P-V1

Phytoplankton and Zooplankton relationships in several coastal areas of Palma Bay (Baleares Islands) 1988-1989

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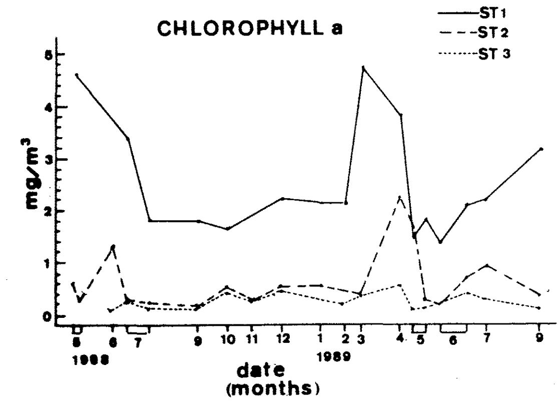
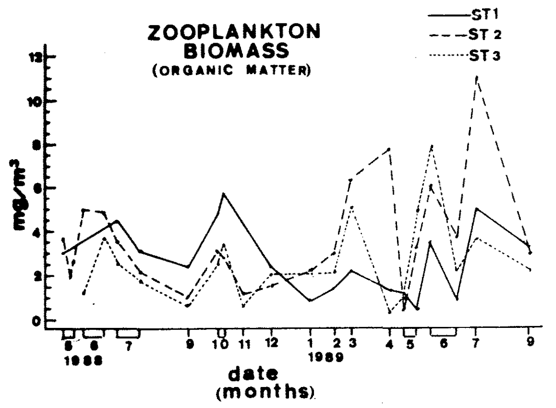
In order to define the temporal coastal variations of the planktonic communities in relation to the pelagic environments, physical, chemical and biological(phytoplankton and zooplankton) marine samples were collected from May 1988 to September 1989. Three different areas of Palma Bay (Mallorca Island) were sampled, at least monthly : Station 1 : Port area, 20 m depth. Station 2 : nearby a sewage effluent, 30 m depth and Station 3 : a cleaner area in the middle of the bay, 30 m depth.

Zooplankton samples were taken with a 20 Ø cm Bongo plankton net 250 µm mesh, equipped with an oceanic 2030 flowmeter, to know the volume of the water filtered in each tow (Steedman, 1974).

Data were analyzed and compared. Annual temperatures varied from 27.7° C in July to 14.4°C in January. The lowest value observed during the studied year was 1°C higher than in previous years (Navarro, 1931, 1932; Lopez-Jurado, 1989). In all areas, a cold homothermy developed in winter, but in summer, a hot homothermy was only observed inshore and a clear thermocline was found offshore.





The euphotic layer, estimated 30 m deep, was close to the bottom at stations 2 and 3, while at station 1, it was only 10 m deep in an average.

All the nutrients values obtained are not considered limiting factors especially inshore, where from July to next February an increase of nitrate and phosphate could be observed (2.5 µg at N/l and 0.5 µg at P/l in September), with mean values of 0.70 µg at N/l and 0.26 µg at P/l, and offshore values 0.20 µg at N/l and 0.18 µg at P/l.

Chlorophyll "a", as an index of phytoplankton biomass, presented a clear gradient between the three areas : in port area, the mean value (2.7 mg/m3) was 10 times higher than at station 3 (0.29 mg/m3), and at station 2 (0.5 mg/m3) twice higher than at the latter. At the same time the zooplankton biomasses obtained were 4.3, 4.9 and 3.7 mg of dry weight/m3 and 2.9, 3.6 and 2.8 mg organic matter/m3, at stations 1, 2 and 3 respectively.

The similarity of organic matter values at stations 1 and 3 can indicate that the inshore phytoplankton is not utilized by the zooplankton grazers (> 250 µm), especially in spring, although at offshore stations, that can be finished.

In the middle of the bay (station 3), the nutrients and the chlorophyll were poorly represented, but several zooplankton maxima values were observed, in spring, early summer and autumn, higher than expected in this oligotrophic area (Margalef, 1989). At station 2, similar variation as in the former area was seen, but particularly in summer, greater values of biomass were appreciated.

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P-V2

Brachiomonas sp. and *Eunotia* sp. two new Microalgae favourable for mariculture cultivation

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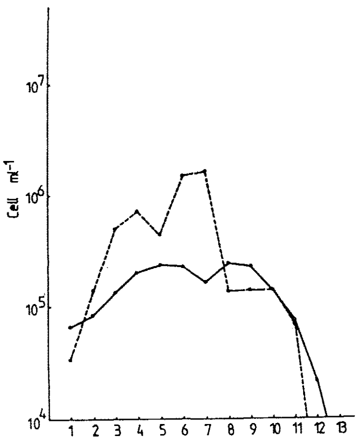
The unicellular algae have been used in aquaculture as food for zooplankton and some other herbivorous organisms, e. g. larval bivalves. One of the main conditions has been the fastest possible growth of populations and adequateness of the species's size and quality as food for the organisms they have been grown for. Although the concentrated algae (either frozen or dessicated in capsulae) have been used lately as a food for zooplankton, live unicellular algae have remained a basic food in mariculture. Consequently, new phytoplankton species are still being isolated and the investigations on their ecology and nutritional quality carried on.

This paper presents the results of the research work on two microalgae (Brachiomonas sp. and Eunotia sp.) isolated at the Biological Institute, Dubrovnik, where they were used for the first time as food for rotifers. This work is a part of a larger programme "Influence of the different algae on the growth and nutrient quality of the rotifer Brachionus plicatilis for better survival and growth conditions of the rotifer-fed sea bass larvae and the post-larvae".

The two algae were isolated in supralittoral rock pools in Dubrovnik, by the standard method of dilution and micropippeting (Knight-Jones, 1951). The algae were cultured in pasteurized nutrients enriched sea water (Guillard and Ryther, 1962) in aerated 50 l plastic bags, at 22°C and 12 hL: 12 hD cycle and the light level of 480 lux. The culture density was determined daily by microscopic counts in Burker-Turk chamber. The rotifer Brachionus plicatilis was inoculated (ca 10 ind/ml) when the algae population density reached over 3 x 10^5 cells/ml). The growth of rotifer population was observed daily, until the density was sufficient for larvae's food. Rotifer's chemical composition was also analysed (Carić et al, 1989).

Both phytoplankton species achieved high population densities on the fifth day of the trial (Fig 1). The green algae Brachiomonas sp. was observed to retain the highest density somewhat longer than the other species. Moreover, rotifer Brachionus plicatilis fed on Brachiomonas sp. reached higher density values than when fed on the diatom Eunotia sp. (Fig 2).

Water, ash, lipids and proteins contents of the rotifer fed on these two microalgae differed from those of the rotifer fed on Chlorella sp. and Phaeodactylum tricornutum (Carić et al, 1989). Highest protein levels were found in Eunotia sp. - fed rotifer, whereas lipids were observed to achieve the highest values in rotifer fed on Chlorella sp. Because of a relatively fast population growth which saves both time and energy and thus reduces production costs, optimal cell size (15 - 90 µm) and high protein levels, we recommend the use of both microalgae for rotifers rearing.



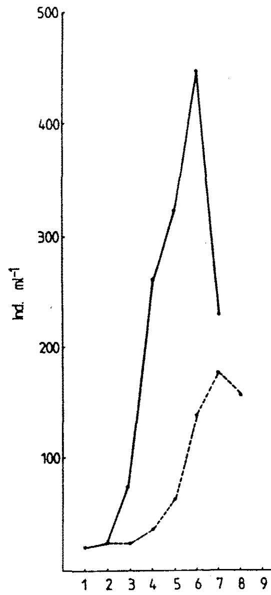


Figure 1. Population growth of microalgae Eunotia sp. (----) and Brachiomonas sp. (——)

Figure 2. Population growth of the rotifer Brachionus plicatilis fed on Brachiomonas sp. (——) and Eunotia sp. (---)

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