B-II2

Feeding habits on Aristeus antennatus (Risso, 1816)

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The continental slope in the Western Mediterranean, ranging in depth between 400 and 1700 m, supports shoals of penaeid decapod crustaceans, of which A. antennatus is one of the most abundant, holding out particular interest to fisheries.

Its long-term fluctuations and local, seasonal migrations reflect a complex ecological behavioural pattern characterizing the benthic communities dwelling at those depths. The feeding habits and intraspecific competition in this species have been studied in an attempt to determine the causes responsible for shoal movement. A comparative analysis of the diet of three main size classes has also been carried out, taking into account sex, season and moulting as factors exerting a possible influence on diet. Overlap and resource partitioning are discussed using traditional methods, and dietary diversity has been evaluated.

Analysis of stomach contents indicates that the diet consists chiefly of bivalves, macrurous crustaceans, polychaetes, amphipods and ophiuroids. These five taxonomic categories account for more than 50 % of the diet of this species. Results have been presented as percent frequency of occurrence and number of prey items.

A. antennatus has been observed to prey upon the bottom-dwelling community, and there are significant differences in the composition of the diets of the various size classes, which exploit different resource levels, albeit with relatively high overlap. Larger individuals root deeper into the substratum when feeding, whereas the activity of smaller males and females is confined to the surface layer of the substratum. There is a significant relationship between size class and the depth of foraging in the substratum but no relationship between size class and prey size. There is also a significant relationship between foraging depth and the pronounced sexual dimorphism present in this species. This is probably reflected in the internal population structure and probably also plays a role in the local bathymetric migrations taking place during the year.
There exist significant differences in composition of the diet in the different seasons, with a gradual decrease between spring and winter in the proportion of prey items that live buried in the substratum.

The moult cycle in these especies is much less pronounced than in other decapod crustaceans, and it does not seem to have any appreciable influence on the diet.

The study is basically intended as a contribution to our understanding of food webs in the deeper regions on the continental slope. It brings to light the importance of the activity of deeper-water penaeids in the bathyal communities in the region between the continental shelf and the abyssal zone and points up as yet unresolved issues for future research.

B-II3

An uncommon recruitment of A. antennatus (Risso) (Crustacea Decapoda Aristeidae) in the Gulf of Genoa

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Resumé:

Durant l'année 1987, un recrutement a complètement modifié la structure du stock pêché, qui était plus ou moins stable depuis quinze ans environ. Ce phénomène a réactualisé d'anciennes coutumes de pêche et pose le problème d'éventuelles fluctuations pluridécennales parmi les populations d'*Aristeus antennatus*.

The biology of *Aristeus antennatus* (Risso) (Crustacea Aristeidae) is at present being studied in both Mediterranean and Atlantic countries which have specific fisheries for this species and is being monitored by the CIESM Working Group on deep water shrimps (Sardà 1987). A common topic of particular interest is the structure of the fished stocks in terms of sex-ratio, sizes and maturity stages. Having observed an evident modification in the length/frequency distributions of the shrimps fished in the Gulf of Genoa in summer 1987, we here give some details on this subject.

Length.frequency distribution of the red shrimps living on bathyal bottoms at about 700 m on the Portofino area (Eastern Ligurian Riviera) have been recorded since 1972. In the trawl catches the females are invariably dominant and it is only on these (which generally constitute 90% of the total shrimps) that the comparison of sizes is based. From 1972 to 1980 in the Portofino area females were distributed in two main groups approximately separated by the carapace length of 50 mm. In terms of age this size was supposed to divide the shrimps of age 0+ to 1 from those of age 1 to 2+ (Orsi Relini and Relini 1985). The second group was always more abundant that the first (two exemplas are shown in fig. 1).

After summer 1980 the shrimps were absent on the same fishing grounds and fishing ceased. A recovery began in summer 1985 and the first catches of the recently reappeared shrimps were composed almost totally of large-sized females (Orsi Relini and Relini 1986). The same structure (fig. 1) was recorded in summer 1986. Finally, in 1987 a large number of small females appeared in the catches (fig. 1). At the time of writing (March 1988) the small shrimps still represent an important fraction of the fished stock of this sector in the Gulf of Genoa.

As a result of this new situation fishing activities have increased. Trawling for shrimps did not stop in December as in the previous years (in the Seventies and at the recovery in 1985 the fishing season lasted a maximum of six months) and during the winter the shrimps were found in high concentrations on bottoms deep only 500m. In other words we are now facing a situation similar to that registered in the Forties by Brian (1942) in the same area; and it is also similar to the fishing activities recently observed on the Catalan Coast (Sardà and Demestre 1987) and in Portuguese waters (Arrobas and Ribeiro-Cascalho 1987).

Data recently collected by the Working Group showed that the shrimps fished in the Western Mediterranean increase in size from East to West; a similar gradient of sizes was found in the direction from South to North comparing catches in the Italian seas (Orsi Relini and Relini 1979, 1987). The present massive recruitment on the Ligurian bottoms has at least eliminated the S-N differences (in terms of size-composition of the catches) while it would be of great interest to ascertain what is happening along the longitudinal gradient.

In our area a spatial and temporal distribution of red shrimps comparable to the present one was to be found, as already noted, more than twenty years ago. If the size-composition of the catches then was the same as now (something which it is impossible to verify, as there is a lack of specific data in the literature), the population of *A. antennatus* is possibly subject to cyclical changes lasting several decades. A general trend of catches (consisting of a peak and a progressively reducing series over a period of thirty years) has been registered independently both in the Gulf of Genoa on the basis of oral reports from fishermen (Orsi Relini and Relini 1985) and in the Spanish region of Tramontana on the basis of fishery statistics (Tobar and Sardà 1987). A parallel series of values was registered during a period of eighteen years for the red shrimps trawling of the Balearic Islands (Oliver 1983).

In Spain a new rising phase apparently began in the eighties; it cannot be excluded that this present recruitment in the Gulf of Genoa indicates the same phenomenon.

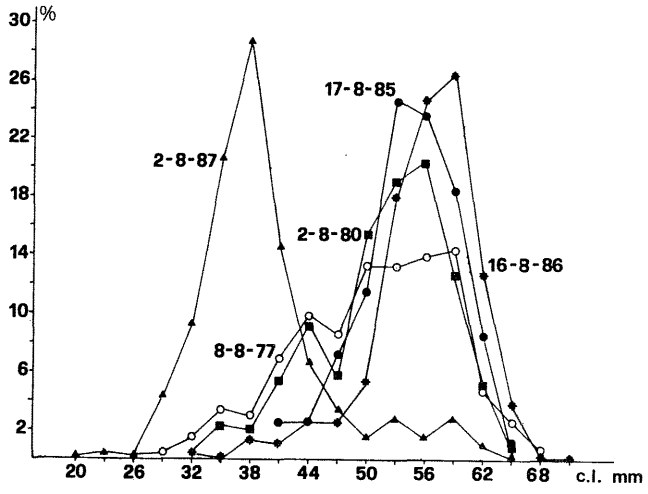

Fig. 1 - Length/frequency distributions of females forming the fished stock in Portofino area. The 1987 recruitment is evident.

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