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The development of the spring fishing season on *Sardina pilchardus* (Walb.)  
in the western Channel

by

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1. Introduction

Due to the decreased herring catches on the traditional fishing grounds in the North Sea, our fishing fleet had an interest in the exploration and inclusion of other fishing grounds. Analyzing the possible resources, the regions of the Gulf of Biscay and the adjacent areas resulted.

2. International fishing activities

All the fisheries in the Gulf of Biscay and similar waters off the Iberic Westcoast up to date carried out in regions, lying far off the coasts and territorial waters, mainly based on concentrations of fishes near the bottom. Only in the coastal regions of the Western Channel, the Gulf of Biscay and near Atlantic coasts of Spain/Portugal midwater fishing methods by driftnet and purseseine-like gears have been developped.

The absence of midwater fishing beyond the territorial waters is surprisnig, because typical pelagic fishes like pilchard are abundant in the whole area.

Indications of pelagic fishes which could be assumed as belonging to pilchard, mackerel, horse mackerel, anchovy or poutasson have been reported by Russian and British workers beyond the territorial waters (Bridger, Mal'kov and Polonsky).

3. Results of the surveys in 1966 and 1967.

a Acoustic detection and experimental fishing in 1966 and 1967

During the first exploration cruise of the R/V "Karl Liebknecht" in the waters of the Gulf of Biscay and adjacent areas in May and June 1966 in the central part of the English Channel marked pelagic echo traces were found. The best ones occurred in a total depth of water of about 80 m on the positions of  $49^{\circ}22'N - 50^{\circ}05'N$  and  $03^{\circ}30'W - 04^{\circ}40'W$ . They consisted of small pinlike indications with a vertical diameter of 5 - 10 m (maximum 20 m). When examining by CRT-Scale expander the shoals showed a high density of fishes. Usually they were found in middle and lower layers of the water in the daytime and in the middle and upper layers during the night. On their vertical migrations they reached the bottom very seldom at noon. In such cases it was supposed by bottom trawl test hauls that the indications belonged to adult stages of *Sardina pilchardus* Walb.

Similar indications, also identified as pilchard, occurred in the region between the English Channel and the Biscay around Ushant in a total depth of water <sup>6f</sup> 120 m in the second decade of June in 1966. In the 3<sup>rd</sup> decade of April the characteristic traces of *S. pilchardus* also could be seen in the Northern Biscay in a water depth of 120 - 140 m.

About the middle of March 1967 the detections were continued by pelagic two-boat fishing trials of commercial trawlers. In the same area of the western part of the Channel where in the preceding year in June the small pelagic shoals of *S. pilchardus* had been located, indications of the same kind were found and determined as pilchards.

The fishing trials yielded in 0,3 tons per hour and ship. It was possible to carry out fishing in these shoals at all times of the day.

Furthermore since the middle of March pelagic shoals differing from the shoals of the western central part of the Channel, were found off Wolf Rock beyond the territorial waters. They were bigger and had a pilelike shape. Test fishing with two-boat midwater trawl averaged 10 t per haul and ship, composed of 25 % of adult *S. pilchardus* and 75 % juvenile *Scomber scombrus*. It must be supposed that the *S. pilchardus* about the middle of the March found to the south of Wolf Rock represented the last groups of wintering concentrations, forming more and more smaller shoals.

British investigations led to the hypothesis that the main concentrations of the adult *S. pilchardus* in autumn migrate westward into the direction of the adjacent Atlantic areas of the English Channel and in-to opposite direction in spring (Bridger). On the other hand the existence of the British coastal fishery on pilchard both in winter and in summer must be considered. Probably the greater part of the stock makes the mentioned East-West-migrations in an annual cycle, where-as a small part can be found during the whole year off the Cornish coasts.

b The first spring season of *Sardina pilchardus* Walb. in 1967

As an immediate result of the basic surveys carried out in May and June 1966 and in March and April 1967, since the middle of April 1967 a fishing activity of the whole fleet of Lugger-trawlers and cutters started. The fishery could be continued up to the second half of July. According to the results of the test fishing experiments two-boat-midwater trawling was the most suitable method of catch. All trials with one-boat midwater trawl had no remarkable results, although practised with powerful stern-trawlers. A comparison of the different results by oneboat and twoboat midwater trawling shows clear escape reactions of the shoal.

The mean catch per day and ship by pelagic two-boat trawl fishery both for Lugger-trawlers and cutters averaged in 4 - 5 t.

The figure (Fig. 1) of this pilchard season points out striking fluctuations of the catches, principally between several days, but also in comparison

with the mean values of the decades for the whole fleet. They had a maximum of about 300 %. To some extent the fluctuations of the daily catches and the catches of the decades are related to the different number of boats fishing. Moreover in case of the Lugger-tractors and cutters, depending strongly on weather these fluctuations can be explained by the influences of the sea motion at the beginning and the end periods with bad weather.

Because of the intensity of the fluctuations there should be considered any other factors as responsible causes. Thus it is worth to analyze the influence of the direction of the wind. For instance there was a relation between the catches per unit and the direction of the wind in the Russian winter fishery on the horse-mackerel (*Trachurus trachurus*) of the same area. Western winds caused a more intensive front between entering Atlantic waters and the waters of the North Sea resp. waters of the English Channel. resp. Eastern winds led to a mixture of this front. (Malkov, Polonsky). In spite of the sudden decrease of the important maximum catches <sup>on</sup> April, 23., June, 4. - 7., June, 25., with predominant western winds in general there couldn't be found clear interrelations.

According to our material it is not possible neither to refute, nor to confirm the rule, spread among our fishermen, that the catches are decreasing with eastern winds.

Another fact which might induce the fluctuations could be suggested in physiological conditions of fish. The spring fishery coincided with the main spawning period and the period of main feeding. The spawning period of *S. pilchardus* extends as known in several months in summer having a maximum in early summer. A certain rhythm of spawning activity by the partial and gradual ripening and spawning can be assumed as well.

Probably the top catches coincide with the dates of intensified spawning. Actually, according to the reports of the captains in very good catches masses of pilchards with running gonads dominated.

In spring fishery the most suitable method of fishing consisted in continuous towing after preceding rough detection of shoals. In this kind the factors of fluctuations related to the distribution could be neglected.

In July in the time of gradual end of spawning activity the mobility of shoals increased. According to the reports of the captains towards the end of the season the ships with the best towing capacity had the highest catches.

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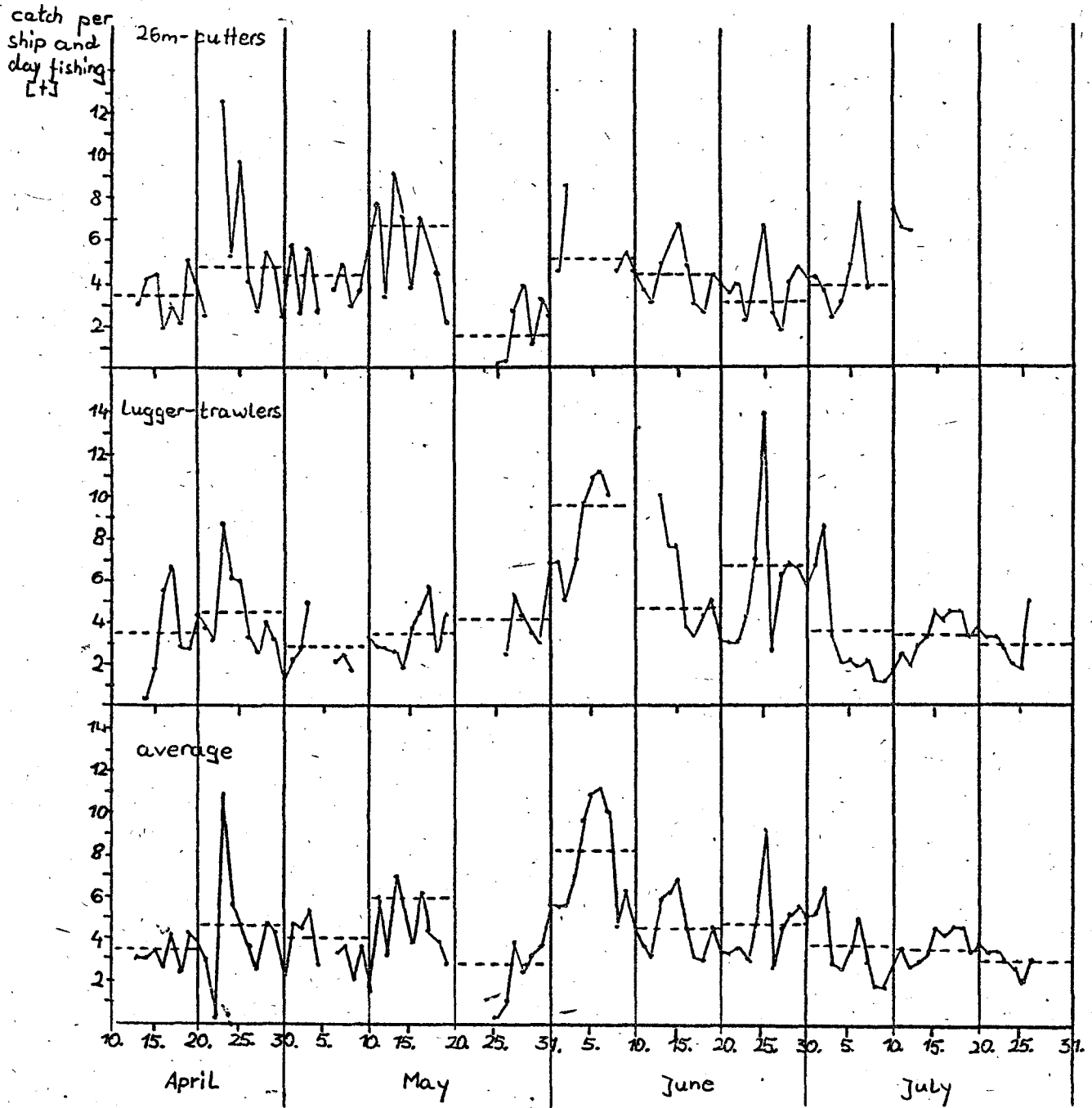


Fig. 1: Curves of catch per unit of effort in the midwater pair trawling on *Sardina pilchardus* 1967

