Commercial fishery of *Sardina philchardus* Walb. fry in the Gulf of Salerno (Southern Italy): ichthyofaunal composition

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Our study is based on the fact that in Italy *Sardina pilchardus* (Walb) fry fishery is allowed for commercial purposes, even if for only two months in a year. However, it has always been a hard and delicate task to ascertain whether the catches of sardine fry might be noxious for the species accidentally captured. The great number of provisions, decrees and laws about this kind of activity can confirm this observation, but they often totally disagree, even though basea on the opinion of reliable experts and researchers in fishing problems and fauns management as clearly recently reviewed (IANNIBELLI, 1983; IANNIBELLI e LEVI, in prep.).

In order to provide a further contribution to the unresolved problem, a research program was carried out beginning from the fishing season, 1981, in order to collect recent and reliable data on the biological and economical aspects of the exploitation of this pelagic resource (IANNIBELLI, 1983). In this study the Gulf of Salerno was chosen as sampling area, that resulted to be, from a preliminary investigation, one of those still most interested by this kind of activity.

In the first year of research, the catch period of the sardine fry was between March 9th.- April 17th, 1981, during which we have put out to sea four times, using some of the motorboats usually operating in the area. For each day of survey one sample was collected in each of the areas mostly frequented by the different boats on that day.

The samples of about 100 grs. of weight each were taken directly from the commercial catch and then put very delicately in some cellophane bags. where the fixative liquid was added (formaldehyde at 4% in sea water neutralized with sodium carbonate, following the indications of MOTODA *et al.* reported by STEEDMAN (1976). Samples were identified in laboratory by binocular stereozoom microscope observation, according to ABOUSSOUAN (1964); ARBAULT et BOUTIN (1968), LEE (1966), LOZANO REY (1960), NICHOLS and WOOD (1976), PERLMUTTER *et al.* (1957), SAVILLE (1964), TORTONESE (1975), as well as the monography n°38 of the series "Fauna e Flora del Golfo di Napoli"(1956).

Faunal composition of the collected material resulted to be mostly constituted by *Sardina pilchardus* (Walb) (21267 specimens) but with the presence also of *Pomatoschistus marmoratus* (Risso)(Gobiidae, 255 specimens) and of *Aphia minuta* (Risso)(Gobiidae, 114 specimens). Much less numerous instead the specimens of *Pagellus bogaraveo* (Brunn.) (Sparidae, 12 specimens), of *Liza aurata* (Risso) and *Liza ramada* (Risso)(Mugilidae, 5 and 2 specimens respectively) as well as *Crystallogobius linearis* (Dub. Kor.)(Gobiidae, 2 specimens). Also the presence of *Boops boops* (L.) (Sparidae, 1 specimen) and of 1 Gadoid of very reduced size was noted.

Analyzing these results it is evident the sardine fry exploitation for commercial purposes is based almost exclusively not only on the stocks of the above Teleostean but also on two species of Gobiidae, for the number extremely reduced of captured specimens of other species. However, it is to be noted that *Aphia minuta*, which is a goby of a very reduced size for its whole vital cycle,has always been captured for commercial purposes, but the quantity that was caught in the kind of fishery investigated cannot be considered a problem for the protection of this species.

The same observation can be made on *P. marmoratus*, which is the most represented species after *Sardina pilchardus*. The capture of this goby cannot be considered particularly relevant as it does not seem to be "target species" of any other specific fishing activity, and it is to be considered ubiquitous in the Mediterranean Basin (MILLER, 1973, 1986; TORTONESE, 1975).

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Fishery and Growth of *Aphia minuta* off Majorca Island

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Aphia minuta or "jonquillo" is a pelagic neritic species, belonging to the family Gobiidae, captured around Majorca Island during the months of December through March by the artisanal fishery fleet. Its importance is based on the fact that it has a great acceptance on the market together with the price it reaches, and because it is one of the few specific fisheries of the winter season for the coastal fleet.

The "jonquillo" is captured with a fishing-net ("jonquillero") which combines purse-seine and trawling. This species meets during the winter months forming shoals for reproductive purposes. Its pelagical habits during this period allow finding them easily using the echo sounder. They are basically found inside the bays (Palma, Pollensa and Alcudia), at bottoms between 20 and 70 meters of depth, above sand and seaweed areas (*Posidonia oceanica*).

In figure 1 the importance of captures of "jonquillo" from Majorca Island in the last ten years can be observed, with amounts that lay between 20 and 80 metric tons.

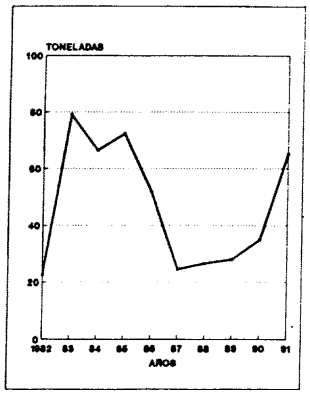

Figure 1.- Captures from 1982-91.

The length-frequency distribution from December 1990 to March 1991 is shown in figure 2. The range of sizes oscillates between 14 and 45 mm. The average size by month is doubled from the beginning to the end of the season.

Batacharya's Modal Progression Analysis (1967) was applied to these data, in order to identificate different cohorts. In table 1 we may observe a monthly series of length modes which go on evolving in time. The mean average increases by month.

To interpret these data and being *Aphia minuta* a species of one year of life span, we determinated the age of the individuals by using the daily growth rings on otoliths *sagit-ta* (METHOT and KRAMER, 1979).

The otoliths (N = 20) belonged to fishes between 17 and 44 mm of total length corresponding to ages from 64 to 217 days. The good accordance on sizes and age strongly suggested the adecuation of the daily rings for ageing the species. However, further validation is necessary.

The growth parameters (VON BERTALANFFY, 1938) were calculated by a stadistical programme which uses the Marquant's algorithm ("Fishparm") by the iterative calculation of parameters, and by the method based on the length-frecuency analysis ("Elefan", PAULY and DAVID, 1981).

The growth parameters determined are :

1) Otoliths : L_∞ = 42.62 mm ; K = 6.35
2) ELEFAN : L_∞ = 45.62 mm ; K = 6.352 ; t_0 = 0.1123.

XII	I	II	III	IV
	17	19	25	27
25	26	30	33	34
30	35	38	39	39
35	39			

Table 1.- Modal clases by month.

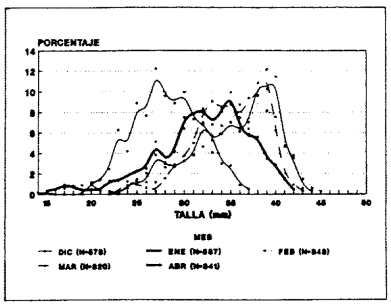

Figure 2.- Length distribution of "jonquillo" off Majorca.

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