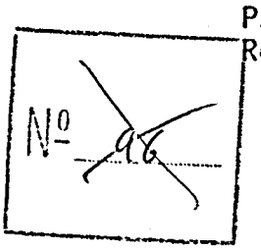
International Council for the Exploration of the Sea

C.M. 1974/L: 5
Plankton Committee
Ref.: Pelagic Fish (Southern) Committee



PRELIMINARY RESULTS FROM THE SCIENTIFIC EXPEDITION "MAROC-IBERIA, I"

by

Julio Rodríguez-Roda
Instituto de Investigaciones Pesqueras
Cádiz, Spain

Abstract

During June 19 to July 16, 1972 was verified on the Spanish Oceanographic Ship "Cornide de Saavedra" a expedition for study the spawning areas of Thunnus thynnus and Engraulis encrasicholus. This expedition had the following limits: oriental and south coasts of Iberian Peninsula and north and western Morocco ones. Also was studied the Hydrography, Phytoplankton, Primary Production and Zooplankton.

We have not meet any larvae of Thunnus thynnus, but only T. obesus between Safi and Rabat off Atlantic coasts of Morocco.

Respect to the Engraulis encrasicholus we have meet a big spawning zone between Casablanca and Gibraltar Straight in the Atlantic sea, and also in the mediterranean sea in the Alhucemas Bay and off Alicante and Almería.

Introduction

The expedition was verified from 19 June to 16 July of 1972 on the Spanish Oceanographic Ship "Cornide de Saavedra". The characteristics

of this ship are: Length over all: 57.45 meters, Breadth moulded: 11.20 m., Depth: 7 m., Mean draft: 4.20 m., Displacement: 1,300 tons, Power 1,250 H.P., Speed trial: 11knots. The ship was put in service one year before, and our expedition was the fourth of the realized ones till then.

The zone of the sea researched had the following limits: oriental and south coasts of Iberian Peninsula and north and western Morocco ones, being the geographical coordinates limits among which were established study station the following for the Atlantic Ocean: between the parallels 32º50' N and 36º55' N and meridiònals 9º20'W and 6º0'W. For the Mediterranean Sea: between the parallels 35º06'N and 38º23'20" N. and meridionals 5º18' W. and 0º04'E. In the Gibraltar Straight were studied four stations also, between the meridionals 5º20'W. and 5º55'W.

In the map we give with points the studied stations.

The scientific personal was compound of seven Biologists and two Quemists, beside the assistants scientifics personal.

The expedition began and finished in Cádiz's harbour, with stops in Casablanca, Ceuta, Alicante and Málaga.

We did 111 stations but many of them are coincident for different investigations, so if we distribute for subjects the total number of the studied stations is 152. From these ones 66 correspond to Atlantic, 4 to Gibraltar Straight and 82 to Mediterranean sea.

Objetives.

With this expedition we tried to localize in an extensive atlantic and mediterranean zone the spawning areas of tuna (Thunnus thynnus) and Anchovy (Engraulis encrasicholus) for which we selected the most appropriate season and place of a possible concentration of eggs and larvae of these species.

In a previous work (RODRIGUEZ-RODA, 1964) we told respect to tuna, that "the spawning place was unknow for us, however it have catched a great quantities of little tunas of 40 cm. of fork length and of 1 to 2 Kg. of weight in atlantic Morocco zone and in the mediterranean coasts of Ceuta and La Línea, during the months of Setember, this indicate that to a side and other of Gibraltar Straight could be spawning zones. Also during the before months mentioned appear little tunas in spanish east coasts, this indicate that very near may be a place for spawning". Our objetive consisted therefore in look for the spawning zones, that is to say, eggs concentration and larvae development

from southatlantic and southmediterranean areas from Iberian Peninsula, as well as of the Morocco coasts and over all in the places in which we presumed such existence.

Respect to anchovy we selected the same zones, but more near to the coast, so for Iberian coast than for the Morocco ones.
The date selected for the expedition was between the last fifteen days of June and fifteen first ones of July and it was based in previous studies (RODRIGUEZ-RODA 1964), in which we indicated that "during the coming season, months May and June, tuna appear with gonads ripening and in a pre-spawning state or spawning one, and in the returning season, months July and August, this gonads are flaccid yet and with manifest signs of to have spawning, that is to say in post-spawning state. Between these two phases, last of June month and firsts of July, tuna disappear from the coast and his catch is very limited, being precisely in these moments when it must to verifie the spawning."

For to be realized the spawning of the anchovy in summer, it not had difficulties for the limitation of the study season.

For to correlate the planktonic fisheries with the physic-chemistry parameters, we took water samples to different profundities for the salinity, oxigen, nitrates, nitrites, silicates and pH analysis, moreover of the temperature.

Respect to plankton were realized the correspondent catches with the nets and the primary production or marine fertility was calculated to using the radioactive carbon technical.

We recapitulate as follows the different studies realized in the expedition and taking of data about hydrography, phytoplankton, primary production zooplankton and spawning zones of tuna and anchovy.

Hydrography

Study realized by Drs. F. Fraga and R. Establier.

We have taken hydrography data, in order to have a base for the biologist studies from a total of 30 hydrography stations: 17 situated in the Atlantic, 2 in the Gibraltar Straight and 11 in the Alboran Sea. In every stations and always that the profundity was suficient we took samples at the standards profundities till 1,500 m. and the temperature, salinity, disolved oxigen, pH, nitrates, nitrites and silicates were determined. The samples were taken in plastic Hydro-Bios bottles with plastific metallic lids and the cable was keep up in vertical position helped by active rudder that holded the vessel.

Phytoplankton and Primary Production.

Study realized by Dr. E. Arias.

The studied material proceeding from 23 of the 30 programmed hydrographics stations. In which we took pigments samples in surface of phytoplankton and primary productivity.

For the realization of pigments studies was filtered between 5 and 7 liters of sea water on Whatman's paper, being calculate the pigments concentrations with the PARSONS and STRICKLAND's expressions.

The followed method for the primary production calculation have consisted in to fill up, without to filter, 9 bottles of Pyrex glass of 100 ml. of capacity, in the three studied levels. These bottles, at which we put on 1 ml. of radioactivity solution, were expounded at the light in reversed position, realizing the incubation in a wood box divided in three departments: one directly expounde at light and the other two ones whith each of two filters that limited the light to a 10 % and a 1 % respectively.

The results obtained show perfectly the delimited zones: one situated in Alboran Sea and the other in the west zone of Gibraltar Straight. The first has a high productivity and a high pigments contained, specially in the stations situated near the coast, whilst in the western zone we found values extraordinarily low.

The middle measures of the productivity and chlorophyl "a" show proportionality, that is to say, at bigger quantity of chlorophyl "a" more production. In general the founded concordance is sufficently big therefore the productivity of sea Alboran is higher to Atlantic waters one, because of the special dinamic of the waters from one and another side of Gibraltar Straight, probably.

Zooplankton

Study realized by Dr. F. Vives.

From the 30 programmed hydrographic-planktonics stations in the expedition Maroc-Iberia, in 26 of them were effected vertical fisheries of zooplankton of different profundities (1 000-500, 200-50) to the surface (according to the station profundity) and horizontal fisheries to 2-3 m. under the surface.

In the vertical fisheries the displaced volume was measured with view to apreciate the biomass that oscillated between the 2 and the 20 mg/m^3 . Comparing the distribution of this biomass with the phyto-

plankton one, we confirmed the remarkable parallelism existing between both and the existence of bigger values for the Alboran sea than for the Iberian-morocco bay.

The hydrography aspect has been treated with view to ecology study. From the data obtained we have calculate the percentages of waters atlantic and mediterranean mixture in the Alboran sea in order to study the planktonic populations in relation with water masses.

The systematic-ecologic study was relized for the following groups: Copepods (142 species), Amphipods (12 species), Euphausiids (8 species), Pteropods (11 species), Gastropods (30 species), Appendicularians (10 species), Salps and Doliolids (4 species).

The remainder groups, included the meroplankton, will be subject for a second work.

From every one are pointing determinate ecologic aspects in special the ones referents to water masses (atlantic or mediterranean) distributions as much horizontals like verticals, so that their relation with the upwelling areas or dowwelling waters.

Spawning anchovy zones.-

Study realized by Dr. P. Suau.

Fisheries were realized along to the north Morocco coasts and south-east Spanish ones; by means a plankton net with mesh of 250 microns.

The most important area found was front of atlantic Morocco coasts, between Casablanca and the Gibraltar Straight, specially at north of Rabat. We found less abundance front of mediterranean coast, where detach Alhucemas' bay.

In Spanish coast it was localized a spawning area very important off Alicante and other less important front Almeria.

It was measure the eggs dimensions founding values which indicate that the greater size correspond to the atlantic waters, followed by the Morocco mediterranean, Almería and finally the Alicante ones, that is in according with the hydrographic characteristics correspondent to every one.

Spawning tuna zones.-

Study realized by Dr. J. Rodríguez-Roda

It was utilized cylinder-conical standardized special nets (FAO

Fisheries Reports, nos. 37 and 80) of 100 cm. of mouth diameter and 451 cm. of length, of monofilament nylon net with a fine mesh of 0.505 mm. for the sections I and II and 0.308 mm. for the section III or bottom of the net. A flowmeter was attached in order to know the filtered water volume. The net was towed for 30 minutes (15 minutes in each direction), obliquely and at the regular towing speed of 2 to 3 knots and till 70 m. of depth and in general on the isobath of 100 m. The greater part of catches was realized in the night and at 3 and 7 hours later of sunset.

We used the winch Vidalis, with a towing warp angle of 60º and 140 m. of untied cable.

Samples were preserved in 10 percent formalin and to controled because of the samples will turn acid in time.

We made 53 stations about tuna of which 23 were in the Atlantic, 1 was in the Gibraltar Straight and 29 were in the Mediterranean.

In neither of the stations appeared larvaes of Thunnus thynnus and in lieu of we found larvae of T. obesus between Safi and Rabat in the Atlantic coast of Morocco.

We give the stations in which appeared classifiable scombroid larvaes.

Station	Date	Latitude N	Longitude W	Species	Length L.S. mm.
13	24.06.72	32º50'00"	09º20'	1 Thunnus obesus	4.20
32	01.07.72	33º56'00"	07º16'	2 Thunnus obesus	4.44 and 5.04
100	11.07.72	37º42'00"	00º36'	1 Auxis thazard	4.80 L.T.
101	12.07.72	37º31'30"	01º03'	Auxis thazard (various).	5.04 L.T.

Like a complement we give also the station in which we found anchovy larvae (Engraulis encrasicholus).

Station	Date	Latitude N.	Longitude W.	Number specimen	Length L.T. mm.
13	24.06.72	32º50'00"	09º20'00"	2	12.53 and 14.20
14	25.06.72	33º00'00"	09º02'00"	1	-
15	25.06.72	33º36'00"	08º19'00"	1	-
25	28.06.72	36º43'00"	06º48'00"	in quantity	-
32	01.07.72	33º56'00"	07º16'00"	in quantity	-
34	02.07.72	34º07'30"	06º55'00"	in quantity	12.86 and 14.52
36	02.07.72	34º21'00"	06º49'00"	in quantity	-
38	02.07.72	34º41'00"	06º36'00"	big quantity	-
40	02.07.72	35º04'00"	06º22'00"	in quantity	-
55	04.07.72	35º23'00"	04º55'30"	few larvae	-
65	07.07.72	35º33'00"	04º00'00"	few larvae	-
78	08.07.72	33º29'00"	02º57'30"	few larvae	-
80	08.07.72	35º11'00"	02º40'30"	few larvae	-
89	09.07.72	36º55'30"	01º52'00"	few larvae	-
91	09.07.72	37º22'00"	01º33'30"	few larvae	-
93	09.07.72	37º30'30"	00º58'00"	3 larvae	16.20 and 14.35
97	11.07.72	37º57'00"	00º31'00"	in quantity	15.03
100	11.07.72	37º42'00"	00º36'00"	in quantity	-
101	12.07.72	37º31'30"	01º03'00"	in quantity	23.55
102	12.07.72	36º45'00"	02º19'00"	few larvae	-
106	12.07.72	36º42'30"	03º37'30"	2 larvae	15.83 and 8.80

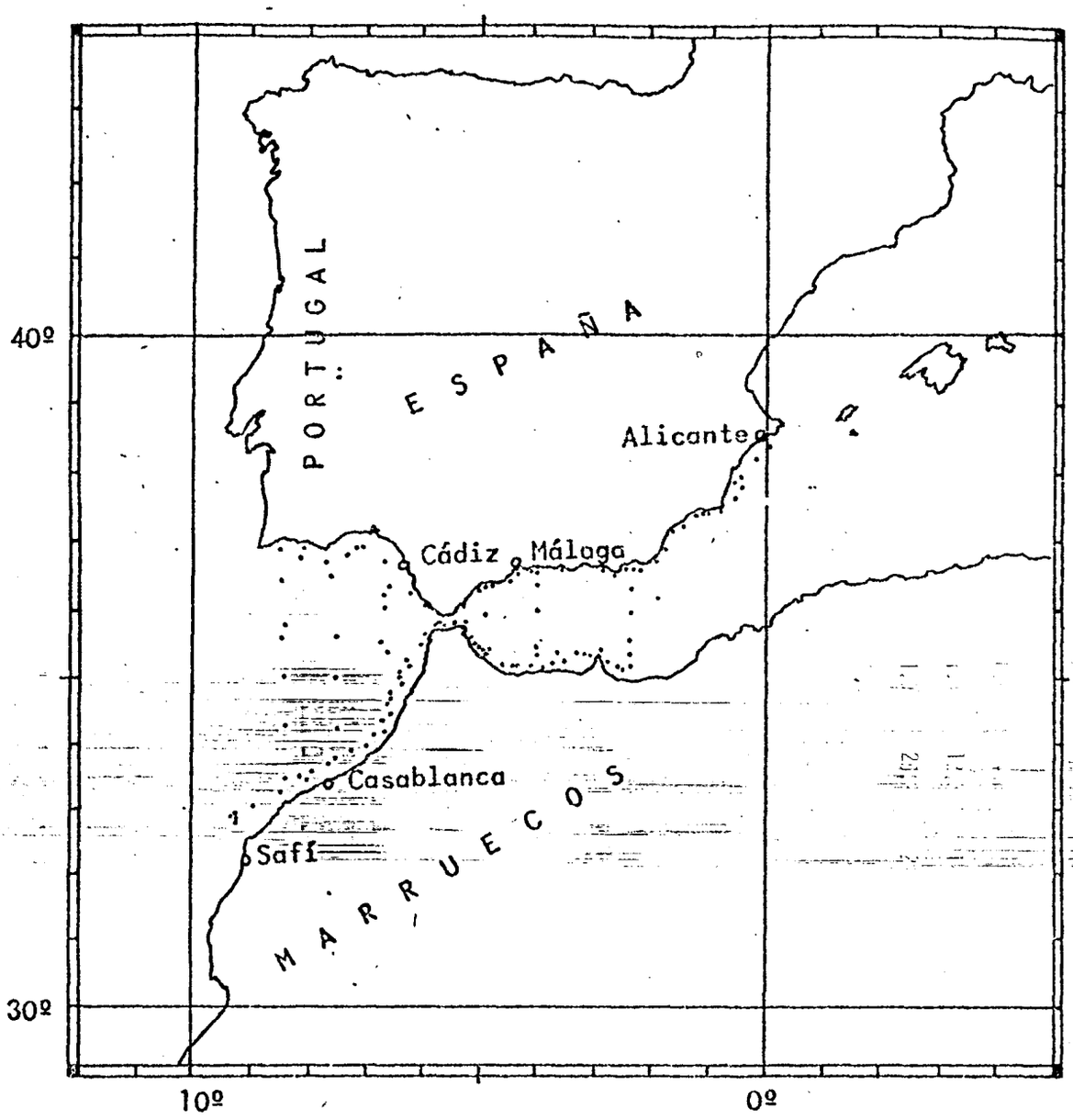


Fig.1.- Atlantic and Mediterranean explored zones and stations studied from the scientific expedition "Maroc-Iberia, - ".