

OBJETIVE 4: BIOLOGICAL PARAMETERS

4.A.- SIZE DISTRIBUTION

Methodology: Elaboration of the Standardized Biological Sampling Program according to the methodology of ICCAT. Establishment of an Information and Sampling Network at ports, tuna traps and onboard. Sampling of catch size according to trip, haul or lifting. Random sampling. Acquirement of the standard length of the samples, deliberation of the total catch by spatial-temporal stratus.

Results:

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| MOROCCO (INRH) |
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Objective 4.1a

Drift gillnet

The survey on size frequencies (LJ-FL) of the swordfish captured by the drift gillnet, has been conducted by the observers based in the ports of Tanger and Nador during the period April-October 1999. On the whole, the size of 7100 specimens has been obtained, 5293 of which correspond to the port of Tanger (**table 4.1**). The monthly and global size frequencies distribution of the swordfish by port is shown in **figures (4.1 and 4.2)**. In the port of Tanger, the range of sizes of landed swordfish varies from 80 to 230 cm with an average fork length of 140 cm. This size corresponds to an average live weight of some 45 Kg. The fork length of the swordfish landed in the port of Nador ranges from 70 to 210 cm with an average length of 110 cm. This length corresponds to a live weight of about 15 kg.

Fishing rod

A total of 305 individual weights of bluefin tuna captured with fishing rod were obtained according to the fishmongers based in the Port of Tanger. These individual weights were then transformed into the corresponding fork length by means of the size-weight relation established in 1998 (**table 4.2**). The distribution of size frequencies in bluefin tuna is illustrated in (**Fig. 4.3**). The fork length of the landed specimens ranges from 140 to 285 cm, with an average length of some 220 cm, and the average weight was of about 170 Kg. The modal class is represented by the specimens whose fork length ranges from 215 to 220 cm.

| Taille/mois | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
|-------------|------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|-------|---------|
| 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 75 | 0 | 0 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 80 | 0 | 0 | 0 | 5 | 16 | 4 | 0 | 0 | 4 | 2 | 0 | 0 | 31 |
| 85 | 0 | 0 | 0 | 28 | 25 | 5 | 1 | 2 | 14 | 3 | 0 | 0 | 78 |
| 90 | 0 | 0 | 0 | 105 | 115 | 29 | 7 | 4 | 36 | 6 | 0 | 0 | 302 |
| 95 | 0 | 0 | 0 | 194 | 190 | 72 | 25 | 8 | 60 | 22 | 0 | 0 | 571 |
| 100 | 0 | 0 | 0 | 195 | 131 | 67 | 32 | 13 | 45 | 13 | 0 | 0 | 496 |
| 105 | 0 | 0 | 0 | 135 | 144 | 89 | 26 | 24 | 94 | 32 | 0 | 0 | 544 |
| 110 | 0 | 0 | 0 | 114 | 161 | 84 | 34 | 29 | 90 | 29 | 0 | 0 | 541 |
| 115 | 0 | 0 | 0 | 80 | 141 | 69 | 22 | 24 | 79 | 27 | 0 | 0 | 442 |
| 120 | 0 | 0 | 0 | 57 | 124 | 76 | 20 | 34 | 65 | 29 | 0 | 0 | 405 |
| 125 | 0 | 0 | 0 | 49 | 110 | 47 | 18 | 34 | 59 | 15 | 0 | 0 | 332 |
| 130 | 0 | 0 | 0 | 31 | 94 | 46 | 9 | 29 | 53 | 14 | 0 | 0 | 276 |
| 135 | 0 | 0 | 0 | 44 | 96 | 66 | 16 | 46 | 55 | 21 | 0 | 0 | 344 |
| 140 | 0 | 0 | 0 | 29 | 76 | 49 | 10 | 54 | 56 | 16 | 0 | 0 | 290 |
| 145 | 0 | 0 | 0 | 19 | 66 | 56 | 17 | 64 | 61 | 14 | 0 | 0 | 297 |
| 150 | 0 | 0 | 0 | 23 | 79 | 87 | 18 | 75 | 51 | 16 | 0 | 0 | 349 |
| 155 | 0 | 0 | 0 | 19 | 81 | 86 | 24 | 79 | 59 | 17 | 0 | 0 | 365 |
| 160 | 0 | 0 | 0 | 20 | 61 | 73 | 27 | 58 | 41 | 17 | 0 | 0 | 297 |
| 165 | 0 | 0 | 0 | 15 | 72 | 59 | 23 | 67 | 49 | 12 | 0 | 0 | 297 |
| 170 | 0 | 0 | 0 | 12 | 58 | 61 | 15 | 53 | 32 | 14 | 0 | 0 | 245 |
| 175 | 0 | 0 | 0 | 14 | 47 | 37 | 15 | 36 | 19 | 6 | 0 | 0 | 174 |
| 180 | 0 | 0 | 0 | 10 | 33 | 28 | 9 | 29 | 14 | 3 | 0 | 0 | 126 |
| 185 | 0 | 0 | 0 | 5 | 32 | 17 | 8 | 14 | 15 | 6 | 0 | 0 | 97 |
| 190 | 0 | 0 | 0 | 8 | 16 | 19 | 2 | 12 | 15 | 7 | 0 | 0 | 79 |
| 195 | 0 | 0 | 0 | 5 | 8 | 11 | 0 | 2 | 4 | 0 | 0 | 0 | 30 |
| 200 | 0 | 0 | 0 | 2 | 7 | 7 | 1 | 10 | 3 | 2 | 0 | 0 | 32 |
| 205 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 0 | 2 | 1 | 0 | 0 | 14 |
| 210 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 1 | 4 | 3 | 0 | 0 | 14 |
| 215 | 0 | 0 | 0 | 2 | 3 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 10 |
| 220 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| 225 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 230 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 235 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 240 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 245 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 250 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 255 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 260 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 265 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 270 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 275 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 285 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 290 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 310 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 315 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 320 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 325 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 330 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 335 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 345 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | | | | 1221 | 2010 | 1256 | 381 | 801 | 1083 | 348 | - | - | 7100 |
| P.CATCHES | 1940 | 24741 | 87664 | 198289 | 695000 | 490096 | 109506 | 391741 | 218660 | 73844 | 21429 | 10810 | 2323721 |
| N.CATCHES | - | - | - | 7872 | 17769 | 9779 | 2255 | 6289 | 5304 | 1616 | | | |
| N.SAMPLE | - | - | - | 1221 | 2010 | 1256 | 381 | 801 | 1083 | 348 | - | - | 7100 |
| Poids echan | - | - | - | 30755 | 78617 | 62947 | 18501 | 49893 | 44648 | 15900 | - | - | |
| poids moyen | - | - | - | 25,19 | 39,11 | 50,12 | 48,56 | 62,29 | 41,23 | 45,69 | - | - | |

Table 4.1 : Monthly distribution of size frequencies (number of sampled fish) SWO. GILL NET. 1999 Port : Tanger and Nador

| Taille(cm)/m | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
|------------------|---|------|------|------|------|--------|--------|-------|-------|-----|-------|----|--------|
| 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 105 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 110 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 115 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 130 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 150 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 160 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 |
| 165 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 0 | 6 |
| 170 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 6 |
| 175 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 8 |
| 180 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 1 | 0 | 0 | 0 | 12 |
| 185 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 0 | 0 | 0 | 0 | 11 |
| 190 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 8 | 0 | 0 | 0 | 0 | 10 |
| 195 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 6 | 1 | 0 | 0 | 0 | 12 |
| 200 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 4 | 0 | 0 | 0 | 0 | 15 |
| 205 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 9 | 2 | 0 | 0 | 0 | 32 |
| 210 | 0 | 0 | 0 | 0 | 0 | 1 | 15 | 7 | 2 | 0 | 0 | 0 | 25 |
| 215 | 0 | 0 | 0 | 0 | 0 | 1 | 21 | 4 | 1 | 0 | 0 | 0 | 27 |
| 220 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 9 | 0 | 0 | 0 | 0 | 25 |
| 225 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 3 | 0 | 0 | 0 | 0 | 19 |
| 230 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 1 | 0 | 0 | 0 | 0 | 16 |
| 235 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 5 |
| 240 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 5 | 1 | 0 | 0 | 0 | 14 |
| 245 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | 1 | 0 | 0 | 0 | 9 |
| 250 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 8 |
| 255 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 5 |
| 260 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 7 |
| 265 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 7 |
| 270 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 2 | 1 | 0 | 0 | 0 | 10 |
| 275 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 6 |
| 280 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 4 |
| 285 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 290 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 295 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 305 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 310 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 315 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 320 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 325 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 330 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 335 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 345 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 350 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 0 | 0 | 0 | 0 | 6 | 195 | 91 | 13 | 0 | 0 | 0 | 305 |
| P.CATCHES | 0 | 3299 | 1873 | 7778 | 1815 | 175507 | 288804 | 90310 | 16406 | 670 | 13538 | 0 | 600000 |
| N.CATCHES | - | - | - | - | - | 1237 | 1583 | 601 | 85 | - | - | - | |
| N.SAMPLE | 0 | 0 | 0 | 0 | 0 | 6 | 195 | 91 | 13 | - | - | - | |
| poids echant(kg) | | | | | | 851 | 35572 | 13673 | 2516 | | | | |

Table 4.2 Monthly distribution of size frequencies (number of sampled fish) BFT. HAND.
1999 Port : Ksar Sghir

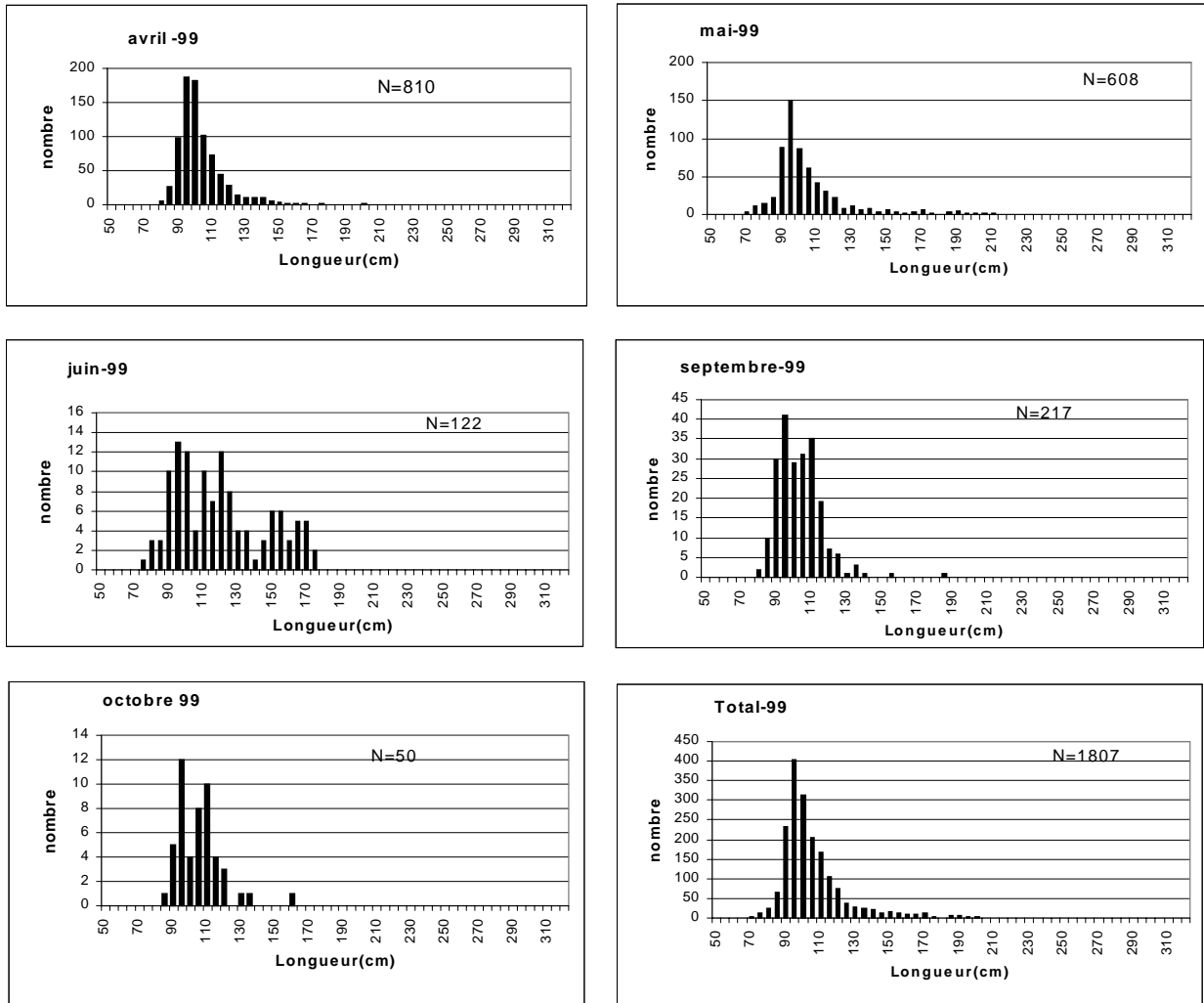


Figure 4.1 Distribution of size frequencies of swordfish in the port of Nador

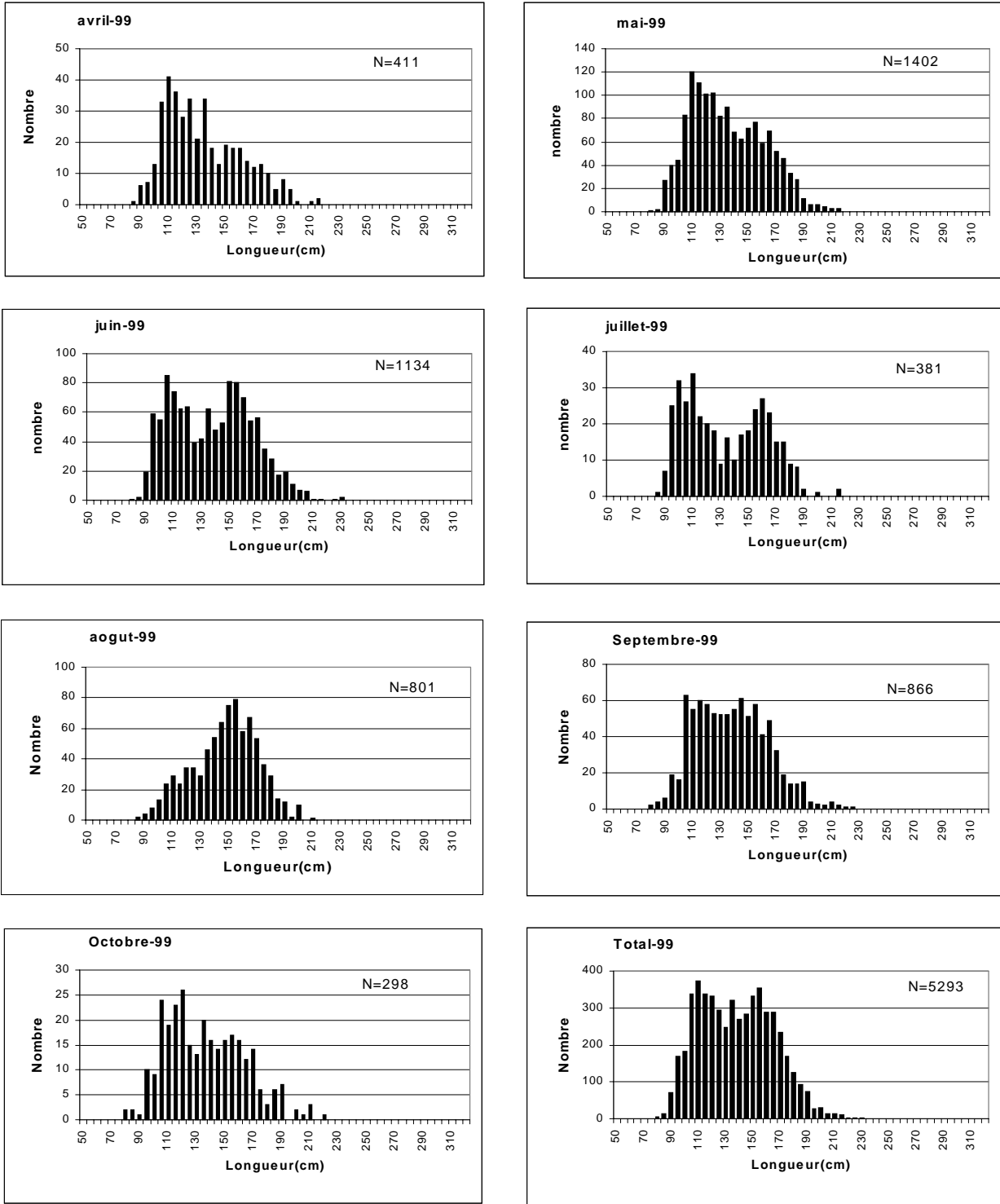


Figure 4.2: Distribution of size frequencies of swordfish in the port of Tanger

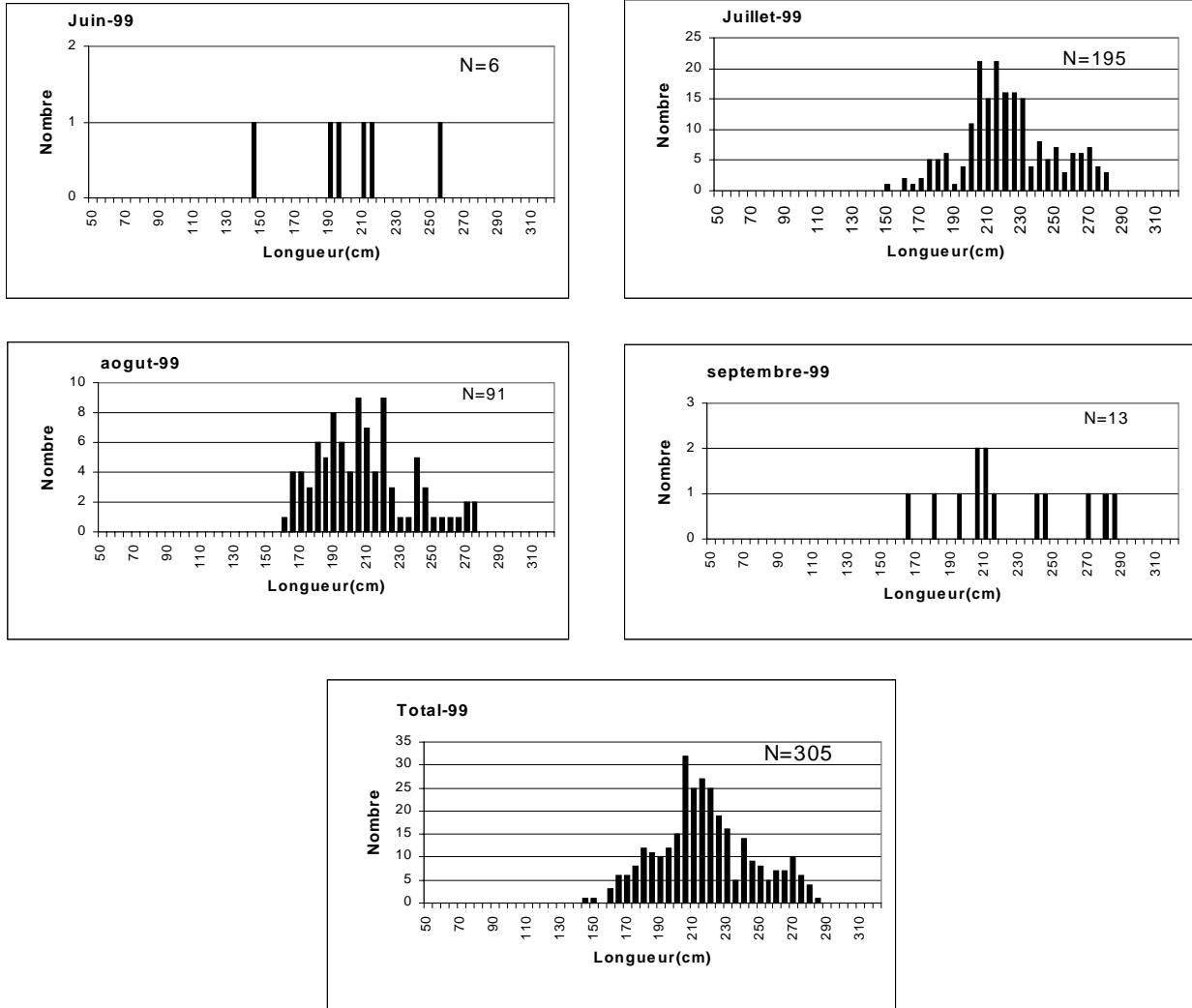


Figure 4.3: Distribution of size frequencies of bluefin tuna in the port of Ksar Sghir

| |
|--------------------|
| SPAIN (IEO) |
|--------------------|

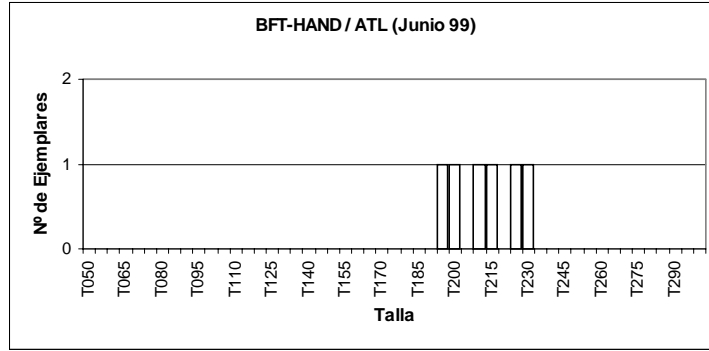
Objective 4.2a

With the objective of obtaining the size distribution of the catches by species, method, spatial-temporal stratus, an information and sampling network was established at ports and onboard. The sampling network covered the ports of Algeciras, Motril, Aguilas, Cartagena and Alicante. In Cartagena, in addition, sampling was carried out at a transformation and exportation factory of red tuna. The observations and sampling onboard were performed during the period from May to October.

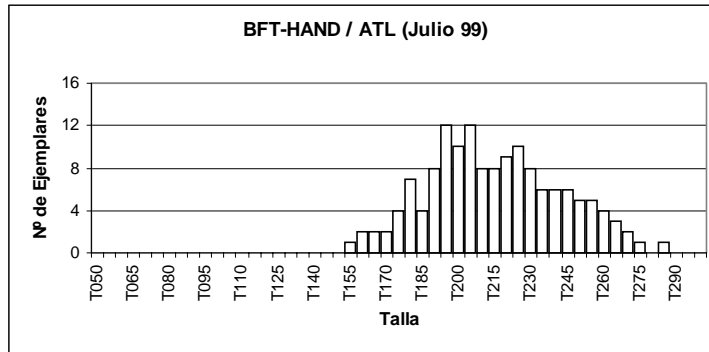
In total, the size of 8212 samples was obtained for the bluefin tuna captured by means of tuna traps, hand line, long line, purse seine and live bait in the Mediterranean and Gibraltar Strait as well as of 10154 individuals of swordfish caught by longline in the Mediterranean.

The series of **figures from 4.4 to 4.9** present the size distribution obtained according to species, method and spatial-temporal strata for the year 1999.

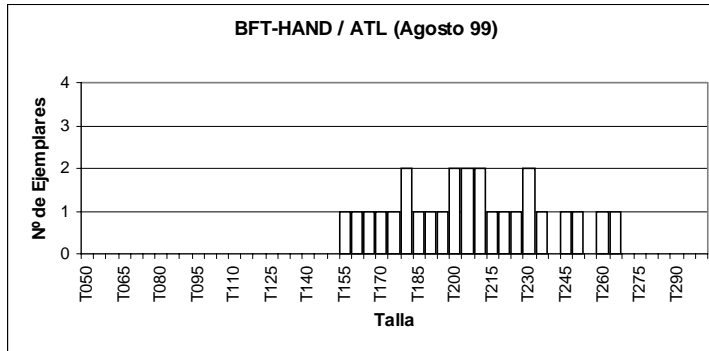
The series of **figures from 4.10** display length distributions for swordfish from surface longline during 1999.



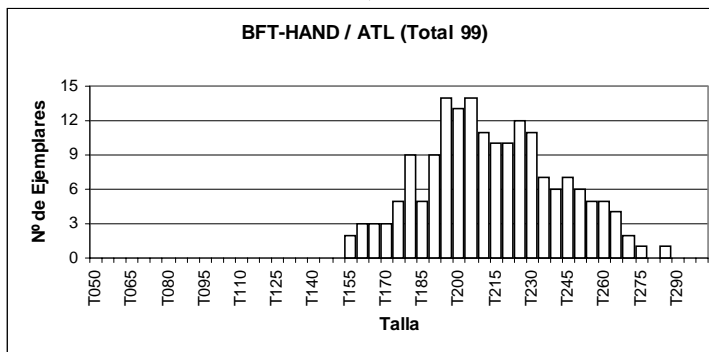
N = 6; n=6



N = 147; n=147



N = 26; n=26



N = 179; n=179

Figure 4.4 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Hand Line in the Gibraltar Strait for 1999.

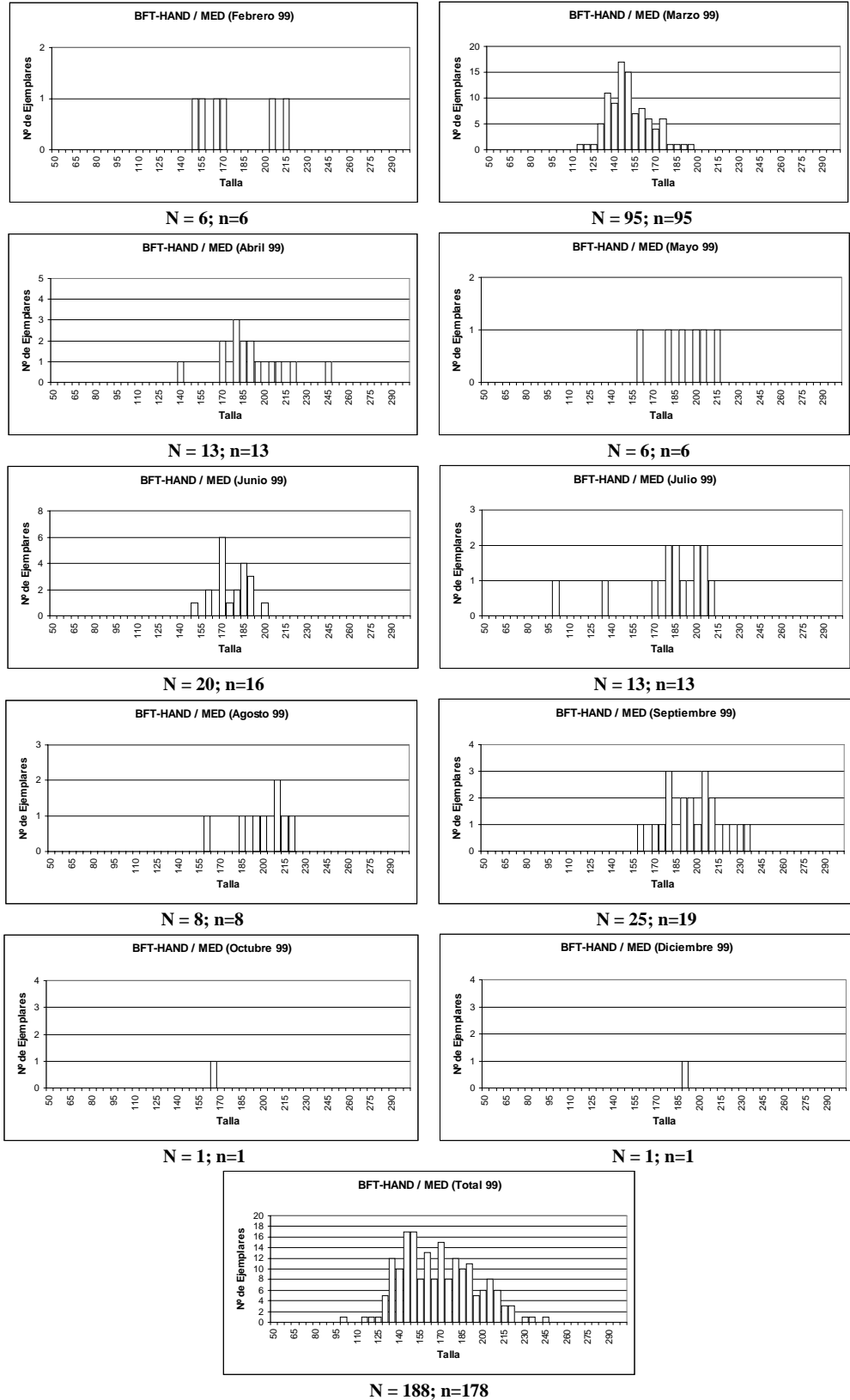
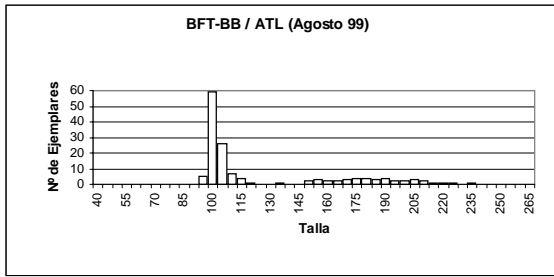
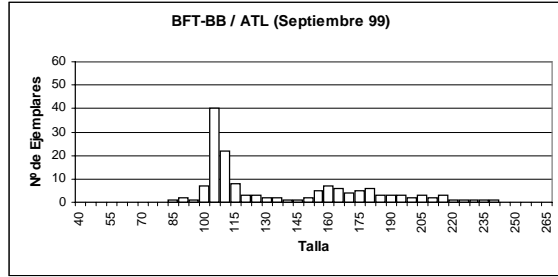


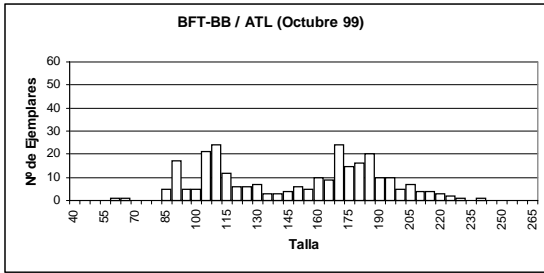
Figura 4.5 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Hand Line in the Mediterranean for 1999.



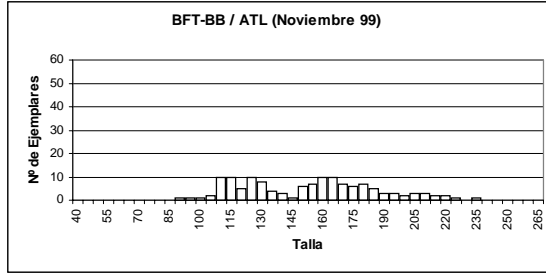
N =143 ; n=143



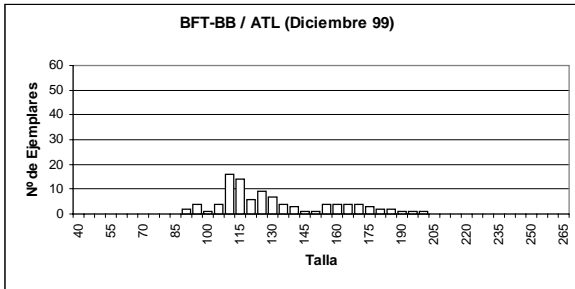
N =152 ; n=152



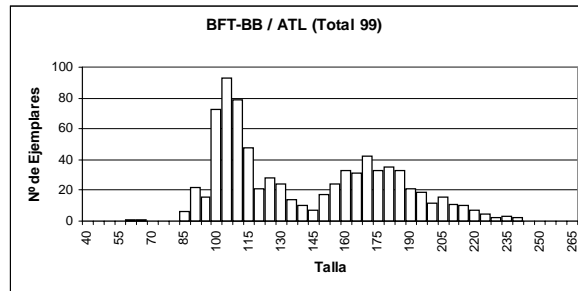
N = 272; n=272



N =134 ; n=134

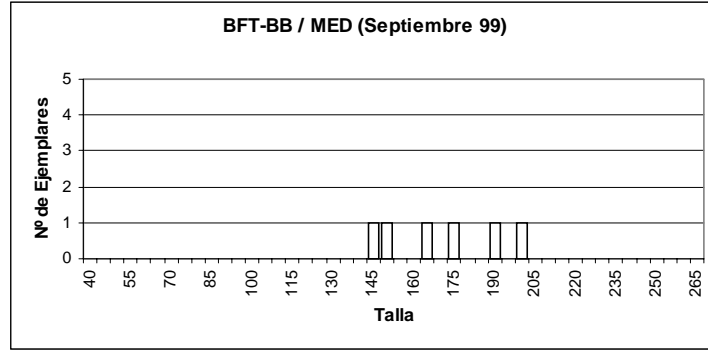


N =98; n=98

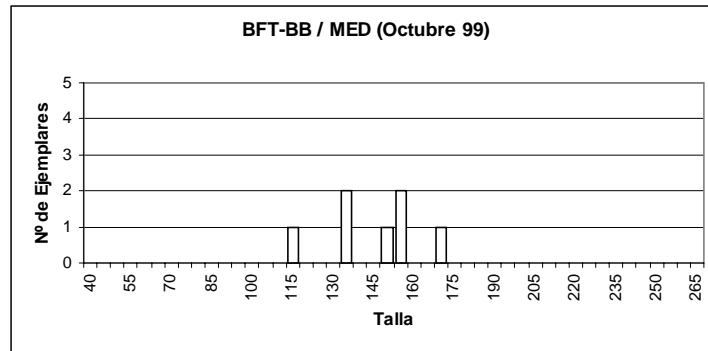


N = 799; n=799

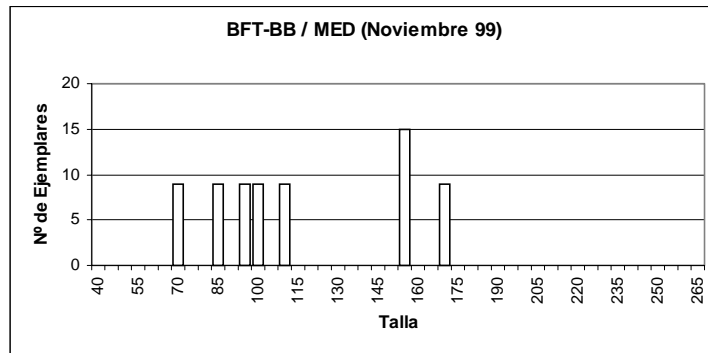
Figura 4.6 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Live Bait in the Gibraltar Strait for 1999.



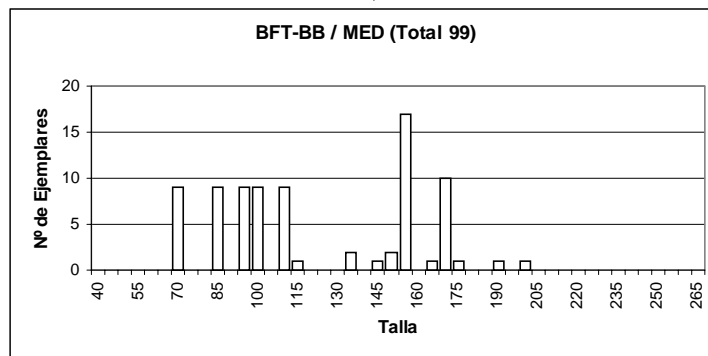
N =6 ; n=6



N =7 ; n=5

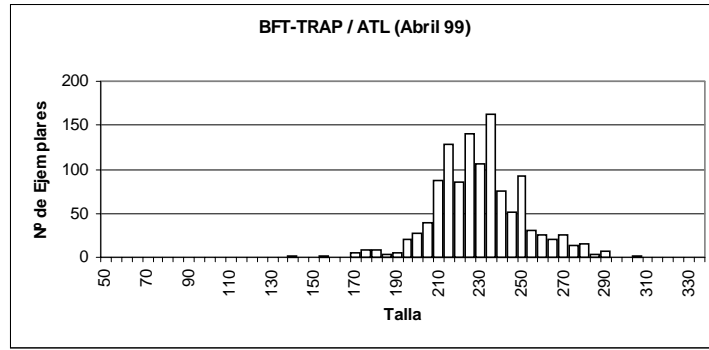


N =69 ; n=8

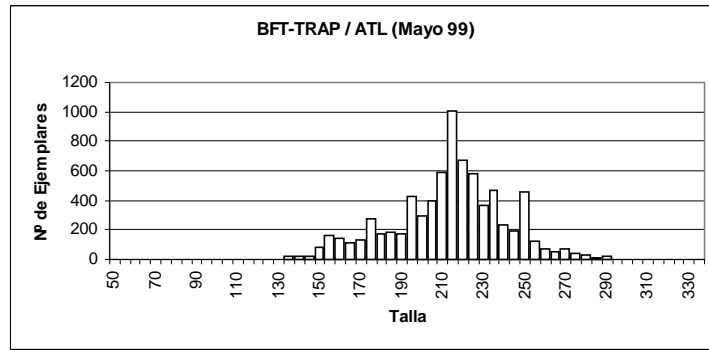


N =82 ; n=19

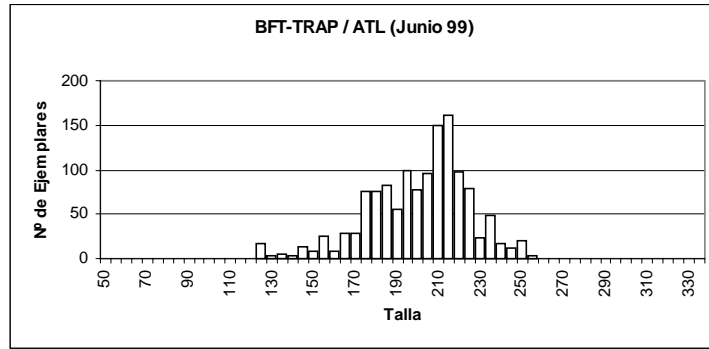
Figura 4.7 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Live Bait in the Mediterranean for 1999.



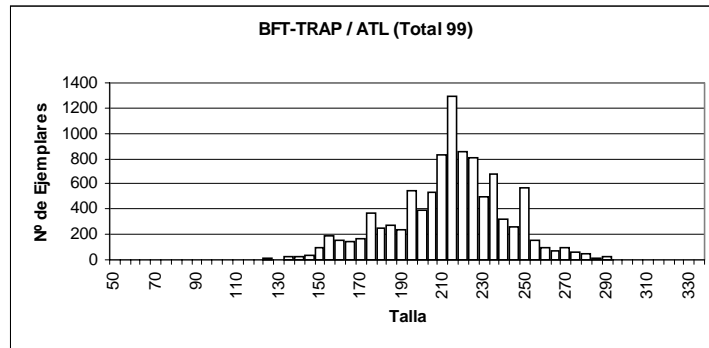
N = 1192; n=830



N = 7639; n=2533

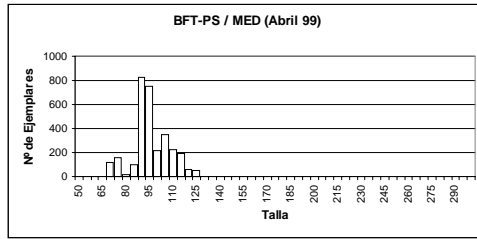


N = 1313; n=334

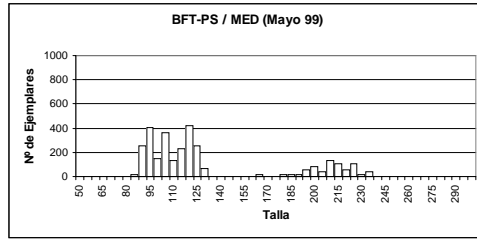


N = 10604; n=3697

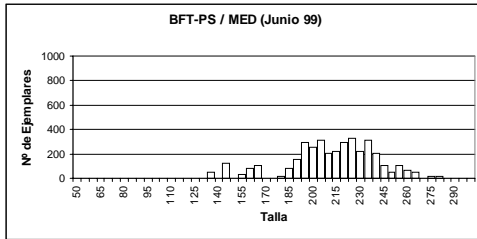
Figura 4.8 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Tuna Traps in the Atlantic for 1999.



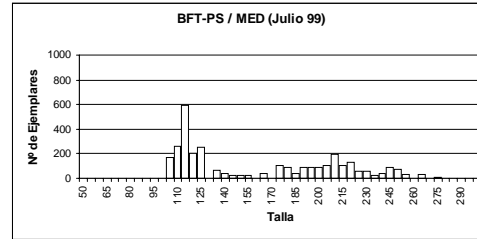
N =3050 ; n=696



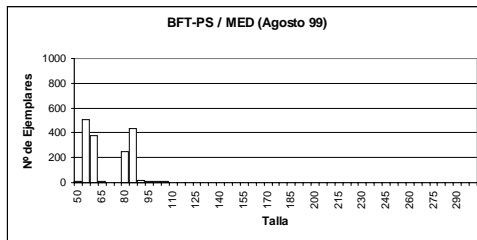
N =3009 ; n=442



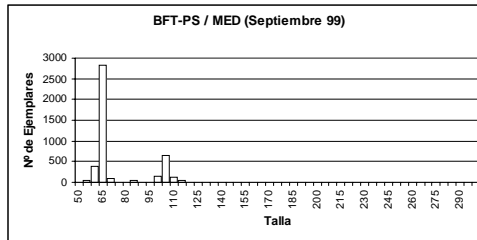
N =3712 ; n=432



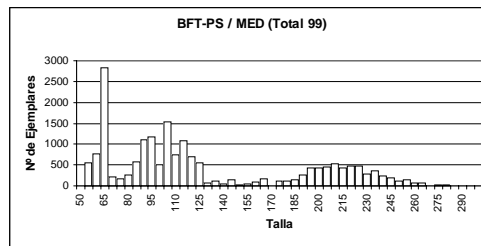
N =3153 ; n=291



N =1642 ; n=1029

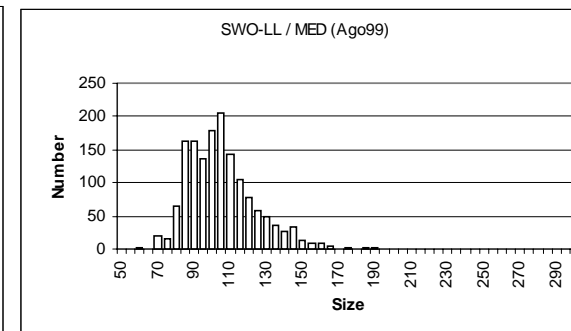
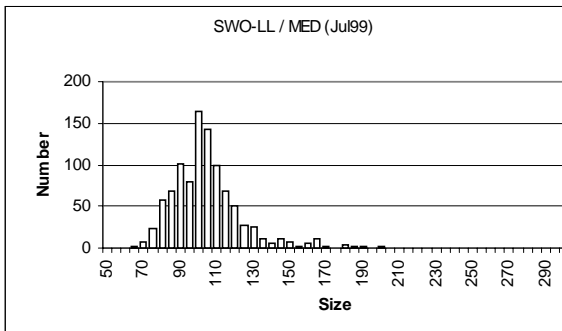
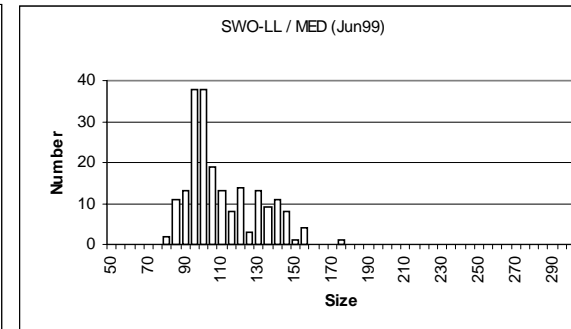
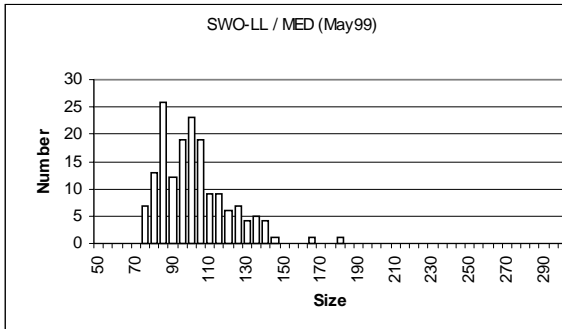
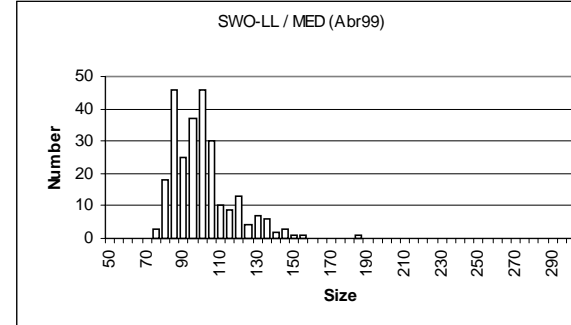
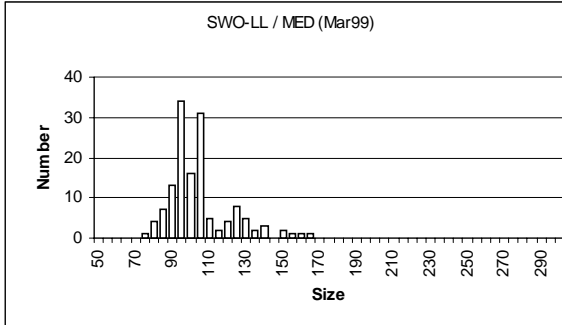
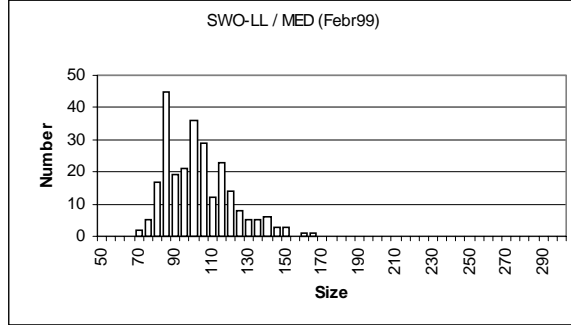
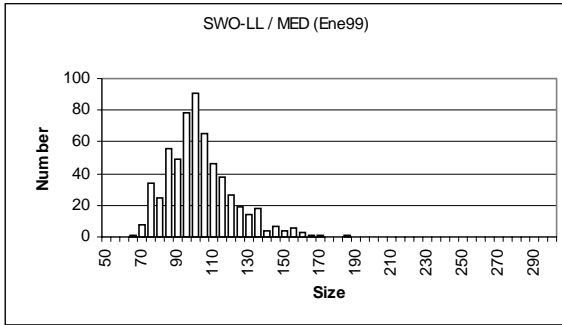


N = 4379; n=450



N =18945 ; n=3340

Figura 4.9 Distribution of sizes by month and total for Red Tuna (BFT) caught by the method of Purse Seine fishing in the Mediterranean for 1999.



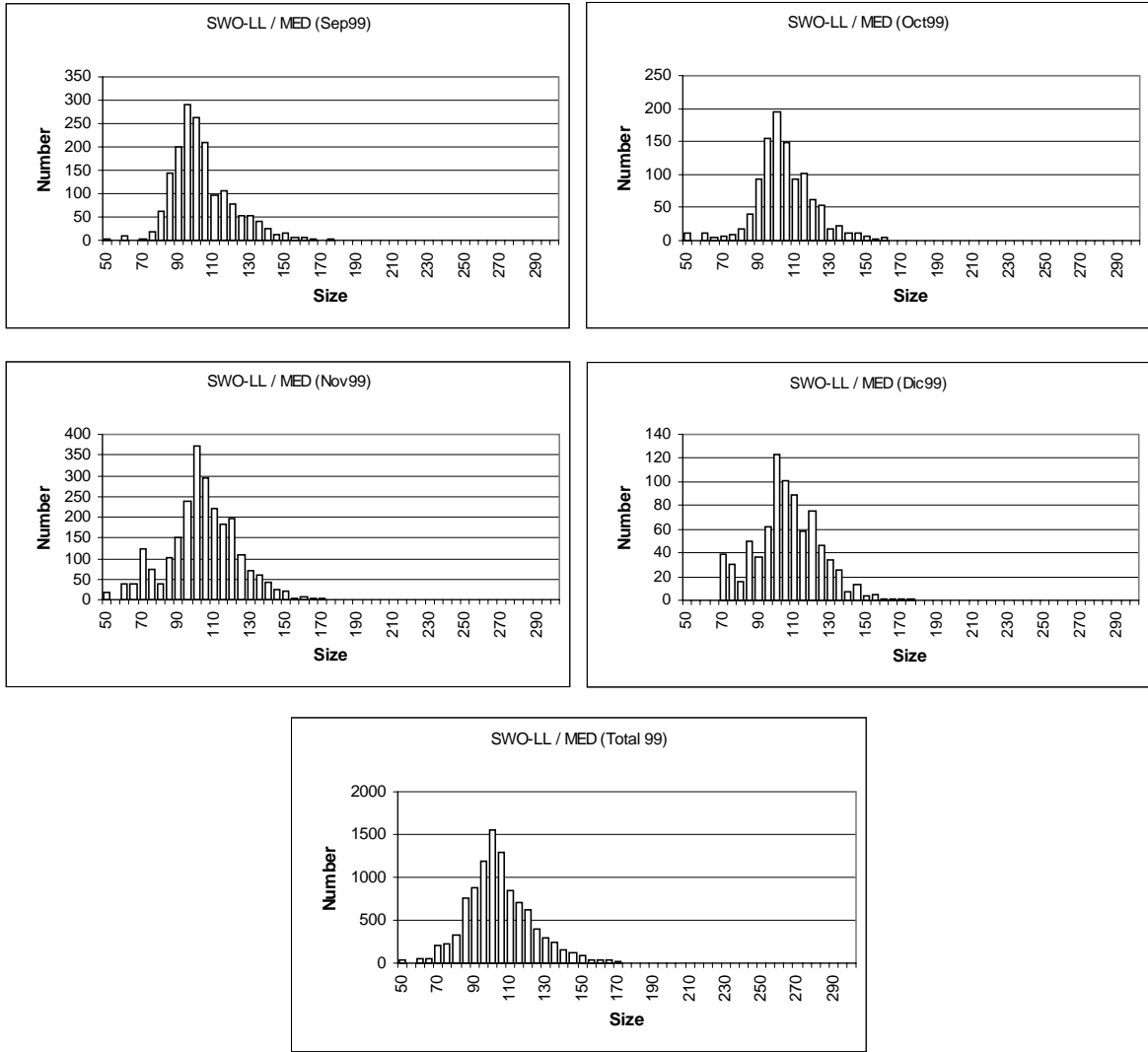


Figura 4.10 Distribution of sizes by month and total for (SWO) caught by the method of Surface longline fishing in the Mediterranean for 1999.

| |
|------------------------|
| TÚNISIA (INSTM) |
|------------------------|

Objective 4.3a

In spite of the delay in receiving the signature from the LOA, size distributions of the red tuna catches from the tuna trap at Sidi Daoud and the size distributions by month and the total red tuna catch from purse seine fishing and off-loaded at the port of Sfax were obtained. The problem of the delay in the start-up of the observation and sampling program at the tuna traps, ports and onboard impeded the acquirement of size distributions of sword fish caught by long line fishing and disembarked at the port of Tabarka.

Table 4.4 shows the distributions according to weight class (5kg) of red tuna catches per month caught by purse seine fishing and off-loaded at the port of Sfax. Figures **4.11** and **4.12** represent the size distributions obtained by tuna traps and purse seine fishing respectively and as previously mentioned.

Figure 4.13 displays swordfish length distribution for the surface longline fishery for previous years.

| poids | janvier | février | mars | avril | mai | Juin | juillet | août | sept | oct | nove | déce |
|--------------|------------|-----------|------------|-------------|------------|-------------|------------|----------|----------|----------|----------|----------|
| 10 | | | | | | 1287 | 313 | | | | | |
| 15 | | | | | | 13 | 22 | | | | | |
| 20 | 3 | | 1 | 12 | | | | | | | | |
| 25 | 60 | 13 | 21 | 178 | | | | | | | | |
| 30 | 102 | 27 | 99 | 423 | 8 | | | | | | | |
| 35 | 55 | 11 | 103 | 419 | 34 | | | | | | | |
| 40 | 64 | 15 | 113 | 385 | 81 | | | | | | | |
| 45 | 61 | 5 | 77 | 411 | 108 | | | | | | | |
| 50 | 45 | 6 | 37 | 373 | 145 | | | | | | | |
| 55 | 29 | 1 | 25 | 250 | 91 | | | | | | | |
| 60 | 17 | | 25 | 206 | 70 | | | | | | | |
| 65 | 11 | | 15 | 149 | 43 | | | | | | | |
| 70 | 2 | | 12 | 88 | 27 | | | | | | | |
| 75 | 1 | | 9 | 59 | 16 | | | | | | | |
| 80 | 2 | | 6 | 21 | 12 | | | | | | | |
| 85 | | | 3 | 13 | 5 | | | | | | | |
| 90 | | | 3 | 11 | 6 | | | | | | | |
| 95 | | | 2 | 9 | 6 | | | | | | | |
| 100 | | | 2 | 5 | 1 | | | | | | | |
| 105 | | | 0 | 4 | 1 | | | | | | | |
| 110 | | | 1 | 4 | 1 | | | | | | | |
| 115 | | | 1 | 3 | 1 | | | | | | | |
| 120 | | | 0 | 0 | 1 | | | | | | | |
| 125 | | | 1 | 2 | 1 | | | | | | | |
| 130 | | | 3 | 1 | 0 | | | | | | | |
| 135 | | | 0 | 2 | 1 | | | | | | | |
| 140 | | | 0 | 0 | 1 | | | | | | | |
| 145 | | | 0 | 0 | 0 | | | | | | | |
| 150 | | | 0 | 0 | 1 | | | | | | | |
| 155 | | | 0 | 0 | 0 | | | | | | | |
| 160 | | | 0 | 0 | 1 | | | | | | | |
| 165 | | | 0 | 0 | 0 | | | | | | | |
| 170 | | | 0 | 1 | 1 | | | | | | | |
| 175 | | | 1 | | | | | | | | | |
| Total | 452 | 78 | 560 | 3029 | 663 | 1300 | 335 | 0 | 0 | 0 | 0 | 0 |

Tabla 4.4- : Ventilation des prises de thon rouge à la senne tournante débarquées au port de Sfax au courant de l'année 1999

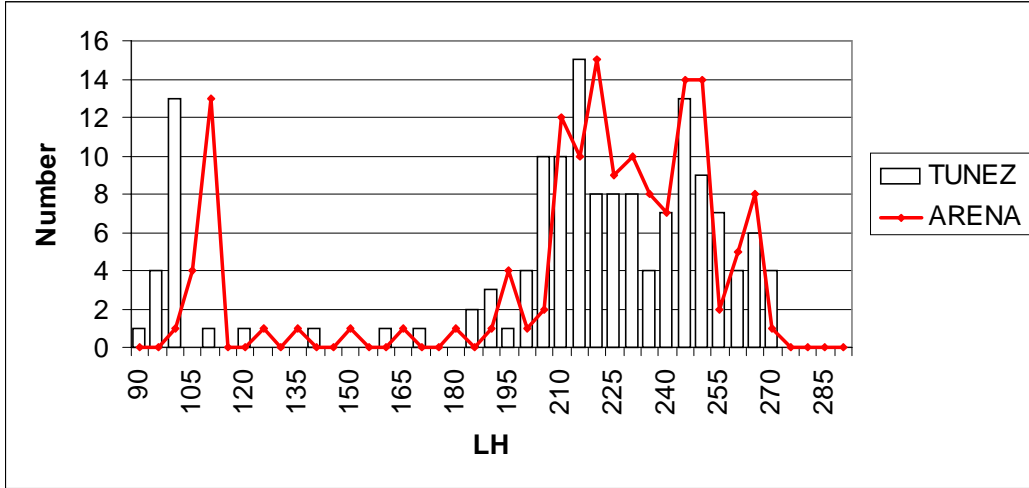


Figure 4.11: Size distribution of red tuna obtained by the size-weight relationship from Arena $10^{((\text{LOG}(F2)-\text{LOG}(0,000019607))/3,0092)}$ BFT-TRAP 1999 – Tunisia

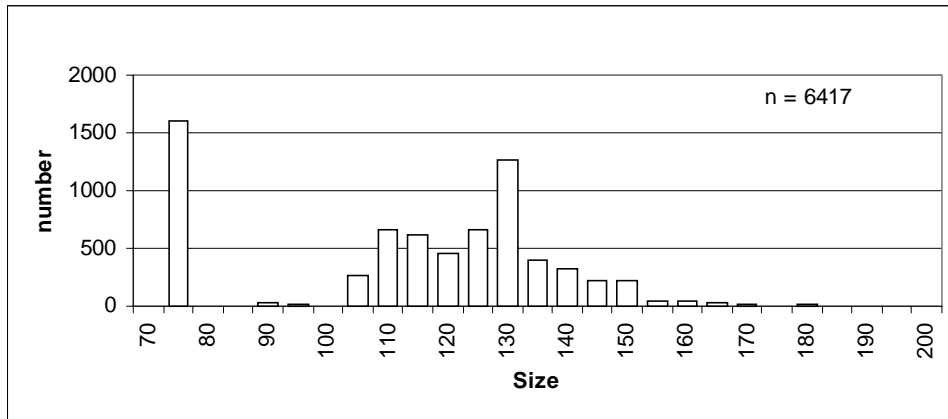


Figure 4.12: Size distribution of red tuna obtained by the size-weight relationship from Arena $10^{((\text{LOG}(F2)-\text{LOG}(0,000019607))/3,0092)}$ BFT-PS 1999 – Tunisia

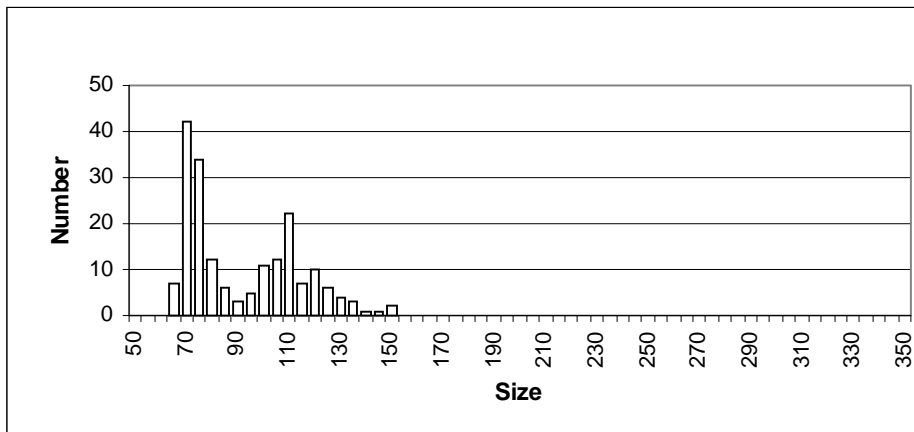


Figure 4.13: Size distribution of SWO-LL Tunisia.

| |
|--------------------|
| MALTA (NAC) |
|--------------------|

Objective 4.4a

The size samples of the red tuna were carried out onboard the long line fishing vessels. The size LF cm was obtained from the samples caught per haul. By the same means, from the off-loadings in Marsaxlok and FishMarket the relationship of individual weights for red tuna and sword fish per trip was obtained.

The lengths of tuna were grouped in 5 cm intervals and **Table 4.5** shows the number of bluefin tuna caught at each appropriate length range during the months of May and June. It also indicates the total of bluefin tuna in each class range. **Figure 4.14, 4.15 and 4.16** are graphical distributions of data collected in Table 4.5.

Figure 4.17 displays swordfish length distribution for the surface longline fishery during 1999 (May and June).

| Size | GEAR: LLHB | | BFT-99 |
|-------|------------|-----|--------|
| | 5 | 6 | Total |
| 50 | 0 | 0 | 0 |
| 55 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 |
| 65 | 0 | 0 | 0 |
| 70 | 0 | 0 | 0 |
| 75 | 0 | 0 | 0 |
| 80 | 0 | 0 | 0 |
| 85 | 0 | 1 | 1 |
| 90 | 1 | 2 | 3 |
| 95 | 2 | 4 | 6 |
| 100 | 0 | 6 | 6 |
| 105 | 4 | 11 | 15 |
| 110 | 8 | 4 | 12 |
| 115 | 10 | 7 | 17 |
| 120 | 11 | 6 | 17 |
| 125 | 10 | 6 | 16 |
| 130 | 9 | 7 | 16 |
| 135 | 9 | 12 | 21 |
| 140 | 9 | 5 | 14 |
| 145 | 11 | 9 | 20 |
| 150 | 13 | 9 | 22 |
| 155 | 8 | 5 | 13 |
| 160 | 7 | 10 | 17 |
| 165 | 14 | 8 | 22 |
| 170 | 13 | 7 | 20 |
| 175 | 9 | 9 | 18 |
| 180 | 18 | 19 | 37 |
| 185 | 29 | 23 | 52 |
| 190 | 53 | 32 | 85 |
| 195 | 82 | 41 | 123 |
| 200 | 70 | 20 | 90 |
| 205 | 80 | 25 | 105 |
| 210 | 64 | 22 | 86 |
| 215 | 72 | 17 | 89 |
| 220 | 48 | 12 | 60 |
| 225 | 40 | 1 | 41 |
| 230 | 31 | 2 | 33 |
| 235 | 15 | 2 | 17 |
| 240 | 12 | 1 | 13 |
| 245 | 10 | 1 | 11 |
| 250 | 6 | 0 | 6 |
| 255 | 8 | 1 | 9 |
| 260 | 1 | 0 | 1 |
| 265 | 2 | 0 | 2 |
| 270 | 0 | 0 | 0 |
| 275 | 0 | 0 | 0 |
| 280 | 0 | 0 | 0 |
| 285 | 0 | 0 | 0 |
| 290 | 0 | 0 | 0 |
| 295 | 0 | 0 | 0 |
| 300 | 0 | 0 | 0 |
| 305 | 0 | 0 | 0 |
| 310 | 0 | 0 | 0 |
| 315 | 0 | 0 | 0 |
| 320 | 0 | 0 | 0 |
| 325 | 0 | 0 | 0 |
| 330 | 0 | 0 | 0 |
| 335 | 0 | 0 | 0 |
| 340 | 0 | 0 | 0 |
| 345 | 0 | 0 | 0 |
| 350 | 0 | 0 | 0 |
| Total | 789 | 347 | 1136 |

Table 4.5 No. of Bluefin Tuna Caught at each Size range

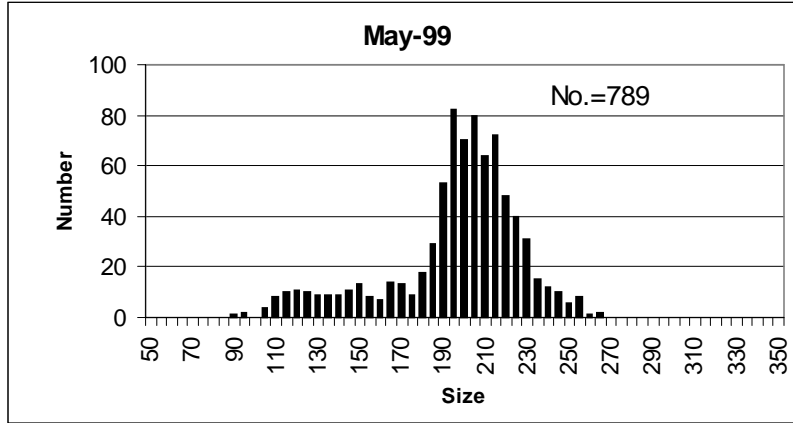


Fig. 4.14 Distribution of Length of BFT caught by LLHB in May 1999

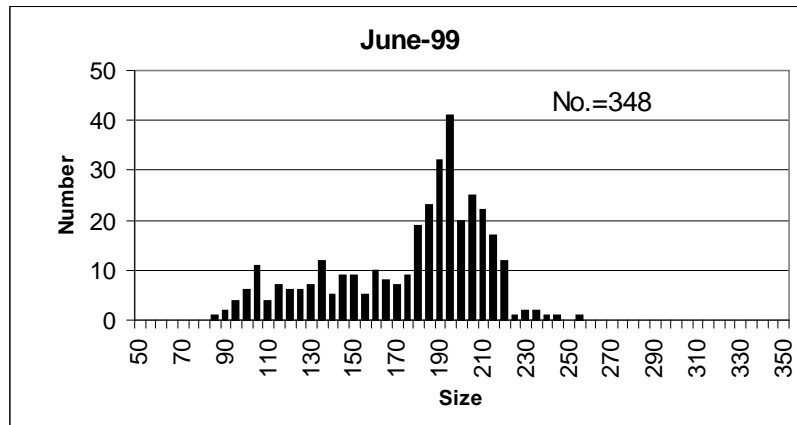


Fig. 4.15 Distribution of Length of BFT caught by LLHB in June 1999

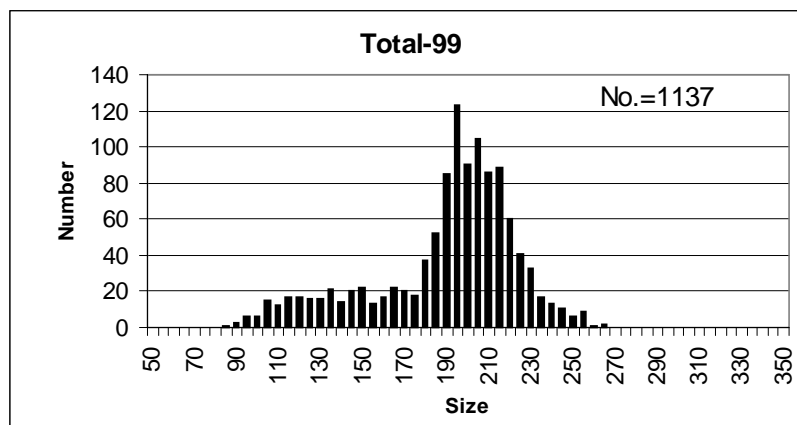


Fig. 4.16 Distribution of Length of all BFT caught by LLHB 1999

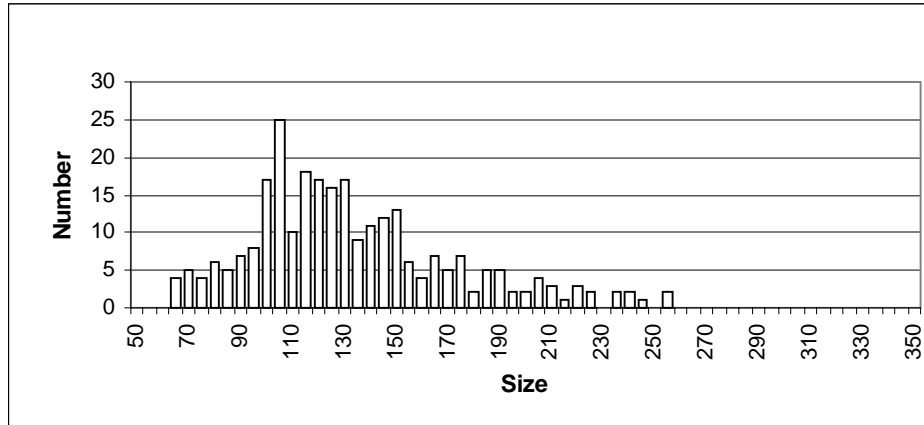


Figure 4.17 Distribution of Length of all SWO caught by LLHB 1999

LIBYA (MBRC)

Objective 4.5a

The size sampling (LF cm) of red tuna were carried out at the tuna traps of Zreg and Musrata by displacing a scientist and technician to these locations. **Figure 4.18** presents the size distribution of red tuna caught by means of tuna traps.

Onboard the long line fishing vessels, the weight relationship was obtained by range from the captured samples and were transformed to size by means of the corresponding size-weight relationship (Arena 1963). **Figure 4.19** presents the size distributions of red tuna caught by long line fishing. The dynamics onboard the purse seine fishing vessels did not permit the carrying out of size sampling.

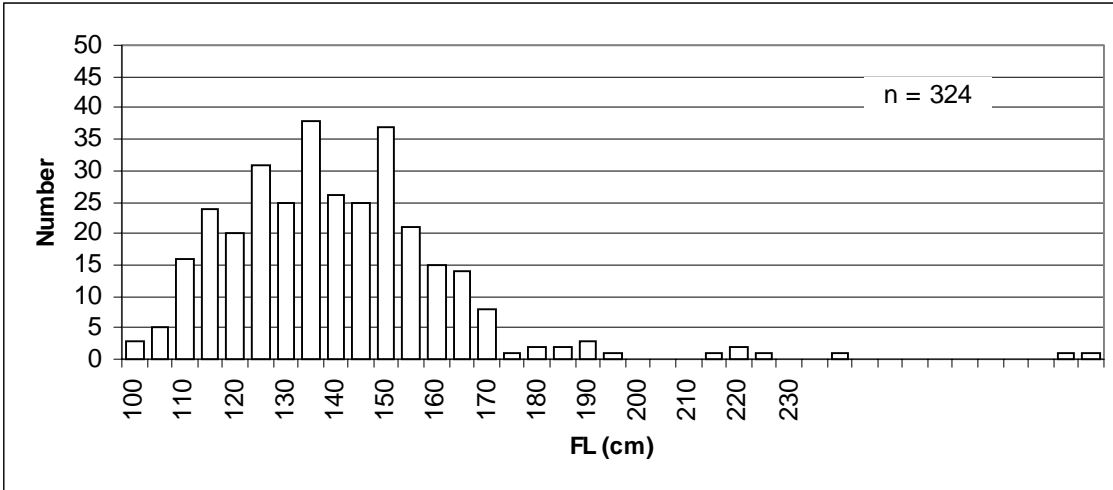


Figure 4.18: Size distribution of red tuna BFT-TRAP 1999 – Libya

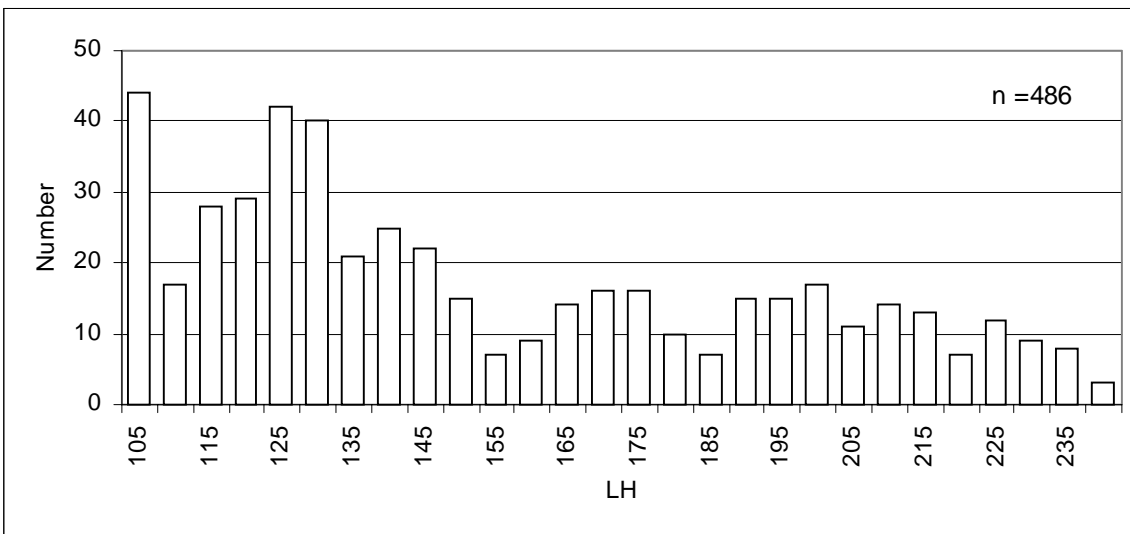


Figure 4.19: Size distribution of red tuna obtained by the size-weight relationship from $Arena 10^{((\text{LOG}(F2)-\text{LOG}(0,000019607))/3,0092)}$ BFT-LL 1999 – Libya