ZOOPLANKTON COMMUNITY STRUCTURE FOR COASTAL WATERS OF THE GULF OF NAPLES SUMMER OF 1983

A. IANORA, M.G. MAZZOCCHI and B. SCOTTO DI CARLO
Stazione Zoologica di Napoli

Summary. The temporal and spatial variability of zooplankton communities sampled during the summer of 1983 from coastal Gulf of Naples waters are discussed in relation to the structure of phytoplankton populations.

The inverse relationship between phyto- and zooplankton standing stocks is well documented. Very little information is available, however, on how the spatial and temporal variability of phytoplankton populations affect the structure of zooplankton communities. A recent survery in the inner part of the Gulf of Naples was undertaken in the summer of 1983 in order to describe phyto- and zooplankton assemblages as well as physico-chemical parameters resulting in a highly diverse and temporally unstable environment. From June 2 to September 1, weekly samples were taken at 6 stations from 25 and 50m to the surface using a 250 μ mesh Nansen net. Details for sampling sites are given by Modigh et al., this volume.

Dry weights for both sampling depths showed very little variation in time, with only a slight increment in August. No significant differences in biomass were recorded from 0-25m and 0-50m. Biomass values were always very high with mean values greater than 10mg m^{-3}. In August, mean values exceeded 20mg m^{-3} and reached 52mg m^{-3} at St. 109. These values are the highest reported for coastal Tyrrhenian waters and are comparable with those given for other highly productive Mediterranean regions.However, the high biomass recorded were confined to a narrow coastal region of the inner part of the Gulf and are probably dispersed rapidly beyond the 100m isobath. In contrast, maximum values of 10mg m^{-3} were recorded previously in the central part of the Gulf (Carrada et al., 1980).

Zooplankton communities observed from 0-25m at sampling stations 1, 3, 4 and 8 were strikingly similar with a low number of dominating species. The period until mid-July was mainly characterized by an elevated number of copepods, particularly *Acartia clausi*, *Paracalanus parvus*, *Clausocalanus furcatus* and *Centropages typicus*. Juvenile copepods belonging mainly to the genus *Paracalanus* and *Clausocalanus* were also abundant during this period. *Podon polyphemoides*, practically the only cladoceran present at the time, had particularly high values at Sts. 1 and 3 near the Naples harbor. A significant change in population structure occurred after mid-July when *P. polyphemoides* was almost entirely substituted by the cladocerans *Evadne tergestina* and, above all, by *Penilia avirostris* that comprised the bulk of the zooplankton until the end of the sampling period.The latter species had peak values reaching 60% of the total zooplankton abundance at Sts. 4

and 8. Copepods were of lesser importance in this period and tendend to diminish rapidly with time. Dominant copepods included not only the former species but also *Temora stylifera* that showed a rapid population growtl from mid-August onwards.

These preliminary results suggest not only a uniformity in structure for zooplankton communities in the inner part of the Gulf but also a synchrony in the succession of these communities with time. It is interesting to note that our findings do not seem to concur with those reported for phytoplankton sampled simultaneously for this area (Zingone et al., this volume). In this case, the authors recorded a marked spatial heterogeneity in species composition of the Gulf. This discordance with our data suggests that differences in phytoplankton community structure may have little bearing on the structure of zooplankton populations. This is theoretically predictable if zooplankton are to meet their dietary requirements for maintenance by adapting to rapid changes in the food source. It follows that as long as food sources remain unchanged in terms of size or nutritional content, then a change in phytoplankton community structure will not necessarily imply a change in the structure of the zooplankton community. At least this seems to be the case for the Gulf of Naples where food levels were continuously elevated throughout the sampling period and dominated by small cells <15 microns. In addition, our data suggests that even when food levels are high, zooplankton show opportunistic feeding of the type suggested by Poulet (1973) whereby filtering is greatest on particles having highest concentrations. The presence of the same zooplankton species in more or less equal proportions in all of the stations sampled notwithstanding differences in phytoplankton species composition supports this hypothesis. Changes in zooplankton structure may therefore denote not so much a change in food type but rather a periodicity in species succession patterns governed by the life cycles intrinsic for the single species. This is an aspect of zooplankton dynamics that seems to be of utmost importance for the understanding of mechanisms regulating trophic relations and community structure in plankton populations.

References

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