

## OBJETIVE 4: BIOLOGICAL PARAMETERS

### 4.C.- SEX – RATIO

Objective: to advance the knowledge of this biological parameter and its variability by size class.

Methodology: size sampling with sex identification of red tuna and sword fish by fishing method and spatial-temporal stratus.

Results: During the development of the project it was collected sex-ratio by length-class for bluefin tuna caught by tuna traps, surface longline and hand line. Similarly, the sex-ratio by size class was obtained for swordfish caught by drifting gill nets and surface longline fishing.

MOROCCO (INRH)
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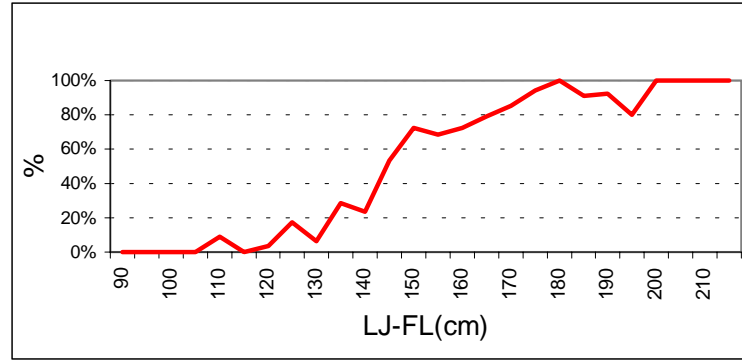
#### **Objective 4.1c**

The data collection on size and sex of the swordfish caught by drift gillnet, has been conducted monthly in the port of Tanger. The determination of sex has involved 376 specimens (**table.4.1**). The proportion of females by size is shown in **figure (4.1)**. It can be noticed that females are dominant in sizes (LJ-FL) greater than 150 cm, whereas males are dominant in sizes smaller than 140 cm. The global sex-ratio shows a tendency to balance (50%). These results confirm those obtained in the previous campaign (1998).

taille	1999		%
	Male	Femelle	
90	1	0	0%
95	0	0	-
100	2	0	0%
105	6	0	0%
110	10	1	9%
115	18	0	0%
120	28	1	3%
125	19	4	17%
130	29	2	6%
135	10	4	29%
140	23	7	23%
145	7	8	53%
150	8	21	72%
155	6	13	68%
160	8	21	72%
165	4	15	79%
170	4	23	85%
175	1	16	94%
180	0	12	100%
185	1	10	91%
190	1	12	92%
195	1	4	80%
200	0	7	100%
205	0	4	100%
210	0	1	100%
215	0	1	100%
220	0	0	-
225	0	0	-
230	0	2	100%
235	0	0	-
240	0	0	-
245	0	0	-
250	0	0	-
255	0	0	-
260	0	0	-
265	0	0	-
270	0	0	-
275	0	0	-
280	0	0	-
285	0	0	-
290	0	0	-
295	0	0	-
300	0	0	-
305	0	0	-
310	0	0	-
315	0	0	-
320	0	0	-
325	0	0	-
330	0	0	-
335	0	0	-
340	0	0	-
345	0	0	-
350	0	0	-
<b>Total</b>	<b>187</b>	<b>189</b>	<b>50%</b>

**Table.4.1** : Sex-ratio data per size

**Fig.4.1** : Sex-ratio per size of the swordfish in the port of Tanger (GILL NET1999)



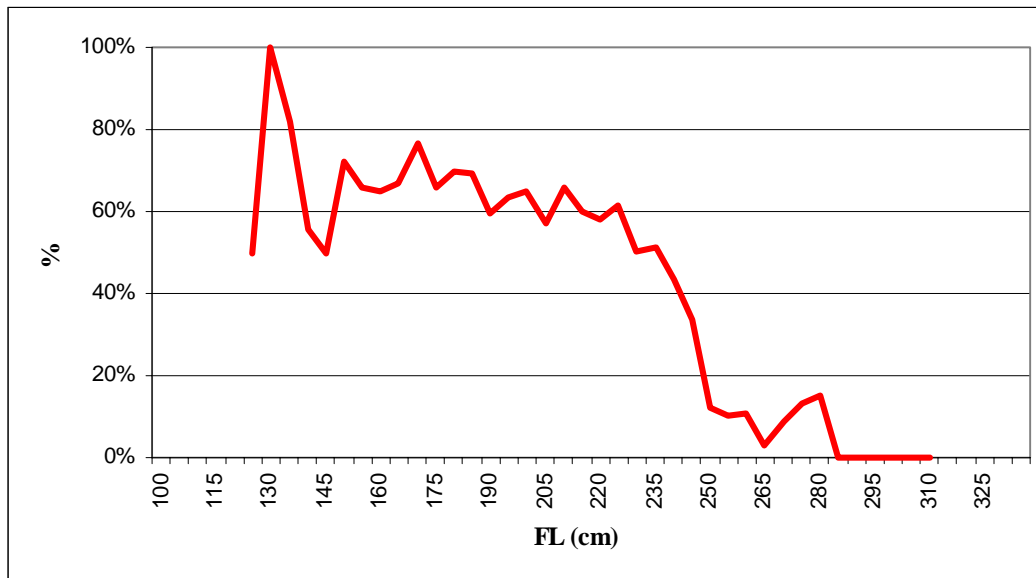
<b>SPAIN (IEO)</b>
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**Objective 4.2c**

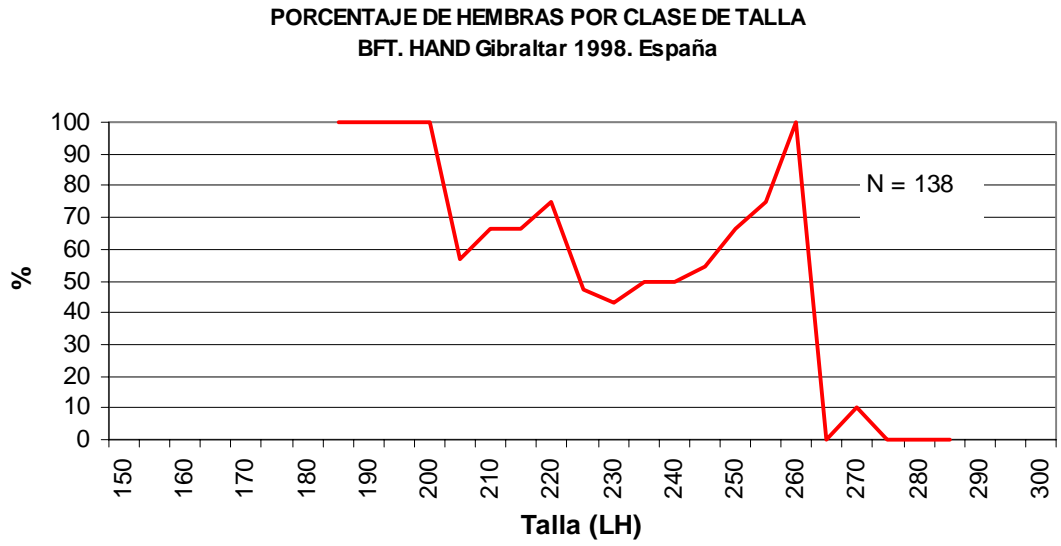
The size sampling with sex identification of the samples are conditioned to the type of capture process and the off-loading strategy, which may or may not make the carrying out of the sampling possible. In any event, a biological sampling program of sex by size was established at the ports of Barbate, Tarifa, Algeciras and Cartagena (transformation factory) and whereby the sex-ratio by size class was obtained for the catches of red tuna caught by tuna traps, hand line, long line and purse seine fishing. Thereby, a total of 5000 bluefin tuna were sexed. **Figures** from **4.2** to **4.4** present the percentages of females by size class of red tuna caught by tuna traps, hand line and surface longline.

The size sampling and sex identification of sword fish have been systematically acquired for the past several years for the catches of this species caught by superficial long line fishing in the Mediterranean.

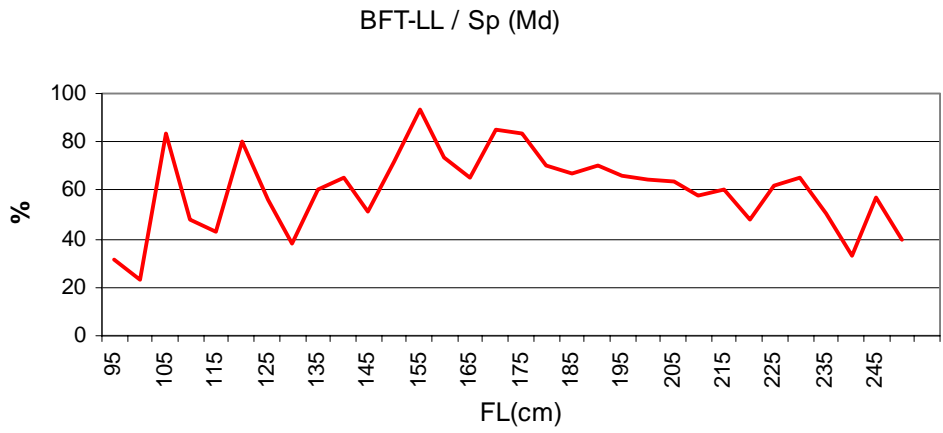
**Figure 4.5** displays the proportion of females by length- class for swordfish caught by surface longline fishing in the Mediterranean Sea.



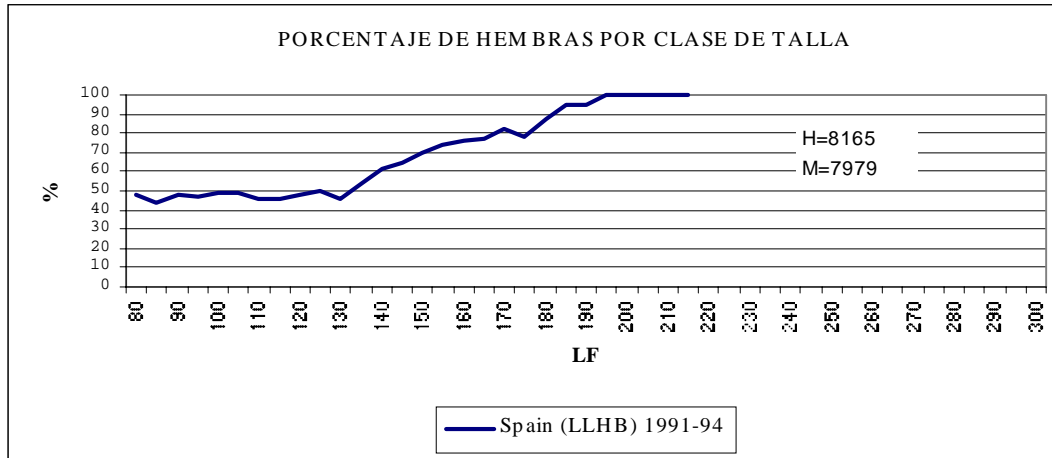
**Figure 4.2:** Sex-ratio of red tuna caught by tuna traps in the Spanish Atlantic



**Figure 4.3:** Sex-ratio of red tuna caught by hand line. (FAO-COPEMED/Gibraltar'98)



**Figure 4.4:** Sex-ratio of red tuna caught by surface longline.



**Figure 4.5:** Sex-ratio of swordfish caught by hand line. (FAO-COPEMED/Gibraltar'98)

## TUNISIA (INSTM)

### Objective 4.3c

This task aims at gaining an idea about the sexual distribution of the bluefin tuna and the swordfish per size, fishing gear and space-time sector.

This objective was not accomplished in the fishing season of 1999 due to the following reasons :

- a- In general terms, the funds allocated for the project have not been available on time and as a result no official procedures have been implemented in order to hire observers.
- b- The non-official commitments were not honoured by the observers as a result of the previously stated reason, although they had received proper training.
- c- The difficulty of fulfilling this operation on the Sidi Daoud trap-net. First of all, it must be remarked that only one matanza took place at the end of May 1999 and that this fish were destined to exportation. Therefore, those responsible for the trap-net watched very carefully for the freshness state of the animals. As a result, many workers were mobilized for the eviscerating operations and started working long before the measuring operations were completed. Consequently it was difficult to carry out the size-sex correspondance taking into account the specimens available.

We were able to note the size and sex of some specimens. The distribution of sex in the total catch was calculated by counting the female gonads.

In order to solve this problem and obtain data regarding the sex-ratio, we need:

- 1- The services of an observer for each species and in each selected port.
- 2- When it comes to the trap-net, we had thought of hiring another person to be in charge of this operation by numbering the fish and the gonads jointly.

<b>MALTA (NAC)</b>
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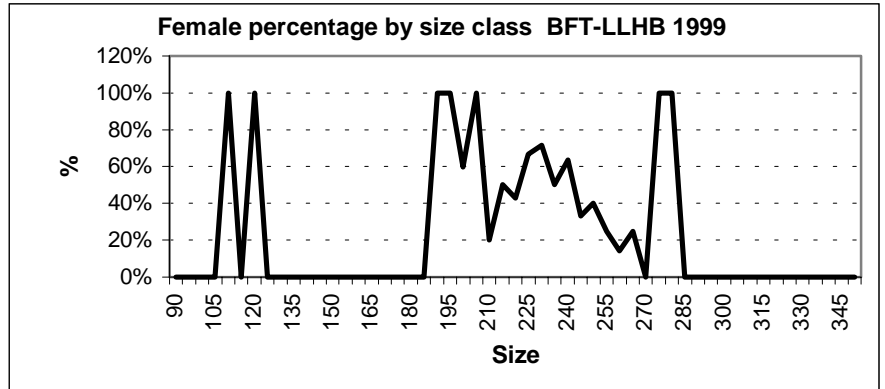
**Objectif 4.4c**

**Identification of Sex**

Sex determination of tuna can only be done by examining internal organs. Thus, information on sex could only be obtained from carcasses which had not been eviscerated. The observers on board were asked to identify the sex of the individual tuna and record the information on the forms indicated above since the tuna are gutted out at sea.

**Table 4.2** gives the number of male and female bluefin tuna observed by the observers on board the fishing vessels. **Fig. 4.6** gives the female percentage by size class of BFT caught by LLHB during the year 1999.

Size	M	F	%
90	0	0	-
95	0	0	-
100	0	0	-
105	0	0	-
110	0	1	100%
115	1	0	0%
120	0	1	100%
125	0	0	-
130	0	0	-
135	0	0	-
140	1	0	0%
145	0	0	-
150	2	0	0%
155	2	0	0%
160	0	0	-
165	0	0	-
170	1	0	0%
175	0	0	-
180	0	0	-
185	1	0	0%
190	0	1	100%
195	0	2	100%
200	2	3	60%
205	0	2	100%
210	4	1	20%
215	3	3	50%
220	4	3	43%
225	3	6	67%
230	2	5	71%
235	3	3	50%
240	4	7	64%
245	4	2	33%
250	3	2	40%
255	6	2	25%
260	6	1	14%
265	3	1	25%
270	3	0	0%
275	0	2	100%
280	0	2	100%
285	0	0	-
290	1	0	0%
295	0	0	-
300	0	0	-
305	0	0	-
310	0	0	-
315	0	0	-
320	0	0	-
325	0	0	-
330	0	0	-
335	0	0	-
340	0	0	-
345	0	0	-
350	0	0	-
<b>Total</b>	<b>59</b>	<b>50</b>	<b>46%</b>



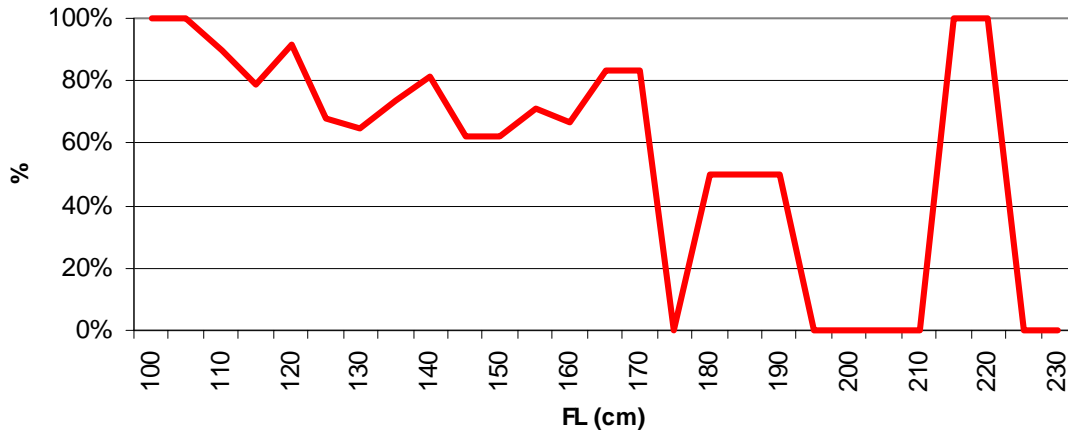
**Table 4.2** No. of Male and Female BFT observed for Each Size Range

**Fig. 4.6** Female Percentage by Size Class

**LIBYA (MBRS)**

**Objective 4.5c**

The LF cm size sampling with sex identification of red tuna samples caught by tuna traps were systematically and randomly carried out. In total, 197 red tuna samples were sexed in the year 1999. **Figure 4.7** shows the obtained percentages of females per size class.



**Figure 4.7** Sex-ratio of red tuna for the month of June 1999. Tuna traps, Libya.