

PHYTOPLANKTONIC PRIMARY PRODUCTION IN AN INTERACTION ZONE BETWEEN EPICONTINENTAL AND MARINE SYSTEMS

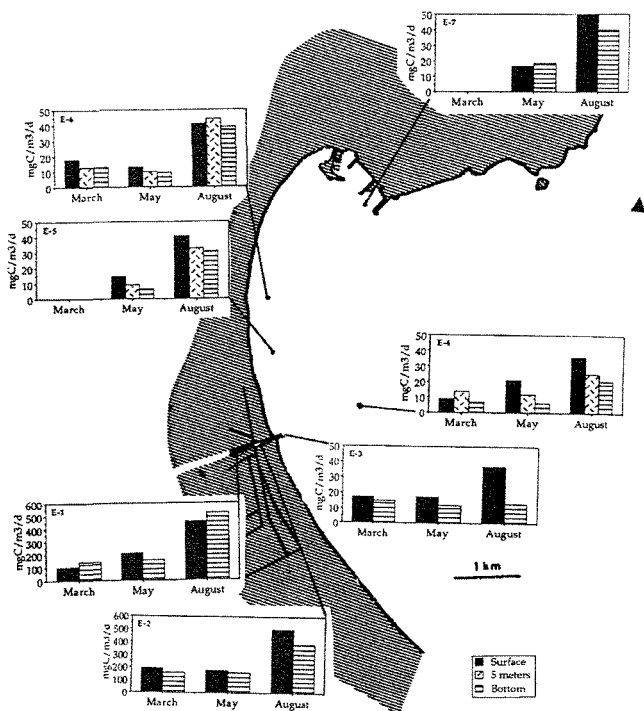
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The hydrology and phytoplankton community activity have been studied, by means of monthly samples, in an interaction zone between a coastal marsh system, the Albufera of Mallorca, and the sea, at the Alcudia Bay. Vertical profiles were carried out at seven stations, two (E-1 and E-2) in the canal leading to the bay (maximum depth 1 m) and five (E-3, E-4, E-5, E-6 and E-7) within the bay (maximum depth 15 m). Primary production measurements have been realized for many times to evaluate phytoplankton activity in the sea (SOURNIA, 1973) as well as in coastal lagoon (f.ex. COMIN and VALIELA, 1993). This parameter was measured at three moments of the year (March, May and August) for this study. The Albufera waters are rich in nutrients, chiefly nitrates (values exceeding $100 \mu\text{g-at. N-NO}_3^- \text{ l}^{-1}$), as a result of agricultural fertilizers. This results in very high values in phytoplankton primary production, between 100 and $500 \text{ mg C m}^{-3} \text{ d}^{-1}$, and assimilation numbers between 3 and $16 \text{ mg C mg Chla}^{-1} \text{ h}^{-1}$. Nutrient export to the bay enhances phytoplankton proliferation in two ways: either rapidly by massive input of water, or on a longer term as a result of deposition and slow nutrient recycling from the sediment (MOYÀ *et al.*, 1992). Nevertheless primary production values in the bay, between 5 and $50 \text{ mg C m}^{-3} \text{ d}^{-1}$, are about ten times lower than in the Albufera throughout the sampling period. In this zone the assimilation number varies in a lower range, between 2 and $10 \text{ mg C mg Chla}^{-1} \text{ h}^{-1}$. Biomass and phytoplankton primary production are related in both the Albufera and the bay, and can be related to environmental fluctuations. Primary production maxima coincide in both systems and take place during the summer (figure 1). These maxima coincide with biomass maxima, expressed as chlorophyll *a* concentration, which present values between 2.5 and 5.8 mg m^{-3} in the Albufera, and between 0.4 and 0.9 mg m^{-3} in the bay. Results suggest that in the interaction zone between the Albufera and the bay primary production is kept high throughout the cycle, even though significant differences may be attributed to environmental conditions such as nutrient concentration and phytoplankton biomass. Values obtained for the bay are comparable to those of oligotrophic waters (MARGALEF, 1989), while those of the Albufera fall within the range of mesotrophic-eutrophic waters. Results in the stations of Gran Canal in the Albufera experiment an evolution throughout the cycle similar to that observed in the Ebro Delta lagoons (COMÍN and VALIELA, 1993), where phytoplanktonic primary production was low from fall to winter, showed a very low production rates in May and increased in June-July (in Encanyissada).

Figure 1. Primary production values, in $\text{mg C m}^{-3} \text{ d}^{-1}$, at the different stations (E-1 and E-2 at the Albufera, and E-3 to E-7 at the Alcudia Bay) and levels throughout the three sampling times (March, May and August).



This work has been supported by the project C.I.C.Y.T. AMB. 92-0716-002-01 of the Spanish Comisión Interministerial de Ciencia y Tecnología (Ministry of Education and Science).

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