

OBJETIVE 4: BIOLOGICAL PARAMETERS

4.E.- REPRODUCTION

Objective: To increase the knowledge of the reproduction process of the red tuna: area and spawning period, sexual maturity and fecundity.

Methodology: Surveillance of the red tuna fisheries. The gathering of fishing data with regard to catch, effort, and fishing situations. Size sampling and the acquirement of gonad-somatic indices. The acquirement of gonad samples, their conservation and preparation. Course on Methodology for the histological study of gonads. Observer onboard. Gathering of data on environmental factors.

Results:

SPAIN (IEO)

Objective 4.2

Area – reproduction period and sexual maturity:

For the study area and reproduction period of the red tuna, an information and sampling system was established specifically in the transportation and exportation factories which processed a high percentage of the landings from long line and purse seine fishing directed at red tuna reproducers during the period from May to July. This was due to the fact that for reasons of interest and commercial strategy, the vessels off-loaded directly to lorries which transported the catches without eviscerating them until they reached the mentioned factories whereupon data on catch and fishing areas were obtained and the biological sampling of size and weight with sex identification was carried out. In addition, the gonad weight of the female samples was obtained with the purpose of knowing the Gonad-somatic indices (Kume y Josep 1969) indicating the levels of sexual maturity of the tuna fish.

Similarly, observation and sampling was done onboard the long line fishing vessels which directed their effort to the catch of red tuna from May to July. During this onboard activity, data on catch, effort, fishing situation and size sampling of the catches were obtained. In the cases in which the catches were eviscerated onboard, the gonad index of the caught tuna was obtained. Similarly, environmental data relative to the superficial sea temperature and the prospecting of the thermocline using the XBT, as well as meteorological factors such as sea conditions, wind, etc. were obtained. In total, data from 120 days onboard was obtained. With the ultimate purpose of having a more overall vision of the area, spawning season and its variability, the data obtained by the onboard observers during 1999 have been compiled. The fishing areas where the reproducing tuna were caught during the months of May, June and July can be seen in **Figure ____**. In total, the GSI from 112

female red tuna samples whose values are presented in **figure 8.6**, corresponding to the months of May, June and July.

With respect to the study on sexual maturity and fecundity, a course which was organized by the Oceanographic Centre of Malaga IEO took place from 1 to 11 March 1999. In this course (annex 1), the methodology on the study of the maturity state of the gonads through histological analysis was deeply looked into. In total, 55 red tuna gonad samples were collected for further studies on these biological parameters.

TUNISIA (INSTM)

Objective 4.3

4-3-1-Study of the area and the lay period as well as its variability over the time.

This task has not been accomplished. The Italian institute decided to welcome scientists from other countries in the COPEMED area as a part of its research activities in order to participate in a prospection larval campaign.

A training course about the recognition and determination of eggs and larvae of Scombridae reproducing in the Mediterranean was programmed as well.

This course is of special usefulness for the Tunisian party, because we had planned to include this task among the anual prospection activities carried out by the research vessel of the INSTM, the N/O HANNIBAL.

This operation could eventually be extended to the Lybian waters if coordination is assured.

At the moment, we do not have such informations in the southern part of the COPEMED area.

4-3-2-Size of the first sexual maturity

In order for this task to be completed properly, a practical training course was organised by COPEMED at Malaga University (Spain) in 1999.

The commitments not honoured by the observers on board of the purse seiners, specifically trained for this matter have caused the lack of data.

The aim is to note the size or the weight of female fish, extrait the gonads and obtain their weight. The mean portion of gonads is carefully conserved in the Gilson liquid.

This year all possible precautions have been taken in order to avoid these failures.

The availability of economical means will allow me:

- To obtain the gonads from the catch of trap-nets, purse seiners and longliners from the month of May.
- To establish coordination with my Lybian colleague in order to obtain the samples of the gonads of this fish in the month of June 2000. I am willing to travel to Lybia in case my presence is imperative.

4-3-2-Size of the first sexual maturity.

This part is directly linked to the implementation of the previous task. Therefore, the causes inherent in the failure of the implementation of the size of first sexual maturity are still valid, and the proposed solutions are the same.

MALTA (NAC)

Objectif 4.4

Reproductive Studies

The female gonads that were identified were weighed using the small balance available on board. This measurement was then used to calculate the Gonadosomatic Indices of bluefin tuna. This can be calculated as shown below:

$$\text{Gonadosomatic Index} = \frac{\text{Weight of Gonads in g}}{(\text{Fork Length of Fish in cm})^3} \times 10^4$$

Table 7.1 gives the gonad weight and GI calculated for the female BFT observed. Fig. 7.1 gives the average GI during fortnightly periods throughout the whole sampling period.

Tag No.	Gonad Weight (kg)	GSI
1	1.75	0.8
4	1.75	2.55
28	1.75	1.06
29	1.8	1.48
30	2.5	1.14
41	3.6	3.62
50	4.75	4.92
51	4.75	4.46
52	1.2	1.62
53	1.5	1.23
54	4.5	2.16
55	7	5.34
56	6	7.5
58	5.5	4.83
62	11	8.37
64	10	7.61
65	11	5.41
67	3.7	2.29
70	2.2	3.21
71	1.8	3.66
73	1.7	3.85
74	0.7	0.5
75	1.3	5.78
76	1.7	6.33
77	2	5.8
78	2.2	5.08
79	0.85	5.73
80	1.1	5.77
81	1.3	6.01
82	1.2	5.72
83	1	5.12
84	0.63	4.61
85	1.45	5.52
86	0.95	4.86
87	1.4	5.21
88	1.1	5.12
89	1.7	5.24
90	2.2	4.99
94	0.55	4.02
95	0.68	3.57
106	5	4.39
107	6	3.66
110	13.5	12.68
117	3.45	4
121	3	19.22
128	5	2.75
130	5	3.85

Table 7.1 Gonad Weight and GI for Female BFT observed

Fig. 7.1 Average GI During Fortnightly Periods

LIBYA (MBRC)

Objective 4.5

Due to the difficulties encountered on the tuna trap vessels, the quick processing of the catches and owing to the fact that the gonads from the female tuna samples were immediately sold to Italian buyers and also due to the lack of personnel, neither the gonad weight nor therefore the programmed gonad-somatic indices could be obtained. Nevertheless, it was observed that female samples of very young tuna (20-25 kg) possessed gonads which were at a high level of development and as a result the study of size-age at first maturity of red tuna samples caught by tuna traps in Libya at the end of the genetic migration period is considered to be very interesting.