Food Webs in the Gulf of Trieste (Northern Adriatic Sea)

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Food webs identified in the Gulf of Trieste (Northern Adriatic Sea) are described from March 1986 to March 1990.

A long term monitoring project of plankton communities has been conducted in the Gulf of Trieste since 1970 (FONDA UMANI, 1991). Structure and temporal trend of phyto- microzoo- and netzoo-plankton communities are described from March 1986 to March 1990 based on biweekly or monthly sampling in a hydrological station 200 m offshore Miramare. Phyto- and microzoo-plankton were sampled by Niskin bottles at four levels (0, 5, 10 and 15 m), while netzooplankton by vertical hauls from the bottom (15 m) to the surface with a WP 2 net (200 µm mesh size). Data of phyto- and microzooplankton are reported as average of the whole water column.

The phytoplankton community included microflagellates, diatoms and dinoflagellates. The most abundant fraction was represented by microflagellates (Chlorophyceae, Prymnesiophyceae, Prasinophyceae, Euglenophyceae, Chrysophyceae and Cryptophyceae) throughout the period from March 1986 to February 1987. Diatoms were significant in spring and autumn, while dinoflagellates are always scarce (fig. 1). The microzooplankton community was constituted mainly by ciliates other than tintinnids throughout the year, tintinnids prevailing in winter and micrometazoa in spring, while other protozoa were very scarce (CABRINI *et al.*, 1989) (fig.2). Netzooplankton was dominated by neritic copepods in all seasons with the exception of summer when cladocerans (mainly *Penilia avirostris*) prevailed. The meroplankton fraction was more abundant during the spring while other holoplanktonic organisms such as chaetognaths, tunicates, etc. had low densities. We distinguished the netzooplankton in four trophic categories (TIMONIN, 1971; RAYMONT, 1983) : herbivores, fine filter feeders, mixed feeders and carnivores. The first was represented mostly by copepods which were more abundant in summer, the second was constituted by *P. avirostris* and tunicates and was prevalent at the end of the summer.

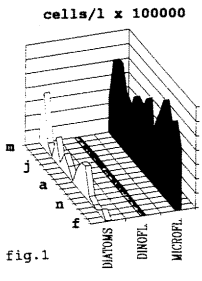

fig.1

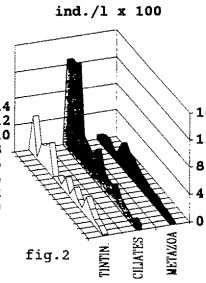

fig.2

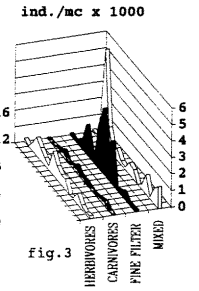

fig.3

The third, mainly formed by *Acartia clausi*, was dominant in spring, while the fourth (*Podon* spp., *Oncaea* spp., *Sagitta* spp., etc.) was very scarce (fig.3).

The microzooplankton fraction was supported by nanoplankton (ranging from 2 to 10 µm), mainly constituted by microflagellates. In particular, ciliates other than tintinnids seemed to be related with this fraction (fig.4). In fact the increase of nanoplankton was followed by an increase in aloricate ciliates one week later, whereas three or four months later micrometazoa and fine filter feeders substituted as consumers the aloricate ciliates. These latter two fractions seemed to be less efficient in grazing nanoplankton, which reached another maximum in autumn-winter.

Diatoms were grazed by herbivores, but by mixed feeders too (fig.5). Following the spring diatom bloom, an increase of both these components occured about one month later. An opposite trend seemed to occur for diatoms and their consumers, very similar to the preypredator model. Also between herbivores and mixed feeders an opposite trend was evident and, when diatoms decreased, herbivores were substituted by mixed feeders, which can feed on other trophic sources i.e. detritus.

In the second and the third year the microzooplankton fraction diminished and consequently the nanoplankton one increased; diatoms were quite constant, even if a winter maximum was observed. This shift may have determined a variation in the appearance of herbivores; an increase of carnivores was evident and this fact may have influenced the microzooplankton decrease.

We can therefore distinguish two different food webs : the first, supported by nanoplankton is the fastest one and determines the high values of ciliates found throughout the year in the Gulf and the summer abundance of fine filter feeders. The second is supported mainly by diatoms, is the slowest one and influences the temporal trend of herbivores and mixed feeders. Carnivores mostly follow the pattern for herbivore (fig.3), but may be influenced by the microzooplankton trend.

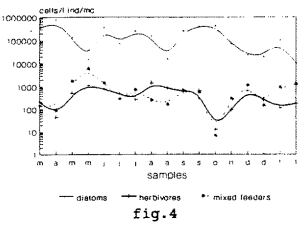

fig.4

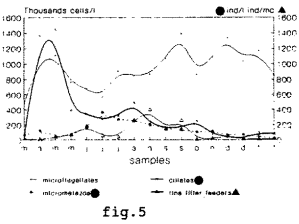

fig.5

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