

SARDINA PILCHARDUS (WALB.) FRY FISHERY IN A MIDDLE TYRRHENIAN BAY (SALERNO, ITALY): BIOLOGICAL, TECHNOLOGICAL AND MANAGEMENT ASPECTS

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Sardina pilchardus (Walb.) fry fishery for consumption purpose is an activity with a very old tradition in Italy, about which information can be found since 1314. At present fishing is allowed from Dec. 1 to Apr. 30 but only for two months per year, under the provisions of the Local Fishery Consultant Commission. One of the Italian areas in which this fishing activity is mostly practiced is the Gulf of Salerno, and so we chose it for this research. The ichthyofaunal spectrum analysis results of this fishery have been already published in a preceding work (IANNIBELLI and LEVI, 1992). In order to obtain information on the motor-boats and the fishing gears used, the mostly frequented areas, the techniques used, etc. we have distributed questionnaires to all the fishing crews in the site investigated, who fill in this information daily. Similarly, in order to get information on the quantities caught, we obtained the data directly from the motor-boats, considering that a great part of the catch is not sold on the fish-market, but is given directly to peddlers or to scellers with standard stores. The motor-boats used are between 5 and 8 mt length overall and their tonnage 1.5 - 5 gross tons. The boat motors are 12 - 60 H.P. and are always exclusively Diesel. At present the boats used in Salerno Bay are 30, less than a half of the ones used in the years around 1960 and equal in number to those used in the years around 1930. The fishing gear used is a so-called net "rezzola", typical in the area, which is a hand-trawl net, working on the sea surface and which is drawn directly from the boat, while until the years around 1880 fishermen used to pull the net from the seashore. The innovation of drawing hand-trawl nets from the boats, which has been diffused by the presence of this kind of gear also in southern Italy since the middle of the last century, has allowed to operate with a less numerous crew and also to capture shoals of fishes otherwise uncatchable. Another gear used is the hand scoop net (50 cm in diameter), always nightly and with a light source, as reported also by CREAC'H (1952) for a similar fishing activity carried out in the Antibes area.

The fishing action operates at a distance of 300 mt approximately from the shore, never more than 1 km, and this also is in full accord with the literature (DE BUEN, 1930, 1931). Fishing is carried out in areas 3-45 mt deep, on generally sandy sea-bottoms. The depth and the nature of the sea-bottoms on which sardine fry is caught in greater quantity are, here too, according to literature (HOLDT, 1899; LO BIANCO, 1911; PAOLUCCI, 1912; LA GALL, 1928; FURNESTIN, 1959; LEE *et al.*, 1967). It has been observed that when the fishing-action is carried out between 2.5 and 5 mt depth fishermen try to circumscribe with the net depressions more or less accentuated of the sea-bottom called "fosse" in which the greatest quantity of the fry collect after their appearance in the area. Actually, the sardine fry in Salerno Bay arrive near the coast favoured by the current of the South, the East and the West and they tend to assemble in this little natural shallow pit on the sea-bottom, where they can better resist the current, and which they will abandon, if not caught first, to reach the currents of the North, that bring them again to the open sea. These direct observations are in full accordance with LARRANETA and LOPEZ (1957) and DE BUEN (1931), whereas ROULE (1932) also describes the opposite action section used by MISTRAL and SCIROCCO in relation to the "poutine" fishery on the Nice coast. Being that the period of deposition of the eggs and the growth average of sardine larvae and post-larvae is very variable from one year to another, depending on temperature, salinity and many other factors as reported in numerous works of the sardines (LARRANETA and LOPEZ, 1957; LEE, 1961; KARLOVAC, 1967; LEE *et al.*, 1967; FURNESTIN and FURNESTIN, 1959; GAMULIN and HURE, 1955) it is clear that the fishing period varies in relation to all that has been above mentioned.

The technique of sardine fry fishery for commercial purposes in Salerno bay, is simple enough, and corresponds with some variations, to that used for fishing from the boat with a hand-trawl net. The daily number of holds goes from a minimum of 1 to a maximum of 55, with a media of 17 holds for day. The average time for outgoing and incoming fishing is 5:30 and 1:00 A.M., while for night fishing it is 9:00 P.M. and 6:00 A.M. The time to reach the fishing areas is 65 min. approximately. The number of the crew components varies from a minimum of 2 to a maximum of 5 persons. The sardine fry in the Gulf of Salerno, was always considered a highly valued fish product. Its easy perishability creates a serious guaranty for the consumers, since it is extremely difficult to keep it in good condition for a long period. Moreover the value fish fry increases when it is composed of similar size fishes, 25-28 mm at maximum, as it can easily be observed. It has been proved, further, that if proteins increases in adult sardines respect to fish fry, sardine fry fat contents is 3% whereas that of adults is 8% (VINCENT CUAZ and POURTALLIER, 1973). The first is considered a lean fish and is justly esteemed of greater value than the second that is considered fatty.

Regarding the market of sardines fish fry in Salerno, from the analysis of gross proceeds for every gram, during the fishery days, comes out a rapidly increasing trend. This seems to indicate some form of saturation of the market request, and searching a correlation between the value in grams of fish fry and the total quantity of the catch, it was found a significant negative correlation (-0.44601) demonstrating that the value in grams of fish fry and the total quantity of the catch diminishes with the growth of it. From a management point of view, therefore, it would be unproductive an extension of the fishing season, or a raise in the boat fishing number. More productive, instead could be revealed the study of a method to refrigerate the fish on the boats, as well as its eventual transformation in a canned product, under oil, or in another type of conservation. The possibility of utilizing in the best way the period of two months allowed, succeeding to individualize quickly the fishing-target, would be another strategy that could bring to the best yield of the investigated activity.

REFERENCES

- CREAC'H P., 1952. *Rev. Trav. Off. Pêches Marit.*, 17 : 57-60
DE BUEN F., 1930. Clupéidés et leur pêche. *Rapp. Proc. verb. C.I.E.S.M.* 5 : 173-194.
DE BUEN F., 1931. Clupéidés et leur pêche. *Rapp. Proc. verb. C.I.E.S.M.* 6 : 389-436.
FURNESTIN J. and FURNESTIN M.L., 1959. *Rev. Trav. Inst. Pêches Marit.*, 23 : 79-104.
GAMULIN T. and HURE J., 1955. *Acta Adriatica*, 7 : 1-23.
IANNIBELLI M., and LEVI D., 1992. Commercial fishery of *Sardina pilchardus* Walb. fry in the Gulf of Salerno (Southern Italy): ichthyofaunal composition: *Rapp. Proc. verb. C.I.E.S.M.* 33: 295.
KARLOVAC J., 1973. Oscillations des quantités des stades planctoniques de la sardine. *S. pilchardus* Walb.,.... 1965/66 jusqu'à 1969/70. *Rapp. Comm. int. Mer Médit.*, 21: 813-815
LARRANETA M.G. and LOPEZ J., 1957. *Inv. Pesq.*, 6:53-82.
LEE J.Y., 1961. La sardine du Golfe du Lion. *Rev. Trav. Inst. Pêches Marit.*, 25: 417-511.
LEE J.Y., PARK J.S., TOURNIER H. and ALDEBERT Y., 1957. *Ibidem*, 31 : 343-350.
LE GALL J., 1928. Notes et observations sur la biologie de la sardine de la Manche. *J. du Conseil*, 3: 206-223.
LO BIANCO S., 1911. *Mitt Zool. Stat. Neapel*, 20 : 129-156.
PAOLUCCI C., 1913. *Riv. Mensile di Pesca*, 15 : 33-60.
ROULE I., 1933. Les Poissons Tome V : Larves et métamorphoses Delagrave, Paris. 309 pp.
VINCENT - CUAZ L. and POURTALLIER J. 1973. La poutine pêchée sur le littoral du département des Alpes Maritimes en 1970. *Rapp. Comm. int. Mer Médit.*, 21 : 773-776.

Rapp. Comm. int. Mer Médit., 34, (1995).