak in May, (Fig. 2c) they corresponded to almost half of the total community with species belonging mainly to Pennates. A secondary Diatom peak observed in June was almost entirely due to small centric Diatoms identified as *Cyclotella* spp and *Thalassiosira* spp. up to 7 µm in size.

Two annual peaks of Chlorophyceae were observed in December and January but their percentage in the total phytoplankton community never exceeded 34%. A small coccoid form up to 5 µm in size, of uncertain taxonomy belonging probably to Chrysophyta was observed mainly in the winter and spring samples corresponding to almost 72% of the phytoplankton community in March, when fresh-water conditions prevailed. Finally, Dinoflagellates (*Peridinium* spp) were observed only in certain summer samples at the estuary mouth.

The spatial variation of salinity was reflected in the phytoplankton community structure. The percentage of major phytoplankton groups in 1 m depth is shown in Fig. 4 for two characteristic months: May (annual salinity minimum) and October (annual salinity maximum).

The high chlorophyll-a value and cell numbers and the phytoplankton community structure, spatial and seasonal variability, presented in this work, along with the high turbidity, the dissolved oxygen stratification, the high nutrient concentrations and the strong fluctuations presented elsewhere (YIANNAKOPOULOU, 1990 and 1991) confirm the eutrophic conditions in Vistonis and point out to the different character of brackish semi-closed waters as compared to the Mediterranean Sea environment.

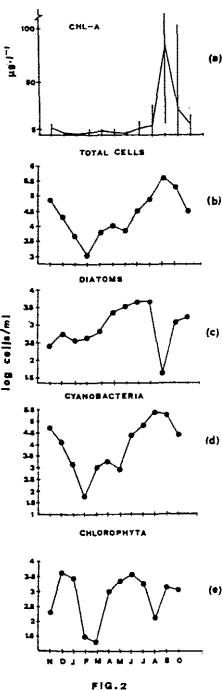


FIG. 2



FIG. 1

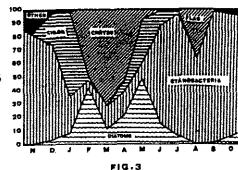


FIG. 3

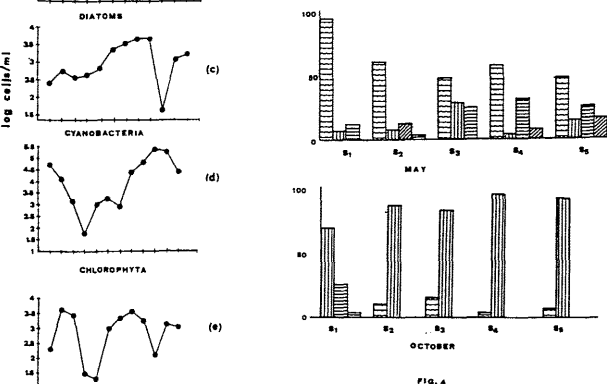


FIG. 4

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