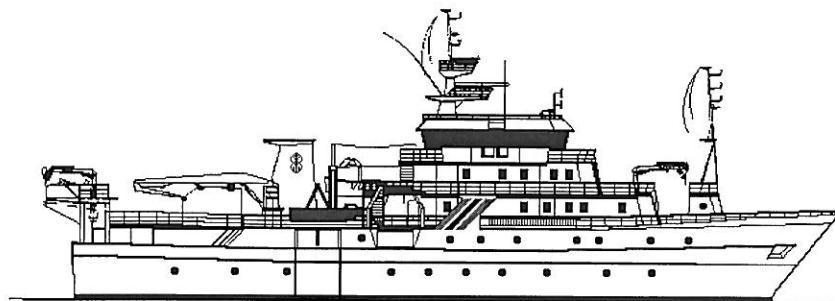


NORAD – FAO PROJECT GCP/INT/730/NOR

CRUISE REPORTS "DR. FRIDTJOF NANSEN"



**SURVEYS OF THE FISH RESOURCES OF  
THE WESTERN GULF OF GUINEA  
(Benin, Togo, Ghana & Côte d'Ivoire)**

**Survey of the pelagic and demersal resources**  
**29 August – 17 September 2000**

Centre de Recherches Océanologiques  
Abidjan  
Côte d'Ivoire

Direction des Pêches  
Cotonou  
Benin

Direction de l'Elevage et de la Pêche  
Lomé  
Togo

Marine Fisheries Research Division  
Tema  
Ghana

Centre Béninois de Recherche Scientifique et Technique  
Cotonou  
Benin

Institute of Marine Research (IMR)  
Bergen  
Norway

The DR FRIDTJOF NANSEN RESEARCH PROGRAMME is sponsored by the Norwegian Agency for Development Cooperation (NORAD). The Food and Agriculture Organization of the United Nations (FAO) provide support to the Programme through Project GCP/INT/730/NOR: International Cooperation with the Nansen Programme: Fisheries Management and Marine Environment. This project is the follow-up to the Project NORAD/FAO/UNDP GLO/92/013. The Institute of Marine Research (IMR), Bergen, Norway is responsible for the implementation of the Programme in cooperation with FAO Fisheries Department and the local fisheries administrations. The aim of the Nansen Programme is to assist developing countries in fisheries research, management and institutional strengthening.

The programme has previously conducted the following surveys in the Gulf of Guinea:

Area	Period
Cape Verga (Rep. of Guinea) to Cape St. Paul (Ghana)	02 – 25 June 1981
Togo to Cameroon	07 – 20 August 1981
Côte d'Ivoire and Ghana	12 – 20 October 1989
Benin, Togo, Ghana and Côte d'Ivoire	19 April – 06 May 1999

CRUISE REPORTS "DR. FRIDTJOF NANSEN"

**SURVEYS OF THE FISH RESOURCES OF  
THE WESTERN GULF OF GUINEA  
(Benin, Togo, Ghana & Côte d'Ivoire)**

**Survey of the pelagic and demersal resources**  
**29 August – 17 September 2000**  
Revised edition

by

**Else Torstensen and Oddgeir Alvheim**

Institute of Marine Research  
P.O. Box 1870 Nordnes  
N-5817 Bergen, Norway

**Kwame A. Koranteng**

Marine Fisheries Research Division  
P.O. Box BT-62  
Tema, Ghana

and

**Merete Tandstad**

FAO Fisheries Department (FIRM)  
Via delle Terme di Caracalla  
Rome, Italy

**Institute of Marine Research  
Bergen, 2002**

## TABLE OF CONTENTS

### CHAPTER 1 INTRODUCTION

1.1	Objectives .....	1
1.2	Participation.....	1
1.3	Narrative .....	2
1.4	Survey effort.....	3

### CHAPTER 2 METHODS

2.1	Meteorological and hydrographical sampling .....	5
2.2	Biological sampling.....	6
2.3	Biomass estimates.....	6

### CHAPTER 3 OCEANOGRAPHIC CONDITIONS..... 10

### CHAPTER 4 RESULTS OF THE ACOUSTIC SURVEY: FISH DISTRIBUTION AND ABUNDANCE ESTIMATE OF PELAGIC SPECIES

4.1	Benin.....	16
4.2	Togo.....	20
4.3	Ghana.....	21
4.4	Côte d'Ivoire.....	22
4.5	Review of results .....	23

### CHAPTER 5 RESULTS FROM THE TRAWL SURVEY: CATCH DISTRIBUTION, COMPOSITION AND SWEPT-AREA BIOMASS ESTIMATES OF DEMERSAL FISH

5.1	Benin.....	25
5.2	Togo.....	29
5.3	Ghana.....	32
5.4	Côte d'Ivoire.....	37
5.5	Review of results .....	43

### CHAPTER 6 FISHING TRIALS ON THE DEEP CONTINENTAL SHELF AND UPPER SLOPE..... 45

### REFERENCES ..... 48

Annex I	Records of fishing stations
Annex II	Length distributions of main species
Annex III	Families/genera in swept-area estimates
Annex IV	Swept-area biomass estimates
Annex V	Total length-fork length and L-W-relationships
Annex VI	Instruments and fishing gear used

## **CHAPTER 1      INTRODUCTION**

---

Following a request from the Government of Ghana, later supported by the Governments of Benin, Togo and Côte d'Ivoire, IMR, NORAD and FAO agreed to conduct a survey in the western Gulf of Guinea covering the waters of the above four countries. This was a follow-up of a similar survey conducted in the period 19 April-6 May 1999. The survey was organised by IMR and FAO under the project GCP/INT/730/NOR: International cooperation with the Nansen Programme: Fisheries Management and Marine Environment. This project is the continuation of a series of projects and agreements between NORAD, IMR and FAO involving surveys with the research vessel "Dr. Fridtjof Nansen". The objectives of the survey had been previously discussed and agreed upon during a pre-survey meeting held in Tema, Ghana on the 26 August 2000 where representatives from Côte d'Ivoire, Ghana, Togo, Benin, Norway and FAO participated. There was a request from Benin and Togo that the results from this year's survey should be treated and analysed separately for the two countries, by this the survey report would be more meaningful to the two countries.

### **1.1 Objectives**

The main objectives of the survey were:

- to map the distribution and estimate the acoustic abundance of the main pelagic species
- to describe the distribution, composition and estimate the abundance of the main demersal species by a swept-area trawl programme
- to map the general hydrographic regime by using a CTD-sonde to monitor the temperature, salinity and oxygen at bottom trawl stations and in hydrographical transects
- to do on-the-job training on the main survey routines

Following the interest expressed by Ghana to have a fair idea about fishery resources in waters deeper than 100 m, an effort was made during the survey to trawl at such depths.

### **1.2 Participation**

Direction des Pêches, Cotonou, Bénin:

Amélie Gbaguidi

Centre Béninois de Recherche Scientifique et Technique, Cotonou, Bénin:  
 Roger Djiman

Direction de l'Elevage et de la Pêche, Lomé, Togo:  
 Vidzraku Agbokousse  
 Kossi Maxoè Sedzro

Marine Fisheries Research Division, Tema, Ghana:  
 K. Debra-Mireku  
 Kwame A. Koranteng  
 Felix Odai  
 Daniel W. Ofori-Adu  
 Comfort Yeboah.

Centre de Recherches Oceanologiques, Abidjan, Côte d'Ivoire:  
 Doumini Boubéri

FAO Fisheries Department (FIRM), Rome, Italy:  
 Merete Tandstad

Institute of Marine Research, Bergen, Norway:  
 Oddgeir Alvheim, Thor Egil Johansson, Tore Mørk, Else Torstensen (cruise leader).

### **1.3 Narrative**

The vessel left Tema (Ghana) in the evening of 29 August and steamed eastwards to the western part of Benin where the survey started in the morning of 30 August. The shelf was surveyed during daytime (0600 to 1800) by parallel course tracks about 20 NM (nautical miles) apart. In Benin and Togo the inter-transect distance was 15-20 NM, allowing for 3 transects in Benin and 2 in Togo. Semi-random swept-area hauls were carried out on the shelf within the depth zones 20-30 m, 31-50 m and 51-100 m during daytime. In addition seven bottom trawl hauls were made deeper than 100 m in areas with suitable trawling grounds. Continuous acoustic registrations were done throughout the survey. To obtain a denser acoustic coverage, night-time registrations were made in between the daytime-course tracks. Pelagic trawling with a mid-water trawl was carried out during dark hours. Blind trawl hauls were made close to the surface, in the "blind" sector of the echo sounder.

The CTD-stations were taken at most of the bottom trawl stations. In addition, five hydrographical profiles were made with CTD from surface down to 500 m depths. In Ghanaian waters zooplankton samples were taken at six locations close to bottom trawl stations. Zooplankton was sampled with a 1-metre diameter ICITA (Judas) net in step oblique hauls. The plankton stations were taken where the bottom depth was 30-60 m.

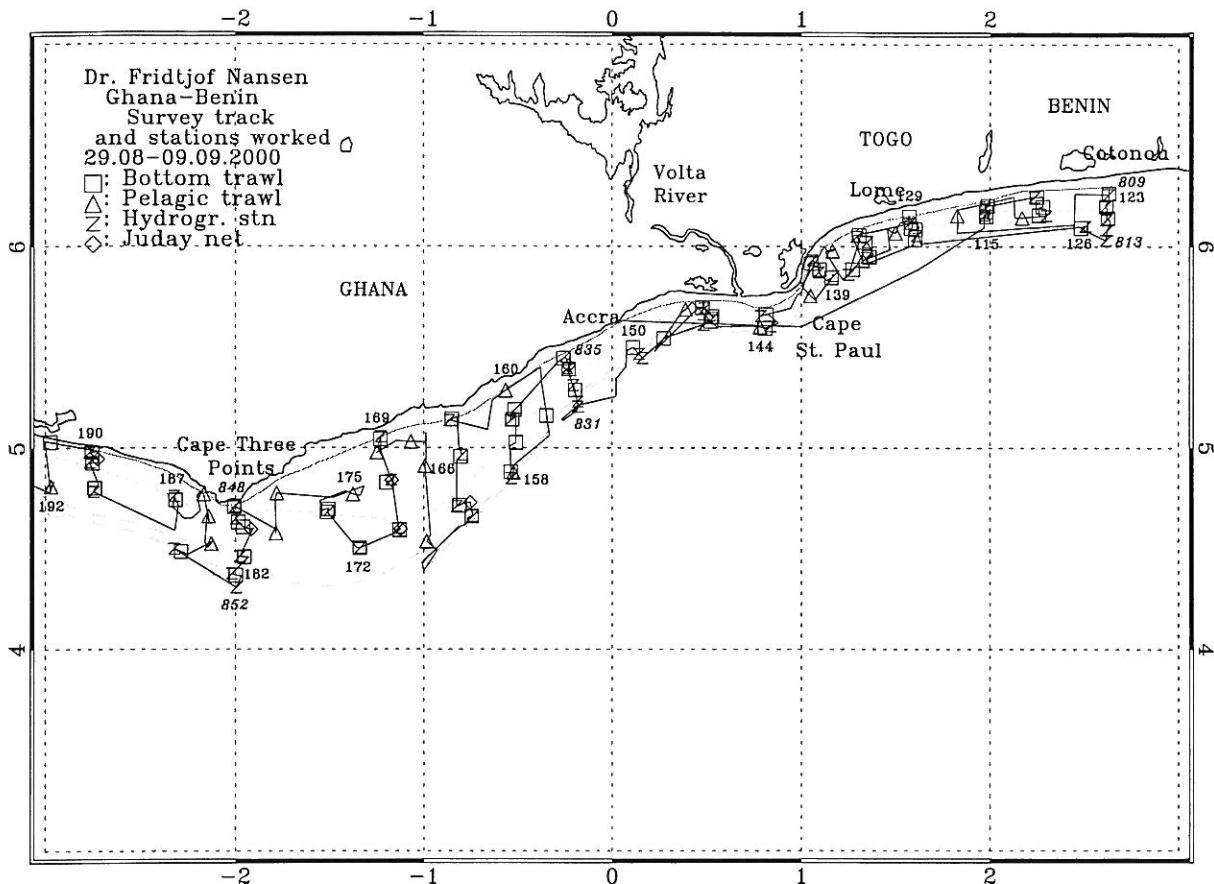
The shelf off Benin was covered from 30 to 31 August. One hydrographic transect was made off Cotonou. The Togo area was surveyed from 31 August to 1 September. The shelf off Ghana was surveyed from 1 to 8 September. In this area two hydrographic transects were made, off Accra and Cape Three Points. Côte d'Ivoire shelf area was covered from 8 to 15 September with two hydrographic transects off Grand Jacques on the central part and Grand Bérébi in the west. The survey was completed in the early hours of 15 September at a position about 15 NM from the Côte d'Ivoire-Liberia border. The vessel arrived in Tema in the afternoon of 16 September. There was a strong easterly current that gave an additional speed over bottom of 2-3 knots.

#### **1.4 Survey effort**

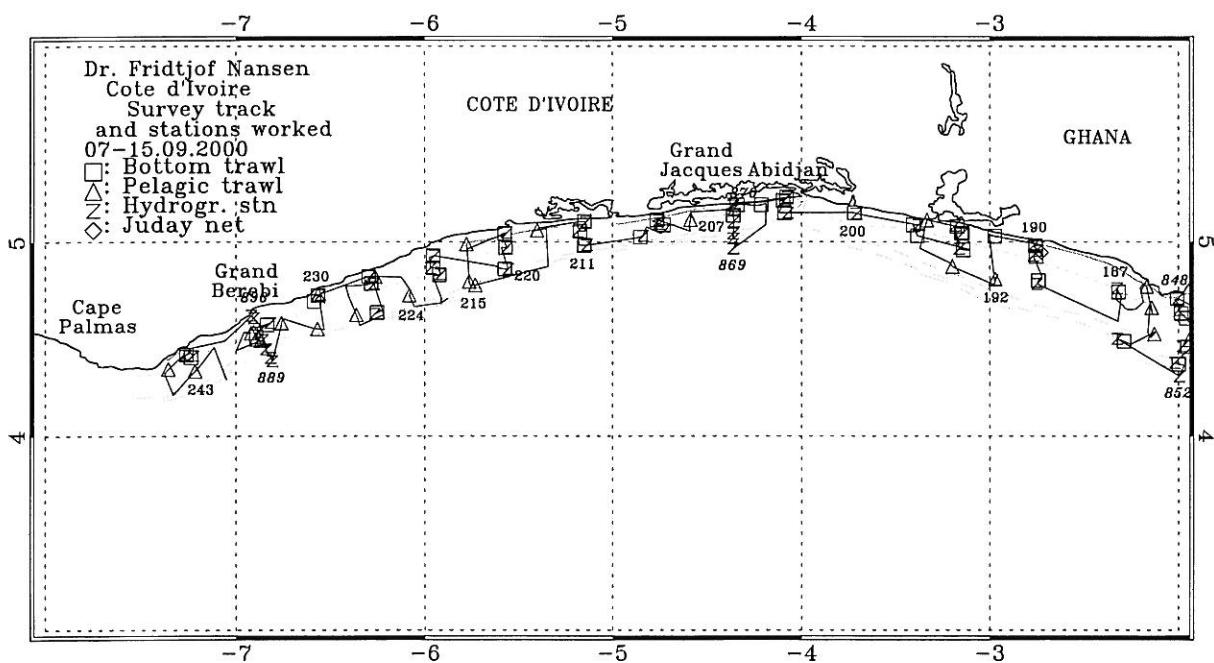
Figure 1 shows the cruise tracks with fishing, hydrographic and plankton stations. Table 1 summarises the survey effort in each sector.

Table 1. Number of hydrographic (CTD), plankton (P), pelagic trawl (PT) and bottom trawl (BT) stations, successful swept-area hauls and distance surveyed (NM) by area.

Region	CTD	P	PT	BT	Swept-area hauls			Distance surveyed (NM)
					0-30 m	31-50m	51-100 m	
Benin	11	-	2	10	3	3	3	160
Togo	6	-	2	7	2	2	2	145
Ghana	37	6	17	37	8	12	10	1055
Côte D'Ivoire	41	-	19	32	10	11	11	870
Total	95	6	40	86	23	28	26	2 230



a) Benin-Ghana



b) Ghana-Côte d'Ivoire

Figure 1. Course track with fishing and hydrographic stations for a) Benin-Ghana and b) Ghana-Côte d'Ivoire. Depth contours at 20 m, 50 m, 100 m, 200 m and 500 m are indicated.

## CHAPTER 2      METHODS

---

### 2.1 Meteorological and hydrographical sampling

#### *Temperature, salinity and oxygen*

A Seabird 911 CTD plus was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the Seabird Seasave software installed on a PC. The profiles were usually taken down to a few metres above the bottom, but not deeper than 500 m. Two Niskin bottles were triggered for water samples at a few of the stations, one near the bottom and the other near the surface (5 m depth). The samples were analysed for salinity using a Guildline Portasal salinometer, and the oxygen content was determined using the Winkler method. These laboratory values were used to calibrate the CTD, though after removing obvious outliers.

For oxygen, 18 samples out of 20 were accepted for the calibration. A linear regression gave the following formula for correcting the oxygen values:

$$O_2 = O_{2ctd} * 0,980 - 0,244$$

For the salinity calibration, a total of 20 samples were accepted. The salinometer did not work and the samples were be analysed by the Marine Fisheries Research Division, Tema, Ghana.

#### *Current speed and direction measurements (ADCP)*

A ship-born Acoustic Doppler Current Profiler (ADCP) from RD Instruments was activated on every CTD station with bottom depth greater than 50 m. The ADCP was set to ping every 8seconds, the depth cell was chosen to 8 m and the number of cells to 50. As a routine the data were averaged over 300 seconds for analyses onboard. Both the raw and averaged data were stored on files. The data were analysed by the PC software UMS (Underway Mapping System).

#### *Meteorological observations*

Wind direction and speed, air temperature, global radiation and sea surface temperature (5 m depth) were logged automatically every nautical mile on an Aanderaa meteorological station.

## 2.2 Biological sampling

The trawl catches were sampled for species composition by weight and numbers. The deck sampling procedure is described in more detail by Strømme (1992). Length measurements (total length) were taken for target species. The total length of fish was recorded to the nearest 1 cm below, for anchovy to the nearest 0.5 cm. In addition, total length and total body weight (g) were recorded for the target species in the acoustic survey. Basic information recorded at each fishing stations, i.e. trawl haul, and is presented in Annex I. Pooled length frequency distributions, raised to catch per hour, of selected species by area are shown in Annex II. Families of demersal fish included in the swept area analysis are given in Annex III. The swept-area biomass estimates are presented in Annex IV.

L-W-relationships for selected species were calculated based on individual length and weights (Annex V). A description of the fishing gears used, acoustic instruments and their standard settings is given in Annex VI.

## 2.3 Biomass estimates

### *Acoustic abundance estimation*

A SIMRAD EK500 Echo sounder was used and the echograms were stored on both paper and files. The acoustic biomass estimates were based on the integration technique. The Bergen Integrator (BEI) was used for analysis and allocation of the integrated  $s_A$ -values (average area back scattering coefficient in  $m^2/NM$ ). The splitting and allocation of the integrator outputs ( $s_A$ -values) was based on a combination of a visual scrutiny of the behaviour pattern as deduced from echo diagrams, the BEI analysis, and the catch combinations. The mean integrator value in each sampling unit ( $s_A$ -values) was divided between the standard categories/groups of fish, as noted below, on the basis of trawl catches and characteristics of echo traces:

- plankton
- sardinella (*Sardinella aurita* and *S. maderensis*)
- anchovy (*Engraulis encrasicolus*)
- Chub mackerel (*Scomber japonicus*)
- PEL 1 (other clupeids than sardinella and anchovy)
- PEL 2 (carangids, other scombrids than chub mackerel, barracudas, hairtail)
- mesopelagic fish
- demersal fish

The following target strength (TS) function was applied to convert  $s_A$ -values (mean integrator value for a given area) to number of fish (sardinella, anchovy, PEL 2):

$$TS = 20 \log L - 72 \text{ dB} \quad (1)$$

or in the form

$$C_F = 1.26 \cdot 10^6 \cdot L^{-2} \quad (2)$$

where L is total length and  $C_F$  is the reciprocal back scattering strength, or the so-called fish conversion factor. In order to split and convert the allocated  $s_A$ -values ( $\text{m}^2/\text{NM}^2$ ) to fish densities (number per length group per  $\text{NM}^2$ ) the following formula was used

$$N_i = A \cdot s_A \cdot \frac{p_i}{\sum_{i=1}^n \frac{p_i}{C_{Fi}}} \quad (3)$$

where:  
 $N_i$  = number of fish in length group i  
 $A$  = area ( $\text{NM}^2$ ) of fish concentration  
 $s_A$  = mean integrator value (echo density) in area A ( $\text{m}^2/\text{NM}^2$ )  
 $p_i$  = proportion of fish in length group i in samples from the area  
 $C_{Fi}$  = fish conversion factor for length group i

The number per length group ( $N_i$ ) was then summed and the total number of fish obtained:

$$N = \sum_{i=1}^n N_i \quad (4)$$

The length distribution of a given species within an area was computed by simple adding of the length frequencies obtained in the pelagic trawl samples within the area. In the case of co-occurrence of target species, the  $s_A$  value was split in accordance with length distribution and catch rate in numbers in the trawl catches. Biomass per length group ( $B_i$ ) was estimated by applying weights by length ( $W_i$ ) relations when available or theoretical weights (calculated by using condition factors), multiplied with number of fish in the same length group ( $N_i$ ). A condition factor of 0.91 was used in the biomass estimates of PEL 2. The total biomass in each area was obtained by summing the biomass of each length group:

$$B = \sum_{i=1}^n N_i \bar{W}_i \quad (5)$$

The number and biomass per length group in each concentration were then added up to obtain totals for each region.

#### *Biomass estimates based on Swept-area method*

In the bottom trawl survey, stock biomasses was estimated by the swept-area method with catch per haul as the index of abundance (see Strømme 1992). The general formula to estimate biomass B, using this method is:

$$B = \frac{A}{a} \cdot \frac{\bar{X}}{q} \quad (6)$$

A is the total area surveyed, a is the swept area of the net per haul,  $\bar{X}$  is the average catch per haul (the index of abundance) and q is the proportion of fish in the path of the net that are actually caught. The density of the resource is estimated as biomass per unit area. In a stratified survey of k non-overlapping strata, if the mean catch per haul in stratum i and its variance are denoted by  $\bar{X}_i$  and  $\sigma_i^2$  respectively, then an unbiased estimate of the population mean  $\bar{X}$  is the stratified mean  $\bar{X}_{st}$  which is given by:

$$\bar{X}_{st} = \frac{1}{N} \sum_{i=1}^k N_i \bar{X}_i = \sum_{i=1}^k W_i \bar{X}_i \quad (7)$$

where  $W_i = \frac{N_i}{N} = \frac{A_i}{A}$  is the relative size of the  $i^{th}$  stratum ( $A_i$  is the area of the  $i^{th}$  stratum and A is the total area surveyed). The variance of the stratified mean is given by

$$\text{var}(\bar{X}_{st}) = \sum_{i=1}^k W_i^2 \text{var}(\bar{X}_i) = \sum_{i=1}^k W_i^2 \frac{s_i^2}{n_i} \quad (8)$$

where  $n_i$  is number of hauls in the  $i^{th}$  stratum and n is the total number of hauls in the survey.

Table 2 shows the areas used in the swept-area method to estimate biomass for the different regions. A stratified semi-random design was used, with depth and main area as stratification

factors. Estimated total biomass by species/group was obtained by summing estimates for each depth stratum.

The swept-area-per-haul ( $a$ ) is calculated as the product of the distance covered during trawling and the distance between the wings of the trawl. The bottom trawl on “Dr. Fridtjof Nansen” has an estimated headline height of 5 m and a distance between wings during towing of about 18 m. All trawl hauls were monitored by SCANMAR trawl sensors, allowing improved accuracy in determining the actual time the trawl was fishing on the bottom. A more detailed description of the fishing gear is given in Annex IV. For conversion of catch rates to fish densities the area between the wings is assumed to be the effective fishing area. The catchability coefficient  $q$  was assumed to be 1. The length of a haul, recorded as distance over the bottom, was measured by GPS.

Table 2. Area ( $\text{NM}^2$ ) used in the swept-area biomass estimates for the different regions.

Depth stratum (m)	Benin	Togo	Ghana	Côte d'Ivoire
0 – 30	387	149	1 412	563
31 – 50	134	78	2 064	701
51 – 100	244	100	2 751	1 619

## CHAPTER 3 OCEANOGRAPHIC CONDITIONS

---

### *Surface distribution*

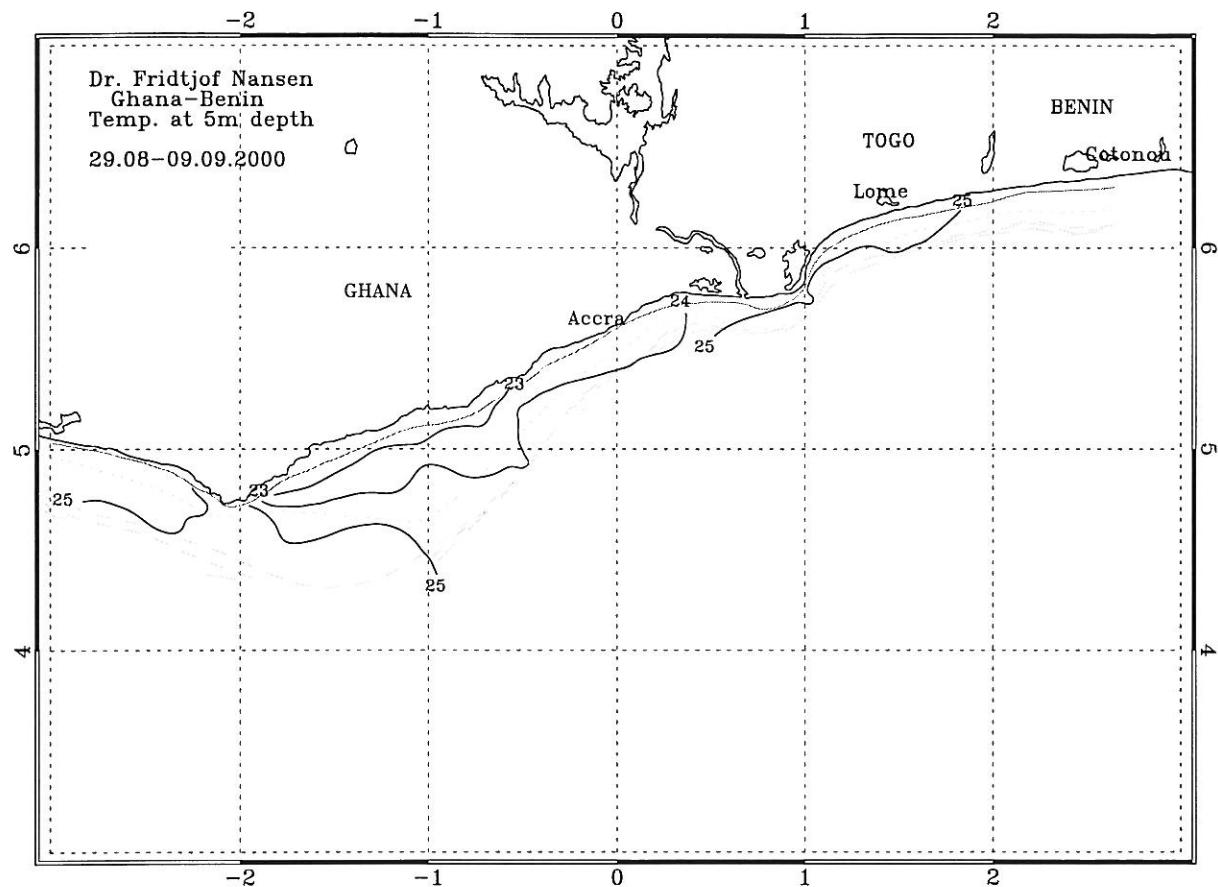
The surface layer temperature was continuously recorded during the cruise. Figures 2a and b show the horizontal distribution of sea surface temperature (SST) for the Benin-Ghana and western Ghana-Côte d'Ivoire areas respectively. The lowest temperature of 19°C was recorded off Grand Bérébi on the western side of Côte d'Ivoire. The surface temperatures showed a progressive increase from west to east of the survey area reaching a value of 25°C off Togo-Benin. In addition, coastal temperatures were lower than in offshore areas. This is expected at this time of the year when a seasonal coastal upwelling occurs in the survey area. This pattern of surface temperature distribution is in agreement with previous observations about the differential intensity of the coastal upwelling along the western Gulf of Guinea coast (Pezennec and Bard, 1992; Koranteng and Pezennec, 1998).

The salinity contours (Figures 3a and b) were difficult to follow having no clear patterns. This may be due to the season of the year which is at the tail end of the major upwelling season. The surface salinity ranged between 34.6‰ and 35.6‰ in the whole survey area and in the Benin-Togo-Ghana area, the coastal salinity was lowest around the Volta River estuary in Ghana.

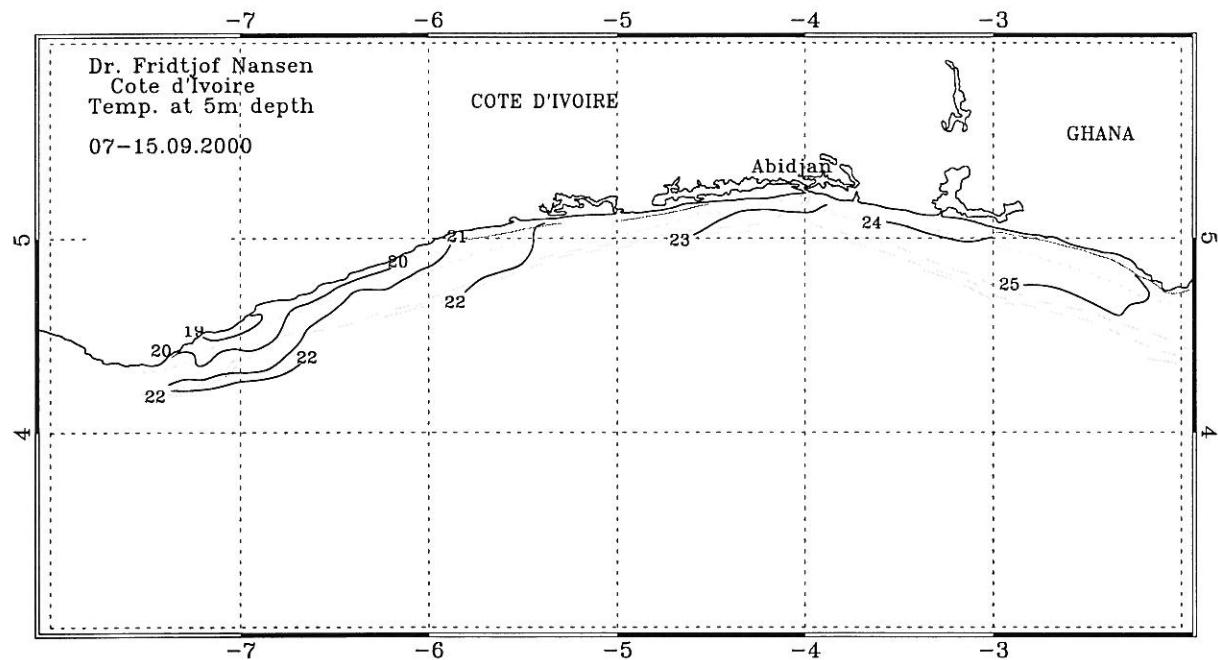
### *Vertical sections*

Figures 4a-e show the vertical distribution of temperature, salinity and dissolved oxygen as recorded on the five hydrographic transects worked during the survey. The top of the thermocline, which is known to be comparatively weak at this time of the year, was found at between 17 and 33 m depth. The thermocline was shallowest off Grand Bérébi.

Surface salinity varied between 34.6‰ off Cape Three Points (Ghana) and 35.4‰ off Grand Jacques and Grand Bérébi (Côte d'Ivoire). Dissolved oxygen values ranged between 2 at the bottom and 5 ml/l at the surface.

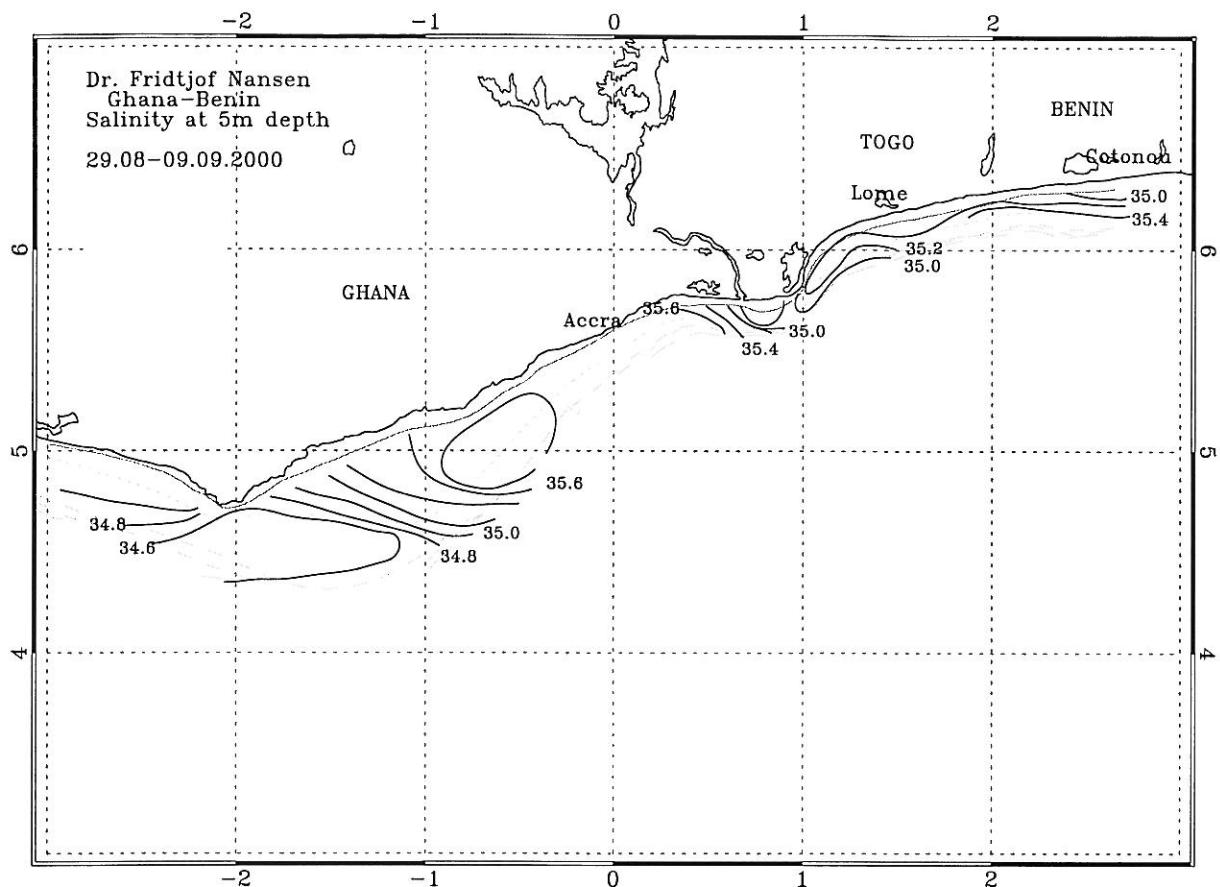


a) Benin-Ghana

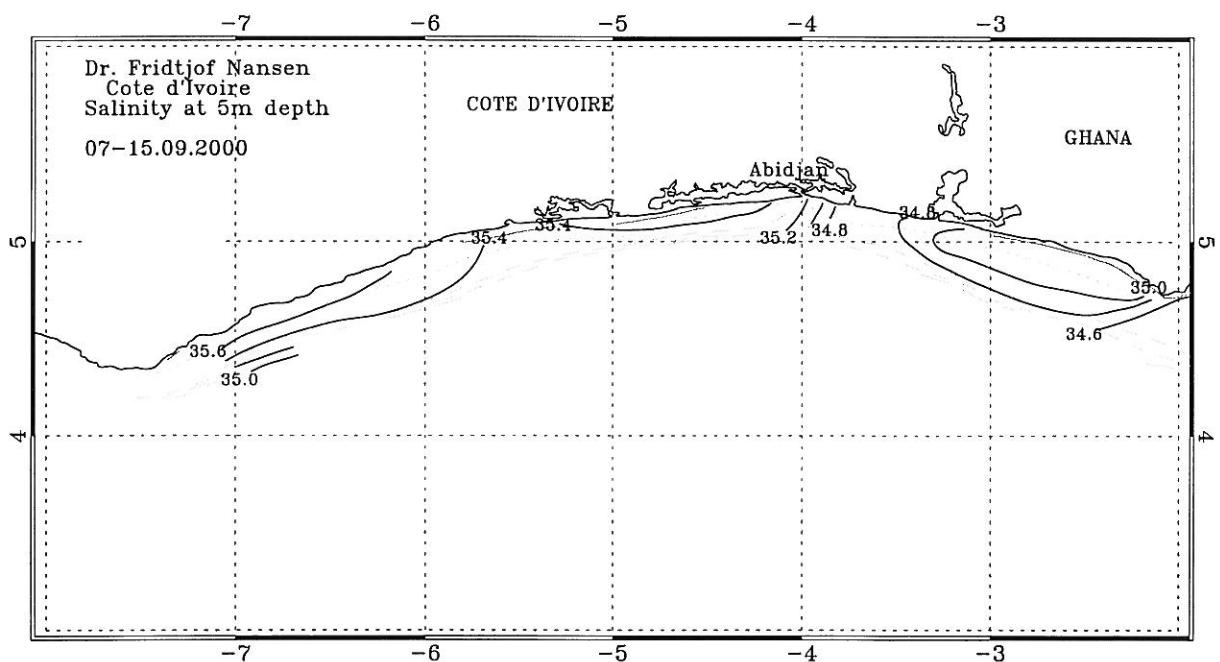


b) Ghana-Côte d'Ivoire

Figure 2. Horizontal distribution of surface temperature (5 m depth) at a) Benin-Ghana and b) Ghana-Côte d'Ivoire. Depth contours as in Fig. 1.

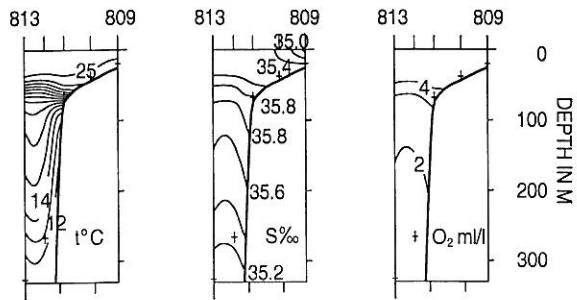


a) Benin-Ghana

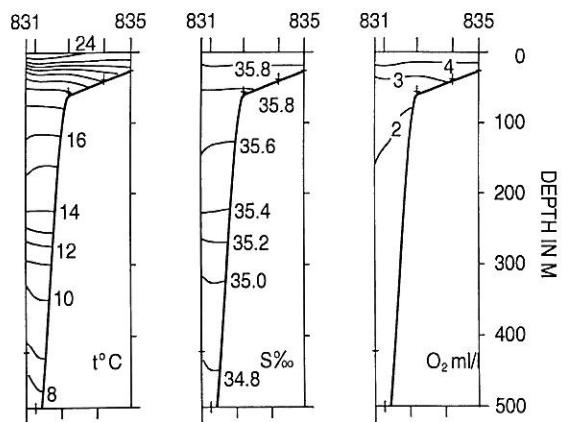


b) Ghana-Côte d'Ivoire

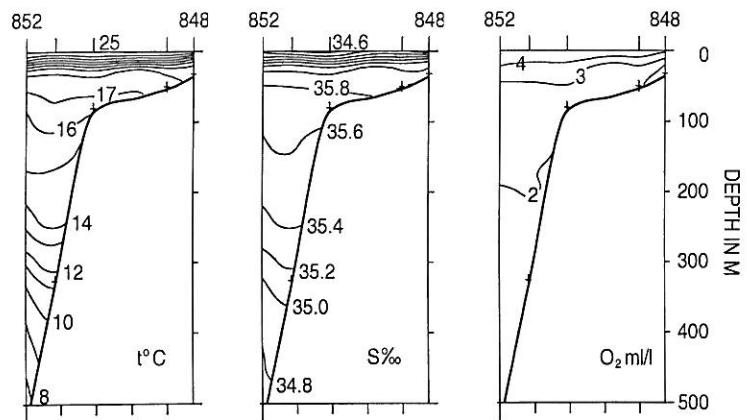
Figure 3. Horizontal distribution of salinity (5 m depth) at a) Benin-Ghana and b) Ghana-Côte d'Ivoire.  
Depth contours as in Fig. 1.



a) Cotonou – 31.08.2000

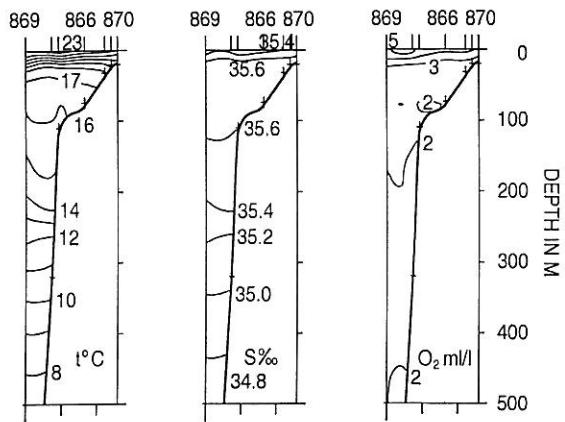


b) Accra – 04.09.2000

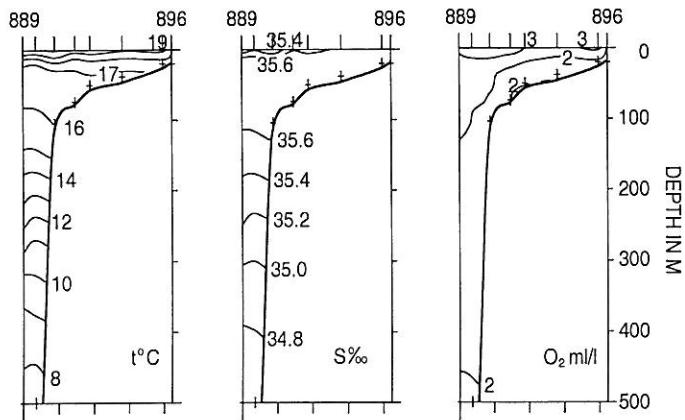


c) Cape Three Points – 07.09.2000

Figure 4. Vertical sections of temperature, salinity and oxygen at a) Cotonou, b) Accra, c) Cape Three Points, d) Grand Jacques and e) Grand-Bérébi.



d) Grand Jacques – 10-11.09.2000



e) Grand Bérébi – 14.09.2000

Figure 4. Continuation

#### *ADCP current measurements*

A subset of vectors obtained at 19 m depth is shown in Figure 5. No averaging has been done except the 5 minutes averaging done in real time. Therefore at deep stations lasting more than 10 minutes, several vectors are plotted at the same position, and there is some variability both within and between stations due to variability in time and space.

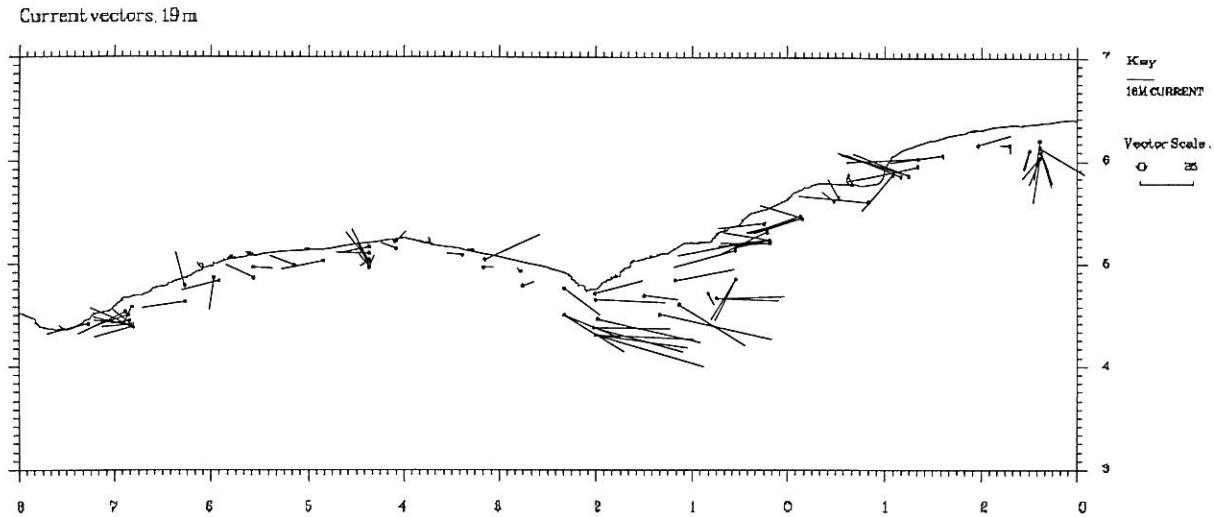


Figure 5. ADCP current at 19 m depth vectors (scale = 50 cm/s) off Benin - Côte d'Ivoire.

The current vectors show a marked and strong current both towards and away from the coastline. The figure portrays some inconsistency in the strength and direction of the current. At 19 m it is clear that the current being measured is the Guinea current although one cannot rule out the possibility of encountering the Guinea Under Current. The strength of the currents around the two large capes in the sub-region, Cape Palmas and Cape Three Points, is also noticeable. The importance of the two capes in the dynamics of water movements in the sub-region have been noted in a number of works (e.g. Marchal and Picaut, 1977).

## CHAPTER 4    RESULTS OF THE ACOUSTIC SURVEY: FISH DISTRIBUTION AND ABUNDANCE ESTIMATE OF PELAGIC SPECIES

---

Figures 6-8 show the distribution of the main groups of pelagic fish, i.e. sardinellas, anchovies and other fish (mainly carangids) defined as category PEL 2, as observed with the acoustic integration system. The acoustic densities (in  $\text{m}^2/\text{NM}^2$ ) are illustrated by a scale normally used on acoustic surveys with “Dr. Fridtjof Nansen”.

### 4.1 Benin

#### *Clupeids*

*Sardinella aurita* and *S. maderensis* were in general caught in small quantities in the bottom trawl hauls in Benin waters. The largest catches were taken in the outer and inner shelf, respectively. *S. aurita* was found both on the inner (fish of sizes 6.5-9.5 cm) and outer (10.0-22.0 cm) shelf while *S. maderensis* (9.5-28.0 cm) was found only on the inner shelf. The acoustic registration of pelagic fish by the echo sounder was scattered. Some low-density fish schools were mainly attributed to anchovies. For the acoustic abundance estimates the pelagic trawl hauls were used for the species composition and length distribution. The biomass of the two sardinella species together was estimated to be about 200 tonnes.

*Ilisha africana* was caught in two of the bottom-trawl hauls on the inner shelf area in the eastern part of Benin waters; catch rates were 0.6-55.08 kg/h. As only a few specimens of the species were taken in the pelagic haul in the area no  $s_A$ -values were attributed to this species and no estimate of abundance was made.

#### *Anchovy*

*Engraulis encrasicolus* was caught in two bottom trawl hauls on the inner shelf, and as the dominant pelagic species in one of the hauls. Schools of *E. encrasicolus* were recorded at low densities on the inner shelf (Fig. 7a). It was the dominant species in the pelagic trawl haul in the area. Only juvenile fish (4.5-8.0 cm TL) were caught. The biomass of anchovy was estimated to be about 1 500 tonnes.

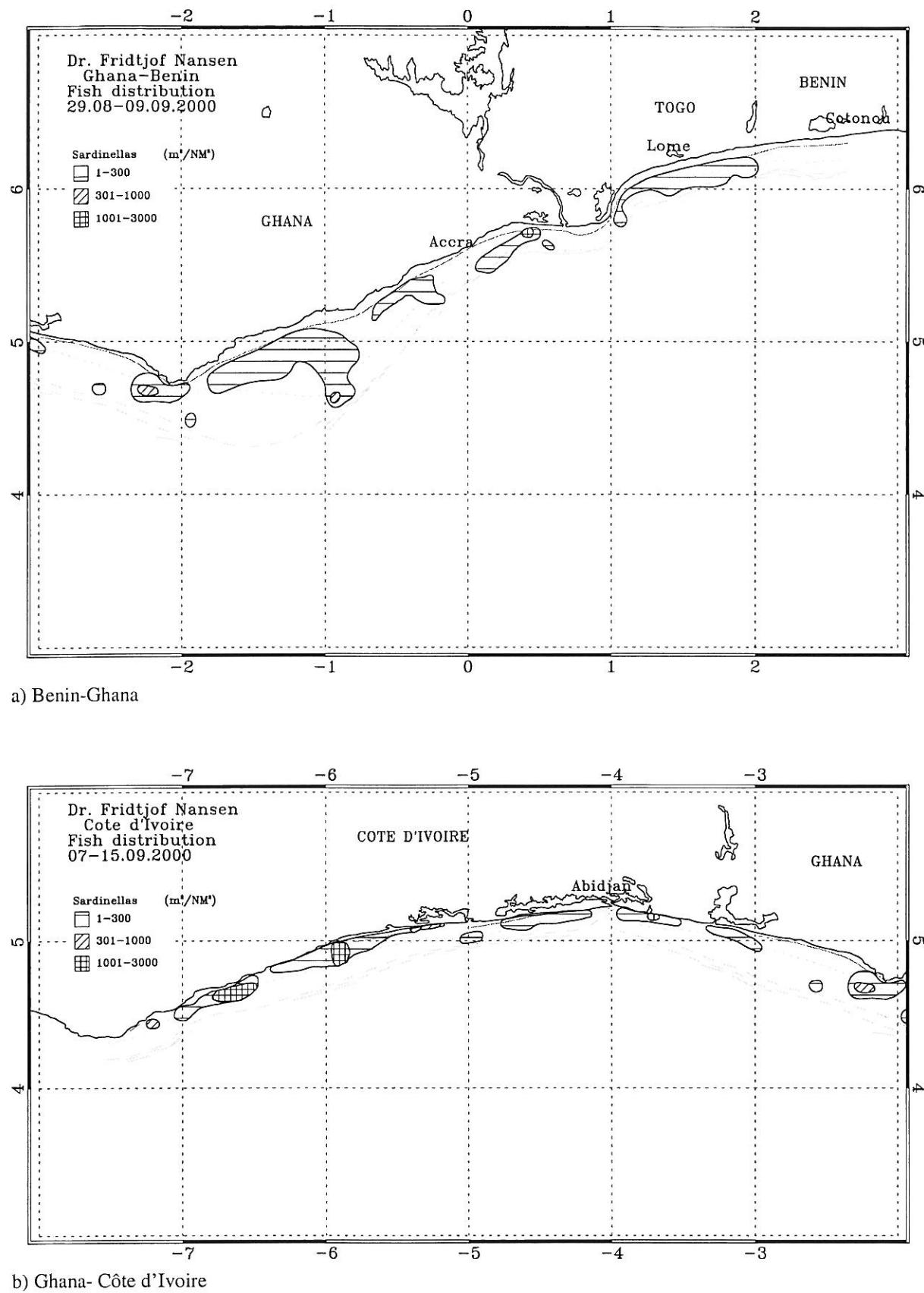
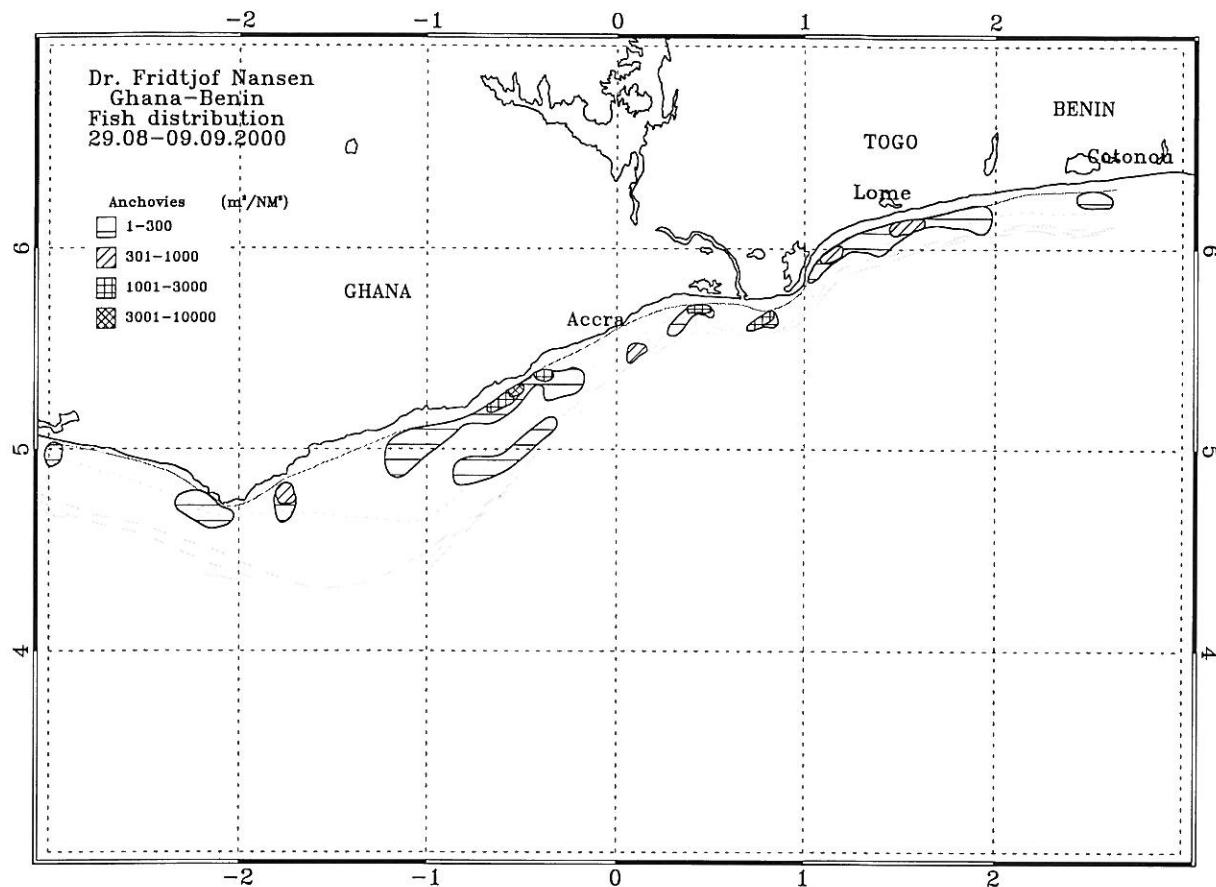
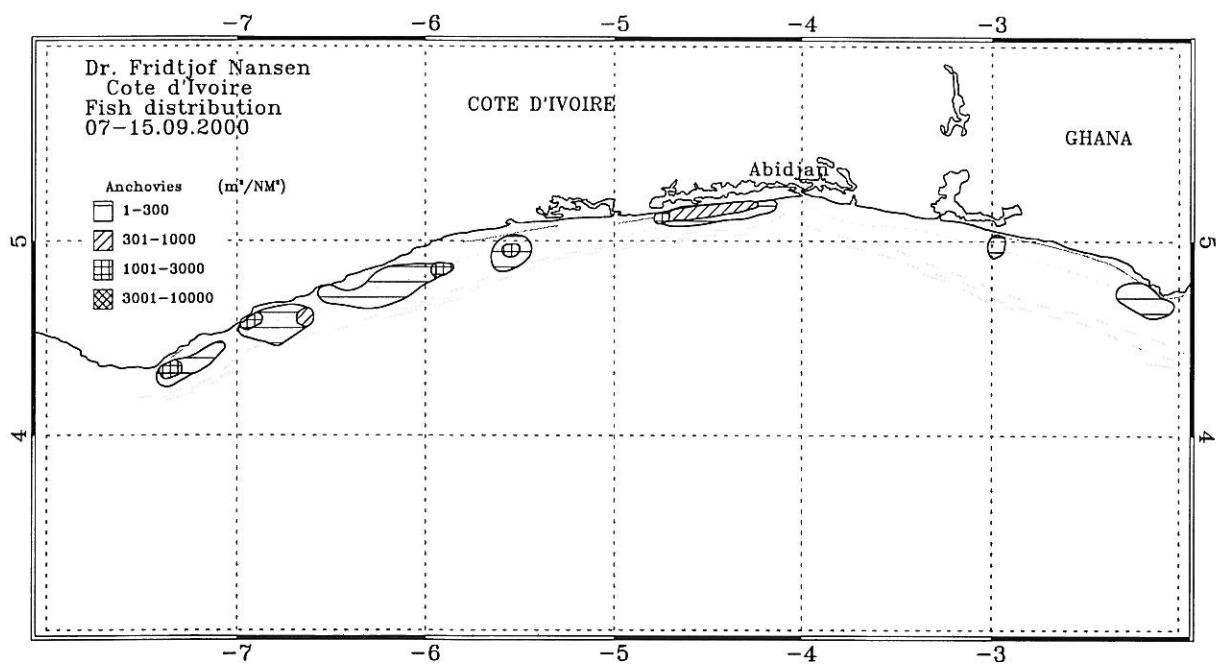


Figure 6. Distribution of *Sardinella* spp. off a) Benin-Ghana and b) Ghana-Côte d'Ivoire. Depth contours as in Fig. 1.

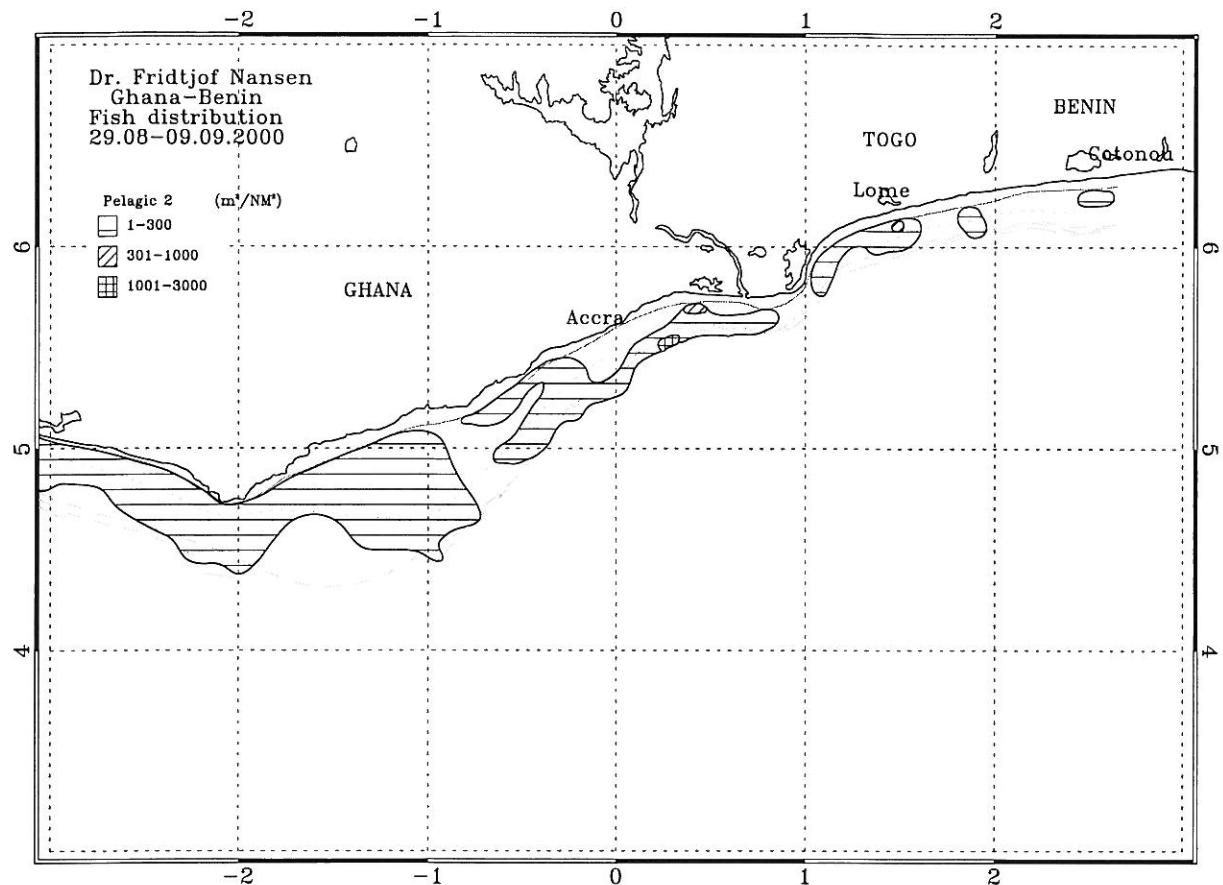


a) Benin-Ghana

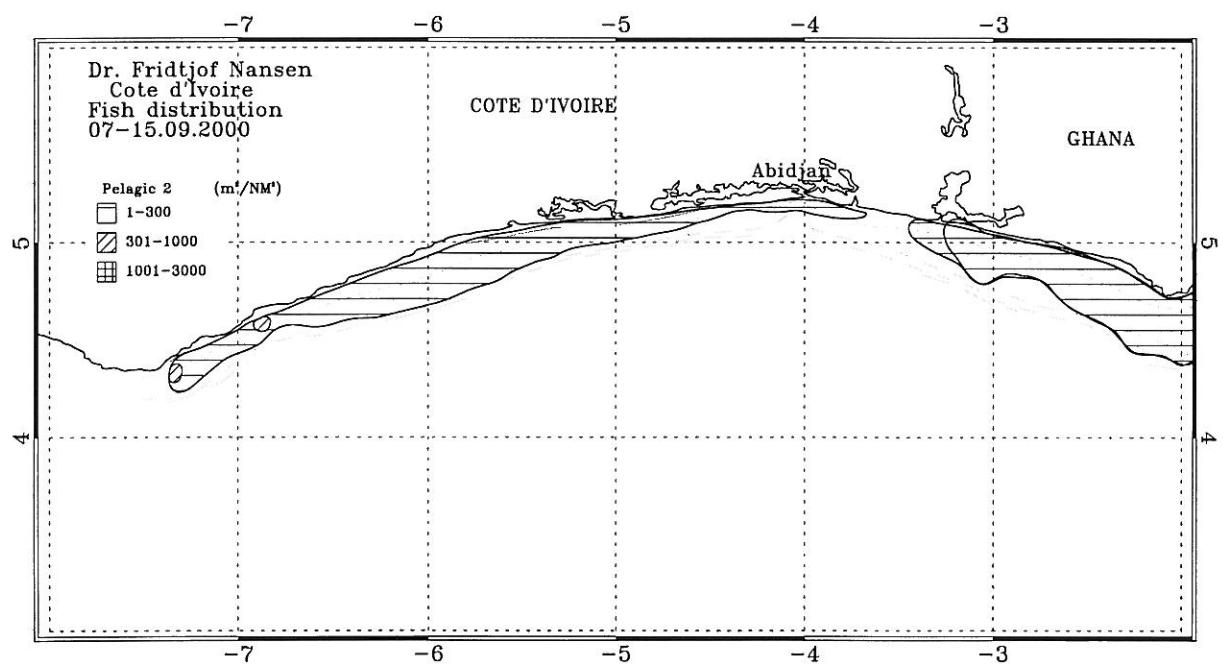


b) Ghana-Côte d'Ivoire

Figure 7. Distribution of anchovy (*Engraulis encrasicolus*) off a) Benin-Ghana and b) Ghana-Côte d'Ivoire. Depth contours as in Fig.1.



a) Benin-Ghana



b) Ghana-Côte d'Ivoire

Figure 8. Distribution of PEL 2 (Carangids, scombrids, barracudas and hairtail) off a) Benin-Ghana and b) Ghana-Côte d'Ivoire. Depth contours as in Fig.1.

*PEL 2 (carangids, scombrids, barracudas and hairtail)*

This group consisted mainly of carangids with *Chloroscombrus chrysurus*, *Selene dorsalis* and *Alectis alexandrinus* as the most abundant species in the bottom-trawl hauls. While *C. chrysurus* was caught at the inner shelf, *S. dorsalis* and *A. alexandrinus* were caught at both the inner and outer parts of the shelf. The carangids *Decapterus macarellus* and *Trachurus trecae* were caught at few stations. Few specimens of the scombrids *Scomberomorus tritor* were caught in the bottom trawls. Barracudas, *Sphyraena guachancho*, *S. sphyraena* and *S. afra*, were distributed at the inner shelf area, none were caught at the outer shelf. The hairtail *Trichiurus lepturus* was caught at three of the inner shelf stations and one at the outer shelf. Few scattered schools, all of low density, were attributed to this group. The distribution of PEL 2 as allocated from the acoustic data is shown in Fig. 8a. In the pelagic hauls *Decapterus rhonchus* was the dominant carangids at the outer shelf and *C. chrysurus* at the inner shelf. Few *Scomber japonicus* was caught in the pelagic haul at the outer shelf. Based on a pooled length distribution of *C. chrysurus* (10-20 cm TL), *D. rhonchus* (20-25 cm TL) and *T. trecae* (16-20 cm TL), the biomass of this group was estimated to be 1 500 tonnes.

#### 4.2 Togo

*Clupeids*

*Sardinella aurita* and *S. maderensis* were caught in small quantities in the bottom trawl; *S. maderensis* in the shallower area while *S. aurita* was caught both at the inner and the outer shelf. Distribution of sardinella from acoustic registration is presented in Fig. 8a. Both species were taken in pelagic hauls in the inner shelf area, *S. aurita* 6-24 cm TL and *S. maderensis* 6-30 cm TL, with a dominance of juvenile fish. Based on a combined length distribution the total biomass was estimated to be 4 000 tonnes.

*Anchovy*

*Engraulis encrasicolus* was caught in one bottom-trawl haul and one pelagic trawl haul, both in shallow waters (20-30 m). In both hauls anchovy was the dominant species. It was recorded in small schools and scattered layers at the inner and outer shelf areas. The total biomass in the area was estimated to be about 2 500 tonnes.

*Ilisha africana* was not caught in Togo.

*PEL 2 (carangids, scombrids, barracudas and hairtail)*

Carangids and associated species were found over the entire shelf. The species composition in the trawl hauls in this area is seen in Annex 1. Catches of this group consisted mainly of

carangids. *Alectis alexandrinus* and *Selene dorsalis* were the dominant species at the inner shelf area and *Trachurus trecae* at the outer shelf. Scombrids (*Scomberomorus tritor*) were caught at one station at the inner and one at the outer shelf. No hairtails were caught in this or the outer shelf. Barracuda (*Sphyraena guachancho*) was caught in low numbers in two hauls at the inner shelf. Only scattered layers and small, little dense schools were recorded by the acoustic registration. Based on a pooled length distribution of *Chloroscombrus chrysurus* (20-25 cm TL) and *T. trecae* (16-20 cm TL), the biomass of this group was estimated to be 2 500 tonnes.

#### 4.3 Ghana

##### *Clupeids*

Sardinellas were caught at most of the stations, with *Sardinella aurita* as the dominant species. This species was found over the entire shelf area and *S. maderensis* on the inner shelf. Several small and some larger schools of medium density were allocated to sardinella (Fig. 6a, b). The highest concentrations were recorded east of Accra, where the main species was *S. aurita*, both juvenile of about 8-9 cm TL and adults of about 20 cm TL. The total biomass of sardinellas was estimated to be about 32 500 tonnes.

*Ilisha africana* was caught in one bottom trawl haul in shallow waters (30-50 m) but as no  $S_A$ -values were attributed to this species no estimate of abundance was made.

##### *Anchovy*

Some small schools of *Engraulis encrasicolus* were recorded but anchovies were mostly observed in mixed scattered layers in the inner shelf area. Dense concentrations were registered around Accra (Fig. 7a). Large catches of anchovy (140 kg/h-1 350 kg/h) were taken in the pelagic trawl haul east of Cape St. Paul, off Accra and east of Cape Three Points. Anchovy was taken at seven out of thirty-nine bottom trawl stations along the inner shelf. The biomass of anchovy was estimated to be about 24 000 tonnes.

##### *PEL 2 (carangids, scombrids, barracudas and hairtail)*

As in Benin and Togo waters this group consisted mainly of carangids. *Trachurus trecae* was the most abundant in the bottom trawl catches in the inner shelf area. *Chloroscombrus chrysurus*, *Selene dorsalis* and *Decapterus punctatus* were the other common species in the bottom trawl hauls at the shallow part of the shelf. In the outer part of the shelf, *T. trecae* was the carangid caught in the bottom trawl. The catch rates of *T. trecae* were high with a mean of 280 kg/h. Most of the carangids were juveniles (10-16 cm). *Scomber japonicus* was the most common scombrid in the bottom-trawl hauls, while *Scomberomorus tritor* was caught at three stations, two pelagic trawl hauls during night time and one bottom-trawl haul. The

barracudas, *Sphyraena guachancho* and *S. sphyraena*, were found in about half of the bottom-trawl hauls, all at the inner shelf. The hairtail *Trichiurus lepturus* was caught at a few stations, in both bottom-trawl and pelagic hauls. Small schools of PEL 2 species were detected on most of the shelf, both on the inner and outer shelf (Fig. 8a, b). The schools were mainly of low-medium density. The biomass of PEL 2 was estimated to be approximately 61 000 tonnes, applying an over-all average length of 15 cm (pooled length distributions).

#### 4.4 Côte d'Ivoire

##### *Clupeids*

Sardinellas were recorded along the whole coast of Côte d'Ivoire, with highest concentrations in shallow waters in the western part of the area (Fig. 6b). Both *Sardinella aurita* and *S. maderensis* occurred frequently in the bottom-trawl catches, and were also caught in the pelagic-trawl hauls. *S. maderensis* was more abundant and dominated the inner shelf, while both species were found in low-medium densities on the outer shelf. Most of the sardinellas found on the shelf off Côte d'Ivoire were small size (Fig. 9), and the total biomass was estimated to be about 84 000 tonnes.

*Ilisha africana* was frequently taken in bottom and pelagic trawl hauls on the shallow area of the shelf but no no  $s_A$ -values were allocated to this species.

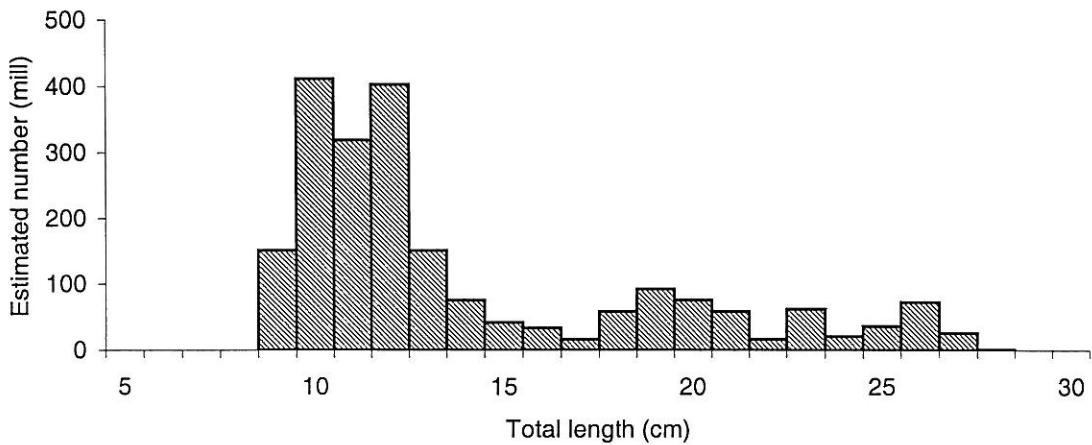


Figure 9. Length distribution of *Sardinella* spp. in Côte d'Ivoire, estimated acoustically.

##### *Anchovy*

Several schools of *Engraulis encrasicolus* (5-10 cm TL) were recorded in shallow. The main concentrations were found in the western area, west of Abidjan (Fig. 7b). Anchovy was

caught at several of the bottom-trawl stations on the inner shelf (see Annex I). Using pooled length distribution the biomass of anchovy was estimated to be 27 000 tonnes.

#### *PEL 2 (carangids, scombrids, barracudas and hairtail)*

Like in Benin, Togo and Ghana the species category PEL 2 consisted mostly of carangids, *Trachurus trecae* was the overall dominant species both at the inner and outer shelf. Other carangids such as *Chloroscombrus chrysurus*, *Alectis alexandrinus* and *Selene dorsalis* also occurred but at lower densities. *Sphyraena guachancho* was the barracuda found but in general low densities. The scombrids, *Scomberomorus tritor* and *Scomber japonicus*, occurred frequently and at low catch rates. Next to the carangids, hairtail was the most abundant species in bottom trawl hauls in the area. *Trichiurus lepturus* was found at about 70% of the bottom-trawl stations with the highest mean catch rate at the outer shelf.

Schools of PEL 2 species were found on most of the shelf, both on the inner and outer shelf. The schools were of medium to high densities; the highest densities found in the shallow area (Fig. 8a). Applying an over-all average length of 14 cm (pooled length distributions, weighted by the catch, for carangids, scombrids, barracudas and hairtails), the biomass of PEL 2 was estimated to be 18 000 tonnes.

#### **4.5 Review of results**

Estimated biomasses of PEL 1 species (sardinellas and anchovies) and PEL 2 species (carangids, scombrids, barracudas and hairtails) based on the Dr. Fridtjof Nansen surveys in 1981 (Strømme 1984), 1989 (Anon. 1989), 1999 (Mehl et al. 2000) and 2000 (this survey), are presented in Table 3. Benin and Togo sectors have in earlier years been covered as one area, due to the narrow coastline of Togo. During the present survey the design was made to have two transects in Togo and three in Benin. With few stations and relatively small areas covered by acoustic registrations, one high value might thus have a great effect on the results.

As shown during the previous surveys, in 1981, 1989 and 1999, pelagic fishes were present over large parts of the area, especially the central and western parts. In the central and eastern areas few schools of low densities were registered as the fish occurred mainly in dispersed distribution. All pelagic hauls were taken as blind hauls as little pelagic fish were seen on the echo sounder. The recorded catch rates show that during night-time the fish were distributed near the surface. Sardinellas and anchovy dominated on the inner shelf, while carangids, scombrids and barracudas were more widely distributed over the entire shelf. Important fishing areas (very shallow waters) for clupeids at this time of the year (up-welling season) were not covered as specified in the objectives. High density of artesian fishing vessels and

gears in these shallow areas, made them nearly inaccessible for the survey in the shallower areas as off Tema-Accra, near Cape Three Points and east of Abidjan.

The biomasses estimated for the sardinella-anchovies group were much higher than the 1999-estimates. This was mainly seen in the biomass estimated for the western part of Côte d'Ivoire, an increase that may be an effect of a stronger residual upwelling in this area. In Ghana the biomass of these combined species was almost the same as last year. The biomass of PEL 2 was at the same order as in 1999.

Table 3. Acoustic biomass estimates of main pelagic groups (tonnes) a) Sardinellas and anchovies (PEL 1) and b) carangids, scombrids, barracudas and hairtail (PEL 2) from surveys with "Dr. Fridtjof Nansen" off Côte d'Ivoire, Ghana, and Benin-Togo in June 1981, October 1989, April/May 1999 and the August/September 2000 survey. Note that Benin-Togo was not covered in 1989.

a) Sardinellas and anchovies (PEL 1)

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin-Togo	Benin	Togo	Total
1981	June	39 000	40 000	*			79 000
1989	12 - 20.10	6 000	41 000	not covered			47 000
1999	19.4 - 8.5	42 000	40 000	5 000			87 000
2000	29.8 – 15. 9	111 000	56 500		1 700	6 500	175 700

b) Carangids, scombrids, barracudas and hairtail (PEL 2)

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin – Togo	Benin	Togo	Total
1981	June	2 000	10 000	*			12 000
1989	12 - 20.10	33 000	57 000	not covered			90 000
1999	19.4 - 8.5	30 000	50 000	4 000			84 000
2000	29.8 – 15. 9	18 000	61 000		1 500	2 500	83 000

\* The estimated biomass for pelagic species (PEL 1 + PEL 2) was 14 000 tonnes (Strømme, T., Føyn, L. and Sætersdal, G. 1983).

## CHAPTER 5 RESULTS FROM THE TRAWL SURVEY: CATCH DISTRIBUTION, COMPOSITION AND SWEPT- AREA BIOMASS ESTIMATES OF DEMERSAL FISH

---

The composition of the fish fauna on the continental shelf and slope of the western Gulf of Guinea changes with depth (Williams 1968). The catch-distribution analyses were therefore performed for two depth strata on the shelf, 0-50 m (inner shelf) and 51-100 m (outer shelf). In the analyses the “Demersal” group includes commercially important families as Sciaenidae, Haemulidae (=Pomadasytidae), Serranidae, Sparidae and Lutjanidae, while the “Pelagic” group includes Engraulidae, Clupeidae, Carangidae, Scombridae, Sphyraenidae and Trichiuridae (the latter family is actually mainly benthopelagic). For the different analysis the “other” group includes all species not accounted for in the groups listed. Therefore the content of “other” will change from table to table.

The locations of the trawl stations are shown in Figure 1. Records of fishing stations and catches are presented in Annex I, and pooled length distributions (weighted by catch) of main species by area are shown in Annex II.

In the swept-area biomass estimates, only the shelf area down to depths of 100 m was included, divided into 0-30 m, 31-50 m and 51-100 m. Mean densities of the main demersal species by depth strata, occurrence and catch distributions are shown in Annex IV.

### **5.1 Benin**

Nine swept-area trawl stations were made on the shelf off Benin. One additional haul was taken at 113-125 m depth. Due to a steep slope and rough bottom it was difficult to trawl in the deeper areas. Tables 4a and 4b show catch rates by main groups for the inner shelf (0-50 m) and outer shelf (51-100 m) respectively.

Pelagic fish dominated on the inner shelf with a relative contribution of 50%. The demersal group was the second most important, contributing 26% to the catches, followed by the “other” group (15%). Shrimps and cephalopods had low average catch rates and sharks were only caught at one station. On the outer shelf the demersal group was the most important with 48% of the average catch rate. The pelagic group made up 36% of the catches, “other” fish 11% and cephalopods 5%. On the outer shelf sharks were caught at all stations, but with low catch rates. *Sepia officinalis hierredda* was the dominant cephalopod. The catch of shrimps was negligible in this zone.

Table 4. Benin. Catch rates (kg/h) by main groups in swept-area bottom trawl hauls on a) inner shelf, 0-50 m, and b) outer shelf, 51-100 m. SE = standard error.

a) Inner shelf, 0-50 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
116	46	11.6	14.2	0.0	8.7	0.0	7.0	41.4
117	26	2.8	18.0	0.0	10.3	0.0	21.1	52.3
118	24	13.7	181.9	0.1	0.0	0.0	33.1	228.9
119	44	127.6	14.6	16.0	10.6	0.0	26.4	195.2
123	28	32.0	78.1	0.0	0.0	0.0	15.3	125.5
124	48	11.2	79.5	0.6	6.0	14.1	9.4	120.8
Mean	36	33.1	64.4	2.8	5.9	2.3	18.7	127.3
SE		19.3	26.7	2.6	2.0	2.4	4.1	30.5
% Catch		26.0	50.6	2.2	4.7	1.8	14.7	

b) Outer shelf, 51-100 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopod	Sharks	Other	Total
115	57	38.8	3.2	0.0	29.0	11.5	20.6	103.1
120	64	46.2	1.8	0.5	20.7	1.9	43.3	114.4
125	81	780.4	632.5	0.0	33.1	1.1	125.0	1 572.0
Mean	67	288.5	212.5	0.2	27.6	4.8	63.0	596.5
SE		246.0	210.0	0.2	3.7	3.3	31.7	487.8
% Catch		48.4	35.6	0.0	4.6	0.8	10.6	

Catch rates of the most important pelagic families, caught by bottom trawl in the swept-area survey, are presented in Tables 5a and b. The clupeids and the carangids were the dominant species groups on both the inner and outer shelf. On the inner shelf the clupeids had the highest catch rates whereas the carangids had the highest catch rates on the outer shelf. The catch rates of both species groups were higher on the outer shelf as compared to the inner shelf. Of the carangids *Selene dorsalis*, *Alectis alexandrinus* and *Chloroscombrus chrysurus* occurred most frequently. *Sardinella aurita* and *Ilisha africana* were the two most frequently occurring clupeids. Barracudas (Sphyraenidae) were the third most important group on the inner shelf with a catch rate of around 7 kg/h. The average catch rates of Hairtails were low on the whole shelf, although higher on the inner than the outer shelf. Some scombrids were found on the inner shelf, whereas scombrids and barracudas were absent on the outer shelf.

Table 5. Benin. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) Inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
116	46	0.6	8.6	1.7	0.0	3.3	27.2	41.4
117	26	1.6	11.2	3.5	0.0	1.8	34.3	52.3
118	24	121.2	44.6	0.0	0.0	16.1	46.9	228.9
119	44	0.0	8.9	0.0	4.1	1.6	180.5	195.2
123	28	64.2	9.9	0.0	3.2	0.8	47.3	125.5
124	48	2.8	54.5	0.0	3.9	18.4	41.3	120.8
Mean	36	31.7	22.9	0.9	1.9	7.0	62.9	127.4
SE		20.7	8.5	0.6	0.8	3.3	23.7	30.5
% Catch		24.9	18.0	0.7	1.5	5.5	49.4	

b) Outer shelf, 51-100 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
115	57	1.0	2.2	0.0	0.0	0.0	99.9	103.1
120	64	0.0	0.5	0.0	1.4	0.0	112.5	114.4
125	81	195.5	437.0	0.0	0.0	0.0	940.0	1 572.5
Mean	67	65.5	146.6	0.0	0.5	0.0	384.1	596.7
SE		65.0	145.2	0.0	0.5	0.0	278.0	487.9
% Catch		11.0	24.6	0.0	0.1	0.0	64.4	

Tables 6a and b show catch rates of the most commercially important demersal species on the shelf down to depths of 100 m, grouped as seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*) and croakers (Sciaenidae). All groups had low catch rates on the inner shelf. The catch rates of grunts, seabreams and croakers were all in the range 3.5-5 kg/h. Seabreams were more abundant on the outer shelf, where they dominated with an average catch rate of 82 kg/h or 14% of the total average catch rate. The most commonly occurring species were *Pagrus caeruleostictus* and *Pagellus bellottii*.

Table 6. Benin. Catch rates (kg/h) of commercially important demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
116	46	7.9	0.0	0.0	1.8	0.0	31.8	41.4
117	26	2.8	0.0	0.0	0.0	0.0	49.5	52.3
118	24	3.9	0.0	0.0	0.0	3.3	221.6	228.9
119	44	3.5	2.8	0.0	21.4	0.0	167.5	195.2
123	28	5.5	0.5	0.0	7.9	16.9	94.7	125.5
124	48	0.5	0.0	0.0	0.0	0.6	119.8	120.8
Mean	36	4.0	0.6	0.0	5.2	3.5	114.1	127.4
SE		1.0	0.5	0.0	3.5	2.7	29.3	30.5
% Catch		3.2	0.4	0.0	4.1	2.7	89.6	

b) Outer shelf, 51-100 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
115	57	13.1	8.5	17.2	0.0	0.0	64.4	103.1
120	64	40.1	0.0	0.0	0.0	4.7	69.6	114.4
125	81	191.4	0.0	3.4	0.0	0.0	1 377.0	1 571.9
Mean	67	81.5	2.8	6.9	0.0	1.6	503.7	596.4
SE		55.5	2.8	5.2	0.0	1.6	436.7	487.7
% Catch		13.7	0.5	1.2	0.0	0.3	84.4	

Annex IV gives the swept-area estimates of mean densities ( $t/NM^2$ ) based on the 9 random bottom trawl stations for demersal species on the shelf of Benin. *Pseudotolithus senegalensis* and *Galeoides decadactylus* had the highest mean density in the shallowest zone ( $\leq 30$  m), *B. auritus* in the 30-50 m zone, while *Dentex congensis* had the highest density in the 51-100 m zone. *D. congensis*, *Sepia officinalis hierredda* and *B. auritus* had the highest overall mean densities.

Table 7 presents swept-area biomass estimates for valuable demersal groups and other groups that occurred in sizeable quantities. Estimated total biomass of valuable demersal groups was about 900 tonnes. Seabreams had the highest biomass followed by croakers. The highest biomass of seabreams was found between 51-100 m depth and that of croakers between 31-50 m. Croakers, grunts, groupers and snappers all had low biomass estimates. Of the pelagic and semi-pelagic groups, carangids had the highest estimated biomass.

Table 7. Benin. Biomass estimates (tonnes) of important species/groups of fish on the shelf, by depth.

Group/species	0-30 m	31-50 m	51-100m	Sum	95% confidence limits	
Seabreams <sup>1</sup>	43	16	642	700	0	1 574
Grunts <sup>1</sup>	27	39	0	66	0	154
Croakers	70	1	12	83	0	193
Groupers	0	0	59	59	0	148
Snappers	4	5	24	34	0	84
<b>Sum dem.val.<sup>1</sup></b>	<b>143</b>	<b>62</b>	<b>737</b>	<b>942</b>	<b>0</b>	<b>1 776</b>
Bigeye grunt <sup>1</sup>	27	190	5	222	0	524
Carangids	232	99	1 159	1 490	0	3 803
Barracudas	70	32	0	102	0	221

<sup>1</sup> Corrected

## 5.2 Togo

Six swept-area trawl stations were made on the shelf off Togo. One deep-water bottom trawl was taken at 287-299 m. Tables 8a and 8b present catch rates by main groups for the inner and outer shelf. On the inner shelf the pelagic and demersal groups made about the same part of the total average catch, 23% and 28%, respectively. The group "other" species had somewhat higher average catch with a relative contribution of 38%. The mean catch of Cephalopods made up 11% of the total catch at the inner shelf. *Sepia officinalis hierredda* was the dominant species, with the highest density in 0-30 m depth. No shrimps or sharks were caught. On the outer shelf demersal fish made up 65%, pelagic 18%, sharks, cephalopods and "other" each made up of less than 10% of the totals and no shrimps were caught in this zone either.

Table 8. Togo. Catch rates (kg/h) by main groups in swept-area bottom trawl hauls on a) inner shelf, 0-50 m, and b) outer shelf, 51-100 m.

### a) Inner shelf, 0-50 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
129	24	5.6	120.4	0.0	19.8	0.0	5.5	151.3
131	48	120.3	71.2	0.0	7.7	0.0	12.6	211.8
134	46	98.7	16.2	0.0	35.8	0.0	29.3	180.0
135	27	66.7	23.2	0.0	48.4	0.0	341.6	479.9
Mean	36	72.8	57.8	0.0	27.9	0.0	97.3	255.8
SE		25.0	24.2	0.0	8.9	0.0	81.6	75.7
% Catch		28.5	22.6	0.0	10.9	0.0	38.0	

## b) Outer shelf, 51-100 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
132	72	20.0	103.1	0.0	21.4	26.5	5.4	176.4
133	88	387.6	9.2	0.0	3.4	19.2	27.5	446.9
Mean	80	203.8	56.2	0.0	12.4	22.8	16.4	311.6
SE		183.8	46.9	0.0	9.0	3.6	11.1	135.3
% Catch		65.4	18.0	0.0	4.0	7.3	5.3	

Catch rates of the most important pelagic families, caught by bottom trawl in the swept-area survey, are presented in Tables 9a and b. In both inner and outer parts of the shelf, families other than those listed in the tables made up large portions of the catch, being 77.4% on the inner shelf and 82% on the outer.

Carangids and clupeids were equally represented on the inner shelf making up 11% and 9.6% respectively of the total catch. *Chloroscombrus chrysurus* and *Alectis alexandrinus* represented the carangids while the clupeids were made up of both *Sardinella aurita* and *S. maderensis*. There was a low representation of scombrids and barracudas and no hairtails were caught at these depths or on the outer shelf. The anchovy *Engraulis encrasicolus* dominated one of the two swept-area bottom trawl hauls made in the 20-30 m depth zone. On the outer shelf, carangids dominated the important pelagic species with a mean catch of 51.4 kg/h (or 16.5% of the catch). This was followed by scombrids and clupeids. No barracudas were caught on this part of the shelf. The clupeids consisted of *S. aurita* and *S. maderensis*.

Table 9. Togo. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

## a) Inner shelf, 0-50 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
129	24	93.1	27.3	0.0	0.0	0.0	30.9	151.3
131	48	0.0	68.7	0.0	0.0	2.6	140.6	211.8
134	46	5.1	11.1	0.0	0.0	0.0	163.8	180.0
135	27	0.0	5.4	8.5	0.0	9.3	456.7	479.9
Mean	36	24.6	28.1	2.1	0.0	3.0	198.0	255.8
SE		22.9	14.3	2.1	0.0	2.2	91.0	75.7
% Catch		9.6	11.0	0.8	0.0	1.2	77.4	

## b) Outer shelf, 51-100 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
132	72	1.9	93.5	7.7	0.0	0.0	73.2	176.4
133	88	0.0	9.2	0.0	0.0	0.0	437.6	446.9
Mean	80	0.9	51.4	3.9	0.0	0.0	255.4	311.6
SE		0.9	42.1	3.9	0.0	0.0	182.2	135.3
% Catch		0.3	16.5	1.2	0.0	0.0	82.0	

Tables 10a and 10b present catch rates of the most commercially important demersal species on the shelf down to depths of 100 m, grouped as seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*) and croakers (Sciaenidae). The seabreams dominated both the inner and outer parts of the shelf. *Dentex canariensis*, *Pagrus caeruleostictus* and *Pagellus bellottii* were the important sparids on the inner shelf while *Dentex congoensis* and *D. angolensis* were found mainly on the outer shelf. No grunts were encountered in the sector and croakers and snappers were caught only on the inner shelf.

Table 10. Togo. Catch rates (kg/h) of commercially important demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

## a) Inner shelf, 0-50 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
129	24	5.6	0.0	0.0	0.0	0.0	145.7	151.3
131	48	83.5	6.0	18.6	0.0	8.7	95.0	211.8
134	46	96.4	0.0	2.3	0.0	0.0	81.3	180.0
135	27	66.7	0.0	0.0	0.0	0.0	413.2	479.9
Mean	36	63.0	1.5	5.2	0.0	2.2	183.8	255.8
SE		20.1	1.5	4.5	0.0	2.2	77.7	75.7
% Catch		24.7	0.6	2.0	0.0	0.8	71.9	

## b) Outer shelf, 51-100 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
132	72	15.9	0.0	0.0	0.0	0.0	160.5	176.4
133	88	384.0	0.0	3.6	0.0	0.0	59.3	446.9
Mean	80	199.9	0.0	1.8	0.0	0.0	109.9	311.6
SE		184.1	0.0	1.8	0.0	0.0	50.6	135.3
% Catch		64.2	0.0	0.6	0.0	0.0	35.3	

Table 11 presents swept-area biomass estimates for valuable demersal groups and other groups that occurred in sizeable quantities in the hauls taken off Togo. Estimated total biomass of valuable demersal groups averaged about 1 200 tonnes. Seabreams made up nearly 95% of this total, followed by groupers and croakers. The deepest zone (51-100 m) was the most productive accounting for 59.3% of the total. This was followed by the middle zone (25.5%) and then the shallowest zone (15.2%). Seabreams had the highest biomass in the deepest zone (51-100 m). Surprisingly no croakers or grunts were recorded in the hauls taken in the shallowest zone ( $\leq 30$  m). Of the pelagic and semi-pelagic groups, carangids had the highest estimated biomass. The bigeye grunt was not represented in the catches.

Table 11. Togo. Biomass estimates (tonnes) of important species/groups of fish on the shelf, by depth.

Group / species	0-30 m	31-50 m	51-100 m	Sum	95% confidence limits	
Seabreams	176	245	681	1 102	0	2 392
Grunts	0	5	0	5	5	5
Croakers	0	11	0	11	0	33
Groupers	0	27	6	33	0	77
Snappers	0	8	0	8	0	23
<b>Sum dem. val.</b>	<b>176</b>	<b>296</b>	<b>687</b>	<b>1 159</b>	<b>0</b>	<b>2 460</b>
Bigeye grunt	0	0	0	0	0	0
Carangids	73	101	165	339	16	662
Barracudas	22	3	0	25	0	70

### 5.3 Ghana

Thirty swept-area trawl hauls were made on the shelf off Ghana. In addition 5 bottom-trawl hauls were made in waters deeper than 100 m. Tables 12 a and b present catch rates by main groups for the inner (0-50) and outer (51-100) shelf respectively. The demersal species group had the highest average catch rate on the inner shelf with a relative contribution of 34%. The “other” group contributed 30% to the total followed by the pelagic group, which had a relative contribution of 27%. Cephalopods made up about 7.5% of the catch, while shrimps and sharks were scarce. On the outer shelf the pelagic and “other” group dominated the catches, contributing 42% and 40% respectively to the total. The demersal group had a relative contribution of 17% on this part of the shelf. Cephalopods and sharks both contributed 0.7% to the total catch, whereas no shrimps were found on the outer shelf in Ghana. In general the average catch rates of the three main groups i.e. demersal, pelagic and “other” were higher on the outer shelf than on the inner shelf. The average catch rate of the demersal group was 231 kg/h on the outer shelf as compared to 169 kg/h on the inner shelf. The pelagic and “other” group had catch rates of 573 kg/h and 556 kg/h on the outer shelf, compared to 131 kg/h and 150 kg/h on the inner shelf.

Table 12. Ghana. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
140	45	31.5	41.6	0.1	22.8	0.0	18.4	114.5
141	25	7.3	8.1	0.0	2.1	0.0	127.6	145.1
142	22	15.6	69.3	0.3	9.2	0.0	97.8	192.2
143	34	88.8	0.5	0.0	0.5	0.0	159.1	248.9
146	26	410.3	149.0	0.0	9.1	0.0	172.9	741.2
147	46	17.9	11.7	0.8	23.9	0.0	10.5	64.8
148	50	88.6	84.7	0.3	42.5	20.9	30.2	267.2
152	45	80.4	159.5	0.5	35.4	2.9	60.7	339.4
153	28	672.5	156.9	1.1	54.3	0.0	46.0	930.8
154	35	198.0	1.9	0.0	10.4	0.0	103.7	314.0
155	40	46.2	0.6	0.0	11.0	0.0	51.3	109.2
161	22	27.2	30.4	0.0	377.0	0.0	336.6	771.1
162	40	8.7	1.1	0.0	16.1	0.5	638.5	664.8
169	25	87.4	345.1	0.0	34.3	0.0	345.0	811.8
170	40	26.4	0.0	0.0	1.6	0.0	341.7	369.7
174	47	931.9	1 426.3	0.0	2.4	89.1	366.7	2 816.4
178	35	533.3	70.1	11.0	1.3	0.0	48.4	664.1
189	44	9.6	34.7	0.0	60.3	7.1	13.0	124.8
190	25	23.7	18.9	0.0	15.6	0.0	19.4	77.7
191	26	73.4	14.8	0.0	15.2	0.0	7.5	110.9
Mean	35	168.9	131.3	0.7	37.2	6.0	149.7	493.9
SE		58.1	70.8	0.6	18.3	4.5	38.0	137.8
% Catch		34.2	26.6	0.1	7.5	1.2	30.3	

b) Outer shelf, 51-100 m

Station	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
139	78	180.0	18.2	0.0	8.7	61.4	64.1	332.4
151	81	257.7	320.9	0.0	12.9	0.0	122.6	714.0
156	56	168.4	502.0	0.0	6.0	2.2	154.3	832.8
163	65	45.9	842.5	0.0	44.9	3.3	162.1	1 098.7
171	53	6.3	0.0	0.0	14.8	3.4	44.9	69.4
172	55	383.6	0.0	0.0	5.7	0.0	1 870.1	2 259.4
180	63	0.1	0.0	0.0	0.0	0.0	4.7	4.7
181	86	868.3	2 311.8	0.0	0.0	0.0	92.2	3 272.3
187	60	28.8	594.4	0.0	0.8	0.0	1.2	625.2
188	66	369.0	1 138.5	0.0	3.6	23.0	3 042.3	4 576.4
Mean	66	230.8	572.8	0.0	9.7	9.3	555.8	1 378.5
SE		84.0	230.4	0.0	4.2	6.2	329.0	479.2
% Catch		16.7	41.6	0.0	0.7	0.7	40.3	

Tables 13a and b show catch rates of the most important pelagic families caught in the bottom-trawl hauls. Carangids dominated both on the inner and outer shelf with catch rates of 104 kg/h on the inner shelf and 354 kg/h on the outer shelf. The most frequently occurring species of carangids were *Trachurus trecae*, *Selene dorsalis*, *Decapterus punctatus* and *Chloroscombrus chrysurus*. On the inner shelf, the second most important group was the Clupeids followed by Barracudas. These groups had catch rates of 16 kg/h and 8 kg/h respectively. The most frequently observed clupeid was *Sardinella aurita*. The Scombrids had low catch rates on the inner shelf (0.6 kg/h) but was the second largest group on the outer shelf where the average catch rate was around 122 kg/h. The Clupeids had the third highest catch rate on the outer shelf (96 kg/h). Hairtails (*Trichiurus lepturus*) were only found at two stations, one on the inner and one on the outer shelf, and at low catch rates. Barracudas were absent on the outer shelf.

Table 13. Ghana. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
140	45	0.0	41.6	0.0	0.0	0.0	72.8	114.5
141	25	2.2	5.9	0.0	0.0	0.0	136.9	145.1
142	22	42.8	16.7	0.0	0.0	9.9	122.9	192.2
143	34	0.0	0.5	0.0	0.0	0.0	248.4	248.9
146	26	0.0	12.8	9.1	0.0	127.1	592.2	741.2
147	46	0.0	9.6	0.0	0.0	2.0	53.1	64.8
148	50	4.8	79.9	0.0	0.0	0.0	182.5	267.2
152	45	0.0	146.9	0.0	0.0	12.6	179.9	339.4
153	28	1.7	146.8	0.0	0.0	8.4	773.9	930.8
154	35	0.0	1.9	0.0	0.0	0.0	312.1	314.0
155	40	0.0	0.0	0.0	0.0	0.6	108.6	109.2
161	22	0.1	30.2	0.0	0.0	0.0	740.7	771.1
162	40	0.0	1.1	0.0	0.0	0.0	663.7	664.8
169	25	243.8	99.8	1.4	0.0	0.0	466.6	811.8
170	40	0.0	0.0	0.0	0.0	0.0	369.7	369.7
174	47	0.0	1 426.3	0.0	0.0	0.0	1 390.1	2 816.4
178	35	8.8	16.6	0.0	44.7	0.0	594.0	664.1
189	44	0.7	31.0	1.4	0.0	1.6	90.0	124.8
190	25	0.1	17.4	0.0	0.0	1.3	58.8	77.7
191	26	9.1	2.1	0.0	0.0	3.6	96.1	110.9
Mean	35	15.7	104.4	0.6	2.2	8.4	362.7	493.9
SE		12.2	70.4	0.5	2.2	6.3	76.9	137.8
% Catch		3.2	21.1	0.1	0.5	1.7	73.4	

## b) Outer shelf, 51-100 m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
139	78	0.0	15.2	3.0	0.0	0.0	314.2	332.4
151	81	0.0	320.9	0.0	0.0	0.0	393.1	714.0
156	56	139.3	356.8	5.9	0.0	0.0	330.8	832.8
163	65	28.6	807.2	6.8	0.0	0.0	256.2	1 098.7
171	53	0.0	0.0	0.0	0.0	0.0	69.4	69.4
172	55	0.0	0.0	0.0	0.0	0.0	2 259.4	2 259.4
180	63	0.0	0.0	0.0	0.0	0.0	4.7	4.7
181	86	438.9	918.4	951.8	2.7	0.0	960.5	3 272.3
187	60	151.6	442.0	0.8	0.0	0.0	30.8	625.2
188	66	198.9	684.0	255.6	0.0	0.0	3 437.9	4 576.4
Mean	66	95.7	354.4	122.4	0.3	0.0	805.7	1 378.5
SE		45.2	112.2	95.6	0.3	0.0	361.9	479.2
% Catch		6.9	25.7	8.9	0.0	0.0	58.4	

Catch rates of the most valuable demersal groups on the shelf are presented in Tables 14a and 14b. From these tables it can be seen that the seabreams have the highest catch rates both on the inner and outer shelf with catch rates of 51 kg/h and 72 kg/h respectively. The most common species of seabreams were *Pagellus bellottii*, *Dentex canariensis* and *Pagrus caeruleostictus*. *D. congoensis* was found only on the outer shelf, *D. canariensis* and *Pagrus caeruleostictus* mainly on the inner shelf whereas *Pagellus bellottii* was found both on the inner and outer shelf (See Annex IV). The second most important group on the inner shelf was the snappers with an average catch rate of around 30 kg/h followed by groupers and grunts both with average catch rates of around 6.5-7 kg/h. Croakers had an average catch rate of 4.8 kg/h on the inner shelf. Grunts had the second highest average catch rate on the outer shelf (31 kg/h) followed by groupers and snappers. Croakers were not found on the outer shelf of Ghana.

Annex IV gives the swept-area estimates of mean densities (t/NM<sup>2</sup>) based on 30 random trawl stations for demersal species on the shelf. *Chlamys purpuratus* and *Brachydeuterus auritus* had the highest densities in both of the two shallowest depth zones ( $\leq 30$  m and 31-50 m) followed by *Sepia officinalis hierredda* in the  $\leq 30$  m zone and by *Dasyatis pastinaca* in the 31-50 m zone. *Priacanthus arenatus* had by far the highest mean density in the deepest depth zone (51-100 m) followed by *Chromis cadenati*, *Boops boops* and *Pomadasys incius*. *Priacanthus arenatus* had the highest overall mean density, followed by *Chlamys purpuratus* and *B. auritus*.

Table 14. Ghana. Catch rates (kg/h) of valuable demersal species grouped by families in swept area bottom trawl hauls on the shelf. A: Inner shelf (0-50 m), B: Outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
140	45	28.7	0.0	2.9	0.0	0.0	82.9	114.5
141	25	7.3	0.0	0.0	0.0	0.0	137.8	145.1
142	22	11.3	0.0	0.1	0.0	0.0	180.8	192.2
143	34	60.6	4.6	8.5	0.0	0.0	175.3	248.9
146	26	108.1	289.3	0.0	9.1	3.7	331.0	741.2
147	46	6.6	0.0	0.7	0.2	0.0	57.2	64.8
148	50	53.0	0.0	0.5	0.0	0.0	213.8	267.2
152	45	79.7	0.0	0.0	0.0	0.0	259.7	339.4
153	28	86.4	0.0	0.0	0.0	0.0	844.5	930.8
154	35	103.8	0.4	6.5	61.5	0.0	141.7	314.0
155	40	32.0	0.8	3.4	6.2	0.0	66.7	109.2
161	22	24.3	0.0	0.0	0.0	0.0	746.8	771.1
162	40	8.7	0.0	0.0	0.0	0.0	656.1	664.8
169	25	49.4	0.0	0.0	0.0	0.0	762.3	811.8
170	40	26.4	0.0	0.0	0.0	0.0	343.3	369.7
174	47	305.8	286.8	101.8	46.1	0.0	2 075.8	2 816.4
178	35	0.0	0.0	0.0	2.1	92.9	569.1	664.1
189	44	8.7	0.0	0.2	0.0	0.0	115.8	124.8
190	25	11.4	0.0	10.4	1.9	0.0	53.9	77.7
191	26	13.3	7.6	0.0	4.3	0.0	85.7	110.9
Mean	35	51.3	29.5	6.8	6.6	4.8	395.0	493.9
SE		15.4	19.8	5.1	3.7	4.6	106.1	137.8
% Catch		10.4	6.0	1.4	1.3	1.0	80.0	

b) Outer shelf, 51-100 m

Station	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
139	78	106.4	0.0	73.3	0.0	0.0	152.7	332.4
151	81	151.7	0.0	1.0	0.0	0.0	561.3	714.0
156	56	120.9	45.3	0.3	0.0	0.0	666.4	832.8
163	65	42.4	0.8	2.7	0.0	0.0	1 052.9	1 098.7
171	53	2.1	0.0	0.0	0.0	0.0	67.3	69.4
172	55	34.3	40.4	2.4	306.5	0.0	1 875.8	2 259.4
180	63	0.1	0.0	0.0	0.0	0.0	4.7	4.7
181	86	155.5	0.0	12.8	0.0	0.0	3 104.0	3 272.3
187	60	0.0	0.0	0.0	0.0	0.0	625.2	625.2
188	66	108.9	0.0	0.0	0.0	0.0	4 467.4	4 576.4
Mean	66	72.2	8.6	9.2	30.7	0.0	1 257.8	1 378.5
SE		20.0	5.7	7.2	30.7	0.0	466.4	479.2
% Catch		5.2	0.6	0.7	2.2	0.0	91.2	

Table 15 presents swept-area biomass estimates for the valuable demersal groups and other groups that occur in sizeable quantities. The estimated total biomass was about 26 000

tonnes, of which seabreams made up around 50%. The highest biomass of seabreams was found between depths of 51 and 100 m. Snappers had the second highest biomass with around 5 000 tonnes. Seabreams and snappers together made up around 70% of the total biomass. Snappers had the third highest biomass followed by groupers and croakers. Of the pelagic and semi-pelagic groups, bigeye grunt (*B. auritus*) had an estimated biomass of around 9 000 tonnes. The biomass of carangids was estimated to around 47 000 tonnes.

Table 15. Ghana. Biomass estimates (tonnes) of important species/groups of fish on the shelf, by depth.

Group/species	0-30 m	31-50 m	51-100m	Sum	95% Confidence limits
Seabreams <sup>1</sup>	1 666	5 325	6 355	13 346	7 596 19 096
Grunts <sup>1</sup>	85	929	3 384	4 397	0 10 965
Croakers <sup>1</sup>	14	1 032	0	1 046	0 3 202
Groupers	56	1 176	688	1 921	0 4 151
Snappers <sup>1</sup>	1 511	3 013	798	5 322	0 11 951
<b>Sum dem. val.<sup>1</sup></b>	<b>3 332</b>	<b>11 476</b>	<b>11 224</b>	<b>26 032</b>	<b>11 217 40 847</b>
Bigeye grunt <sup>1</sup>	3 671	4 954	495	9 120	0 20 412
Carangids <sup>1</sup>	1 821	16 512	28 720	47 054	19 407 74 700
Barracudas <sup>1</sup>	791	124	0	915	

<sup>1</sup> Corrected

#### 5.4 Côte d'Ivoire

A total of 32 swept-area trawl hauls were made on the Ivorian shelf. For lack of suitable bottom, no trawl hauls were made in waters deeper than 100 m. Tables 16 a and b show catch rates by main groups for the inner (20-50 m) and outer (51-100 m) shelf. The pelagic group had the highest average catch rate on the inner shelf with a relative contribution of nearly 48% (Table 16 a). The demersal group was the second most important group contributing to 39% of the catches, followed by the group “other”, which had a relative contribution of 10% and cephalopods (2.1%). There were low average catch rates of shrimps and sharks on this part of the shelf. The pelagic group also dominated catches on the outer shelf with a contribution of nearly 47%. This was followed by the demersal group (22.6%), cephalopods (2%) and sharks (1.4%). No shrimps were caught on the outer shelf.

The species of shrimp found in Côte d'Ivoire were *Penaeus notialis*, *P. kerathurus* and small quantities of *Parapenaeus longirostris*. The main species of cephalopods were *Sepia officinalis hierredda*, *Octopus vulgaris* and *Alloteuthis africana*.

Table 16. Côte d'Ivoire. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
195	23	321.3	820.7	16.2	19.2	0.0	182.3	1 359.7
196	37	425.1	17.8	0.0	18.8	0.0	34.9	496.6
199	40	30.5	19.6	0.0	18.1	0.0	25.9	94.1
200	28	4 054.4	405.2	4.0	16.6	0.0	10.1	4 490.2
202	42	267.7	90.0	0.0	29.1	5.9	91.3	483.9
203	26	115.3	13.3	0.0	35.5	0.0	31.4	195.5
204	25	456.1	689.6	0.0	21.6	0.0	1 257.6	2 424.9
208	24	561.1	553.8	2.9	8.4	0.0	12.3	1 138.5
209	47	6.1	81.8	1.3	19.6	1.2	40.4	150.4
212	37	100.3	81.7	8.2	11.6	0.0	27.8	229.6
213	22	268.6	274.0	18.4	97.9	0.0	41.4	700.2
218	21	39.5	117.4	32.0	55.8	0.0	56.8	301.6
219	47	3.5	729.9	0.0	35.8	28.3	19.2	816.7
221	22	258.6	71.2	0.5	10.4	4.4	31.5	376.6
222	41	24.8	4 509.7	0.0	34.7	3.1	197.1	4 769.4
228	40	49.8	23.1	1.6	8.5	0.0	27.6	110.6
229	29	256.8	226.1	2.6	2.6	0.0	45.5	533.7
231	27	275.3	210.1	2.2	3.9	0.0	36.8	528.3
232	37	301.6	83.1	5.1	5.7	1.7	1.6	398.7
239	48	121.4	1 065.7	0.1	0.3	0.0	1.6	1 189.0
240	47	407.5	81.1	1.0	3.7	0.0	12.1	505.4
Mean	34	397.4	484.0	4.6	21.8	2.1	104.1	1 014.0
SE		186.3	212.3	1.8	4.9	1.4	58.8	287.6
% Catch		39.2	47.7	0.4	2.1	0.2	10.3	

b) Outer shelf, 51-100 m

Station	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
197	61	641.9	68.6	0.0	3.0	16.8	41.2	771.3
198	57	126.0	1 502.4	0.0	19.2	95.9	2 007.6	3 751.1
201	93	234.4	535.8	0.0	26.8	7.4	315.8	1 120.2
205	67	458.0	163.4	0.0	19.5	1.8	187.9	830.6
210	65	145.1	499.6	0.0	31.2	0.0	75.4	751.3
211	69	50.4	25.4	0.0	28.0	2.8	43.1	149.7
220	87	177.4	0.1	0.0	6.8	0.0	18.7	203.0
223	62	67.9	52.3	0.0	22.9	6.2	69.8	219.1
227	86	309.9	6.7	0.0	5.2	4.8	81.5	408.0
237	66	71.4	1 852.6	0.0	33.5	0.0	8.7	1 966.2
241	56	95.4	216.1	0.1	17.3	6.7	10.8	346.4
Mean	70	216.2	447.5	0.0	19.4	12.9	260.0	956.1
SE		56.3	193.2	0.0	3.2	8.4	176.9	321.7
% Catch		22.6	46.8	0.0	2.0	1.4	27.2	

Tables 17a and b show the catch rates of the most important pelagic families caught in the bottom trawls. The clupeids were the dominant pelagic group on the inner shelf with an average catch rate of around 259 kg/h constituting 25.6% of the catch (Table 17a). The clupeid species that occurred most frequently were the sardinellas, *Sardinella aurita*, *S. maderensis* and *S. rouxi*. The anchovy, *Engraulis encrasicolus* and *Ilisha africana* were also found. The second most important group was the carangids, which contributed 17.5% to the total. The most frequently caught species of this group were *Chloroscombrus chrysurus* and *Selene dorsalis*. Hairtails (*Trichiurus lepturus*) contributed 4%, while scombrids and barracudas added little to the total catch. The carangids had the highest average catch rate on the outer shelf (347 kg/h or 36.3% of the catch) followed by hairtails (78 kg/h or 8.2%). The most frequently caught carangid on the outer shelf was *Trachurus trecae*, which also had the highest catch rates of this group. The main clupeid species was *S. aurita*. The catch rate of barracudas on the outer shelf was 1.1 kg/h, which is lower than on the inner shelf where the catch rate was 4.7 kg/h.

Table 17. Côte d'Ivoire. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
195	23	83.7	621.9	0.0	30.5	84.6	539.0	1 359.7
196	37	0.2	15.2	0.0	0.0	2.5	478.7	496.6
199	40	0.2	19.3	0.0	0.0	0.0	74.5	94.1
200	28	29.1	376.1	0.0	0.0	0.0	4 085.0	4 490.2
202	42	0.0	89.0	0.9	0.0	0.0	394.0	483.9
203	26	0.0	10.2	0.0	3.1	0.0	182.2	195.5
204	25	66.5	623.2	0.0	0.0	0.0	1 735.3	2 424.9
208	24	0.9	518.8	0.3	33.6	0.2	584.6	1 138.5
209	47	0.0	56.9	0.8	24.2	0.0	68.6	150.4
212	37	0.8	25.9	0.0	54.0	1.0	147.9	229.6
213	22	148.3	17.3	1.8	106.6	0.0	426.2	700.2
218	21	35.0	10.7	0.0	68.2	3.5	184.2	301.6
219	47	665.9	22.2	0.0	41.7	0.0	86.9	816.7
221	22	7.6	9.0	0.0	54.4	0.2	305.4	376.6
222	41	4 108.0	379.4	20.5	0.0	1.8	259.8	4 769.4
228	40	0.0	6.8	0.0	14.6	1.8	87.5	110.6
229	29	187.5	15.4	0.0	23.3	0.0	307.5	533.7
231	27	110.8	33.2	0.0	64.0	2.2	318.2	528.3
232	37	0.0	9.7	0.0	73.3	0.0	315.6	398.7
239	48	0.3	786.2	0.0	279.2	0.0	123.3	1 189.0
240	47	0.4	70.0	0.0	10.2	0.5	424.2	505.4
Mean	34	259.3	177.0	1.2	41.9	4.7	529.9	1 014.0
SE		195.1	55.9	1.0	13.6	4.0	193.7	287.6
% Catch		25.6	17.5	0.1	4.1	0.5	52.3	

## b) Outer shelf, 51-100 m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
197	61	0.0	65.3	2.1	1.2	0.0	702.8	771.3
198	57	14.4	1 464.0	12.0	0.0	12.0	2 248.7	3 751.1
201	93	0.0	531.0	4.8	0.0	0.0	584.4	1 120.2
205	67	1.4	48.4	0.0	113.6	0.0	667.2	830.6
210	65	0.0	486.8	9.6	3.2	0.0	251.7	751.3
211	69	0.0	7.6	0.0	17.8	0.0	124.4	149.7
220	87	0.0	0.1	0.0	0.0	0.0	202.9	203.0
223	62	0.0	39.6	0.1	12.6	0.0	166.8	219.1
227	86	0.3	2.9	0.5	2.9	0.0	401.3	408.0
237	66	0.0	1 175.2	0.0	677.4	0.0	113.6	1 966.2
241	56	181.7	0.0	0.3	34.1	0.0	130.3	346.4
Mean	70	18.0	347.4	2.7	78.4	1.1	508.5	956.1
SE		16.4	157.4	1.3	60.7	1.1	186.6	321.7
% Catch		1.9	36.3	0.3	8.2	0.1	53.2	

Catch rates of the most valuable demersal groups on the shelf are presented in Tables 18a and b. From Table 18a it can be seen that the catch rates of the valuable demersal species on the inner shelf were low. Among these, seabreams had the highest catch rate of 24.1 kg/h, and a relative contribution to the total catch of 13.2%. This was followed by croakers (13.6 kg/h) and grunts (12.1 kg/h). *Pomadasys incisus* and *P. rogeri* occurred in 21% and 12% of trawl hauls respectively. Snappers and groupers did not contribute significantly to the catch in the inner shelf. On the outer shelf, seabreams dominated the valuable demersal species with a relative contribution of nearly 11% and an average catch rate of 103 kg/h. *Dentex angolensis*, *Pagellus bellottii* and *D. canariensis* were the most frequently occurring seabreams. Croakers, with *Pteroscion peli* and *Umbrina canariensis*, constituted the second most important group (4.1%) followed by grunts and groupers. Snappers made up only 0.1% of the catch on the outer shelf. On both the inner and outer shelves, non-valuable demersal species made up a large percentage of the catch (95% on the inner and 82.2% on the outer).

Table 18. Côte d'Ivoire. Catch rates (kg/h) of valuable demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0-50 m

Station	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
195	23	6.9	3.6	0.0	32.3	43.9	1 273.1	1 359.7
196	37	2.1	0.0	0.0	4.1	0.0	490.4	496.6
199	40	9.1	0.0	0.0	15.5	0.0	69.5	94.1
200	28	2.6	0.0	2.6	0.0	0.0	4 485.0	4 490.2
202	42	267.4	0.0	0.0	0.0	0.0	216.5	483.9
203	26	89.6	0.0	0.0	4.2	0.0	101.7	195.5
204	25	65.6	0.0	0.0	0.0	0.0	2 359.3	2 424.9
208	24	2.2	0.0	0.0	0.0	8.4	1 127.9	1 138.5
209	47	2.7	0.0	2.3	0.0	0.0	145.4	150.4
212	37	1.0	0.0	0.0	0.0	21.4	207.2	229.6
213	22	0.0	0.0	0.0	0.0	72.0	628.2	700.2
218	21	0.0	0.0	0.0	0.0	39.0	262.5	301.6
219	47	3.5	0.0	0.0	0.0	0.0	813.2	816.7
221	22	4.4	0.0	4.0	4.2	14.0	350.1	376.6
222	41	24.8	0.0	0.0	0.0	0.0	4 744.6	4 769.4
228	40	5.4	0.0	0.5	0.2	0.0	104.5	110.6
229	29	0.0	0.0	0.0	174.9	48.2	310.6	533.7
231	27	0.0	0.0	1.2	3.4	36.6	487.0	528.3
232	37	0.0	0.0	0.0	12.5	2.7	383.5	398.7
239	48	0.0	0.0	0.0	0.0	0.0	1 189.0	1 189.0
240	47	18.4	0.0	0.0	2.2	0.0	484.8	505.4
Mean	34	24.1	0.2	0.5	12.1	13.6	963.5	1 014.0
SE		13.2	0.2	0.2	8.3	4.7	290.1	287.6
% Catch		2.4	0.0	0.0	1.2	1.3	95.0	

b) Outer shelf, 51-100 m

Station	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
197	61	196.2	0.0	38.8	236.6	114.6	185.2	771.3
198	57	24.0	0.0	0.0	0.0	0.0	3 727.1	3 751.1
201	93	116.2	0.0	0.0	0.0	59.8	944.2	1 120.2
205	67	223.0	0.0	1.2	13.0	180.6	412.8	830.6
210	65	80.0	5.6	0.0	0.0	0.0	665.7	751.3
211	69	28.6	0.0	0.2	0.0	2.4	118.5	149.7
220	87	159.8	0.0	0.0	0.0	0.0	43.2	203.0
223	62	40.9	0.0	11.3	0.0	0.0	166.9	219.1
227	86	153.8	0.0	2.4	0.0	58.6	193.2	408.0
237	66	23.2	0.0	0.0	0.0	17.8	1 925.2	1 966.2
241	56	87.0	0.0	1.2	0.0	0.0	258.2	346.4
Mean	70	103.0	0.5	5.0	22.7	39.4	785.5	956.1
SE		21.7	0.5	3.5	21.4	18.1	337.1	321.7
% Catch		10.8	0.1	0.5	2.4	4.1	82.2	

Appendix IV gives the swept-area estimates of mean densities ( $t/NM^2$ ) based on 32 random trawl stations for demersal species on the shelf. As in last year's survey, *Brachydeuterus auritus* had the highest mean densities in both of the two depth zones (0-30 m, 31-50 m) on the inner shelf. The species occurred in 65% of the hauls. It was followed by *Priacanthus arenatus* in the shallowest depth zone and *P. bellottii* in the 31-50 m zone. *Priacanthus arenatus* was the most dominant species in the 51-100 m depth zone followed by *D. angolensis* and *P. bellottii* the latter of which occurred in 76% of the hauls. The cephalopod *Sepia officinalis hierredda* recorded the highest percentage incidence occurring in 31 of the 32 hauls.

Table 19 presents the swept-area biomass estimates for the valuable demersal groups and other groups that occur in sizeable quantities. The estimated total biomass of valuable demersal groups was about 11 000 tonnes of which seabreams made up almost 60%. The highest biomass of seabreams was found in the 51-100 m depth zone. Croakers had the second highest biomass with nearly 3 000 tonnes. This was followed by croakers, grunts and snappers.

Of the pelagic and semi-pelagic species, Carangids had the highest estimated biomass (about 26 000 tonnes), followed by bigeye grunt (*B. auritus*) with 14 000 tonnes, while few barracudas were caught in the hauls.

Table 19. Côte d'Ivoire. Biomass estimates (tonnes) of important species/groups of fish on the shelf, by depth.

Group/species	0-30 m	31-50 m	51-100m	Sum	95% Confidence limits
Seabreams <sup>1</sup>	332	764	5 569	6 666	3 999 9 332
Grunts <sup>1</sup>	512	70	1 085	1 667 0	3 870
Croakers <sup>1</sup>	552	42	2 137	2 731 741	4 721
Groupers	17	7	259	283 0	647
Snappers <sup>1</sup>	6	0	32	38 0	104
<b>Sum dem. val.<sup>1</sup></b>	<b>1 419</b>	<b>883</b>	<b>9 083</b>	<b>11 385 5 455</b>	<b>17 315</b>
Bigeye grunt <sup>1</sup>	11 508	2 657	81	14 245 0	30 559
Carangids <sup>1</sup>	4 369	2 944	19 056	26 369 0	54 119
Barracudas <sup>1</sup>	180	14	65	259	

<sup>1</sup> Corrected

## 5.5 Review of results

Table 20 summarizes the catch rates of valuable demersal groups and a few other common groups in the four regions covered during the present survey. Average catch rates for the whole shelf area from 0 to 100 m is used in the comparisons.

Table 20. Comparison of mean catch rates (kg/h) of valuable demersal and some other groups in swept-area bottom -trawl hauls on the shelf (0-100 m) off Benin, Togo, Ghana and Côte d'Ivoire for the Nansen surveys of 1999 and 2000.

Group/species	Togo-Benin	Benin	Togo	Ghana		Côte d'Ivoire	
	1999	2000	2000	1999	2000	1999	2000
Seabreams	28.6 <sup>1</sup>	29.9	108.7	32.8 <sup>1</sup>	58.3	26.1 <sup>1</sup>	51.2
Grunts	0.9	3.5	0.0	7.1	14.6	6.6	15.7
Croakers	4.6	2.9	1.5	0.7	3.2	9.5	22.5
Groupers	10.3	2.3	4.1	2.5	7.6	2.5	2.1
Snappers	0.3	1.3	1.0	0.7	22.5	2.3	0.3
<b>Sum dem. val.</b>	<b>44.7<sup>1</sup></b>	<b>39.9</b>	<b>115.3</b>	<b>43.8<sup>1</sup></b>	<b>106.2</b>	<b>47.0<sup>1</sup></b>	<b>91.8</b>
Bigeye grunt	5.5	10.1	0.6	213.4	39.1	91.9	216.3
Carangids	37.0	64.2	35.9	33.3	187.7	62.2	235.5
Barracudas	6.3	4.7	2.0	5.9	5.6	13.2	3.5

<sup>1</sup> Corrected

For this year's survey the highest overall catch rate of valuable demersal fish was in Togolese waters (115.3 kg/h). This high catch rate in Togo was caused by one big catch of seabreams of 384 kg/h at station 133 (Table 10). As only 6 stations were sampled in Togo, this high catch rate had a strong influence on the final result. The corresponding catch rates in Benin, Ghana and Côte d'Ivoire were around 40 kg/h, 106 kg/h and 92 kg/h respectively. Seabreams was the major group in all of the four countries followed by snappers and grunts in Ghana, croakers and grunts in Côte d'Ivoire and grunts and croakers in Benin.

Of the separate species groups, the highest catch rate of seabreams was in Togo (115.3 kg/h) followed by Ghana (58.3 kg/h), Côte d'Ivoire (51.2 kg/h) and Benin (29.9 kg/h). The catch rate of snappers was highest in Ghana (22.5 kg/h) but very low in the other three areas. Côte d'Ivoire had the highest catch rates of croakers (22.5 kg/h). The other zones had low catch rates of croakers, ranging from 3.2 kg/h in Ghana to 2.9 kg/h in Benin and 1.5 kg/h in Togo. Ghana had the highest catch rate of Groupers followed by Togo. For grunts and the bigeye grunt (*Brachydeuterus auritus*) catch rates were highest in Côte d'Ivoire, 15.7 and 216.3 kg/h respectively. The corresponding rates were 14.6 and 39.1 kg/h for Ghana, and 3.5 and 10.1 kg/h for Benin. The catches of grunts and big-eye grunt in Togo were negligible.

Carangids were most abundant in Côte d'Ivoire followed Ghana, Benin and Togo. Catch rates of barracudas was highest in Ghana followed by Benin.

Table 21 summarizes the biomass estimates for the four sectors covered in this survey and the three sectors covered in the 1999 survey. The shelf area in each sector is also given. Due to a much shorter coastline and also a narrower shelf than off Ghana, Benin and Togo had the lowest biomass of most fish groups. In this year's the biomass of seabreams was highest off Ghana. Grunt and bigeye grunt was more abundant in Côte d'Ivoire than in the three other areas.

When comparing the results of last year's survey with this year's one should take cognisance of the fact that the two surveys were conducted in two different seasons. Whereas the 1999 survey was conducted during the thermocline season, this year's survey was conducted during the upwelling season.

Table 21. Biomass estimates (tonnes) of valuable demersal species and some other groups from swept-area bottom-trawl hauls on the shelf (0-100 m) off Benin, Togo, Ghana and Côte d'Ivoire from the 1999 and 2000 survey. The shelf area ( $\text{NM}^2$ ) in each area is given.

Group/ Species	Benin -Togo	Benin	Togo	Ghana		Côte d'Ivoire		Total	
	1999	2000	2000	1999	2000	1999	2000	1999	2000
Seabreams	823	700 <sup>1</sup>	1 102	8 478	13 346 <sup>1</sup>	3 457 <sup>1</sup>	6 666 <sup>1</sup>	12 758 <sup>1</sup>	21 814 <sup>1</sup>
Grunts	59	66 <sup>1</sup>	5	1 431	4 397 <sup>1</sup>	417	1 667 <sup>1</sup>	1 907	6 135 <sup>1</sup>
Croakers	280	83	11	125	1 046 <sup>1</sup>	941	2 731 <sup>1</sup>	1 346	3 871 <sup>1</sup>
Groupers	312	59	33	557	1 921	305	283	1 174	2 296
Snappers	22	34	8	151	5 322 <sup>1</sup>	145	38	318	5 402 <sup>1</sup>
<b>Sum dem. val.</b>	<b>1 495</b>	<b>942<sup>1</sup></b>	<b>1 159</b>	<b>10 743</b>	<b>26 032<sup>1</sup></b>	<b>5 265</b>	<b>11 385<sup>1</sup></b>	<b>17 503<sup>1</sup></b>	<b>39 518<sup>1</sup></b>
Bigeye grunt	171	222 <sup>1</sup>	0	70 314	9 120 <sup>1</sup>	9 913	14 245 <sup>1</sup>	80 398	23 587 <sup>1</sup>
Carangids	1 143	1 490	339	6 860	47 054 <sup>1</sup>	5 477	26 369 <sup>1</sup>	13 480	75 252 <sup>1</sup>
Barracudas	246	102	25	1 084	915 <sup>1</sup>	811	259 <sup>1</sup>	2 141	1 301 <sup>1</sup>
Area ( $\text{NM}^2$ )									
0-100 m	1 092	765	327	6 227	6 227	2 883	2 883	10 202	10 202

<sup>1</sup> Corrected

## CHAPTER 6 FISHING TRIALS ON THE DEEP CONTINENTAL SHELF AND UPPER SLOPE

---

Following the interest expressed by Ghana to have a fair idea about fishery resources in waters deeper than 100 m, an effort was made during the survey to trawl at such depths. Generally, trawling at such depths was extremely difficult because of uneven bottom topography. Seven hauls were made as follows: 1 each in the Benin and Togo and 5 in the Ghana at depths of between 99 and 360 m (Table 22). No deep water hauls were made in the Côte d'Ivoire because of general lack of suitable bottom conditions there where the continental shelf is very narrow and the slope is extremely steep.

Table 22: Positions, catch rates and principal species encountered in trawl hauls taken beyond 100 m depth

Sector	Position		Depth (m)	Catch (kg/h)	Top three species caught at the station
	Latitude	Longitude			
Benin	06° 06'N	02° 29'E	125-113	293.2	<i>Dentex congensis</i> <i>Dentex angolensis</i> <i>Squatina oculata</i>
Togo	05° 53'N	01° 16'E	287-299	315.5	<i>Rhizoprionodon acutus</i> <i>Squatina oculata</i> <i>Chlorophthalmus atlanticus</i>
Ghana	05° 32'N	00° 16'W	323-336	1 188.9	<i>Hypoclydonia bella</i> <i>Chlorophthalmus atlanticus</i> <i>Setarches guentheri</i>
	04° 53'N	00° 32'W	99-109	2 950.1	<i>Priacanthus arenatus</i> <i>Promethichthys prometheus</i> <i>Ephippion guttifer</i>
	04° 40'N	00° 45'W	121-126	158.2	<i>Antigonia capros</i> <i>Dentex congensis</i> <i>Zeus faber</i>
	04° 22'N	02° 00'W	253-199	650.0	<i>Zenopsis conchifer</i> <i>Chlorophthalmus atlanticus</i> <i>Ariommata bondi</i>
	04° 29'N	02° 17'W	317-328	370.4	<i>Chlorophthalmus atlanticus</i> <i>Parasudis fraser-bruenneri</i> <i>Zenopsis conchifer</i>

Catch rates of between 150 and 3 000 kg/h (average of 846.6 kg/h) were obtained from the seven hauls. The average catch rate amounted to a stock density of 26.48 t/NM<sup>2</sup> for all species combined. The corresponding figure for the area between 20 and 100 m was

14.51 t/NM<sup>2</sup> implying much higher catch rates on the upper continental slope than on the shelf. However, whereas catch rates of commercially important species on the shelf were high, other less known species made up the bulk of the catch at the deeper stations. Table 22 also gives the three most abundant species recorded in each deep.

Table 23. Deep stations: catch rates (kg/h) of the most abundant species and ‘others’ in the swept-area bottom trawl hauls, 100-400 m.

Station	Depth	Sparidae	Merluccidae	Priacanthus	<i>Aristeus varidens</i>	<i>Parapenaeus longirostris</i>	Other	Total
126	119	249.4	0.0	1.3	0.0	0.0	42.5	293.2
136	293	0.0	0.0	0.0	2.6	7.9	304.9	315.5
149	330	0.0	8.0	0.0	0.0	17.5	1 163.4	1 188.9
157	104	8.0	0.0	2 767.4	0.0	0.0	174.8	2 950.1
164	124	39.3	0.0	2.2	0.0	0.0	116.7	158.2
182	226	16.1	0.0	0.0	0.0	0.0	633.9	650.0
183	323	0.0	6.8	0.0	0.0	0.4	363.1	370.4
Mean	217	44.7	2.1	395.8	0.4	3.7	399.9	846.6
SE		34.5	1.4	395.3	0.4	2.6	290.1	287.6
% Catch		5.3	0.3	46.8	0.0	0.4	47.2	

The most abundant species was *Priacanthus arenatus* with a mean catch rate of 395.8 kg/h (Table 23) but it was not encountered beyond 200 m depth (Table 22). Seabreams constituted an important group of species with an average catch rate of 44.7 kg/h and the most abundant seabreams were the Congo dentex (*Dentex congoensis*) and the Angola dentex (*Dentex angolensis*). The deep-water shrimp (*Parapenaeus longirostris*) was the most abundant shrimp found in this depth range. The species occurred in 43% of the hauls and had a mean catch rate of 3.7 kg/h. Merluccidae (hake) also occurred in these hauls with an average catch rate of 2.1 kg/h.

Table 24 shows the 15 most abundant species (with their common English names) that made up at least 1% of the catch in all 7 hauls and their overall assessed density. At the top of the list is the bigeye (*Priacanthus arenatus*). The next three most abundant species; namely *Hypoclydonia bella*, *Chlorophthalmus atlanticus* and *Zenopsis conchifer* were encountered beyond 200 m depth. Other species that occurred in over 50% of the hauls were the Atlantic greeneye (*Chlorophthalmus atlanticus*), the smoothback angelshark (*Squatina oculata*) and the piper gurnard (*Trigla lyra*).

Table 24. Common English names, mean density and percent incidence of the top 15 species that occurred in the deep hauls.

Rank	Scientific Name	Common English Name	Mean Density	% incidence
1	<i>Priacanthus arenatus</i>	Atlantic bigeye	12.37	43
2	<i>Hypoclydonia bella</i>	-	2.67	29
3	<i>Chlorophthalmus atlanticus</i>	Atlantic greeneye	2.56	57
4	<i>Zenopsis conchifer</i>	Silvery John dory	1.17	29
5	<i>Dentex congensis</i>	Congo dentex	0.91	43
6	<i>Dentex angolensis</i>	Angola dentex	0.65	43
7	<i>Promethichthys prometheus</i>	Promethean escolar	0.61	43
8	<i>Squatina oculata</i>	Smoothback angelshark	0.55	57
9	<i>Rhizoprionodon acutus</i>	Milk shark	0.47	14
10	<i>Setarches guentheri</i>	Deepwater scorpionfish	0.44	29
11	<i>Parasudis fraser-bruenneri</i>	Greeneye	0.37	29
12	<i>Antigonia capros</i>	Common boarfish	0.30	14
13	<i>Ariomma bondi</i>	Silver-rag driftfish	0.29	43
14	<i>Trichiurus lepturus</i>	Hairtail / Ribbonfish	0.24	14
15	<i>Trigla lyra</i>	Piper gurnard	0.24	57

## REFERENCES

- Anon. 1989. Surveys of the small pelagic fish resources of Côte d'Ivoire and Ghana, 12-20 October 1989. NORAD/UNDP/FAO Programme. Reports of surveys with R/V Dr. Fridtjof Nansen. Institute of Marine Research, Bergen, November 1989. 14 pp.
- Koranteng, K. A. and O. Pezennec (1998): Variability and Trends in Environmental Time Series along the Ivorian and Ghanaian Coasts, pp 167-177 In Global versus Local Changes in Upwelling Systems, edited by Durand M.-H., *et al.* ORSTOM Editions, Paris.
- Marchal E. and J. Picaut 1977. Répartition et abondance évaluées par échointégration des poissons du plateau continental ivoiro-ghanéen en relation avec les upwellings locaux. *Journal Recherches Océanographiques* 2, 39 - 57.
- Mehl, S., Alvheim, O., Koranteng, K. and M. Tandstad, 1999. Surveys of the fish resources of the western Gulf of Guinea (Benin, Togo, Ghana, Côte d'Ivoire). Survey of the pelagic and demersal resources 19 April-6 May 1999. Preliminary cruise report. Cruise reports Dr. Fridtjof Nansen, Institute of Marine Research, Bergen, Norway
- Pezennec O. and F.-X. Bard (1992). Importance écologique de la petite saison d'upwelling ivoiro-ghanéenne et changements dans la pêcherie de *Sardinella aurita*. *Aquatic Living Resources* 5, 249 - 259.
- Strømme, T., Føyn, L. and G.S. Sætersdal, 1983. Survey of the offshore sub-surface community from Togo to Cameroon and of the shelf from Equatorial Guinea to the Congo Aug-Sep 1981. Reports on surveys with the Dr. Fridtjof Nansen, Institute of Marine Research, Bergen, Norway, 29 p.
- Strømme T. 1984. Report on the R/V DR FRIDTJOF NANSEN fish resource survey off West Africa: Morocco to Ghana and Cape Verde Islands May 1981-March 1982. CECAF/ECAF Series 84/29, FAO, Rome.
- Strømme T. 1992. NAN-SIS: Software for fishery survey data logging and analysis. User's manual. *FAO Computerized Information Series (Fisheries)*. No. 4. Rome, FAO. 1992. 103 p.
- Williams F. 1968. Report on the Guinean Trawling Survey, Organisation of African Unity Scientific and Technical Research Commission (99).

## Annex I Records of fishing stations

PROJECT STATION: 115  
 DATE: 30/ 8/00 GEAR TYPE: BT No:7 POSITION:Lat N 609  
 start stop duration Long E 159  
 TIME :10:39:03 11:09:41 31 (min) Purpose code: 3  
 LOG :1274.01 1275.51 1.47 Area code: 4  
 FDEPTH: 52 61 GearCond.code: 4  
 BDEPTH: 52 61 Validity code:  
 Towing dir: 180° Wire out: 180 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 53.27 CATCH/HOUR: 103.10

SPECIES  
 weight numbers  
*Sepia officinalis hierredda* 20.9 52 20.65  
*Epinephelus aeneus* 17.11 21 16.60  
*Squatina oculata* 11.46 2 11.12  
*Lutjanus fulgens* 8.52 14 8.26 315  
*Pagrus caeruleostictus* 6.85 19 6.64 312  
*Allotomus thompsoni* 6.74 1757 6.54  
*Zeus faber* 4.06 2 3.94  
*Dentex canariensis* 3.41 21 3.31  
*Fistularia petimba* 3.10 17 3.01  
*Pseudupeneus prayensis* 2.86 39 2.77 316  
*Pagellus bellottii* 1.97 31 1.91 314  
*Alectis alexandrinus* 1.94 2 1.88  
*Aluterus punctatus* 1.94 2 1.88  
*Sea urchins (strong spines)* 1.59 19 1.54  
*Torpedo marmorata* 1.55 2 1.39  
*Ananthurus mediterraneus* 1.43 2 1.39  
*Scomberoides stephani* 1.08 2 1.05  
*Octopus vulgaris* 1.01 2 0.98  
*Brachionichthys semifasciatus* 0.62 2 0.60  
*Sardinella maderensis* 0.58 4 0.56  
*Dentex canariensis* 0.58 2 0.56 313  
*Sardinella aurita* 0.41 4 0.40  
*Syacium micrurum* 0.33 93 0.32  
*Saurida brasiliensis* 0.33 81 0.32  
*Dentex gibbosus* 0.29 2 0.28 317  
*Chilomycterus spinosus mauret.* 0.27 2 0.26  
*Chascanopsetta lugubris* 0.27 14 0.26  
*Syacium micrurum* 0.27 31 0.26  
*Lepidotrigla cadmami* 0.23 10 0.22  
*Grammoplites gruveli* 0.23 10 0.22  
*Dentex canariensis* 0.19 8 0.18  
*Lophiodes kempfi* 0.15 2 0.15  
*Sphoeroides marmoratus* 0.12 4 0.12  
*PCTINIDAE* 0.12 4 0.12  
*Decapterus punctatus* 0.08 6 0.08  
*Serranus accrescens* 0.04 2 0.04  
*Microchirus frechkopi* 0.04 2 0.04  
*Bothus podas africanus* 0.04 6 0.04  
*Selene dorsalis* 0.02 6 0.02

Total 103.12 100.02

PROJECT STATION: 118  
 DATE: 30/ 8/00 GEAR TYPE: BT No:7 POSITION:Lat N 615  
 start stop duration Long E 215  
 TIME :15:39:18 16:09:10 30 (min) Purpose code: 3  
 LOG :1304.26 1306.08 1.81 Area code: 4  
 FDEPTH: 23 24 GearCond.code: 4  
 BDEPTH: 23 24 Validity code:  
 Towing dir: 90° Wire out: 180 m Speed: 30 kn\*10

Sorted: 53 Kg Total catch: 114.38 CATCH/HOUR: 228.76

SPECIES  
 weight numbers  
*Engraulis encrasiculus* 118.38 69970 51.75 326  
*Chloroscombrus chrysurus* 31.84 286 13.92  
*PERCINIDAE* 14.00 6.12  
*Sphyraena guachancho* 8.30 34 3.63 330  
*Galeoides decadactylus* 8.00 72 3.60  
*Brachydeuterus auritus* 5.92 200 2.59  
*Selene dorsalis* 5.50 28 2.40  
*Sphyraena afra* 5.06 2 2.21  
*Elops lacerta* 4.86 10 2.12  
*Ephippion guttifer* 3.86 4 1.69  
*Salar crumenophthalmus* 3.70 18 1.62  
*Pseudotolithus senegalensis* 3.34 6 1.46 329  
*Sphyraena sphyraena* 2.74 8 1.20  
*Dentex canariensis* 2.34 4 1.02 328  
*Caranx hippos* 2.08 6 0.91  
*Sardinella maderensis* 1.56 4 0.68  
*Pagellus caeruleostictus* 1.56 2 0.68  
*Alectis alexandrinus* 1.48 2 0.65  
*Sardinella aurita* 1.40 286 0.67 325  
*Albula vulpes* 1.14 2 0.50  
*Lethrinus atlanticus* 0.54 2 0.24  
*Drepane africana* 0.52 2 0.23  
*Chaetodipterus goorensis* 0.40 2 0.17  
*Balistes capricornis* 0.36 2 0.16  
*Penaeus kerathurus* 0.10 4 0.04

Total 228.88 100.06

PROJECT STATION: 119  
 DATE: 30/ 8/00 GEAR TYPE: BT No:7 POSITION:Lat N 612  
 start stop duration Long E 217  
 TIME :16:44:25 17:14:31 30 (min) Purpose code: 3  
 LOG :1310.10 1311.42 1.28 Area code: 4  
 FDEPTH: 42 46 GearCond.code:  
 BDEPTH: 42 46 Validity code:  
 Towing dir: 270° Wire out: 160 m Speed: 30 kn\*10

Sorted: 52 Kg Total catch: 97.59 CATCH/HOUR: 195.18

SPECIES  
 weight numbers  
*Brachydeuterus auritus* 69.76 3680 35.74 332  
*Brachydeuterus auritus* Juv. 30.00 5252 15.37  
*Pomadasys jubelini* 19.44 24 9.96 331  
*Penaeus notialis* 15.96 952 8.18  
*Sepia officinalis hierredda* 10.62 20 5.44  
*Raja miraletus* 7.20 40 3.69  
*Selene dorsalis* 6.80 20 3.48  
*Trichiurus lepturus* 4.08 388 2.09  
*Cymbium cymbium* 3.56 2 1.82  
*Lutjanus fulgens* 2.76 4 1.41  
*Pagrus caeruleostictus* 2.72 4 1.39  
*Syacium micrurum* 2.64 108 1.35  
*Cynoglossus senegalensis* 2.64 8 1.35  
*Pomadasys incisus* 1.96 12 1.00  
*Salar crumenophthalmus* 1.76 8 0.90  
*Sturnus fiafola* 1.68 4 0.86  
*Sphyraena guachancho* 1.64 28 0.84  
*Scyllarides herklotsii* 1.56 284 0.80  
*Galeoides decadactylus* 1.44 20 0.74  
*Grammoplites gruveli* 1.36 84 0.70  
*Fistularia petimba* 1.28 4 0.66  
*Psettodes belcheri* 1.20 4 0.61  
*Calappa pelii* 0.88 24 0.45  
*Pagellus bellottii* 0.80 8 0.41  
*Priacanthus arenatus* 0.48 4 0.25  
*Dactylopterus volitans* 0.36 4 0.18  
*Chloroscombrus chrysurus* 0.36 4 0.18  
*Brotula barbata* 0.12 8 0.06  
*Lepidotrigla cadmami* 0.12 4 0.06

Total 195.18 99.97

PROJECT STATION: 120  
 DATE: 30/ 8/00 GEAR TYPE: BT No:7 POSITION:Lat N 609  
 start stop duration Long E 216  
 TIME :17:47:26 18:17:07 30 (min) Purpose code: 3  
 LOG :1314.93 1316.61 1.68 Area code: 4  
 FDEPTH: 64 64 GearCond.code:  
 BDEPTH: 64 64 Validity code:  
 Towing dir: 110° Wire out: 220 m Speed: 30 kn\*10

Sorted: 24 Kg Total catch: 57.10 CATCH/HOUR: 114.20

SPECIES  
 weight numbers  
*Dentex angolensis* 18.82 154 16.48 334  
*Pagellus bellottii* 18.42 490 16.13  
*Sepia officinalis hierredda* 16.76 56 14.68  
*Priacanthus arenatus* 9.54 262 8.35  
*Aluterus sp.* 8.34 6 7.30  
*Lepidotrigla cadmami* 7.40 236 6.48  
*Umbrin canariensis* 4.70 20 4.12  
*Sepia officinalis hierredda* 3.90 268 3.2  
*Sturnus fiafola* 3.50 68 3.06  
*Dentex congoides* 2.82 60 2.47  
*Chilomycterus spinosus mauret.* 2.68 14 2.35  
*Bothus podas africanus* 2.42 310 2.12  
*Raja miraletus* 2.16 6 1.89  
*Grammoplites gruveli* 2.16 134 1.89  
*Squatina oculata* 1.88 2 1.65  
*Brotula barbata* 1.74 14 1.52  
*Syacium micrurum* 1.48 268 1.30  
*Brachydeuterus auritus* 1.48 134 1.30  
*Trichiurus lepturus* 1.36 2 1.19  
*Cymbium cymbium* 0.76 2 0.67  
*Torpedo marmorata* 0.54 6 0.47  
*Muraena sp.* 0.54 6 0.47  
*Selene dorsalis* 0.48 25 0.42  
*Penaeus notialis* 0.48 60 0.42

Total 114.36 100.15

PROJECT STATION: 117  
 DATE: 30/ 8/00 GEAR TYPE: BT No:7 POSITION:Lat N 612  
 start stop duration Long E 159  
 TIME :13:27:28 14:03:14 36 (min) Purpose code: 3  
 LOG :1287.99 1290.15 2.13 Area code: 4  
 FDEPTH: 26 26 GearCond.code:  
 BDEPTH: 26 26 Validity code:  
 Towing dir: 90° Wire out: 110 m Speed: 30 kn\*10

Sorted: 31 Kg Total catch: 31.39 CATCH/HOUR: 52.32

SPECIES  
 weight numbers  
*Sepia officinalis hierredda* 10.33 10 19.74  
*Solar crumenophthalmus* 6.63 35 12.67 321  
*Fistularia petimba* 5.37 20 10.26  
*Sea urchins (strong spines)* 4.77 32 9.12  
*Aluterus blankerti* 4.70 12 8.98  
*Alectis alexandrinus* 4.32 7 8.26  
*Ephippion guttifer* 4.28 2 8.18  
*Scomberomorus tritor* 3.53 3 6.75  
*Dentex canariensis* 1.92 3 3.67 324  
*Sphyraena sphyraena* 1.75 3 3.34  
*Sardinella maderensis* 1.57 10 3.06 322  
*Pandacanthus reticulatus* 1.55 2 2.96  
*Pagrus caeruleostictus* 0.90 3 1.72 323  
*Diodon holocanthus* 0.23 2 0.44  
*Chloroscombrus chrysurus* 0.23 2 0.44  
*Rypticus saponaceus* 0.13 2 0.25  
*Pseudupeneus prayensis* 0.10 2 0.19

Total 52.31 99.97

PROJECT STATION: 121										
DATE: 30/ 8/00			GEAR TYPE: PT No:4		POSITION: Lat N 609 Long E 210					
start	stop	duration	Purpose code:	1	Area code:	4	GearCond.code:	BDEPTH:	5	Validity code:
TIME :20:14:57	20:46:51	32 (min)	Towdir:	90°	LOG :1329.80	1331.69	1.87	Depth:	304	Towing dir: 90° Wire out: 160 m Speed: 30 kn*10
Total	24 Kg		Total catch:	23.59	CATCH/HOUR:	44.23				
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
Sardinella aurita	26.55	435	60.03	335						
Decapterus rhonchus	1.95	345	17.97	336						
Ariomma sp.	4.01	32	9.07							
Ariomma bondi	2.96	62	6.69							
Todarodes sagittatus	1.16	19	2.62							
Scomber japonicus	0.49	6	1.11							
Selar crumenophthalmus	0.45	2	1.02							
Unidentified fish	0.34	21	0.77							
Sphyraena guachancho	0.19	9	0.43							
Trachurus trecae	0.09	2	0.20							
Fistularia petimba	0.04	4	0.09							
Total		44.23		100.00						
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
Boops boops	55.52	15004	37.23							
Decapterus punctatus	418.97	1603	26.64							
Sardinella aurita	195.52	8845	12.43							347
Dentex congensis	190.34	4345	12.10							348
Priacanthus arenatus	74.48	569	4.74							
Sepia officinalis hierredda	33.06	41	2.10							
Ariomma bondi	22.76	517	1.45							
Branchiostegus semifasciatus	13.45	52	0.86							
Selar crumenophthalmus	13.45	259	0.86							
Fistularia petimba	5.17	52	0.33							
Alectis alexandrinus	4.55	6	0.29							
Erotula barbata	4.51	4	0.29							
Epinephelus aeneus	3.43	2	0.22							
Trigla lyra	3.10	52	0.20							
Pseudopeneus prayensis	2.07		0.13							
Squatina oculata	1.12		0.07							
Dentex canariensis	1.08	2	0.07							
Total		1572.58		100.01						
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
DATE: 31/ 8/00	GEAR TYPE: PT No:4	POSITION: Lat N 609 Long E 150								
start	stop	duration	Purpose code:	1	Area code:	4	GearCond.code:	BDEPTH:	33	Validity code:
TIME :00:35:14	01:05:19	30 (min)	Towdir:	0°	LOG :1365.21	1367.11	1.90	Depth:	51	Wire out: 150 m Speed: 35 kn*10
Total	50 Kg		Total catch:	135.82	CATCH/HOUR:	271.64				
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
Chloroscombrus chrysurus	111.04	1120	40.88	341						
Engraulis encrasiculus	99.08	43156	36.11	340						
Sardinella maderensis	41.04	306	15.11	337						
Sardinella aurita	10.24	3128	3.77	338						
Sardinella maderensis	5.28	392	1.94	339						
Alectis alexandrinus	2.16	2	0.80							
Selar crumenophthalmus	0.96	8	0.35							
Brachydeuterus auritus	0.64	64	0.24							
Ariomma bondi	0.64	8	0.24							
Saurida brasiliensis	0.64	128	0.24							
Ilisha africana	0.32	16	0.12							
Sardinella aurita	0.20	2	0.07							
Alloteuthis africana	0.16	56	0.06							
Decapterus punctatus	0.16	40	0.06							
Selene dorsalis	0.08	8	0.03							
Total		271.64		100.02						
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
DATE: 31/ 8/00	GEAR TYPE: BT No:7	POSITION: Lat N 616 Long E 238								
start	stop	duration	Purpose code:	3	Area code:	4	GearCond.code:	BDEPTH:	25	Validity code:
TIME :07:21:25	07:50:46	29 (min)	Towdir:	180°	LOG :1431.32	1433.11	1.78	Depth:	30	Wire out: 90 m Speed: 30 kn*10
Total	80 Kg		Total catch:	60.63	CATCH/HOUR:	125.44				
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
Ilisha africana	55.08	6528	43.91							
Pseudotolithus senegalensis	13.24	19	10.55	343						
Engraulis encrasiculus	8.88	5992	7.08							
Pomadasys jubellini	7.85	10	6.27							
Galeoides decadactylus	5.65	70	4.50							
Pagrus caeruleostrictus	5.50	8	4.30							
Chloroscombrus chrysurus	5.5	65	4.19							
Selene dorsalis	5.24	221	3.38							
Alloteuthis africana	3.64	10	2.90							
Pteroposcion peli	3.64	81	2.90							
Trichiurus lepturus	3.23	372	2.57							
Uranoscopus polli	2.03	10	1.62							
Balistes capricornis	1.41	10	1.12							
Brachydeuterus auritus	1.22	70	0.97							
Cynoglossus sp.	1.16	2	0.92							
Sphyraena sphyraena	0.81	21	0.65							
Raja miraletus	0.74	2	0.59							
Eucinostomus melanopterus	0.60	10	0.48							
Lutjanus goreensis	0.54	2	0.43							
Trachinotus ovatus	0.21	31	0.17							
Naurotes ductor	0.21	21	0.17							
Sardinella maderensis	0.21	21	0.17							
Grammoplites gruveli	0.10	10	0.08							
Total		125.46		100.00						
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
DATE: 31/ 8/00	GEAR TYPE: BT No:7	POSITION: Lat N 612 Long E 237								
start	stop	duration	Purpose code:	3	Area code:	4	GearCond.code:	BDEPTH:	43	Validity code:
TIME :08:50:00	09:08:15	18 (min)	Towdir:	180°	LOG :1438.50	1439.50	0.98	Depth:	53	Wire out: 150 m Speed: 35 kn*10
Total	46 Kg		Total catch:	36.25	CATCH/HOUR:	120.83				
SPECIES	weight	numbers	CATCH/HOUR	% OF TOT.	C	SAMP				
Selene dorsalis	22.53	253	18.65							
Chloroscombrus chrysurus	20.53	250	16.99							
Sphyraena guachancho	18.40	117	15.23							
Rhizoprionodon acutus	14.07	3	11.64							
Brachydeuterus auritus	10.13	307	8.38	346						
Alectis alexandrinus	7.33	10	6.07							
Galeoides decadactylus	4.47	90	3.70	344						
Alloteuthis africana	4.33	760	3.58							
Trichiurus lepturus	3.87	63	3.20							
Sardinella maderensis	2.20	93	1.82	345						
Caranx hippos	2.07	7	1.71							
Trachurus trecae	2.00	3	1.66							
Pseudopeneus prayensis	1.80	17	1.49							
Sepia officinalis hierredda	1.67	7	1.38							
Eucinostomus melanopterus	1.33	7	1.10							
Epiphinton guttifer	1.13	3	0.94							
Ilisha africana	0.60	30	0.50							
Penaeus notialis	0.60	13	0.50							
Pseudotolithus senegalensis	0.47	3	0.50							
Syacium micrumrum	0.33	13	0.27							
Drepane africana	0.33	10	0.27							
Scyllarides herklotsii	0.03	7	0.02							
Total		120.82		99.99						

PROJECT STATION: 129  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 609  
TIME :06:32:26 start stop duration Long E 134  
LOG :1596.34 1598.10 1.74 Purpose code: 3  
FDEPTH: 21 27 Area code : 3  
BDEPTH: 21 27 GearCond.code:  
Towing dir: 174° Wire out: 90 m Speed: 30 kn\*10  
Sorted: 76 Kg Total catch: 75.69 CATCH/HOUR: 151.38

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Engraulis encrasicolus	88.74	43688	58.62	354
Sepia officinalis hierredda	19.80	16	13.08	
Alectis alexandrinus	18.28	28	12.08	
Selene dorsalis	6.36	16	4.20	
Pagrus caeruleostrictus	4.60	8	3.04	
Chloroscombrus chrysurus	2.40	22	1.59	
Sardinella maderensis	2.20	220	1.45	
Sardinella aurita	2.20	220	1.45	
Torpedo torpedo	1.40	2	0.92	
Elops lacerta	1.12	2	0.74	
Dentex canariensis	1.00	2	0.66	
MONACANTHIDAE	0.92	2	0.61	
Priacanthus arenatus	0.68	4	0.45	
Urancophorus polli	0.60	2	0.40	
Alloteuthis blankerti	0.40	2	0.26	
Fistularia petimba	0.32	2	0.21	
Decapterus punctatus	0.24	2	0.16	
Eucinostomus melanopterus	0.08	2	0.05	
Total	151.34	99.97		

PROJECT STATION: 130  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 605  
TIME :08:52:50 start stop duration Long E 135  
LOG :1600.28 1604.66 0.37 Purpose code: 3  
FDEPTH: 43 44 Area code : 3  
BDEPTH: 43 44 GearCond.code: 9  
Towing dir: 225° Wire out: 150 m Speed: 30 kn\*10  
Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
N O C A T C H	weight numbers			
Total	0.00			

PROJECT STATION: 131  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 605  
TIME :08:52:49 start stop duration Long E 136  
LOG :1603.29 1604.84 1.52 Purpose code: 3  
FDEPTH: 49 46 Area code : 3  
BDEPTH: 49 46 GearCond.code:  
Towing dir: 70° Wire out: 150 m Speed: 30 kn\*10  
Sorted: 102 Kg Total catch: 102.39 CATCH/HOUR: 211.84

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Pagrus caeruleostrictus	69.10	103	32.62	355
Selene dorsalis	57.93	176	27.35	
Epinephelus aeneus	15.56	10	7.35	
Dentex canariensis	12.79	27	6.04	
Alectis alexandrinus	8.86	6	4.18	
Umbrina canariensis	8.69	17	4.10	
Lutjanus fulgens	6.04	6	2.85	
Alloteuthis africana	4.82	2748	2.28	
Brachydeuterus auritus	3.52	300	1.66	
Epinephelus guaza ?	2.94	2	1.39	
Sepia officinalis hierredda	2.86	4	1.37	
Dactylopterus volitans	2.48	4	1.17	
Fistularia petimba	2.13	10	1.01	
Cymbium sp.	1.94	2	0.92	
Sphyraena guachancho	1.45	2	0.68	
Alluterus blankerti	1.32	2	0.62	
Sphyraena sphyraena	1.12	4	0.53	
Torpedo torpedo	1.08	2	0.51	
Bothus podas africanus	1.03	56	0.49	
Pagellus bellottii	0.83	14	0.39	
Seriola dumerili	0.79	2	0.37	
Pagellus sp.	0.79	2	0.37	
Balistes capriscus	0.66	2	0.31	
Chloroscombrus chrysurus	0.66	8	0.31	
Raja miraletus	0.62	2	0.29	
Sea urchins (strong spines)	0.50	9	0.24	
Saemilia brasiliensis	0.11	98	0.19	
Selene crumenophthalmus	0.29	2	0.14	
Citharus linguatula	0.25	14	0.12	
Grammoplites griseus	0.12	12	0.06	
Decapterus macarellus	0.12	56	0.06	
Serranus accraensis	0.08	6	0.04	
Epiphione guttifer	0.04	2	0.02	
Trichirurus lepturus	0.02	4	0.01	
Total	211.84	100.02		

PROJECT STATION: 132  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 602  
TIME :10:19:34 start stop duration Long E 136  
LOG :1609.72 1610.46 0.73 Purpose code: 3  
FDEPTH: 67 77 Area code : 3  
BDEPTH: 67 77 GearCond.code:  
Towing dir: 204° Wire out: 220 m Speed: 30 kn\*10  
Sorted: 41 Kg Total catch: 41.15 CATCH/HOUR: 176.36

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trachurus trecae	9.00	1869	51.37	356
Squatina oculata	26.49	9	15.02	
Alloteuthis africana	18.26	3956	10.35	
Dentex congoensis	12.34	437	7.00	357
Scomberomorus tritor	7.71	4	4.37	
Boops boops	4.11	81	2.33	
Dentex angolensis	3.51	30	1.99	
Fistularia petimba	3.17	9	1.80	
Sepia officinalis hierredda	3.17	4	1.80	
Decapterus punctatus	2.91	103	1.65	
Sardinella aurita	1.89	43	1.07	
Chilomycterus sp.	1.63	4	0.92	
Lepidotrigla cadmansi	0.26	9	0.15	
Priacanthus arenatus	0.26	4	0.15	
Ariommata bondi	0.04	26	0.02	
Total	176.35	99.99		

PROJECT STATION: 133  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 557  
TIME :12:54:23 start stop duration Long E 121  
LOG :1630.78 1632.29 1.48 Purpose code: 3  
FDEPTH: 94 81 Area code : 3  
BDEPTH: 94 81 GearCond.code:  
Towing dir: 60° Wire out: 310 m Speed: 30 kn\*10  
Sorted: 93 Kg Total catch: 223.43 CATCH/HOUR: 446.86

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Dentex congolensis	292.56	5902	65.47	360
Dentex angolensis	60.12	666	13.45	359
Dentex canariensis	16.92	18	3.79	358
Squatina oculata	12.20	2	2.73	
Dentex canariensis	9.96	36	2.23	362
Fistularia petimba	9.68	20	2.17	
Trachurus trecae	9.24	180	2.07	361
Mustelus mustelus	7.00	2	1.57	
Lepidotrigla cadmansi	5.40	78	1.21	
Dentex gibbosus	4.44	6	0.99	
Raja miraletus	2.28	6	0.51	
Epinephelus aeneus	2.24	2	0.50	
Zeara faber	2.04	4	0.46	
Priacanthus arenatus	1.68	6	0.38	
Sepia officinalis hierredda	1.56	66	0.35	
Chaetodon marcellae	1.44	48	0.32	
Epinephelus haefnensis	1.32	6	0.30	
Brotula barbata	1.28	20	0.29	
Uranoscopus polli	1.08	12	0.24	
Sepia officinalis hierredda	1.08	2	0.24	
Lophiodon kempfi	0.84	12	0.19	
Omnastrephes pteropur	0.72	12	0.16	
Branchiostegus semi fasciatus	0.64	2	0.14	
Fistularia petimba	0.48	6	0.11	
Bothus podas africanus	0.24	60	0.05	
Grammoplites griseus	0.24	66	0.05	
Calappa calappa	0.12	6	0.03	
MONACANTHIDAE	0.06	6	0.01	
Total	446.86	100.01		

PROJECT STATION: 134  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 601  
TIME :14:36:59 start stop duration Long E 120  
LOG :1638.43 1639.47 1.02 Purpose code: 3  
FDEPTH: 48 44 Area code : 3  
BDEPTH: 48 44 GearCond.code:  
Towing dir: 250° Wire out: 180 m Speed: 30 kn\*10  
Sorted: 69 Kg Total catch: 69.01 CATCH/HOUR: 180.03

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Pagellus bellottii	34.80	402	19.33	365
Sepia officinalis hierredda	24.52	44	13.62	
Pagrus caeruleostrictus	23.01	188	12.78	363
Dentex canariensis	19.30	34	10.72	364
Pagrus africanus	19.25	23	10.69	367
Alectis alexandrinus	8.09	5	4.49	
Fistularia petimba	7.77	60	4.00	
Octopoda vulgaris	6.32	3	3.62	
Raja miraletus	5.50	13	3.06	
Sardinella aurita	5.11	146	2.84	366
Alloteuthis africana	4.80	1414	2.67	
Aluterus blankerti	4.59	10	2.55	
Caranx crysos	2.97	3	1.65	
Dactylopterus volitans	2.56	8	1.42	
Epinephelus aeneus	2.03	5	1.13	
Chilomycterus spinosus mauret.	1.98	8	1.10	
Balistes punctatus	1.72	3	0.96	
Syacium micrumrum	1.67	115	0.93	
Lepidotrigla cadmansi	0.99	50	0.55	
Citharus linguatula	0.99	57	0.55	
Pseudupeneus praevis	0.78	16	0.43	
Grammoplites griseus	0.72	39	0.29	
Epiphione guttifer	0.72	10	0.23	
Serranus accraensis	0.31	10	0.17	
Total	180.00	99.98		

PROJECT STATION: 135  
DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 603  
TIME :15:45:47 start stop duration Long E 118  
LOG :1643.14 1644.67 1.52 Purpose code: 3  
FDEPTH: 27 26 Area code : 3  
BDEPTH: 27 26 GearCond.code:  
Towing dir: 80° Wire out: 140 m Speed: 30 kn\*10  
Sorted: 122 Kg Total catch: 239.94 CATCH/HOUR: 479.88

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Dactylopterus volitans	200.64	594	41.81	
Sea urchins (strong spines)	56.08	616	11.69	
Dentex canariensis	54.40	112	11.34	369
Sepia officinalis hierredda	48.40	100	10.09	
Balistes capriscus	32.08	112	6.69	
Palauichthys palau	12.58	24	2.68	
Pagrus caeruleostrictus	12.52	44	2.57	368
Scomberomorus tritor	8.52	4	1.78	
Sphyraena sphyraena	7.36	20	1.53	
Lagocephalus laevisgatus	6.64	16	1.38	
Epiphione guttifer	4.32	4	0.90	
Fistularia petimba	4.08	32	0.85	
MONACANTHIDAE	4.08	12	0.85	
Alectis alexandrinus	3.92	12	0.82	
Sea cucumbers	3.20	4	0.67	
Aluterus blankerti	2.80	4	0.58	
Acanthostegus quadricornis	2.64	16	0.55	
Chilomycterus spinosus mauret.	2.32	8	0.48	
Torpedo torpedo	2.16	4	0.45	
Raja miraletus	2.00	4	0.42	
Diodon holocanthus	1.92	4	0.40	
Albula vulpes	1.92	4	0.40	
Sphyraena guachancho	1.92	4	0.40	
Selene dorsalis	1.44	4	0.30	
Fistularia tabacaria	0.96	4	0.20	
Pseudupeneus praevis	0.56	8	0.12	
Xyrichtys novacula	0.24	4	0.05	
Total	479.88	100.02		

PROJECT STATION: 136  
 DATE: 1/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 553  
 start stop duration Long E 116  
 TIME :18:51:25 19:21:57 31 (min) Purpose code: 3  
 LOG :1662.64 1664.34 1.69 Area code: 3  
 FDEPTH: 287 299 GearCond.code:  
 BDEPTH: 287 299 Validity code:  
 Towing dir: 45° Wire out: 850 m Speed: 30 kn\*10

Sorted: 130 Kg Total catch: 163.00 CATCH/HOUR: 315.48

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Rhizoprionodon acutus	106.61	33.79		
Squalius oculata	76.44	72	24.13	
Chimaera halmus atlanticus	24.39	412	7.73	
Torpedo marmorata	14.71	12	4.66	
Xenomystax sp	14.52	97	4.60	
Sea urchins (strong spines)	9.58	93	3.04	
Parasudis sp.	7.94	194	2.52	
Parapenaeus longirostris	7.94	461	2.52	
Dactylopterus volitans	7.65	25	2.42	
Zenion hololepis	7.55	1248	2.39	
Pterothrissus bellucci	5.90	45	1.87	
Brotula barbata	5.69	6	1.80	
Promethichthys prometheus	3.77	25	1.20	
Trigla lyra	3.77	29	1.20	
Malacocephalus occidentalis	3.48	35	1.18	
Aristea varidens	2.63	130	0.83	
Raja strigula	2.48	8	0.79	
Gymnophites gruveli	2.13	15	0.68	
Lophiodes kempfi	2.03	5	0.64	
Plesioktista martia	1.84	703	0.58	
C R A B S	1.06	35	0.34	
Todarodes sagittatus	1.06	6	0.34	
Cyttopsis roseus	0.77	45	0.24	
Fistularia petimba	0.58	6	0.18	
Epigonius telescopus	0.58	15	0.18	
Unidentified fish	0.29	74	0.09	
Monolene microstoma	0.19	19	0.06	
Dibranchus atlanticus	0.10	10	0.03	
Scylorhinus canicula	0.10	6	0.03	

Total 315.48 99.98

PROJECT STATION: 137  
 DATE: 1/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 559  
 start stop duration Long E 110  
 TIME :22:08:21 22:38:15 30 (min) Purpose code: 1  
 LOG :1687.58 1689.26 1.65 Area code: 2  
 FDEPTH: 2 2 GearCond.code:  
 BDEPTH: 37 32 Validity code:  
 Towing dir: 260° Wire out: 150 m Speed: 30 kn\*10

Sorted: 38 Kg Total catch: 727.88 CATCH/HOUR: 1455.76

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Engraulis encrasicolus	1340.24	337030	92.06	370
Sardinella maderensis	38.72	1672	2.66	372
Decapterus macarellus	18.48	1452	1.27	373
Decapterus punctatus	14.96	352	1.03	
Sardinella aurita	13.20	1760	0.91	371
Alectis alexandrinus	10.80	8	0.74	
Saurida brasiliensis	7.04	1320	0.48	
Chloroscombrus chrysurus	5.28	88	0.36	
Alloteuthis africana	3.52	484	0.24	
Selar crumenophthalmus	1.76	44	0.12	
Scomber japonicus	1.76	176	0.12	

Total 1455.76 99.99

PROJECT STATION: 138  
 DATE: 2/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 545  
 start stop duration Long W 103  
 TIME :01:05:58 01:35:47 30 (min) Purpose code: 1  
 LOG :1709.55 1711.37 1.81 Area code: 2  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 121 556 Validity code:  
 Towing dir: 360° Wire out: 150 m Speed: 35 kn\*10

Sorted: 31 Kg Total catch: 31.42 CATCH/HOUR: 62.84

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Chelonia mydas	42.40	2	67.47	
Nealiotus triipes	5.48	296	8.72	
Ariomma melanum	3.92	108	6.24	
Ornithostrophus pteroporus	3.24	64	5.16	
Euthynnus alletteratus	2.44	12	3.88	
Sardinella aurita	2.00	24	3.18	374
Sardinella maderensis	1.72	12	2.71	375
Hypoclinemis bella	0.28	14	0.45	
Scorpaena porcus	0.28	2	0.35	
Promethichthys prometheus	0.24	18	0.38	
Ariomma bondi	0.24	4	0.38	
Unidentified fish	0.20	10	0.32	
Ariomma sp.	0.20	4	0.32	
Gempylus serpens	0.12	2	0.19	
Priacanthus arenatus	0.08	2	0.13	

Total 62.84 100.01

PROJECT STATION: 139  
 DATE: 2/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 551  
 start stop duration Long E 109  
 TIME :05:33:01 06:23:08 30 (min) Purpose code: 3  
 LOG :1724.17 1725.88 1.68 Area code: 2  
 FDEPTH: 83 72 GearCond.code:  
 BDEPTH: 83 72 Validity code:  
 Towing dir: 240° Wire out: 300 m Speed: 30 kn\*10

Sorted: 103 Kg Total catch: 166.22 CATCH/HOUR: 332.44

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Dentex congensis	80.28	1920	24.15	377
Epinephelus venustus	73.28	10	22.04	
Scolopsis oculata	61.40	36	18.47	
Ariomma bondi	43.32	702	13.03	
Dentex angolensis	26.66	74	7.57	376
Trachurus trecae	15.24	342	4.58	
Sepla officinalis hierredda	6.52	14	1.96	
Monolene microstoma	5.40	12	1.62	
Sarda sarda	2.96	2	0.89	
Fistularia petimba	2.62	8	0.79	
Chelidonichthys lucerna	2.16	72	0.65	
Sepia officinalis hierredda	1.92	90	0.58	
Zeus faber	1.92	6	0.58	
Uranoscopus polli	1.80	6	0.54	
Chilomycterus spinosus mauret.	1.56	6	0.47	
Priacanthus arenatus	1.56	18	0.47	
Gymnopistes gruveli	1.44	54	0.43	
Calappa calappa	1.44	12	0.43	
MURAENIDAE	0.36	6	0.11	
Boops boops	0.32	6	0.10	
Todarodes sagittatus	0.24	6	0.07	
Lophiodes kempfi	0.24	6	0.07	
Microchirus frecheki	0.12	6	0.04	
C R A B S	0.06	138	0.02	
Unidentified fish	0.06	6	0.02	
Gobius sp	0.06	6	0.02	

Total 332.44 100.00

PROJECT STATION: 140  
 DATE: 2/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 553  
 start stop duration Long E 106  
 TIME :07:20:41 07:50:14 30 (min) Purpose code: 3  
 LOG :1731.05 1732.52 1.45 Area code: 2  
 FDEPTH: 46 43 GearCond.code:  
 BDEPTH: 46 43 Validity code:  
 Towing dir: 20° Wire out: 1737 m Speed: 50 kn\*10

Sorted: 57 Kg Total catch: 57.23 CATCH/HOUR: 114.46

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Selene dorsalis	33.12	66	28.94	
Pagrus caeruleostictus	22.16	346	19.36	378
Alloteuthis africana	16.28	178	14.22	
Fistularia petimba	10.16	106	8.88	
Alectis alexandrinus	7.88	8	6.88	
Sepia officinalis hierredda	6.52	16	5.70	
Dentex canariensis	3.32	10	2.90	
Epinephelus aeneus	2.72	2	2.38	
Pagrus africanus	2.16	4	1.89	
Chilomycterus spinosus mauret.	1.72	12	1.50	
Dactylopterus volitans	1.48	4	1.29	
Syacium micrurum	1.20	108	1.05	
Pagrus bellottii	0.92	20	0.80	
Seriola quinqueradiata	0.80	2	0.70	
Priacanthus arenatus	0.76	6	0.66	
Gymnopistes gruveli	0.64	44	0.56	
Decapterus macarellus	0.60	70	0.52	
Saurida brasiliensis	0.50	166	0.52	
Ariomma bondi	0.36	4	0.31	
Pseudupeneus prayensis	0.28	6	0.24	
Serranus acraensis	0.14	8	0.12	
Dentex congensis	0.12	2	0.10	
Penaeus notialis	0.12	8	0.10	
Citharus linguatula	0.12	10	0.10	
Lepidotrigla carolae	0.10	10	0.09	
Pecten jacobs	0.04	2	0.03	
Chloroscombrus chrysurus	0.04	2	0.03	
Muraenidae frecheki	0.04	2	0.03	
Sillagoides herklotsii	0.02	6	0.02	
Scorpaena scrofa	0.02	2	0.02	
Raja miraletus	0.02	2	0.02	

Total 114.46 99.96

PROJECT STATION: 141  
 DATE: 2/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 555  
 start stop duration Long E 103  
 TIME :08:53:32 09:21:26 28 (min) Purpose code: 3  
 LOG :1738.17 1739.85 1.55 Area code: 2  
 FDEPTH: 24 26 GearCond.code:  
 BDEPTH: 24 26 Validity code:  
 Towing dir: 200° Wire out: 60 m Speed: 30 kn\*10

Sorted: 34 Kg Total catch: 67.70 CATCH/HOUR: 145.07

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Chlamys purpuratus	124.97	4916	86.14	
Pagellus bellottii	6.94	1997	4.78	
Chloroscombrus chrysurus	3.51	9	2.42	
Pseudupeneus prayensis	2.57	28	1.77	
Decapterus macarellus	2.40	343	1.65	
Sardina aurita	1.54	4	1.00	
Sardina maderensis	1.46	81	1.01	
Scorpaena porcus	0.77	17	0.53	
Alloteuthis africana	0.51	129	0.35	
Pagrus caeruleostictus	0.34	26	0.23	
C R A B S	0.04	4	0.03	

Total 145.05 99.97

PROJECT STATION: 142  
 DATE: 2/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 540  
 start stop duration Long E 49  
 TIME :12:16:19 12:30:03 14 (min) Purpose code: 3  
 LOG :1765.03 1765.65 0.61 Area code: 2  
 FDEPTH: 22 22 GearCond.code: 9  
 BDEPTH: 22 22 Validity code: 1  
 Towing dir: 77° Wire out: 65 m Speed: 30 kn\*10

Sorted: 45 Kg Total catch: 44.85 CATCH/HOUR: 192.21

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Engraulis encrasiculus	42.97	22989	22.25	380
Drepane africana	1.97	116	21.32	
Selene dorsalis	16.20	34	8.43	
Torpedo torpedo	12.17	4	6.33	
Acanthostration quadricornis	11.74	56	6.11	
Pagrus caeruleostictus	9.94	137	5.17	379
Sphyraena guachancho	9.86	13	5.13	
Sepia officinalis hierredda	9.17	26	4.77	
Elops lacerta	7.71	13	4.01	
Galeoides decadactylus	7.29	26	3.79	
Chilomycterus spinosus mauret.	5.06	9	2.63	
Torpedo marmorata	5.06	4	2.63	
Lethrinus atlanticus	3.86	4	2.01	
Diodon holocanthus	3.09	17	1.61	
Balistes punctatus	1.37	4	0.74	
Dentex canariensis	1.00	13	0.62	
Ephippion guttifer	1.03	4	0.54	
Eucinostomus melanopterus	0.69	13	0.36	
Pseudupeneus prayensis	0.60	9	0.31	
Dicologlossa cuneata	0.51	4	0.27	
Penaeus notialis	0.34	34	0.18	
Brachydeuterus auritus	0.34	124	0.18	
Decapterus punctatus	0.26	120	0.14	
Selar crumenophthalmus	0.21	4	0.11	
Sphoeroides marmoratus	0.17	4	0.09	
Syacium micrurum	0.17	13	0.09	
Pagellus bellottii	0.17	4	0.09	
Epinephelus aeneus	0.09	4	0.05	
Serranus accraensis	0.04	9	0.03	
MONACANTHIDAE	0.04	4	0.02	
Scorpaena scrofa	0.04	4	0.02	
Squilla aculeata calmani	0.04	4	0.02	
Penaeus kerathurus	0.00	4		

Total 192.20 100.01

PROJECT STATION: 143  
 DATE: 2/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 536  
 start stop duration Long E 49  
 TIME :14:15:56 14:45:39 30 (min) Purpose code: 3  
 LOG :1780.78 1782.30 1.51 Area code: 2  
 FDEPTH: 37 37 GearCond.code:  
 BDEPTH: 37 31 Validity code:  
 Towing dir: 75° Wire out: 150 m Speed: 30 kn\*10

Sorted: 61 Kg Total catch: 124.46 CATCH/HOUR: 248.92

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Balistes punctatus	114.60	234	46.04	
Pagrus caeruleostictus	37.80	80	15.19	384
Lethrinus atlanticus	15.12	20	6.07	381
Diodon holocanthus	14.50	26	5.83	
Acanthostration quadricornis	13.44	86	5.42	
Chilomycterus spinosus mauret.	12.00	22	4.56	383
Pagrus caeruleostictus	10.60	22	4.26	
Epinephelus aeneus	7.22	4	3.02	
Pagrus caeruleostictus	6.46	256	2.60	385
Dentex canariensis	5.72	18	2.30	382
Lutjanus goreensis	4.60	2	1.85	
Drepane africana	2.88	8	1.16	
Cephalopholis taeniops	0.96	2	0.39	
Torpedo torpedo	0.80	8	0.32	
Pseudupeneus prayensis	0.80	8	0.32	
Sepia officinalis hierredda	0.52	26	0.21	
Trachurus trecae	0.52	170	0.21	
Syacium micrurum	0.08	8	0.03	

Total 248.92 100.02

PROJECT STATION: 144  
 DATE: 2/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 536  
 start stop duration Long E 47  
 TIME :16:30:48 17:00:35 30 (min) Purpose code: 1  
 LOG :1794.05 1796.21 2.15 Area code: 2  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 32 190 Validity code:  
 Towing dir: 270° Wire out: 160 m Speed: 35 kn\*10

Sorted: 3 Kg Total catch: 2.74 CATCH/HOUR: 5.48

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Scomberomorus tritor	5.48	12	100.00	386

Total 5.48 100.00

PROJECT STATION: 145  
 DATE: 2/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 541  
 start stop duration Long W 24  
 TIME :19:54:53 20:25:10 30 (min) Purpose code: 1  
 LOG :1822.95 1824.72 1.74 Area code: 2  
 FDEPTH: 32 32 GearCond.code:  
 BDEPTH: 33 46 Validity code:  
 Towing dir: 218° Wire out: 150 m Speed: 30 kn\*10

Sorted: 47 Kg Total catch: 230.28 CATCH/HOUR: 460.56

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Engraulis encrasiculus	243.36	48078	52.84	391
Sardinella aurita	152.16	23910	33.04	390
Decapterus punctatus	17.64	528	3.83	388
Brachydeuterus auritus	15.84	576	3.42	389
Decapterus rhonchus	12.56	24	2.58	387
Proterorhinus semiocteuthus	4.56	103	0.99	
Allotethis africana	4.32	1416	0.94	
Selene crumenophthalmus	3.80	22	0.83	
Sphyraena guachancho	2.00	4	0.43	
Saurida brasiliensis	1.44	180	0.31	
Sepia officinalis hierredda	1.04	2	0.23	
Sphyraena sphyraena	0.88	2	0.19	
Boops boops	0.48	12	0.10	
Friacanthus arenatus	0.32	4	0.07	
Apisilus fuscus	0.24	12	0.05	
Scomber japonicus	0.12	12	0.03	

Total 460.56 100.00

PROJECT STATION: 146  
 DATE: 3/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 542  
 start stop duration Long E 29  
 TIME :05:51:42 06:21:07 29 (min) Purpose code: 3  
 LOG :1865.82 1867.52 1.67 Area code: 2  
 FDEPTH: 26 26 GearCond.code:  
 BDEPTH: 26 26 Validity code:  
 Towing dir: 270° Wire out: 110 m Speed: 30 kn\*10

Sorted: 133 Kg Total catch: 358.26 CATCH/HOUR: 741.23

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Lutjanus fulgens	235.74	368	31.80	392
Sphyraena sphyraena	127.12	374	17.15	
Acanthurus monroviae	100.00	182	13.50	
Lutjanus dentatus	46.47	5	6.27	
Pagrus caeruleostictus	45.52	97	6.14	393
Dentex canariensis	41.13	161	5.55	
Pagrus africanus	21.48	19	2.90	
Fistularia tabacaria	20.57	46	2.78	
Fistularia petimba	13.20	70	1.78	
Ostracion tricornis	10.22	79	1.38	
Sepia officinalis hierredda	9.06	12	1.22	
Pomadasys incisus	9.06	137	1.22	
Scomberomorus tritor	9.06	6	1.22	
Scarus hoefleri	8.40	6	1.13	
Aluterus blankerti	6.72	19	0.91	
Lutjanus goensis	5.96	2	0.80	
Bostrychus sejunctus	5.05	12	0.68	
Decapterus punctatus	4.41	627	0.59	
Uraspis helvola	4.41	5	0.57	
Selar crumenophthalmus	4.14	12	0.56	
Umbrina stiendachneri	3.74	6	0.50	
Chilomycterus spinosus mauret.	1.68	6	0.23	
Apisilus fuscus	1.16	596	0.16	
Rypticus saponaceus	1.16	6	0.16	
Pseudupeneus prayensis	1.03	12	0.14	
Chromis cadenati	0.39	58	0.05	
Chaetodon robustus	0.39	6	0.05	

Total 741.23 99.98

PROJECT STATION: 147  
 DATE: 3/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 539  
 start stop duration Long E 32  
 TIME :06:41:22 08:21:32 30 (min) Purpose code: 3  
 LOG :1876.58 1878.14 1.54 Area code: 2  
 FDEPTH: 46 45 GearCond.code:  
 BDEPTH: 46 45 Validity code:  
 Towing dir: 310° Wire out: 150 m Speed: 30 kn\*10

Sorted: 18 Kg Total catch: 32.39 CATCH/HOUR: 64.78

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Allotethis africana	18.96	5688	29.27	
Brachydeuterus auritus	9.92	1066	15.31	
Alectis alexandrinus	7.04	4	10.87	
Sepia officinalis hierredda	3.00	8	4.63	
Grammopistes griseus	2.72	180	4.20	
Raja miraletus	2.44	4	3.77	
Dentex canariensis	2.40	16	3.70	
Pagrus caeruleostictus	2.32	48	3.58	
Citharus linguatula	2.24	164	3.46	
Sphyraena guachancho	2.00	2	3.09	
Pagellus bellottii	1.92	32	2.96	
Sebastesp	1.92	12	2.96	
Saurida brasiliensis	1.64	480	2.84	
Decapterus punctatus	1.60	324	2.47	
Penaeus notialis	0.80	40	1.23	
Selene dorsalis	0.80	12	1.23	
Epinephelus aeneus	0.72	2	1.11	
Pseudupeneus prayensis	0.64	8	0.99	
Erotula barbata	0.40	4	0.62	
Pomadasys incisus	0.24	4	0.37	
Chloroscombrus chrysurus	0.16	4	0.25	
Fistularia petimba	0.16	20	0.25	
C R A B S	0.08	36	0.12	
Scyllarides herklotsii	0.08	32	0.12	
'Spider crab'	0.08	20	0.12	
Lepidotrigla cadmani	0.08	4	0.12	
Diplodusessa hexophthalma	0.08	4	0.12	
Syacium micrurum	0.08	48	0.12	
Trichiurus lepturus	0.04	12	0.06	
Sardinella aurita	0.02	4	0.03	

Total 64.78 99.97

PROJECT STATION: 148  
 DATE: 3/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 538  
 start stop duration Long E 31  
 TIME :08:20:31 10:00:07 30 (min) Purpose code: 3  
 LOG :1886.50 1888.06 1.51 Area code: 2  
 FDEPTH: 52 52 GearCond.code:  
 BDEPTH: 52 47 Validity code:  
 Towing dir: 75° Wire out: 150 m Speed: 30 kn\*10

Sorted: 45 Kg Total catch: 133.62 CATCH/HOUR: 267.24

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	70.40	872	26.34	
Allotethis africana	37.12	11464	13.89	
Brachydeuterus auritus	35.20	1358	13.17	
Pagellus caeruleostictus	28.16	690	10.54	395
Squatina oculata	22.24	432	8.32	
Grammopistes griseus	20.88	4	7.81	
Sepia officinalis hierredda	5.36	8	2.39	
Saurida brasiliensis	4.80	616	1.80	
Sardinella maderensis	4.80	184	1.80	
Fistularia petimba	4.48	248	1.68	
Decapterus rhonchus	4.24	8	1.59	
Stromateus fiatola	3.68	8	1.38	
Pseudupeneus prayensis	3.36	96	1.26	
Syacium micrurum	2.88	416	1.08	
Decapterus punctatus	2.72	360	1.02	
Dentex canariensis	2.56	8	0.96	
Lepidotrigla cadmani	1.52	40	0.72	
Selene dorsalis	1.26	32	0.66	
Raja miraletus	0.92	2	0.34	
Selar crumenophthalmus	0.80	16	0.30	
Scorpaena scrofa	0.56	24	0.21	
Citharus linguatula	0.48	3		

PROJECT STATION: 149  
DATE: 3/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 532  
start stop duration Long W 16  
TIME :11:40:20 13:20:16 30 (min) Purpose code: 3  
LOG :1916.92 1918.44 1.51 Area code: 2  
FDEPTH: 323 336 GearCond.code:  
BDEPTH: 323 336 Validity code:  
Towing dir: 50° Wire out: 980 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 594.46 CATCH/HOUR: 1188.92

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Hypoclydonia bella	54.60	8526	45.89
Chlorophthalmus atlanticus	254.40	2962	21.40
Setarches guentheri	92.80	5838	7.81
Trichurus lepturus	41.60	80	3.50
Trigla lyra	37.60	160	1.16
Promethichthys prometheus	30.40	640	2.56
Malacocephalus occidentalis	27.20	120	2.29
Benthodesmus tenuis	20.80	560	1.75
Parapenaeus longirostris	17.52	788	1.47
Laemoneuma laureysi	16.80	240	1.41
Malacocephalus laevis	16.00	200	1.35
Epigonus telescopus	16.00	280	1.35
Parasudis sp.	14.40	200	1.21
Centrophorus squamosus	10.00	2	1.07
Lophius vaillantii	9.00	2	0.77
Muraenidae pollini	8.00	14	0.67
Heptanchias perlo	7.20	4	0.61
Chlorophthalmus fraser	6.40	120	0.54
Hymenocephalus italicus	4.80	600	0.40
Coelorinchus coelorrhincus	4.00	80	0.34
Etmopterus spinax	2.40	40	0.20
Nezumia aqualis	1.60	80	0.13
Cyttopsis roseus	0.80	40	0.07
MYCTOPHIDAE	0.40	80	0.03
Total	1188.92	100.00	

PROJECT STATION: 152  
DATE: 4/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 523  
start stop duration Long W 14  
TIME :09:17:47 09:47:34 30 (min) Purpose code: 3  
LOG :2017.34 2018.89 1.54 Area code: 2  
FDEPTH: 42 48 GearCond.code:  
BDEPTH: 42 48 Validity code:  
Towing dir: 140° Wire out: 140 m Speed: 30 kn\*10

Sorted: 38 Kg Total catch: 169.70 CATCH/HOUR: 339.40

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Chloroscombrus chrysurus	137.52	2004	40.52
Pagellus bellottii	60.54	2320	17.75
Allotethis africana	16.56	4714	4.88
Pagrus caeruleostictus	15.84	600	4.67
Sphyraena afra	12.60	2	3.71
Balistes capriscus	11.52	12	3.39
Sepia officinalis hierredda	10.96	22	3.23
Pseudupeneus prayensis	9.84	144	2.90
Fistularia petimba	8.88	276	2.62
Sepia sp.	7.92	336	2.33
Lepidotrigla cadmani	7.68	312	2.26
Priacanthus arenatus	4.32	84	1.27
Decapterus rhonchus	4.08	24	1.20
Dentex canariensis	3.50	12	1.06
Caranx crysos	3.12	12	0.92
Arnoglossus imperialis	2.88	420	0.85
Grammoplites gruvelii	2.88	204	0.85
Mustelus mustelus	2.88	12	0.85
Syacium micrum	2.16	72	0.64
Citharus linguatula	2.16	96	0.64
Lagocephalus laevigatus	2.16	24	0.64
Perilampus rossignoli	1.80	12	0.53
Saurida brasiliensis	1.56	204	0.46
Selene dorsalis	1.20	12	0.35
BIVST11	0.96	12	0.28
Decapterus macarellus	0.96	36	0.28
Boops boops	0.72	12	0.21
BIVST10	0.60	12	0.18
Monacanthus hispidus	0.48	24	0.14
Penaeus notialis	0.48	24	0.14
Microchirus frechekoppi	0.24	24	0.07
'Spider crab'	0.12	12	0.04
Bothus podas africanus	0.12	12	0.04
Chaetodon marcellae	0.12	12	0.04
Total	339.40	100.01	

PROJECT STATION: 150  
DATE: 3/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 530  
start stop duration Long E 7  
TIME :16:47:31 16:54:09 7 (min) Purpose code: 3  
LOG :1937.93 1938.29 0.36 Area code: 2  
FDEPTH: 68 67 GearCond.code: 8  
BDEPTH: 68 67 Validity code: 9  
Towing dir: 50° Wire out: 230 m Speed: 30 kn\*10

Sorted: 16 Kg Total catch: 16.10 CATCH/HOUR: 138.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex gibbosus	41.14	9	29.81
Seriola carpenteri	21.43	9	15.53
Dentex congensis	17.31	1363	12.54
Lepidotrigla cadmani	17.14	386	12.42
Raja straeleni	8.74	9	6.33
Trachurus trecae	7.71	120	5.59
Echidna pelli	4.97	9	3.60
Dentex canariensis	3.60	9	2.61
Ephippion guttifer	3.26	9	2.36
Sepia officinalis hierredda	3.26	129	2.36
Boops boops	1.71	31	1.71
Citharus linguatula	1.37	43	0.99
Rynchos saponaceus	1.37	9	0.99
Pseudupeneus prayensis	1.20	9	0.87
Grammoplites gruvelii	1.20	51	0.87
Lophiodon kempfi	1.20	9	0.87
Pagellus bellottii	1.03	34	0.75
Saurida brasiliensis	0.09	9	0.07
Fistularia petimba	0.09	9	0.07
Syacium micrum	0.09	17	0.07
Peristedion cataphractum	0.09	9	0.07
Total	138.00	100.01	

PROJECT STATION: 153  
DATE: 4/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 527  
start stop duration Long W 16  
TIME :11:41:58 12:14:10 32 (min) Purpose code: 3  
LOG :2020.54 2030.25 1.69 Area code: 2  
FDEPTH: 28 28 GearCond.code: 8  
BDEPTH: 28 28 Validity code:  
Towing dir: 230° Wire out: 100 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 496.81 CATCH/HOUR: 931.52

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	580.22	16892	62.29
Chloroscombrus chrysurus	100.97	2108	10.84
Pagellus bellottii	64.89	1050	6.94
Sepia officinalis hierredda	46.07	201	5.14
G A S T R O P O D S	29.81	10116	3.20
Alectis alexandrinus	22.22	43	3.39
Pagrus caeruleostictus	20.25	773	2.17
Caranx crysos	12.09	43	1.30
Sphyraena guachancho	8.44	28	0.91
Allotethis africana	7.31	1901	0.78
Selene dorsalis	7.03	43	0.75
Boops boops	5.91	156	0.63
Stromateus fiatola	5.34	15	0.57
Aluterus blankerti	4.78	15	0.51
Decapterus macarellus	3.94	197	0.42
Pseudupeneus prayensis	3.38	43	0.36
Sardine maderensis	1.69	28	0.18
Grammoplites gruvelii	1.41	128	0.15
Dentex canariensis	1.11	15	0.15
Penaeus notialis	1.13	28	0.12
Fistularia petimba	0.84	28	0.09
Trachurus trecae	0.56	15	0.06
Syacium micrum	0.15	28	0.02
Chlamys purpuratus	0.15	28	0.02
Monochirus hispidus	0.15	28	0.02
Total	930.84	99.91	

PROJECT STATION: 151  
DATE: 4/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 517  
start stop duration Long W 12  
TIME :07:07:51 07:35:57 28 (min) Purpose code: 3  
LOG :2005.34 2006.66 1.33 Area code: 2  
FDEPTH: 72 90 GearCond.code:  
BDEPTH: 72 90 Validity code:  
Towing dir: 165° Wire out: 250 m Speed: 30 kn\*10

Sorted: 29 Kg Total catch: 333.22 CATCH/HOUR: 714.04

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Trachurus trecae	320.91	6062	44.94
Dentex congensis	151.71	9701	21.25
Boops boops	104.91	1916	14.69
Sea urchins (strong spines)	36.00	2854	5.04
Zeus faber	26.23	51	3.67
Lophius vaillanti	17.49	51	2.45
Tetraodon pustulatus	11.31	51	1.58
Priacanthus arenatus	10.80	231	1.51
Fistularia petimba	10.20	283	1.01
Sepia officinalis hierredda	5.66	1594	0.79
Lepidotrigla carolae	6.69	206	0.94
Allotethis africana	5.66	1594	0.79
Scorpaena stephanica	2.01	2	0.28
Serranus acraensis	1.03	51	0.14
Grammoplites gruvelii	1.03	77	0.14
Citharus linguatula	0.26	51	0.04
Total	714.04	99.98	

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Pagellus bellottii	9.10	1236	24.87
Pomadasys incisus	61.50	50	19.59
Pseudupeneus prayensis	53.20	606	16.94
Lethrinus atlanticus	25.80	64	8.22
Acanthurus monroviae	22.60	28	7.20
Pagrus caeruleostictus	12.68	32	4.04
Dentex canariensis	10.48	26	3.34
Sepia officinalis hierredda	10.36	32	3.30
Priacanthus arenatus	7.48	56	2.38
Epinephelus aeneus	6.44	4	2.05
Syacium micrum	5.80	60	1.85
Dactylopterus volitans	3.96	12	1.26
Lagocephalus laevigatus	3.08	6	0.98
Pagrus caeruleostictus	2.54	22	0.81
Trachurus trecae	1.58	12	0.60
Chromis caderosi	1.34	226	0.49
Chilomycterus spinosus mauret.	1.32	6	0.42
Fistularia petimba	1.10	12	0.35
Chelidonicthys gabonensis	1.00	12	0.32
Aluterus punctata	1.00	6	0.32
Balistes capriscus	1.00	12	0.32
Apisilus fuscus	0.44	44	0.14
Grammoplites gruvelii	0.44	16	0.14
Chlamys purpuratus	0.16	16	0.05
Serranus acraensis	0.06	6	0.02
Coris julis	0.02	2	0.01
Total	313.98	100.01	

PROJECT STATION: 155									
DATE: 4/ 9/00	GEAR TYPE: BT No:7	POSITION: Lat N 508	Long W 32						
TIME :16:39:00	start stop duration								
LOG :12056.27	16:39:00	30	(min)	Purpose code: 3					
FDEPTH:	40	40		Area code: 2					
BDEPTH:	40	40		GearCond.code:					
Towing dir: 60°	Wire out: 150 m	Speed: 30 kn*10		Validity code:					
Sorted: 30 Kg	Total catch: 54.60	CATCH/HOUR: 109.20							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Pseudupeneus prayensis	22.32	294	20.44	414	Chromis cadenati	133.96	2342	25.16	
Pagellus bellottii	18.72	342	17.14	415	Trachurus trecae	82.80	1358	14.99	424
Fistularia petimba	14.52	96	13.30		Boops boops	66.96	1236	12.12	427
Sepia officinalis hierredda	11.04	20	10.11		Sepia officinalis hierredda	36.00	720	5.52	
Pomadasys incisus	6.24	66	5.71		Priacanthus arenatus	35.64	1260	6.45	
Dentex canariensis	6.04	10	5.53	412	Pagellus bellottii	35.28	918	6.39	423
Pagrus caeruleostictus	3.80	18	3.48	413	Pseudupeneus prayensis	34.56	396	6.26	426
Syacium micrurum	3.72	90	3.41		Mustelus mustelus	22.56	4	4.08	
Panulirus regius	3.60	2	3.30		Umbrina canariensis	13.68	36	2.48	
Pagrus caeruleostictus	3.48	168	3.19	416	Pagrus caeruleostictus	11.88	90	2.15	425
Epinephelus aeneus	3.40	2	3.11		Grammoplites gruvelli	7.92	288	1.43	
Boops boops	1.92	132	1.76		Fistularia petimba	7.92	72	1.43	
Acanthurus monroviae	1.92	4	1.76		Dactylopterus volitans	6.84	18	1.24	
Lethrinus atlanticus	1.80	4	1.65		Promethichthys prometheus	6.48	198	1.17	
Chlamys purpuratus	1.44	120	1.14		Sepia officinalis	5.04	18	0.91	
Raja miraletus	1.24	2	1.14		Raja miraletus	4.76	10	0.86	
Balistes capriscus	0.84	6	0.77		Torpedo marmorata	4.08	2	0.74	
Lutjanus fulgens	0.84	2	0.77		Squatina oculata	3.96	2	0.72	
Bodianus speciosus	0.76		0.70		Lepidotrigla carolae	3.60	126	0.65	
BIVST10	0.72	24	0.66		Sargocentron hastatus	3.60	36	0.65	
Sphyraena sphyraena	0.60	2	0.55		Arnoglossus imperialis	2.88	252	0.52	
Grammoplites gruvelli	0.12	30	0.11		Microchirus boscanion	2.88	306	0.52	
Monochirius hispidus	0.06	6	0.05		Chelidonichthys lastoviza	2.16	36	0.39	
Chromis cadenati	0.06	18	0.05		Dicologoglossa hexophthalma	1.80	90	0.33	
Total	109.20	100.01			Ariomma bondi	1.80	18	0.33	
PROJECT STATION: 156									
DATE: 4/ 9/00	GEAR TYPE: BT No:7	POSITION: Lat N 502	Long W 31						
TIME :17:43:46	start stop duration								
LOG :2066.70	18:24:40	41	(min)	Purpose code: 3					
FDEPTH:	57	2068.85	2.13	Area code: 2					
BDEPTH:	57	55		GearCond.code:					
Towing dir: 250°	Wire out: 2077 m	Speed: 40 kn*10		Validity code:					
Sorted: 50 Kg	Total catch: 569.07	CATCH/HOUR: 832.79			Total	552.32	99.99		
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trachurus trecae	358.75	6844	42.84	420	DATE: 5/ 9/00	start stop duration			
Sardinella aurita	139.32	1542	16.73	419	TIME :04:21:16	04:51:12	30	(min)	Purpose code: 1
Pagellus bellottii	98.02	1990	11.77	418	LOG :2137.78	2139.64	1.86		Area code: 2
Chromis cadenati	69.66	1866	8.36		FDEPTH:	0	0		GearCond.code:
Lutjanus fulgens	45.28	75	5.44		BDEPTH:	21	22		Validity code:
Dentex canariensis	18.59	34	2.23	417	Towing dir: °	Wire out: 160 m	Speed: 35 kn*10		
Pseudupeneus prayensis	16.92	174	2.03		Sorted: 16 Kg	Total catch: 98.28	CATCH/HOUR: 196.56		
Lepidotrigla cadmani	15.42	149	1.85		SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Dactylopterus volitans	11.44	50	1.37		Engraulis encrasicolus	134.16	40856	68.25	428
Zeus faber	10.45	25	1.25		Brachydeuterus auritus	44.40	1092	22.59	431
Fistularia petimba	9.45	124	1.13		Decapterus rhonchus	5.52	12	2.81	
Syacium micrurum	5.97	124	0.72		Elops lacerta	5.04	24	2.56	
Scomber japonicus	5.94	50	0.71		Decapterus sp.	2.40	792	1.22	
Sepia officinalis hierredda	4.98	29	0.61		Sphyraena guachancho	1.92	12	0.58	
Sea urchins (strong spines)	4.48	149	0.54		Sardinella maderensis - Juv.	1.68	396	0.85	430
Plicofollis	3.48	25	0.42		Scomber japonicus	0.72	120	0.37	1
Pagrus caeruleostictus	3.34	6	0.40		Sardinella aurita - Juveniles	0.72	348	0.37	429
Sea urchins (strong spines)	2.99	25	0.36		Total	196.56	100.00		
Mustelus mustelus	2.17	1	0.26		DATE: 5/ 9/00	start stop duration			
Boops boops	1.99	50	0.24		TIME :08:00:58	08:32:34	32	(min)	Purpose code: 3
Dicologoglossa hexophthalma	1.49	50	0.18		LOG :2165.33	2167.14	1.80		Area code: 2
Alloteuthis africana	1.00	42	0.12		FDEPTH:	22	22		GearCond.code:
Grammoplites gruvelli	1.00	50	0.12		BDEPTH:	22	22		Validity code:
Citharus linguatula	1.00	25	0.12		Towing dir: 70°	Wire out: 90 m	Speed: 30 kn*10		
Dentex gibbosus	0.94	1	0.11		Sorted: 234 Kg	Total catch: 411.25	CATCH/HOUR: 771.09		
Saurida brasiliensis	0.25	249	0.03		SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Serranus sp.	0.25	25	0.03		Sepia officinalis hierredda	376.84	296	48.87	
Arnoglossus imperialis	0.25	25	0.03		Chlamys purpuratus	322.81	23160	43.16	
Total	832.82	99.99			Trachurus trecae	25.11	647	3.26	433
PROJECT STATION: 157									
DATE: 4/ 9/00	GEAR TYPE: BT No:7	POSITION: Lat N 453	Long W 32						
TIME :19:38:24	start stop duration								
LOG :2077.14	2078.74	1.60	(min)	Purpose code: 3					
FDEPTH:	99	108		Area code: 2					
BDEPTH:	99	108		GearCond.code:					
Towing dir: 190°	Wire out: 320 m	Speed: 30 kn*10		Validity code:					
Sorted: 44 Kg	Total catch: 1475.06	CATCH/HOUR: 2950.12			DATE: 5/ 9/00	start stop duration			
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	TIME :08:00:58	08:32:34	32	(min)	Purpose code: 3
Priacanthus arenatus	2767.36	138368	93.80	421	LOG :2165.33	2167.14	1.80		Area code: 2
Promethichthys prometheus	100.58	5640	3.41		FDEPTH:	22	22		GearCond.code:
Ephippion guttifer	22.56	94	0.76		BDEPTH:	22	22		Validity code:
Umbrina canariensis	15.04	94	0.51		Towing dir: 230°	Wire out: 140 m	Speed: 30 kn*10		
Squatina oculata	13.24	6	0.45		Sorted: 38 Kg	Total catch: 365.64	CATCH/HOUR: 664.80		
Sepia officinalis hierredda	5.64	94	0.19		SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Ariomma bondi	5.64	188	0.19		Chlamys purpuratus	609.16	21647	91.63	
Dentex congoides	5.64	94	0.19		Sepia officinalis hierredda	13.45	22	2.02	
Brotula barbata	2.88	20	0.10		Pagellus bellottii	8.65	107	1.30	434
Dentex canariensis	2.32	6	0.08		BIVST10	5.24	131	0.79	
Lepidotrigla cadmani	1.88	94	0.06		Sea urchins (strong spines)	4.36	1920	0.66	
Mystriophis rostellatus	1.84	2	0.06		Dactylopterus volitans	4.33	9	0.65	
Raja miraletus	1.36	4	0.05		Balistes capriscus	4.04	5	0.61	
Physiculus huloti	0.94	94	0.03		Lagocephalus laevigatus	3.27	2	0.49	
Dactylopterus volitans	0.60	2	0.02		Sea cucumbers	2.73	2	0.41	
Total	2950.12	99.99			Alloteuthis africana	2.62	873	0.39	
PROJECT STATION: 158									
DATE: 4/ 9/00	GEAR TYPE: PT No:6	POSITION: Lat N 453	Long W 32						
TIME :21:30:26	start stop duration								
LOG :2081.53	2083.57	2.02	(min)	Purpose code: 1					
FDEPTH:	2	2		Area code: 2					
BDEPTH:	110	97		GearCond.code:					
Towing dir: 100°	Wire out: 150 m	Speed: 30 kn*10		Validity code:					
Sorted: 28 Kg	Total catch: 1549.52	CATCH/HOUR: 2905.35			DATE: 5/ 9/00	start stop duration			
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	TIME :10:18:15	10:50:57	33	(min)	Purpose code: 3
Priacanthus arenatus	275.30	137865	94.90	422	LOG :2181.01	2182.89	1.86		Area code: 2
Ariomma bondi	17.70	1680	2.67		FDEPTH:	40	39		GearCond.code:
Promethichthys prometheus	58.80	1885	2.02		BDEPTH:	40	39		Validity code:
Omnastrephes pteropus	10.50	315	0.36		Towing dir: 172°	Wire out: 210 m	Speed: 30 kn*10		
Fistularia petimba	1.05	105	0.04		Sorted: 46 Kg	Total catch: 276.16	CATCH/HOUR: 552.32		
Total	2905.35	99.99			SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
PROJECT STATION: 159									
DATE: 5/ 9/00	GEAR TYPE: BT No:7	POSITION: Lat N 518	Long W 21						
TIME :00:39:00	start stop duration								
LOG :2106.10	2107.50	1.40	(min)	Purpose code: 1					
FDEPTH:	60	66		Area code: 2					
BDEPTH:	60	66		GearCond.code:					
Towing dir: 172°	Wire out: 210 m	Speed: 30 kn*10		Validity code:					
Sorted: 46 Kg	Total catch: 276.16	CATCH/HOUR: 552.32			SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Total	552.32	99.99			Chromis cadenati	133.96	2342	25.16	

PROJECT STATION: 163  
DATE: 5/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 443  
TIME :12:19:18 13:21:09 30 (min) Purpose code: 3 Long W 49  
LOG :2198.37 2199.94 1.58 Area code : 2  
FDEPTH: 64 66 GearCond.code:  
BDEPTH: 64 66 Validity code:  
Towing dir: 70° Wire out: 210 m Speed: 30 kn\*10

Sorted: 45 Kg Total catch: 549.37 CATCH/HOUR: 1098.74

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trachurus trecae	805.80	9762	73.34	437
Pseudupeneus prayensis	52.36	408	4.77	
Alloteuthis africana	34.68	12138	3.16	
Dactylopterus volitans	29.92	136	2.72	
Sardinella aurita	28.56	374	2.60	438
Grammoplites griseus	27.20	136	2.48	
Priacanthus arenatus	21.76	578	1.98	
Pagellus bellottii	14.96	306	1.36	
Dentex congensis	13.60	2210	1.24	
Sea urchins (strong spines)	10.20	578	0.93	
Dentex canariensis	7.96	14	0.72	436
Sepia officinalis hierredda	7.78	272	0.68	
Scomber japonicus	6.80	68	0.62	
Fistularia petimba	6.80	102	0.62	
Syacium micrurum	4.76	34	0.43	
Pagrus caeruleostictus	4.56	18	0.42	435
Raja miraletus	4.40	10	0.40	
Zeus faber	3.72	4	0.34	
Mustelus mustelus	3.32	2	0.30	
Ommastrephes pteroporus	2.72	68	0.25	
Serranus acraensis	2.72	102	0.25	
Decapterus macarellus	1.36	68	0.12	
Dentex gibbosus	1.28	4	0.12	
Apisilus fuscus	0.80	2	0.07	
Ariomma bondi	0.34	34	0.03	
Chromis caderonae	0.34	34	0.03	
Citharus linguatula	0.34	34	0.03	
Total	1098.74	100.01		

PROJECT STATION: 167  
DATE: 6/ 9/00 GEAR TYPE: PT No:7 POSITION:Lat N 502  
TIME :02:58:33 03:28:21 30 (min) Purpose code: 1 Long W 104  
LOG :2297.22 2298.89 1.66 Area code : 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 29 28 Validity code:  
Towing dir: 270° Wire out: 150 m Speed: 35 kn\*10

Sorted: 34 Kg Total catch: 127.54 CATCH/HOUR: 255.08

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Brachydeuterus auritus Juv.	128.00	79360	50.18	
Trachurus trecae, juvenile	54.40	20820	21.33	
Engraulis encrasicolus	27.04	3848	10.60	451
Brachydeuterus auritus	11.52	312	4.52	
Scomber japonicus	8.16	1140	3.20	
Sardinella aurita	8.00	662	3.14	450
Zeus faber	6.60	4	2.59	
Trachurus trecae	4.48	152	1.76	
Decapterus punctatus	4.00	184	1.57	452
Sepia officinalis hierredda	1.28	32	0.50	
Pagellus bellottii	0.80	320	0.31	
Trachinophthalmus myops	0.48	8	0.09	
Sepia off. eggs	0.16	0	0.06	
Dactylopterus volitans	0.08	8	0.03	
Saurida brasiliensis	0.08	8	0.03	
Total	255.08	100.01		

PROJECT STATION: 168  
DATE: 6/ 9/00 GEAR TYPE: PT No:7 POSITION:Lat N 459  
TIME :04:57:33 05:20:09 23 (min) Purpose code: 1 Long W 115  
LOG :2310.40 2311.90 1.49 Area code : 2  
FDEPTH: 10 10 GearCond.code:  
BDEPTH: 30 29 Validity code:  
Towing dir: 61° Wire out: 150 m Speed: 36 kn\*10

Sorted: 21 Kg Total catch: 21.01 CATCH/HOUR: 54.81

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trachurus trecae	20.77	697	37.89	454
Decapterus punctatus	17.32	720	31.60	455
Sardinella aurita	12.78	266	23.22	453
Sepia officinalis hierredda	1.52	39	2.56	
Brachydeuterus auritus	1.10	39	2.01	
Scomber japonicus	0.73	37	1.33	456
Pagellus bellottii	0.37	13	0.68	
Trachinophthalmus myops	0.10	3	0.18	
Saurida brasiliensis	0.03	3	0.05	
Total	54.82	100.02		

PROJECT STATION: 169  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 459  
TIME :04:57:33 05:20:09 23 (min) Purpose code: 1 Long W 115  
LOG :2310.40 2311.90 1.49 Area code : 2  
FDEPTH: 10 10 GearCond.code:  
BDEPTH: 30 29 Validity code:  
Towing dir: 61° Wire out: 150 m Speed: 36 kn\*10

Sorted: 21 Kg Total catch: 21.01 CATCH/HOUR: 54.81

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Chlamys purpuratus	33.54	57530	41.57	
Sardinella aurita	243.84	434	30.04	457
Decapterus punctatus	63.84	2784	7.86	462
Brachydeuterus auritus	37.92	1344	4.67	458
Sepia officinalis hierredda	31.44	30	3.87	
Pagellus bellottii	30.72	15616	2.78	
Trachurus trecae	20.16	624	2.48	461
Trachurus, Juveniles	15.84	8834	1.95	
Pagellus bellottii	10.56	336	1.30	459
Pagrus caeruleostictus	5.28	192	0.65	460
Dentex canariensis	2.88	48	0.35	
Alloteuthis africana	2.88	984	0.35	
Priacanthus arenatus	1.92	24	0.24	
Scomber japonicus	1.44	96	0.18	
Trachinophthalmus myops	1.44	48	0.18	
Trachinophthalmus browni	1.16	24	0.14	
Pseudupeneus prayensis	0.96	48	0.12	
Uranoscopus polli	0.36	2	0.04	
Saurida brasiliensis	0.24	24	0.03	
Total	811.76	99.98		

PROJECT STATION: 170  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 450  
TIME :05:26:37 06:56:16 30 (min) Purpose code: 3 Long W 114  
LOG :2318.69 2320.37 1.68 Area code : 2  
FDEPTH: 23 26 GearCond.code:  
BDEPTH: 23 26 Validity code:  
Towing dir: 210° Wire out: 90 m Speed: 30 kn\*10

Sorted: 49 Kg Total catch: 405.88 CATCH/HOUR: 811.76

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Chlamys purpuratus	33.54	57530	41.57	
Sardinella aurita	243.84	434	30.04	457
Decapterus punctatus	63.84	2784	7.86	462
Brachydeuterus auritus	37.92	1344	4.67	458
Sepia officinalis hierredda	31.44	30	3.87	
Pagellus bellottii	30.72	15616	2.78	
Trachurus trecae	20.16	624	2.48	461
Trachurus, Juveniles	15.84	8834	1.95	
Pagellus bellottii	10.56	336	1.30	459
Pagrus caeruleostictus	5.28	192	0.65	460
Dentex canariensis	2.88	48	0.35	
Alloteuthis africana	2.88	984	0.35	
Priacanthus arenatus	1.92	24	0.24	
Scomber japonicus	1.44	96	0.18	
Trachinophthalmus myops	1.44	48	0.18	
Trachinophthalmus browni	1.16	24	0.14	
Pseudupeneus prayensis	0.96	48	0.12	
Uranoscopus polli	0.36	2	0.04	
Saurida brasiliensis	0.24	24	0.03	
Total	811.76	99.98		

PROJECT STATION: 170  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 450  
TIME :09:56:04 10:26:04 30 (min) Purpose code: 3 Long W 112  
LOG :2335.47 2337.32 1.84 Area code : 2  
FDEPTH: 40 40 GearCond.code:  
BDEPTH: 40 40 Validity code:  
Towing dir: 70° Wire out: 130 m Speed: 30 kn\*10

Sorted: 185 Kg Total catch: 184.85 CATCH/HOUR: 369.70

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Chlamys purpuratus	330.80	67194	89.48	
Pagrus caeruleostictus	28.94	60	7.04	463
Fistularia petimba	1.28	20	0.89	
Sepia officinalis hierredda	1.60	4	0.43	
Balistes capriscus	1.32	2	0.36	
Pseudupeneus prayensis	1.32	10	0.36	
Zeus faber	1.20	4	0.32	
Dactylopterus volitans	1.08	2	0.29	
Priacanthus arenatus	0.88	8	0.24	
Chilomycterus spinosus mauret.	0.52	2	0.14	
Sea urchins (strong spines)	0.52	38	0.14	
Trachinophthalmus myops	0.44	6	0.12	
Pagellus bellottii	0.40	4	0.11	
Bothus podas africanus	0.16	6	0.04	
Grammoplites griseus	0.04	5	0.01	
'Spider crab'	0.04	2	0.01	
Starfish	0.04	4	0.01	
Syacium micrurum	0.02	2	0.01	
Total	369.70	100.00		

PROJECT STATION: 166  
DATE: 6/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 455  
TIME :00:16:06 00:46:44 31 (min) Purpose code: 1 Long W 100  
LOG :2279.05 2281.09 2.14 Area code : 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 37 35 Validity code:  
Towing dir: 360° Wire out: 130 m Speed: 35 kn\*10

Sorted: 30 Kg Total catch: 42.06 CATCH/HOUR: 81.41

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Decapterus punctatus	26.55	898	32.61	447
Scomberomorus tritor	25.16	39	30.91	446
Sepia officinalis hierredda	11.03	64	13.55	448
Sardinella aurita	9.21	151	11.31	448
Brachydeuterus auritus	5.96	112	7.32	
Scomber japonicus	3.48	66	4.27	449
Total	81.39	99.97		

PROJECT STATION: 171  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 436  
TIME :12:50:26 start stop duration Long W 108  
LOG :2354.29 2355.53 1.23 Purpose code: 3  
FDEPTH: 51 54 Area code: 2  
BDEPTH: 51 54 GearCond.code:  
Towing dir: 250° Wire out: 180 m Speed: 30 kn\*10  
Sorted: 35 Kg Total catch: 34.69 CATCH/HOUR: 69.38

PROJECT STATION: 174  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 442  
TIME :18:28:20 start stop duration Long W 130 (min) Purpose code: 3  
LOG :2387.91 2388.14 0.21 Area code: 2  
FDEPTH: 47 47 GearCond.code:  
BDEPTH: 47 47 Validity code:  
Towing dir: 278° Wire out: 110 m Speed: 30 kn\*10  
Sorted: 329 Kg Total catch: 328.63 CATCH/HOUR: 2816.83

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Dactylopterus volitans	12.48	350	17.99	
Sea urchins (weak spines)	11.32	4878	16.32	
Sepia officinalis hierredda	10.00	54	14.41	
Pseudupeneus prayensis	5.20	26	7.49	462
Alloteuthis africana	4.80	1488	6.92	
Boops boops	4.22	226	6.08	
Mustelus mustelus	3.36	2	4.84	
Fistularia petimba	3.16	20	4.55	
Sea urchins (strong spines)	2.56	76	3.69	
Torpedo torpedo	1.96	2	2.82	
Pagellus bellottii	1.80	18	2.82	1
Chlamys pilosa	1.44	262	2.08	
Trachinophthalmus myops	1.28	10	1.84	
Baconger notialis	1.20	2	1.73	
Chelidonichthys gabonensis	0.68	8	0.98	
Priacanthus arenatus	0.60	5	0.86	
Zeus faber	0.52	2	0.75	
MONACANTHIDAE	0.44	4	0.63	
Arnoglossus capensis	0.36	2	0.52	
Xyrichtys novacula	0.32	8	0.46	
Pagrus caeruleostictus	0.32	10	0.46	
Balistes capricrus	0.24	2	0.35	
Trachinus lineolatus	0.20	4	0.29	
Rypticus saponaceus	0.20	1	0.29	
Bothus podas africanus	0.16	10	0.23	
Gymnophorus gruveli	0.16	8	0.23	
Coris julis	0.12	2	0.17	
Scorpaena scrofa	0.12	2	0.17	
Arnoglossus imperialis	0.08	16	0.12	
Chaetodon marcellae	0.08	4	0.12	
Total		69.38		99.99

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Seriola dumerili	1390.97	514	49.38	463
Dasyatis pastinaca	248.57	9	8.82	
Lutjanus fulgens	207.60	463	7.37	465
Dentex canariensis	204.34	163	7.25	468
Boops boops	174.00	7123	6.18	464
Myctoperca rubra	101.66	9	3.61	
Pagrus caeruleostictus	98.23	283	3.49	466
Mustelus mustelus	89.14	26	3.16	
Apisilus fuscus	79.20	240	2.81	
Dasyatis marmorata	37.71	34	1.34	
Plectroichthys mediterraneus	36.69	51	1.30	
Pseudupeneus prayensis	32.23	300	1.14	467
Decapterus punctatus	28.11	1123	1.00	469
Lethrinus atlanticus	17.31	34	0.5	
Syacium micrum	12.00	23	0.43	
Pomadasys incisus	9.43	103	0.33	
Balistes capricrus	8.66	9	0.31	
Dactylopterus volitans	7.89	17	0.28	
Decapterus rhonchus	7.20	17	0.26	
Chromis cadehati	4.11	206	0.15	
Priacanthus arenatus	3.94	9	0.14	
Pagrus caeruleostictus	3.26	1011	0.12	
Sargocentron hastatum	2.57	17	0.09	
Acanthurus monroviae	1.54	9	0.05	
Gymnophorus gruveli	1.54	69	0.05	
Allotrichthys albotrilineatus	1.54	506	0.05	
Chaetodon hoefleri	1.03	17	0.04	
Sepia officinalis hierredda	0.86	43	0.03	
Chelidonichthys gabonensis	0.69	9	0.02	
Squilla mantis	0.34	17	0.01	
Serranus accreensis	0.17	17	0.01	
Monochirius hispidus	0.17	9	0.01	
Saurida brasiliensis	0.09	9	0.01	
Total		2816.39		99.97

PROJECT STATION: 172  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 430  
TIME :15:24:21 start stop duration Long W 120 (min) Purpose code: 3  
LOG :2369.64 2370.80 1.13 Area code: 2  
FDEPTH: 55 55 GearCond.code:  
BDEPTH: 55 55 Validity code:  
Towing dir: 270° Wire out: 200 m Speed: 30 kn\*10  
Sorted: 107 Kg Total catch: 1129.67 CATCH/HOUR: 2259.34

PROJECT STATION: 175  
DATE: 6/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 446  
TIME :20:59:14 start stop duration Long W 122 (min) Purpose code: 1  
LOG :2407.29 2409.73 2.42 Area code: 2  
FDEPTH: 2 2 GearCond.code:  
BDEPTH: 42 42 Validity code:  
Towing dir: 150° Wire out: 150 m Speed: 30 kn\*10  
Sorted: 12 Kg Total catch: 12.11 CATCH/HOUR: 23.44

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Chromis cadehati	844.20	7366	37.36	
Priacanthus arenatus	730.60	5372	32.34	
Pomadasys incisus	306.54	2180	13.57	
Acanthurus monroviae	199.60	456	8.83	
Apisilus fuscus	34.96	126	1.55	
Fistularia petimba	24.82	126	1.10	
Aluterus blankerti	22.80	26	1.01	
Pagellus bellottii	16.20	126	0.72	
Balistes capricrus	12.16	34	0.54	
Dactylopterus volitans	11.64	26	0.52	
Dentex canariensis	8.44	8	0.37	
Stephanolepis hispidus	7.08	26	0.31	
Pagrus caeruleostictus	6.52	20	0.29	
Sepia officinalis hierredda	5.68	6	0.25	
Lutjanus fulgens	5.40	4	0.24	
Trachinophthalmus myops	5.06	26	0.22	
Dasyatis marmorata	2.90	4	0.13	
Lepidotrigla cadmami	2.60	26	0.12	
Zeus faber	2.52	4	0.11	
Epinephelus aeneus	2.36	2	0.10	
Dentex gibbosus	2.08	4	0.09	
Bothus podas africanus	1.52	26	0.07	
Raja miraletus	1.40	2	0.06	
Coris julis	1.24	8	0.05	
Pagellus bellottii	1.08	2	0.05	
Total		2259.40		100.00

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Scomber japonicus	11.15	302	47.57	471
Decapterus punctatus	4.03	95	17.19	470
Sardinella aurita	3.91	45	16.68	
Caranx cryos	2.63	2	11.22	
Lagocephalus laevigatus	1.08	2	4.61	
Trachurus trecae	0.33	6	1.41	
Rachycentron canadum	0.31	2	1.32	
Total		23.44		100.00

PROJECT STATION: 173  
DATE: 6/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 441  
TIME :17:41:46 start stop duration Long W 131 (min) Purpose code: 3  
LOG :2385.40 2385.72 0.30 Area code: 2  
FDEPTH: 48 47 GearCond.code: 9  
BDEPTH: 48 47 Validity code: 9  
Towing dir: 318° Wire out: 180 m Speed: 30 kn\*10  
Sorted: Kg Total catch: CATCH/HOUR:

PROJECT STATION: 176  
DATE: 7/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 447  
TIME :02:17:40 02:42:56 25 (min) Purpose code: 1  
LOG :2445.05 2446.60 1.53 Area code: 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 38 39 Validity code:  
Towing dir: 200° Wire out: 160 m Speed: 36 kn\*10  
Sorted: 38 Kg Total catch: 522.76 CATCH/HOUR: 1254.62

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Engraulis encrasiculus	957.60	117223	76.33	473
Sardinella maderensis	164.88	9070	13.14	475
Sardinella aurita	30.24	3574	2.41	474
Scomber japonicus	28.08	2088	2.24	477
Trachurus trecae	26.64	1476	2.12	476
Brachydeuterus auritus Juv.	10.80	2016	0.86	
Sardina sarda	8.64	216	0.69	
Saurida brasiliensis	7.58	7	0.60	
Priacanthus arenatus	4.32	612	0.34	
Trachinops lepturus	2.88	72	0.23	
Selene dorsalis	2.88	144	0.23	
Chloroscombrus chrysurus	2.88	36	0.23	
Decapterus punctatus	2.16	180	0.17	
Alloteuthis africana	1.44	720	0.11	
Sepia officinalis hierredda	0.72	72	0.06	
Total		1254.62		99.99

SPECIES  
NO C A T C H  
Total

PROJECT STATION: 177  
DATE: 7/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 445  
TIME :04:40:16 05:04:10 24 (min) Purpose code: 1  
LOG :2458.87 2460.14 1.25 Area code: 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 59 57 Validity code:  
Towing dir: 300° Wire out: 160 m Speed: 36 kn\*10  
Sorted: 4 Kg Total catch: 3.64 CATCH/HOUR: 9.10

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Sardinella aurita	6.00	105	74.73	478
Lagocephalus laevigatus	1.00	3	10.99	
Scomber japonicus	0.85	8	9.34	
Auxis thazard	0.30	3	3.30	
Decapterus punctatus	0.10	3	1.10	
Priacanthus arenatus	0.05	3	0.55	
Total		9.10		100.01

DATE: 7/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 443  
start stop duration Long W 200  
TIME :07:17:30 07:48:29 31 (min) Purpose code: 3  
LOG :2477.16 2478.03 0.87 Area code : 2  
FDEPTH: 35 35 GearCond.code:  
BDEPTH: 35 35 Validity code:  
Towing dir: 260° Wire out: 100 m Speed: 30 kn\*10  
Sorted: 61 Kg Total catch: 343.14 CATCH/HOUR: 664.14

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Brachydeuterus auritus	438.15 11619	65.97	478	
Pteroscion peli	46.41 4051	6.99		
Trichiurus lepturus	44.71 3087	6.73		
Pseudotolithus senegalensis	42.15 1128	6.35	480	
Selene dorsalis	15.33 58	2.31	479	
Cynoponticus ferox	15.14 15	2.28		
Cynoglossus browni	7.97 79	1.20		
Sardinella aurita	7.95 383	1.20		
Ephippion guttifer	5.96 21	0.90		
Penaeus notialis	5.92 248	0.89		
Grammoplites griseus	5.54 234	0.83		
Parapenaeopsis atlantica	5.11 1086	0.83		
Galeoides decadactylus	4.61 30	0.69		
Raja miraletus	4.22 8	0.64	481	
Pseudotolithus senegalensis	4.10 14	0.62		
Pomadasys rogeri	1.47 2	0.22		
Sepia officinalis hierredda	1.28 64	0.19		
Lophiodes kempfi	1.20 12	0.18		
Stromateus fiatola	1.06 43	0.16		
Selene dorsalis	0.85 532	0.13		
Dactylopterus volitans	0.70 2	0.11		
Pomadasys incisus	0.62 4	0.09		
Acanthostracion quadricornis	0.58 2	0.09		
Pegusus lascaris	0.54 8	0.08		
Trachurus trecae	0.43 21	0.06		
Ilisha africana	0.43 43	0.06		
Engraulis encrasicolus	0.39 106	0.06		
Calappa calopus	0.23 2	0.03		
Brotula barbata	0.21 43	0.03		
Gobius sp	0.21 21	0.03		
Zeus faber	0.21 43	0.03		
Pentheroscion mbizi	0.21 128	0.03		
Microchirus ocellatus	0.19 4	0.03		
Total	664.08	99.98		

PROJECT STATION: 182  
DATE: 7/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 422  
start stop duration Long W 200  
TIME :14:18:51 15:10:25 30 (min) Purpose code: 3  
LOG :2514.69 2516.48 1.86 Area code : 2  
FDEPTH: 253 199 GearCond.code:  
BDEPTH: 253 199 Validity code:  
Towing dir: 130° Wire out: 800 m Speed: 30 kn\*10  
Sorted: 191 Kg Total catch: 325.00 CATCH/HOUR: 650.00

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Zenopsis conchifer	277.00 156	42.62	487	
Chlorophthalmus atlanticus	181.60 5168	27.94	489	
Ariomma bondi	68.40 1782	10.52		
Epigonus telescopus	24.00 510	3.69	1	
Hypoclydonia bella	23.20 1330	3.57		
Dentex angolensis	16.12 30	2.48	488	
Trichiurus lepturus	11.12 12	1.71		
Scorpaena scrofa	7.36 6	1.13		
Zenion hololepis	6.00 530	0.92		
Synagrops microlepis	4.00 220	0.62		
Chascanopsetta lugubris	3.60 30	0.55		
Flesionika martia	3.20 970	0.49		
Trigla lyra	3.20 30	0.49		
Parapenaeopsis	3.20 300	0.49		
Uranoscopus polli	2.80 10	0.43		
Cyttopsis roseus	2.80 150	0.43		
Mustelus mustelus	2.36 2	0.36		
Todarodes sagittatus	1.80 10	0.28		
CHIROSTYLIIDAE	1.80 200	0.28		
Peristedion cataphractum	1.40 70	0.22		
Lophiodes kempfi	1.24 2	0.19		
Aulopus cadenati	1.20 10	0.18		
Todaropsis eblanae	1.00 50	0.15		
Galeus polli	0.60 10	0.09		
Bembrops heterurus	0.60 10	0.09		
Sepia officinalis hierredda	0.20 30	0.03		
Monodelpe microstoma	0.10 10	0.02		
Syacium micrurum	0.10 10	0.02		
Total	650.00	99.99		

PROJECT STATION: 179  
DATE: 7/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 438  
start stop duration Long W 159  
TIME :08:57:41 09:05:05 7 (min) Purpose code: 3  
LOG :2483.85 2484.33 0.48 Area code : 2  
FDEPTH: 60 61 GearCond.code: 9  
BDEPTH: 60 61 Validity code: 9  
Towing dir: 180° Wire out: 150 m Speed: 30 kn\*10  
Sorted: 71 Kg Total catch: 185.19 CATCH/HOUR: 370.38

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Total				

PROJECT STATION: 183  
DATE: 7/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 429  
start stop duration Long W 217  
TIME :19:29:16 19:59:26 30 (min) Purpose code: 3  
LOG :2548.52 2550.34 1.80 Area code : 2  
FDEPTH: 317 328 GearCond.code:  
BDEPTH: 317 328 Validity code:  
Towing dir: 115° Wire out: 950 m Speed: 30 kn\*10  
Sorted: 71 Kg Total catch: 185.19 CATCH/HOUR: 370.38

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Chlorophthalmus atlanticus	138.50 3536	37.39		
Chlorophthalmus fraser	84.60 2116	22.84		
Zenopsis conchifer	27.20 14	7.34		
Lophius vaillanti	13.56 6	5.36		
Brama brama	13.20 24	3.70		
Malacocephalus occidentalis	12.40 50	3.35		
Xenomystax sp.	9.40 110	2.54		
Trigla lyra	7.84 28	2.12		
Merluccius polli	6.84 14	1.85	490	
Zenion hololepis	6.20 1180	1.67		
Hymenococephalus italicus	6.00 1950	1.62		
'Cone gastropod'	4.80 200	1.30		
MYCTOPHIDAE	3.60 1470	0.97		
Photichthys argenteus	3.40 340	0.92		
Ijimaia loppei	3.40 2	0.92		
Galeus polli	2.80 30	0.76		
'Gaper-like with thorns'	2.60 120	0.70		
Pardachirius cuvieri	2.08 2	0.56		
Lophiodes kempfi	1.76 4	0.48		
Ariomma bondi	1.60 40	0.43		
Chaceon maritae	1.56 6	0.42		
Chascanopsetta lugubris	1.56 16	0.42		
Parapandalus brevipes	1.00 410	0.27		
Dibranchus atlanticus	1.00 100	0.27		
Setarches guentheri	0.90 20	0.24		
Starfish	0.80 320	0.22		
C R A B S	0.60 170	0.16		
Etmopterus spinax	0.60 10	0.16		
Nezumia aequalis	0.60 20	0.16		
Epigonus sp.	0.40 80	0.11		
SYNAPSIDAE	0.40 280	0.11		
Microchirus wittei	0.40 60	0.11		
CHIROSTYLIIDAE	0.40 60	0.11		
Parapenaeus longirostris	0.40 8	0.11		
Malacocephalus laevis	0.40 10	0.11		
Cyttopsis roseus	0.40 20	0.11		
Lepidotrigla cadmami	0.32 4	0.09		
Pontinus accraensis	0.24 2	0.06		
Peristedion cataphractum	0.10 20	0.03		
Total	370.38	100.01		

PROJECT STATION: 180  
DATE: 7/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 436  
start stop duration Long W 158  
TIME :09:32:37 10:02:13 30 (min) Purpose code: 3  
LOG :2486.37 2488.20 1.80 Area code : 2  
FDEPTH: 63 63 GearCond.code:  
BDEPTH: 63 63 Validity code:  
Towing dir: 180° Wire out: 160 m Speed: 30 kn\*10  
Sorted: 2 Kg Total catch: 2.37 CATCH/HOUR: 4.74

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Total	4.74	100.00		

PROJECT STATION: 184  
DATE: 7/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 432  
start stop duration Long W 208  
TIME :21:35:41 22:06:06 30 (min) Purpose code: 1  
LOG :2561.18 2563.14 1.61 Area code : 2  
FDEPTH: 2 2 GearCond.code:  
BDEPTH: 86 99 Validity code:  
Towing dir: 240° Wire out: 150 m Speed: 30 kn\*10  
Sorted: 12 Kg Total catch: 11.76 CATCH/HOUR: 23.52

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trichiurus lepturus	20.54 24	87.76		
Ariomma bondi	2.88 82	12.24		
Total	23.52	100.00		

Total 3272.31 99.97

PROJECT STATION: 185  
DATE: 8/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 440  
TIME :00:15:54 00:45:41 30 (min) Purpose code: 1 Long W 209  
LOG :2576.25 2578.36 2.10 Area code: 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 54 66 Validity code:  
Towing dir: 190° Wire out: 160 m Speed: 35 kn\*10

Sorted: 37 Kg Total catch: 36.78 CATCH/HOUR: 73.56

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Sardinella aurita - Juveniles	43.28	6893	58.84	492
Engraulis encrasicolus	6.56	706	8.92	493
Trachurus trecae	9.04	268	8.21	495
Sardinella aurita	3.52	64	4.79	491
Scromateus fiatola	3.44	12	4.68	
Scomber japonicus	3.24	158	4.40	494
Brachydeuterus auritus Juv.	3.20	342	4.35	
Priacanthus arenatus	1.92	78	2.61	
Saurida brasiliensis	1.68	558	2.28	
Ariommabondi	0.24	6	0.33	
Bregmaceros sp.	0.20	200	0.27	
Lagocephalus laevigatus	0.16	4	0.22	
Trichirurus lepturus	0.08	2	0.11	
Total	73.56	100.01		

PROJECT STATION: 189  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 456  
TIME :13:23:00 13:53:00 30 (min) Purpose code: 3 Long W 244  
LOG :2667.30 2669.00 1.70 Area code: 2  
FDEPTH: 42 46 GearCond.code:  
BDEPTH: 42 46 Validity code:  
Towing dir: 100° Wire out: 180 m Speed: 30 kn\*10

Sorted: 33 Kg Total catch: 62.38 CATCH/HOUR: 124.76

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Alloteuthis africana	31.84	1428	25.52	
Trachurus trecae, juvenile	30.26	5838	24.82	
Sepia officinalis hierredda	28.48	56	22.83	
Pagellus bellottii	8.08		6.48	
Mustelus mustelus	7.08	2	5.67	
Fistularia petimba	3.52	24	2.24	
Grammoplites griseus	2.80	164	2.24	
Dactylopterus volitans	2.24	8	1.80	
Citharus linguatula	2.00	108	1.60	
Sphyraena sphyraena	1.60	8	1.28	
Scomber japonicus	1.44	144	1.15	
Sardinella aurita	0.72	16	0.58	
Pseudopeneus prayensis	0.54	8	0.51	
Syacium micrurum	0.54	32	0.51	
Brachydeuterus auritus	0.54	40	0.51	
Pagrus caeruleostictus	0.64	40	0.51	
Balistes capricus	0.40	4	0.32	
Eucinostomus melanopterus	0.32	4	0.26	
Serranus cabrilla	0.24	4	0.19	
Sea urchins (strong spines)	0.16	4	0.13	
Monochirius hispidus	0.16	8	0.13	
Saurida brasiliensis	0.08	24	0.06	
Lepidotrigla cadmami	0.04	8	0.03	
Zeus faber	0.04	8	0.03	
Total	124.76	99.98		

PROJECT STATION: 186  
DATE: 8/ 9/00 GEAR TYPE: PT No:7 POSITION:Lat N 446  
TIME :02:10:31 02:40:10 30 (min) Purpose code: 1 Long W 210  
LOG :2589.18 2590.67 1.48 Area code: 2  
FDEPTH: 0 0 GearCond.code:  
BDEPTH: 30 28 Validity code:  
Towing dir: 300° Wire out: 150 m Speed: 35 kn\*10

Sorted: 4 Kg Total catch: 4.45 CATCH/HOUR: 8.90

PROJECT STATION: 190  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 459  
TIME :15:28:10 15:58:07 30 (min) Purpose code: 3 Long W 245  
LOG :2677.68 2679.54 1.85 Area code: 2  
FDEPTH: 27 23 GearCond.code:  
BDEPTH: 27 23 Validity code:  
Towing dir: 80° Wire out: 130 m Speed: 30 kn\*10

Sorted: 39 Kg Total catch: 38.83 CATCH/HOUR: 77.66

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trichirurus lepturus	3.76	108	42.25	
Elops lacerta	0.84	2	9.44	
Scomberomorus tritor	0.84	2	9.44	
Engraulis encrasicolus	0.80	292	8.99	496
Trachurus trecae	0.68	22	7.64	
Selene dorsalis	0.60	4	6.74	
Scomber japonicus	0.52	30	5.84	
Brachydeuterus auritus	0.44	14	2.70	
Sardinella maderensis	0.44	18	0.90	
Sardinella aurita - Juveniles	0.08	2	0.45	
Sepiella ornata	0.04	2	0.45	
Chloroscombrus chrysurus	0.04	2	0.45	
Echeneis naucrates	0.02	2	0.22	
Total	8.90	100.00		

PROJECT STATION: 187  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 445  
TIME :06:29:13 06:59:03 30 (min) Purpose code: 3 Long W 219  
LOG :2616.03 2617.72 1.68 Area code: 2  
FDEPTH: 58 61 GearCond.code:  
BDEPTH: 58 61 Validity code:  
Towing dir: 180° Wire out: 160 m Speed: 30 kn\*10

Sorted: 31 Kg Total catch: 312.60 CATCH/HOUR: 625.20

PROJECT STATION: 188  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 448  
TIME :06:29:13 06:59:03 30 (min) Purpose code: 3 Long W 245  
LOG :2655.90 2657.60 1.64 Area code: 2  
FDEPTH: 67 65 GearCond.code:  
BDEPTH: 67 65 Validity code:  
Towing dir: 360° Wire out: 200 m Speed: 30 kn\*10

Sorted: 134 Kg Total catch: 2440.72 CATCH/HOUR: 4576.35

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trachurus trecae	442.00	9134	70.70	497
Sardinella aurita	151.60	3176	24.25	498
Brachydeuterus auritus	25.60	560	4.09	
Boops boops	3.20	60	0.51	
Priacanthus arenatus	1.20	40	0.19	
Ommastrephes pteropus	0.80	20	0.13	
Scomber japonicus	0.80	40	0.13	
Total	625.20	100.00		

PROJECT STATION: 189  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 456  
TIME :16:40:17 16:41:16 29 (min) Purpose code: 3 Long W 258  
LOG :2695.42 2696.87 1.62 Area code: 2  
FDEPTH: 26 25 GearCond.code:  
BDEPTH: 26 25 Validity code:  
Towing dir: 280° Wire out: 130 m Speed: 30 kn\*10

Sorted: 54 Kg Total catch: 53.58 CATCH/HOUR: 110.86

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Brachydeuterus auritus	43.66	1506	39.38	509
Sepia officinalis hierredda	13.82	12	12.47	
Dentex canariensis	9.19	58	8.29	505
Engraulis encrasicolus	8.69	1260	7.84	508
Lethrinus atlanticus	4.55	19	4.10	506
Lutjanus fulvus	4.39	10	3.96	
Pomadasys jubelini	1.92	2	2.47	
Acanthurus monroviae	1.80	2	2.32	
Bodianus speciosus	1.72	2	2.21	
Decapterus punctatus	1.60	216	2.06	
Dentex canariensis	1.40	8	1.80	503
Sphyraena sphyraena	1.32	4	1.70	
Uranoscopus polli	0.32	2	1.08	
Rypticus saponaceus	0.44	4	0.57	
Lolliguncula mercatoris	0.40	386	0.52	
Syacium micrurum	0.36	10	0.46	
Grammoplites griseus	0.20	10	0.26	
Eucinostomus melanopterus	0.20	2	0.26	
Chaetodon robustus	0.16	2	0.21	
Engraulis encrasicolus	0.12	56	0.15	
Dentex canariensis	0.02	4	0.03	
Pagellus bellottii	0.02	2	0.03	
Scomber japonicus	0.02	4	0.03	
Total	77.66	100.01		

PROJECT STATION: 191  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 502  
TIME :16:40:17 16:41:16 29 (min) Purpose code: 3 Long W 258  
LOG :2695.42 2696.87 1.62 Area code: 2  
FDEPTH: 26 25 GearCond.code:  
BDEPTH: 26 25 Validity code:  
Towing dir: 280° Wire out: 130 m Speed: 30 kn\*10

Sorted: 54 Kg Total catch: 53.58 CATCH/HOUR: 110.86

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Brachydeuterus auritus	43.66	1506	39.38	509
Sepia officinalis hierredda	13.82	12	12.47	
Dentex canariensis	9.19	58	8.29	505
Engraulis encrasicolus	8.69	1260	7.84	508
Lethrinus atlanticus	4.55	19	4.10	506
Lutjanus fulvus	4.39	10	3.96	
Pomadasys rogeri	4.26	6	3.84	
Pagrus caeruleostictus	3.85	12	3.47	
Lutjanus dentatus	3.19	2	2.88	
Galeoides decadactylus	2.57	23	2.32	
Pseudupeneus prayensis	2.48	21	2.24	507
Sphyraena sphyraena	1.94	2	1.75	
Selene dawsoni	1.70	2	1.53	
Selene dorsalis	1.41	10	1.27	
Lolliguncula mercatoris	1.37	1014	1.24	
Balistes punctatus	1.32	2	1.19	
Chloroscombrus chrysurus	0.50	6	0.45	
Sardinella maderensis	0.41	6	0.37	
Uranoscopus polli	0.37	2	0.33	
Rypticus saponaceus	0.33	2	0.30	
Pagellus bellottii	0.29	2	0.26	
Trachinophthalmus myops	0.21	4	0.19	
Trachurus trecae	0.17	130	0.15	
Syacium micrurum	0.12	2	0.11	
Chaetodon robustus	0.08	2	0.07	
Total	110.87	100.00		

PROJECT STATION: 188  
DATE: 8/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 448  
TIME :10:00:05 11:40:32 32 (min) Purpose code: 3 Long W 245  
LOG :2655.90 2657.60 1.64 Area code: 2  
FDEPTH: 67 65 GearCond.code:  
BDEPTH: 67 65 Validity code:  
Towing dir: 360° Wire out: 200 m Speed: 30 kn\*10

Sorted: 134 Kg Total catch: 2440.72 CATCH/HOUR: 4576.35

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Priacanthus arenatus	2055.50	19397	14.95	501
Trachurus trecae	684.00	5723	5.68	
Boops boops	260.10	315	0.22	
Scomber japonicus	255.60	3416	5.59	499
Sardinella aurita	198.90	4159	4.35	500
Pagellus bellottii	34.20	923	0.75	
Dentex canariensis	28.99	90	0.63	
Mustelus mustelus	22.95	6	0.50	
Fistularia petimba	22.50	90	0.49	
Lepidotrigla cadmami	21.60	675	0.47	
Dentex gibbosus	18.90	45	0.41	
Dentex angolensis	9.90	315	0.22	
Pseudupeneus prayensis	9.00	90	0.18	
Chromis cadenati	8.10	90	0.18	
Dentex congorensis	8.10	450	0.18	
Zeus faber	7.01	11	0.18	
Pagellus caeruleostictus	5.40	45	0.12	
Sepia officinalis hierredda	3.60	90	0.08	
Grammoplites griseus	3.60	180	0.08	
Pagellus caeruleostictus	2.21	8	0.05	
Chaetodon marcelae	1.80	45	0.04	
Saurida brasiliensis	1.80	270	0.04	
Pagellus bellottii	1.24	11	0.03	
Argoglossus imperialis	0.90	225	0.02	
Raja miraletus	0.45	2	0.01	
Total	4576.35	100.02		

PROJECT STATION: 192									
DATE: 8/ 9/00	GEAR TYPE: PT No:6	POSITION:Lat N	449	Long W	258	start	stop	duration	
TIME :20:09:07	20:40:44	32	(min)	Purpose code: 1					
LOG :2714.44	2716.17	1.71		Area code: 2					
FDEPTH:	2	2		GearCond.code:					
BDEPTH:	84	79		Validity code:					
Towing dir:	Ø	Wire out: 150 m	Speed: 30 kn*10						
Sorted: 22 Kg	Total catch: 22.22	CATCH/HOUR: 41.66							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	weight	numbers			
Trichiurus lepturus	27.45	93	65.89						
Saurida brasiliensis	7.76	5503	18.63						
Auxis thazard	4.24	17	10.18	511					
Ariomma bondi	1.99	24	4.78						
Scomber japonicus	0.19	2	0.46						
Selene dorsalis	0.02	23	0.05						
Fistularia tabacaria	0.02	2	0.05						
Total	41.67	100.04							

PROJECT STATION: 196									
DATE: 9/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N	503	Long W	309	start	stop	duration	
TIME :06:56:11	07:26:32	30	(min)	Purpose code: 3					
LOG :2779.55	2781.09	1.53		Area code: 1					
FDEPTH:	36	37		GearCond.code:					
BDEPTH:	36	37		Validity code:					
Towing dir:	270°	Wire out: 140 m	Speed: 30 kn*10						
Sorted: 38 Kg	Total catch: 248.28	CATCH/HOUR: 496.56							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	weight	numbers			
Brachydeuterus auritus	416.00	26284	83.76	524					
Priacanthus arenatus	217.6	64	4.38	523					
Trachurus trecae	157.04	4096	3.03						
Alloteuthis africana	12.16	5776	2.45						
Pomadasys rogeri	4.12	4	0.83						
Sepia officinalis hierredda	3.56	4	0.72						
Grammoplites gruveli	3.20	160	0.64						
Octopus vulgaris	3.04	2	0.61						
Boops boops	2.88	32	0.58						
Raja miraletus	2.76	6	0.56						
Sphyraena guachancho	2.48	4	0.50						
Sea urchins (strong spines)	1.92	48	0.39						
Pagellus bellottii	1.92	16	0.39						
Synanceia venusta	1.60	32	0.32						
Citharus linguatula	1.40	12	0.28						
Torpedo torpedo	0.64	16	0.13						
Syacium micrum	0.16	112	0.03						
Engraulis encrasicolus	0.16	32	0.03						
Selene dorsalis	0.16	16	0.03						
Pagrus caeruleostictus	0.16	0	0.03						
Total	496.56	100.00							

PROJECT STATION: 193									
DATE: 8/ 9/00	GEAR TYPE: PT No:6	POSITION:Lat N	452	Long W	312	start	stop	duration	
TIME :23:09:18	23:39:11	30	(min)	Purpose code: 1					
LOG :2735.45	2736.85	1.34		Area code: 1					
FDEPTH:	2	2		GearCond.code:					
BDEPTH:	82	83		Validity code:					
Towing dir: 298°	Wire out: 150 m	Speed: 30 kn*10							
Sorted: 11 Kg	Total catch: 11.46	CATCH/HOUR: 22.92							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	weight	numbers			
Ariomma bondi	18.64	450	81.33	512					
Saurida brasiliensis	3.16	2074	13.79						
Scomber japonicus	0.80	8	3.49						
Illlex coindetii	0.12	2	0.52						
Selene dorsalis, juveniles	0.12	122	0.52						
Trachurus trecae	0.04	2	0.17						
Lagocephalus laevisgatus	0.02	2	0.09						
Fistularia tabacaria	0.02	2	0.09						
Total	22.92	100.00							

PROJECT STATION: 197									
DATE: 9/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N	458	Long W	309	start	stop	duration	
TIME :08:15:33	09:06:21	31	(min)	Purpose code: 3					
LOG :2787.93	2789.73	1.77		Area code: 1					
FDEPTH:	62	59		GearCond.code:					
BDEPTH:	62	59		Validity code:					
Towing dir: 120°	Wire out: 200 m	Speed: 30 kn*10							
Sorted: 163 Kg	Total catch: 398.42	CATCH/HOUR: 771.14							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	weight	numbers			
Pomadasys incisus	236.55	3211	30.68	532					
Umbrina canariensis	114.62	819	14.86	533					
Trachurus trecae	64.10	2073	8.31	530					
Dexodon canariensis	61.94	172	8.03	525					
Dentex gibbosus	60.95	55	7.93	529					
Boops boops	55.74	1481	7.23						
Epinephelus aeneus	38.75	6	5.03						
Pagellus bellottii	37.05	656	4.80	528					
Pseudupeneus prayensis	29.26	294	3.79	531					
Pagrus caeruleostictus	20.32	120	2.64	526					
Dentex angelensis	14.01	101	1.82	527					
Squatina oculata	12.62	6	1.64						
Mustelus mustelus	4.18	6	0.54						
Anthias anthias	2.79	105	0.36						
Scomber japonicus	2.48	6	0.32						
Sepia officinalis hierredda	2.09	17	0.27	8					
Pagrus caeruleostictus	1.90	4	0.25						
Priacanthus arenatus	1.74	105	0.22						
Chaetodon robustus	1.39	17	0.18						
Trichiurus lepturus	1.20	2	0.16						
Seriola dumerili	1.16	2	0.15						
Alloteuthis africana	1.05	383	0.14						
Lepidotrigla cadmanii	1.05	35	0.14						
Grammoplites gruveli	1.05	35	0.14						
Raja miraletus	0.77	2	0.10						
Chaetodon marcellae	0.70	17	0.09						
'Spider crab'	0.17	17	0.02						
Pecten jacobus	0.17	17	0.02						
'Spider crab'	0.17	17	0.02						
Total	771.31	100.04							

PROJECT STATION: 198									
DATE: 9/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N	502	Long W	323	start	stop	duration	
TIME :11:11:18	11:41:28	30	(min)	Purpose code: 3					
LOG :2780.68	2810.23	1.51		Area code: 1					
FDEPTH:	60	53		GearCond.code:					
BDEPTH:	60	53		Validity code:					
Towing dir: 279°	Wire out: 200 m	Speed: 30 kn*10							
Sorted: 109 Kg	Total catch: 1875.56	CATCH/HOUR: 3751.12							
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP	weight	numbers			
Priacanthus arenatus	1986.00	79250	52.94	535					
Trachurus trecae	1464.00	47834	39.03	534					
Boops boops	96.00	3420	2.56						
Mustelus mustelus	83.52	14	2.23						
Sepia officinalis hierredda	16.80	60	0.45						
Sardinella aurita	14.40	360	0.38						
Pagellus bellottii	13.40	180	0.35						
Squatina oculata	12.40	2	0.33						
Sphyraena sphyraena	12.00	60	0.32						
Scomber japonicus	12.00	300	0.32						
Dentex angelensis	7.20	60	0.19						
G A S T R O P O D S	6.00	420	0.16						
Brachydeuterus auritus	6.00	60	0.16						
Pseudupeneus prayensis	4.80	60	0.13						
Ariomma bondi	4.80	60	0.13						
Grammoplites gruveli	4.80	180	0.13						
Pagrus caeruleostictus	3.60	60	0.10						
Alloteuthis africana	2.40	600	0.06						
Saurida brasiliensis	1.20	600	0.03						
Total	3751.12	100.00							

PROJECT STATION: 199									
DATE: 9/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N	503	Long W	320	start	stop	duration	
TIME :10:08:06	10:48:30	30	(min)	Purpose code: 3					
LOG :2775.52	2776.21	0.68							

PROJECT STATION: 199  
DATE: 9/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 505  
start stop duration Long W 325  
TIME :12:32:27 13:02:12 30 (min) Purpose code: 3  
LOG :2814.59 2815.98 1.38 Area code : 1  
FDEPTH: 40 39 GearCond.code:  
BDEPTH: 40 39 Validity code:  
Towing dir: 100° Wire out: 150 m Speed: 30 kn\*10

Sorted: 47 Kg Total catch: 47.05 CATCH/HOUR: 94.10

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Selene dorsalis</i>	17.68	50	18.79	539
<i>Pomadasys rogeri</i>	15.52	28	16.49	540
<i>Sepia officinalis hierredda</i>	12.52	20	13.30	
<i>Dactylopterus volitans</i>	10.64	22	11.31	
<i>Brachydeuterus auritus</i>	5.92	776	6.29	
<i>Torpedo torpedo</i>	4.52	10	4.80	
<i>Pagrus caeruleostictus</i>	4.00	10	4.25	542
<i>Pagellus bellottii</i>	4.00	68	4.25	541
<i>Octopus vulgaris</i>	3.80	2	4.04	
<i>Raja miraletus</i>	2.52	4	2.68	
PLAGR02	2.32	106	2.47	
<i>Alloteuthis africana</i>	1.75	694	1.87	
<i>Citharus linguatula</i>	1.72	82	1.83	
<i>Synanceia myriaster</i>	1.44	83	1.53	
<i>Trachurus trecae</i> , juvenile	1.24	584	1.32	
<i>Dentex canariensis</i>	1.10	4	1.17	
<i>Balistes capriscus</i>	0.80	4	0.85	
<i>Cynoglossus canariensis</i>	0.64	4	0.68	
Sea urchins (strong spines)	0.52	6	0.55	
<i>Balistes punctatus</i>	0.48	2	0.51	
<i>Trachurus trecae</i>	0.40	14	0.43	
<i>Sardinella maderensis</i>	0.24	10	0.26	
<i>Arnoglossus imperialis</i>	0.16	14	0.17	
<i>Fistularia petimba</i>	0.08	2	0.09	
<i>Trachinocephalus myops</i>	0.08	2	0.09	

Total 94.10 100.02

PROJECT STATION: 202  
DATE: 10/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 513  
start stop duration Long W 406  
TIME :11:40:27 13:20:11 30 (min) Purpose code: 3  
LOG :2870.80 2872.21 1.37 Area code : 1  
FDEPTH: 44 40 GearCond.code:  
BDEPTH: 44 40 Validity code:  
Towing dir: 260° Wire out: 160 m Speed: 30 kn\*10

Sorted: 41 Kg Total catch: 241.97 CATCH/HOUR: 483.94

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Pagellus bellottii</i>	267.40	4268	55.25	552
<i>Trachurus trecae</i>	89.04	3806	18.40	551
<i>Dactylopterus volitans</i>	45.36	406	9.37	
<i>Sepia officinalis hierredda</i>	27.44	70	5.67	
<i>Balistes capriscus</i>	8.12	42	1.68	
<i>Pseudupeneus prayensis</i>	6.44	70	1.33	
<i>Mustelus mustelus</i>	5.92	2	1.22	
<i>Zeus faber</i>	5.52	8	1.14	
Sea urchins (strong spines)	5.04	42	1.04	
<i>Priacanthus arenatus</i>	3.64	126	0.75	
<i>Syacium micrum</i>	3.08	56	0.64	
<i>Chelidonichthys gabonensis</i>	2.24	28	0.46	
<i>Grammopistes griseus</i>	1.96	55	0.41	
<i>Citharus linguatula</i>	1.96	98	0.41	
<i>Trachinocephalus myops</i>	1.96	14	0.41	
<i>Balistes capriscus</i>	1.92	2	0.40	
<i>Arnoglossus imperialis</i>	1.40	140	0.29	
<i>Fistularia tabacaria</i>	1.40	84	0.29	
<i>Paraconger notialis</i>	1.08	2	0.22	
<i>Todaropsis eblanae</i>	0.84	28	0.17	
<i>Illex coindetii</i>	0.84	28	0.17	
<i>Scomber japonicus</i>	0.64	2	0.13	
<i>Boops boops</i>	0.28	14	0.06	
<i>Scomber japonicus</i>	0.28	14	0.06	
<i>Bothus podas africanus</i>	0.14	14	0.03	

Total 483.94 100.00

PROJECT STATION: 200  
DATE: 10/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 509  
start stop duration Long W 343  
TIME :08:20:06 08:21:07 29 (min) Purpose code: 3  
LOG :2840.86 2842.21 1.40 Area code : 1  
FDEPTH: 27 28 GearCond.code:  
BDEPTH: 27 28 Validity code:  
Towing dir: 275° Wire out: 110 m Speed: 30 kn\*10

Sorted: 47 Kg Total catch: 2170.28 CATCH/HOUR: 4490.24

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Brachydeuterus auritus</i>	4049.21	274523	90.18	543
<i>Trachurus trecae</i>	315.14	6886	7.02	544
<i>Chloroscombrus chrysurus</i>	60.91	662	1.36	
<i>Sardinella maderensis</i>	29.13	97	0.65	545
<i>Sepia officinalis hierredda</i>	16.55	23	0.06	
<i>Dactylopterus volitans</i>	2.81	8	0.06	
GASTROPODS	2.65	132	0.06	
<i>Penaeus japonicus</i>	2.65	132	0.06	
<i>Ephippelus aeneus</i>	2.61	2	0.06	
<i>Balistes capriscus</i>	2.23	12	0.05	546
<i>Sicyonia galeata</i>	1.32	132	0.03	
<i>Pagrus caeruleostictus</i>	1.32	132	0.03	
<i>Scyllarides herklotsii</i>	1.32	132	0.03	
<i>Pagrus caeruleostictus</i>	0.74	2	0.02	
<i>Raja miraletus</i>	0.70	4	0.02	
<i>Pagellus bellottii</i>	0.54	8	0.01	
<i>Pseudupeneus prayensis</i>	0.21	2		
<i>Trachinocephalus myops</i>	0.17	2		

Total 4490.21 100.01

PROJECT STATION: 203  
DATE: 10/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 514  
start stop duration Long W 405  
TIME :14:29:16 14:59:10 30 (min) Purpose code: 3  
LOG :2877.71 2878.89 1.34 Area code : 1  
FDEPTH: 26 25 GearCond.code:  
BDEPTH: 26 25 Validity code:  
Towing dir: 270° Wire out: 110 m Speed: 30 kn\*10

Sorted: 50 Kg Total catch: 97.74 CATCH/HOUR: 195.48

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Pagellus bellottii</i>	75.60	1382	38.67	555
<i>Sepia officinalis hierredda</i>	35.48	78	18.15	
<i>Boops boops</i>	18.90	206	9.67	
<i>Pseudupeneus prayensis</i>	18.20	155	9.31	556
<i>Dentex canariensis</i>	14.20	110	7.16	554
<i>Trachurus trecae</i>	10.20	256	5.22	
<i>Trachinocephalus myops</i>	4.70	30	2.40	
<i>Pomadasys incisus</i>	4.20	20	2.15	
<i>Trichiurus lepturus</i>	3.10	6	1.59	
<i>Balistes capriscus</i>	2.80	30	1.43	
<i>Lethrinus atlanticus</i>	2.60	6	1.33	
<i>Fistularia petimba</i>	1.90	16	0.97	
<i>Syacium micrum</i>	1.20	6	0.61	
<i>Eucinostomus melanopterus</i>	1.10	16	0.56	
<i>Priacanthus arenatus</i>	1.00	16	0.51	
<i>Grammopistes griseus</i>	0.50	10	0.26	

Total 195.48 99.99

PROJECT STATION: 201  
DATE: 10/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 509  
start stop duration Long W 405  
TIME :10:01:23 11:41:07 30 (min) Purpose code: 3  
LOG :2863.38 2864.97 1.59 Area code : 1  
FDEPTH: 97 89 GearCond.code:  
BDEPTH: 97 89 Validity code:  
Towing dir: 270° Wire out: 300 m Speed: 30 kn\*10

Sorted: 149 Kg Total catch: 560.10 CATCH/HOUR: 1120.20

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Trachurus trecae</i>	531.00	22378	47.40	547
<i>Uranoscopus albusca</i>	141.40	648	12.62	
<i>Chelidonichthys gabonensis</i>	75.00	776	6.70	
<i>Umbrina canariensis</i>	59.80	188	5.34	548
<i>Dentex canariensis</i>	59.00	110	5.27	549
<i>Dentex angustifrons</i>	58.60	490	4.78	550
<i>Brama brama</i>	52.20	50	2.87	
<i>Citharus linguatula</i>	30.60	620	2.73	
<i>Conger conger</i>	29.60	2	2.64	
<i>Boops boops</i>	26.20	450	2.34	
<i>Illex coindetii</i>	15.60	410	1.39	
<i>Zeus faber</i>	9.60	20	0.86	
<i>Sphoeroides pachgaster</i>	8.00	20	0.71	
<i>Squatina oculata</i>	7.40	10	0.66	
<i>Octopus vulgaris</i>	7.00	10	0.62	
<i>Saurida brasiliensis</i>	5.80	2136	0.52	
<i>Scomber japonicus</i>	4.80	140	0.43	
<i>Syacium micrum</i>	4.80	40	0.36	
VENERIDAE	4.00	68	0.36	
<i>Todaropsis eblanae</i>	3.40	130	0.30	
<i>Synodus albus</i>	2.80	20	0.25	
<i>Calappa peli</i>	2.00	10	0.18	
<i>Pagellus bellottii</i>	2.00	30	0.18	
<i>Dentex congolensis</i>	1.60	30	0.14	
<i>Ariommabondi</i>	1.00	140	0.09	
<i>Sepia officinalis hierredda</i>	0.80	20	0.07	
<i>Priacanthus arenatus</i>	0.80	20	0.07	
'Calappa baby'	0.40	300	0.04	
GOBIIDAE	0.20	50	0.02	
<i>Parapenaeus longirostris</i>	0.00	10		

Total 1120.20 99.99

PROJECT STATION: 204  
DATE: 10/9/00 GEAR TYPE: BT No:7 POSITION:Lat N 511  
start stop duration Long W 420  
TIME :16:29:50 16:59:49 30 (min) Purpose code: 3  
LOG :2893.30 2894.71 1.38 Area code : 1  
FDEPTH: 24 26 GearCond.code:  
BDEPTH: 24 26 Validity code:  
Towing dir: 260° Wire out: 110 m Speed: 30 kn\*10

Sorted: 31 Kg Total catch: 1212.45 CATCH/HOUR: 2424.90

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
<i>Priacanthus arenatus</i>	1241.60	34068	51.20	
<i>Trachurus trecae</i> , juvenile	531.96	345774	21.94	
<i>Brachydeuterus auritus</i> Juv.	308.88	31746	12.74	
<i>Trachurus trecae</i>	91.20	3200	3.76	558
<i>Pagellus bellottii</i>	65.60	1600	2.71	557
<i>Brachydeuterus auritus</i>	57.60	1440	2.38	
<i>Engraulis encrasicolus</i>	51.48	19744	2.12	559
<i>Boops boops</i>	24.80	400	0.99	
<i>Sepia officinalis hierredda</i>	21.60	26	0.89	
<i>Sardinella aurita</i> - Juveniles	8.58	2574	0.35	
<i>Pseudupeneus prayensis</i>	8.00	80	0.33	
<i>Galeoides decadactylus</i>	8.00	80	0.33	
<i>Sardinella maderensis</i>	6.40	240	0.26	

Total 2424.90 100.00

PROJECT STATION: 205  
 DATE: 10/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 50°  
 start stop duration Long W 42°  
 TIME :17:49.18 18:19:07 30 (min) Purpose code: 3  
 LOG :2898.19 2899.59 1.39 Area code: 1  
 FDEPTH: 60 74 GearCond.code:  
 BDEPTH: 60 74 Validity code:  
 Towing dir: 180° Wire out: 220 m Speed: 30 kn\*10

Sorted: 137 Kg Total catch: 415.31 CATCH/HOUR: 830.62

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Pagellus bellottii	170.00	1994	20.47	561
Pteroscincus pelii	113.60	580	13.68	
Trichiurus lepturus	113.60	144	13.68	
Umbrina canariensis	67.00	250	8.07	560
Saurida brasiliensis	64.50	25396	7.77	
Dentex angolensis	53.00	710	6.38	562
Trachurus trecae	48.40	2284	5.83	563
Priacanthus arenatus	34.00	1160	4.09	
Boops boops	30.40	640	3.66	
Lepidotrigla cadmiana	29.00	360	3.49	
Citharus linguatula	15.20	390	1.83	
Scorpaena scrofa	14.60	100	1.76	
Pomadasys incisus	13.00	100	1.57	
Brama brama	9.84	10	1.18	
Branchiostegus semifasciatus	8.60	10	1.04	
Lolliguncula mercatoris	8.00	5000	0.96	
Ilex coindetii	7.00	220	0.84	
Grammoplites gruveli	5.40	220	0.65	
Torpedo torpedo	4.32	4	0.52	
Raja miraletus	3.04	10	0.37	
Fistularia petimba	3.00	20	0.36	
Uranoscopus albusca	3.00	10	0.36	
Octopus vulgaris	2.20	2	0.26	
Mustelus mustelus	1.80	2	0.22	
Sepia officinalis hierredda	1.40	60	0.17	
Sardinella aurita	1.40	10	0.17	
Dicologlossa hexophthalma	1.20	50	0.16	
Synodus microps	1.00	110	0.14	
Sepia aculeata	1.20	30	0.14	
Sepia officinalis hierredda	0.92	2	0.11	
Arioglossus imperialis	0.80	90	0.11	

Total 830.62 100.01

PROJECT STATION: 208  
 DATE: 11/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 50°  
 start stop duration Long W 44°  
 TIME :06:23:20 06:53:28 30 (min) Purpose code: 3  
 LOG :2976.49 2978.04 1.53 Area code: 1  
 FDEPTH: 24 24 GearCond.code:  
 BDEPTH: 24 24 Validity code:  
 Towing dir: 260° Wire out: 110 m Speed: 30 kn\*10

Sorted: 79 Kg Total catch: 569.24 CATCH/HOUR: 1138.48

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Brachydeuterus auritus	548.08	9884	48.14	571
Trachurus trecae	491.44	6803	43.78	572
Trichiurus lepturus	182.32	28	1.51	
Chloroscombrus chrysurus	15.64	154	1.37	
Trichiurus lepturus	15.30	680	1.34	
Pteroscincus pelii	7.48	136	0.66	
Lolliguncula mercatoris	4.94	3656	0.43	
Selene dorsalis	4.76	222	0.42	
Sepia officinalis hierredda	3.48	4	0.31	
Calappa pelii	2.72	18	0.24	
Fistularia petimba	2.72	18	0.24	
Boops boops	2.38	34	0.21	
Pagellus bellottii	2.24	12	0.20	
Penaeus notialis	1.52	56	0.13	
Synodus microps	1.36	18	0.12	
Cynoglossus canariensis	1.20	6	0.11	
'Unidentified crab'	1.02	528	0.09	
G A S T R O P O D S	1.02	170	0.09	
Parapenaeopsis atlantica	1.02	256	0.09	
Pseudotolithus senegalensis	0.88	2	0.08	
Squilla mantis	0.68	18	0.06	
Torpedo torpedo	0.68	18	0.06	
Ilisha africana	0.68	18	0.06	
Squilla cadenati	0.34	52	0.03	
Lepidotrigla carolae	0.34	34	0.03	
Scomber japonicus	0.34	18	0.03	
Sicyonia sp.	0.18	170	0.02	
Dactylopterus volitans	0.18	18	0.02	
Sicyonia galeata	0.18	120	0.02	
Sphyraena guachancho	0.18	18	0.02	
Sardinella maderensis	0.18	18	0.02	

Total 1138.48 100.03

PROJECT STATION: 209  
 DATE: 11/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 50°  
 start stop duration Long W 44°  
 TIME :08:05:23 08:36:27 31 (min) Purpose code: 3  
 LOG :2984.31 2984.31 1.66 Area code: 1  
 FDEPTH: 44 50 GearCond.code:  
 BDEPTH: 44 50 Validity code:  
 Towing dir: 90° Wire out: 110 m Speed: 30 kn\*10

Sorted: 52 Kg Total catch: 77.69 CATCH/HOUR: 150.37

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trachurus trecae	49.24	3077	32.75	574
Trichiurus lepturus	23.34	37	15.52	
Balistes capricrus	18.43	33	12.26	573
Alloteuthis africana	15.10	5553	10.04	
Torpedo torpedo	7.70	14	5.12	
Alectis alexandrinus	6.74	2	4.48	
Cymbium cymbium	5.81	8	3.86	
Sepia officinalis hierredda	4.49	8	2.99	
Pagellus bellottii	2.67	64	1.78	
Dactylopterus volitans	2.36	12	1.57	
Ephippion guttiferum	2.28	4	1.52	
Grammoplites gruveli	1.39	81	0.82	
Penaeus notialis	1.24	27	0.82	
Arnoglossus imperialis	1.16	168	0.77	
Brachydeuterus auritus	1.16	23	0.77	
Mustelus mustelus	1.16	4	0.77	
Raja miraletus	0.97	2	0.65	
Trichiurus lepturus	0.81	41	0.54	
Chelidonichthys gabonensis	0.81	12	0.54	
Scomber japonicus	0.81	58	0.54	
Chloroscombrus chrysurus	0.81	6	0.54	
G A S T R O P O D S	0.41	93	0.27	
Citharus linguatula	0.23	17	0.15	
Pseudupeneus prayensis	0.23	6	0.15	
Scyllarides hokklopii	0.12	35	0.08	
Saurida brasiliensis	0.12	29	0.08	
GOBIIDAE	0.12	23	0.08	
Zeus faber	0.12	12	0.08	
Priacanthus arenatus	0.12	12	0.08	
Sphoeroides marmoratus	0.08	2	0.05	
Sicyonia galeata	0.06	6	0.04	
Starfish	0.06	6	0.04	
G A S T R O P O D S	0.06	17	0.04	
'Spider crab'	0.06	6	0.04	
Calappa sp.	0.06	6	0.04	
Selenia dorsalis	0.06	12	0.04	

Total 150.39 100.01

PROJECT STATION: 210  
 DATE: 11/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 50°  
 start stop duration Long W 45°  
 TIME :10:19:52 10:49:23 30 (min) Purpose code: 3  
 LOG :2997.97 2999.46 1.49 Area code: 1  
 FDEPTH: 65 64 GearCond.code:  
 BDEPTH: 65 64 Validity code:  
 Towing dir: 262° Wire out: 220 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 375.66 CATCH/HOUR: 751.32

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Trachurus trecae	486.80	19603	64.79	576
Dentex angelensis	69.60	700	9.26	575
Boops boops	44.80	1220	5.96	
Alloteuthis africana	16.40	5080	2.18	
Fistularia petimba	14.40	70	1.92	
Priacanthus arenatus	14.00	300	1.86	
Zeus faber	11.80	22	1.57	
Citharus linguatula	11.60	260	1.54	
Sepia officinalis hierredda	11.20	140	1.49	
Pagellus bellotti	10.40	180	1.38	
Brotula barbata	10.32	12	1.37	
Scomber japonicus	9.60	480	1.28	577
Pseudupeneus prayensis	6.40	40	0.85	
Serranus cabrilla	6.00	2140	0.50	
Lutjanus fuliginosus	5.00	20	0.75	
Brachydeuterus auritus	4.40	20	0.59	
Ommastrephes peruvianus	3.60	540	0.48	
Trichiurus lepturus	3.24	4	0.43	
Dicologlossa cuneata	2.80	20	0.37	
Microchirus frechkipi	2.40	40	0.32	
Grammoplites gruveli	2.00	60	0.27	
'Spider crab'	1.20	420	0.16	
Branchiostegus semifasciatus	1.12	2	0.15	
Dactylopterus volitans	0.48	2	0.06	
Schedophilus pectoralis	0.20	20	0.03	
Brama brama	0.20	20	0.03	
Ariommidae	0.20	40	0.03	
Epicnus sp.	0.20	20	0.03	
Arnoglossus imperialis	0.20	60	0.03	
Calappa pelii	0.16	4	0.02	

Total 751.32 100.00

PROJECT STATION: 211							
DATE:11/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N 459					
start	stop	duration	Long W 509				
TIME :12:48:52	13:19:11	30 (min)	Purpose code: 3				
LOG :3016.30	3017.96	1.63	Area code : 1				
FDEPTH:	70	68	GearCond.code:				
BDEPTH:	70	68	Validity code:				
Towing dir: 270°	Wire out: 220 m	Speed: 30 kn*10					
Sorted: 51 Kg	Total catch: 74.86	CATCH/HOUR: 149.72					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						
Brachydeuterus auritus	18.68	28	12.48				
Dentex angolensis	18.24	412	12.18	580			
Trichurus lepturus	17.76	48	11.86				
Ilex coindetii	14.80	1528	9.89				
Fistularia petimba	13.04	56	8.71				
Zeus faber	8.60	22	5.74				
Sepia officinalis hierredda	8.40		5.61				
Trachurus trecae	7.60	268	5.08	579			
Dentex angolensis	4.96	38	3.31	578			
Alloteuthis africana	4.80	1340	3.21				
Uranoscopus albesca	4.40	36	2.94				
Citharus linguatula	4.40	92	2.94				
Saurida brasiliensis	3.68	984	2.19				
Mustelus mustelus	2.80	2	1.59				
Priacanthus arenatus	2.72	88	1.82				
Pagellus bellottii	2.56	16	1.71				
Pteroscion peli	2.40	24	1.60				
Lepidotrigla cadmani	1.92	24	1.28				
Pagellus bellottii	1.92	20	1.28				
Grammoplites gruveli	1.84	28	1.23				
Dicologoglossa cuneata	1.36	12	0.91				
PECTINIDAE	1.00	36	0.67				
Dentex canariensis	0.88	4	0.59				
Boops boops	0.56	12	0.37				
'Spider crab' 2'	0.40	48	0.27				
Serranus accraensis	0.24	4	0.16				
'Calappa baby'	0.08	128	0.05				
Schedophilus pumarco	0.04	4	0.03				
Aroglossus imperialis	0.04	12	0.03				
Total	149.72	100.01					
PROJECT STATION: 212							
DATE:11/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N 503					
start	stop	duration	Long W 510				
TIME :14:20:46	14:50:28	30 (min)	Purpose code: 3				
LOG :3023.87	3025.51	1.63	Area code : 1				
FDEPTH:	37	36	GearCond.code:				
BDEPTH:	37	36	Validity code:				
Towing dir: 90°	Wire out: 150 m	Speed: 30 kn*10					
Sorted: 43 Kg	Total catch: 114.80	CATCH/HOUR: 229.60					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						
Brachydeuterus auritus	74.08	1086	32.26	583			
Trichurus lepturus	28.16	2816	12.26				
Trichurus lepturus	24.84	38	10.82				
Pseudotolithus senegalensis	21.28	240	9.27	584			
C R A B S	19.20	14	8.36	582			
Scyllarides herklotsii	5.76	1824	2.51				
Lolliguncula mercatoris	5.76	2112	2.51				
Penaeus notialis	5.76	2976	2.51				
GOBIDAE	4.96	288	2.16				
Boops boops	3.84		1.67				
Decapoda rhinclus	3.44	64	1.67				
Sepia officinalis hierredda	3.44	8	1.60				
Sicyonia galeata	2.92		1.27				
Grammoplites gruveli	1.92	2016	0.84				
Priacanthus arenatus	1.92	56	0.84				
Scyllarides herklotsii	1.76	496	0.77				
G A S T R O P O D S	1.44	48	0.63				
Pteroscion peli	1.44	56	0.63				
Dicologoglossa cuneata	1.28	16	0.56				
Bleennius normani	0.96	192	0.42				
Ilex coindetii	0.96	36	0.42				
Alloteuthis africana	0.96	84	0.42				
Todaropsis ebiana	0.96	208	0.42				
Trachurus tricauda juvenile	0.96	384	0.42				
Shrimps small non comm.	0.96	192	0.42				
Sphyrnaena juveniles	0.96	192	0.42				
Trichurus lepturus	0.96	480	0.42				
Pagellus bellottii	0.96	8	0.42				
Grammoplites gruveli	0.80	176	0.35				
Ilisha africana	0.80	8	0.35				
Umbrina canariensis	0.76	2	0.31				
Perulibatrachus elminensis	0.52	2	0.23				
C R A B S	0.48	128	0.21				
Cynoglossus canariensis	0.48	16	0.21				
Calappa peli	0.48	8	0.21				
Sicyonia galeata	0.32	209	0.14				
Starfish	0.16	2	0.07				
Citharus linguatula	0.16	8	0.07				
Sepiella ornata	0.08	8	0.03				
Sphyraena-juveniles	0.08	8	0.03				
Microchirus frechopi	0.08	8	0.03				
Total	229.60	100.02					
PROJECT STATION: 213							
DATE:11/ 9/00	GEAR TYPE: BT No:7	POSITION:Lat N 506					
start	stop	duration	Long W 509				
TIME :15:33:58	16:03:42	30 (min)	Purpose code: 3				
LOG :3029.40	3031.00	1.59	Area code : 1				
FDEPTH:	22	21	GearCond.code:				
BDEPTH:	22	21	Validity code:				
Towing dir: 270°	Wire out: 110 m	Speed: 30 kn*10					
Sorted: 55 Kg	Total catch: 350.10	CATCH/HOUR: 700.20					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						
Brachydeuterus auritus	187.92	3950	26.84				
Ilisha africana	147.60	4752	21.08				
Sepia officinalis hierredda	97.92	252	13.98				
Trichurus lepturus	99.56	5304	11.36				
Pteroscion peli	67.12	1784	9.60				
Trichurus lepturus	27.00		3.86				
Galeoides decadactylus	27.00	486	3.86				
Trachurus trecae	16.20	468	2.31	585			
Pakapenaeopsis atlantica	13.32	2724	1.90				
Cynoponticus ferox	8.88	6	1.27				
Boops boops	8.64	180	1.23				
Pseudotolithus senegalensis	6.84	126	0.98				
Penaeus notialis	5.04	216	0.72				
Schedophilus pumarco	2.88	432	0.41				
Schedophilus pumarco	1.80	36	0.26				
Scomber japonicus	1.80	2	0.26				
Umbrina canariensis	1.44	36	0.14				
Pisodonophis semicinctus	0.84	2	0.12				
Chloroscombrus chrysurus	0.62	18	0.10				
Sardinella maderensis	0.72	18	0.10				
Selene dorsalis	0.36	216	0.05				
Total	700.20	100.00					
PROJECT STATION: 214							
DATE:11/ 9/00	GEAR TYPE: PT No:7	POSITION:Lat N 504					
start	stop	duration	Long W 524				
TIME :18:20:29	18:20:34	32 (min)	Purpose code: 3				
LOG :3045.61	3047.35	1.72	Area code : 1				
FDEPTH:	2	2	GearCond.code:				
BDEPTH:	24	24	Validity code:				
Towing dir: 260°	Wire out: 150 m	Speed: 30 kn*10					
Sorted: 37 Kg	Total catch: 36.65	CATCH/HOUR: 68.72					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						
Sardinella aurita	18.71	242	27.23	587			
Ilisha africana	15.64	353	22.76	588			
Trichurus lepturus	8.06	84	11.73				
Brachydeuterus auritus	7.16	165	10.42				
Trachurus trecae	6.15	141	8.95				
Sardinella maderensis	5.70	83	8.29	586			
Chloroscombrus chrysurus	5.10	92	7.42	589			
Selene dorsalis	1.16	13	1.69				
Boops boops	0.34	8	0.49				
Galeoides decadactylus	0.30	2	0.44				
Sepia officinalis hierredda	0.23	4	0.33				
Sphyraena guachancho	0.11	2	0.16				
Pagellus bellottii	0.04	2	0.06				
Schedophilus pumarco	0.02	2	0.03				
Total	68.72	100.00					
PROJECT STATION: 215							
DATE:12/ 9/00	GEAR TYPE: PT No:6	POSITION:Lat N 447					
start	stop	duration	Long W 544				
TIME :23:56:52	00:26:46	30 (min)	Purpose code: 1				
LOG :3089.35	3090.89	1.52	Area code : 1				
FDEPTH:	2	0	GearCond.code:				
BDEPTH:	106	95	Validity code:				
Towing dir: 256°	Wire out: 140 m	Speed: 36 kn*10					
Sorted: 32 Kg	Total catch: 51.64	CATCH/HOUR: 103.28					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						
Trichurus lepturus	63.40	84	61.39				
MYCTOPHIDAE	39.60	13770	38.34				
Saurida brasiliensis	0.18	90	0.17				
Bremmaceros sp.	0.10	90	0.10				
Total	103.28	100.00					
PROJECT STATION: 216							
DATE:12/ 9/00	GEAR TYPE: PT No:1	POSITION:Lat N 448					
start	stop	duration	Long W 546				
TIME :01:27:33	01:37:53	10 (min)	Purpose code: 1				
LOG :3094.90	3095.50	0.60	Area code : 1				
FDEPTH:	50	50	GearCond.code:				
BDEPTH:	82	85	Validity code:				
Towing dir: 180°	Wire out: 240 m	Speed: 32 kn*10					
Sorted: Kg	Total catch: CATCH/HOUR:						
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
J E L L Y F I S H	0.00						
Total							
PROJECT STATION: 217							
DATE:12/ 9/00	GEAR TYPE: PT No:7	POSITION:Lat N 459					
start	stop	duration	Long W 547				
TIME :03:50:39	04:17:30	27 (min)	Purpose code: 1				
LOG :3110.67	3112.21	1.53	Area code : 1				
FDEPTH:	5	5	GearCond.code:				
BDEPTH:	24	34	Validity code:				
Towing dir: 170°	Wire out: 150 m	Speed: 35 kn*10					
Sorted: 362 Kg	Total catch: 361.92	CATCH/HOUR: 804.27					
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP			
	weight numbers						

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 503  
 start stop duration Long W 535  
 TIME : 06:28:58 06:58:12 29 (min) Purpose code: 3  
 LOG : 3127.21 3128.36 1.15 Area code: 1  
 FDEPTH: 21 20 GearCond.code:  
 BDEPTH: 21 20 Validity code:  
 Towing dir: 2550 Wire out: 90 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 145.75 CATCH/HOUR: 301.55

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Sepio officinalis hierredda	54.70 137	18.14		
Trichurus lepturus	52.63 1179	17.45		
Galeoides decadactylus	38.11 689	12.64	591	
Ilisha africana	34.01 1767	11.28		
Pteroscion peli	20.36 763	6.75		
Parapenaeopsis atlantica	15.81 4008	5.24		
Trichurus lepturus	15.60 29	5.17		
Parapenaeopsis atlantica	11.50 732	3.81		
Psedotolithus senegalensis	10.47 25	3.47	592	
Chloroscombrus chrysurus	8.57 192	2.84		
Pseudorithus senegalensis	8.19 137	2.72	593	
Dasyatis margarita	5.21 31	1.73		
Sphyraena guachancho	3.48 14	1.15		
Stromateus fiatola	3.48 273	1.15		
Penaeus kerathurus	2.73 81	0.91		
Ephippion guttifer	2.40 2	0.80		
Schedophilus pemarco	1.99 25	0.66		
Penaeus notialis	1.90 54	0.63		
Selene dorsalis	1.74 552	0.58		
Portunus validus	1.66 2	0.55		
Uranoscopus pollis	1.24 2	0.41		
Lolliguncula mercatoris	1.12 434	0.37		
Sardinella maderensis	0.99 19	0.33		
Cynoglossus browni	0.91 8	0.30		
Stromateus fiatola	0.70 2	0.23		
Brachydeuterus auritus	0.50 37	0.17		
Alectis alexandrinus	0.37 23	0.02		
BATRACHOIDIDAE	0.27 43	0.12		
'Spider crab 2'	0.25 74	0.08		
Drepane africana	0.25 12	0.08		
Torpedo nobiliana	0.25 6	0.08		
Sicyonia galeata	0.06 6	0.02		

Total 301.55 99.98

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 458  
 start stop duration Long W 534  
 TIME : 08:12:29 08:42:03 30 (min) Purpose code: 3  
 LOG : 3134.99 3136.34 1.37 Area code: 1  
 FDEPTH: 48 46 GearCond.code:  
 BDEPTH: 48 46 Validity code:  
 Towing dir: 270° Wire out: 150 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 408.36 CATCH/HOUR: 816.72

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Engraulis encrasiculus	648.68 147428	79.43	594	
Trichurus lepturus	44.72 52	5.11		
Mustelus mustelus	28.28 26	3.46		
Trachurus trecae	22.20 3946	2.72		
Octopus vulgaris	18.00 16	2.20		
Sardinella aurita - Juveniles	17.26 3330	2.11		
Sepia officinalis hierredda	16.60 30	2.03		
Raja miraletus	3.96 12	0.48		
Pagellus bellottii	3.52 14	0.43		
Dicologlossa hexophthalma	2.46 124	0.30		
Zeus faber	2.16 2	0.26		
Dactylopterus volitans	1.84 6	0.23		
Torpis torpedo	1.80 2	0.22		
O. S. T. P. O. D. S	1.24 124	0.15		
Argoglossus imperialis	1.24 124	0.15		
Grammoplites griseus	1.24 124	0.15		
Alloteuthis africana	1.24 124	0.15		
Saurida brasiliensis	1.24 246	0.15		
Cynoglossus browni	1.12 6	0.14		
Perulibatrachus elminensis	0.48 2	0.06		
Syacium micrurum	0.24 2	0.03		
Citharus linguatula	0.20 4	0.02		

Total 816.72 99.98

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 452  
 start stop duration Long W 535  
 TIME : 10:01:48 10:29:52 28 (min) Purpose code: 3  
 LOG : 3145.64 3146.91 1.26 Area code: 1  
 FDEPTH: 91 82 GearCond.code:  
 BDEPTH: 91 82 Validity code:  
 Towing dir: 270° Wire out: 270 m Speed: 30 kn\*10

Sorted: 37 Kg Total catch: 94.75 CATCH/HOUR: 203.04

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Dentex angolensis	87.17 501	42.93	595	
Dentex congolensis	65.70 765	32.36	596	
Brotula barbata	17.57 17	8.65		
Pagellus bellottii	6.94 90	3.42	597	
Iliev coindetii	4.24 148	2.09		
Scorpaena scrofa	3.21 6	1.58		
Branchiostegus semifasciatus	2.96 6	1.46		
Zeus faber	2.83 6	1.39		
Lepidotrigla cadmani	2.57 32	1.27		
Citharus linguatula	2.06 39	1.01		
Alloteuthis africana	1.80 527	0.89		
Fistularia petimba	1.80 6	0.89		
E. C. H. I. N. O. D. E. R. M. A. T. A	0.77 90	0.38		
Saurida brasiliensis	0.77 386	0.38		
Anthias anthias	0.64 6	0.35		
Sea urchins (strong spines)	0.51 6	0.25		
Todaropsis eblanae	0.51 19	0.25		
Chaetodon marcellae	0.39 6	0.19		
Sepia officinalis hierredda	0.26 6	0.13		
Trachurus trecae	0.13 6	0.06		
SYGSY00	0.06 6	0.03		
Arnoglossus imperialis	0.06 6	0.03		
Syacium micrurum	0.06 19	0.03		

Total 203.01 99.99

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 456  
 start stop duration Long W 557  
 TIME : 13:12:43 13:42:39 30 (min) Purpose code: 3  
 LOG : 3169.09 3170.1 1.38 Area code: 1  
 FDEPTH: 22 22 GearCond.code:  
 BDEPTH: 22 22 Validity code:  
 Towing dir: 260° Wire out: 100 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 188.31 CATCH/HOUR: 376.62

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Brachydeuterus auritus	232.12 8792	61.63	599	
Trichurus lepturus	46.80 4154	12.43		
Galeoides decadactylus	26.00 692	6.90		
Pseudotolithus galiegensis	11.08 6	2.94		
Sepia officinalis hierredda	10.08 12	2.68		
Trichurus lepturus	7.60 22	2.02		
Chloroscombrus chrysurus	5.00 62	1.33		
Mustelus mustelus	4.40 2	1.17		
Ilisha africana	4.36 84	1.16		
Epinephelus aeneus	4.00 6	1.06		
Pagellus bellottii	4.00 20	1.06	598	
Pomadasys incisus	3.12 20	0.83		
Pteroscion peli	2.92 62	0.78		
Sardinella maderensis	2.92 146	0.78		
Galeoides decadactylus	2.12 4	0.56		
Selene dorsalis	1.66 240	0.44		
Caranx sordidus	1.32 4	0.35		
Schedophilus pemarco	1.24 10	0.33		
Trachurus trecae	1.04 42	0.28		
Pomadasys incisus	1.04 22	0.22		
Raja miraletus	0.84 2	0.11		
Elops lacerta	0.40 2	0.11		
Pagrus caeruleostictus	0.36 2	0.10		
Sardinella maderensis	0.32 2	0.08		
C R A B S	0.20 104	0.05		
Todaropsis eblanae	0.20 10	0.05		
Cronius ruber	0.20 10	0.05		
Parapenaeopsis atlantica	0.20 62	0.05		
Sphyraena guachancho	0.20 32	0.05		
Pseudorithus perezi	0.20 2	0.05		
Scyllarides mertensi	0.10 52	0.03		
Lolliguncula mercatoris	0.10 208	0.03		
Cynoglossus browni	0.10 10	0.03		
Sicyonia galeata	0.10 32	0.03		
Scorpaena scrofa	0.08 2	0.02		
Penaeus notialis	0.08 4	0.02		
Penaeus kerathurus	0.08 2	0.02		
Squilla aculeata calmani	0.04 2	0.01		

Total 376.62 100.01

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 452  
 start stop duration Long W 557  
 TIME : 14:33:24 15:03:12 30 (min) Purpose code: 3  
 LOG : 3175.05 3176.56 1.50 Area code: 1  
 FDEPTH: 40 42 GearCond.code:  
 BDEPTH: 40 42 Validity code:  
 Towing dir: 80° Wire out: 160 m Speed: 30 kn\*10

Sorted: 24 Kg Total catch: 2384.72 CATCH/HOUR: 4769.44

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Engraulis encrasiculus	3172.00 641610	66.51	600	
Sardinella aurita - Juveniles	936.00 176800	19.62	601	
Trachurus trecae, juvenile	384.00 75400	7.63		
Balistes capricornis	81.92 128	1.72		
Raja miraletus	74.24 128	1.56		
Octopus vulgaris	26.00 10	0.55		
Pagellus bellottii	23.04 512	0.46		
Scomber japonicus	20.48 1280	0.43		
Grammoplites griseus	17.92 512	0.38		
Priacanthus arenatus	15.36 512	0.32		
Trachurus trecae	15.36 256	0.32		
Syacium micrurum	7.68 128	0.16		
Sepia officinalis hierredda	7.44 10	0.16		
Mustelus mustelus	3.12 2	0.07		
Sphyraena guachancho	1.84 2	0.04		
Pagellus bellottii	1.76 8	0.04		
Illex coindetii	1.28 128	0.03		

Total 4769.44 100.02

DATE: 12/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 450  
 start stop duration Long W 555  
 TIME : 16:07:00 16:37:26 30 (min) Purpose code: 3  
 LOG : 3180.08 3181.70 1.60 Area code: 1  
 FDEPTH: 63 60 GearCond.code:  
 BDEPTH: 63 60 Validity code:  
 Towing dir: 260° Wire out: 220 m Speed: 30 kn\*10

Sorted: 81 Kg Total catch: 109.54 CATCH/HOUR: 219.08

#### SPECIES

	CATCH/HOUR	% OF TOT.	C	SAMP
	weight numbers			
Branchiostegus semifasciatus	39.80 50	18.17		
Trachurus trecae	39.12 1226	17.86	604	
Dentes angolensis	15.60 288	7.12	605	
Alloteuthis africana	15.36 24	7.01		
Brotula barbata	14.00 20	6.39		
Trichurus lepturus	12.64 16	5.77		
Zanclus faber	12.28 24	5.61		
Dentes angolensis	11.84 70	5.40	602	
Epinephelus aeneus	11.24 2	5.13		
Mustelus mustelus	6.20 4	2.83		
Pagellus bellottii	5.50 32	2.65	603	
Sepia officinalis hierredda	5.40 20	2.46		
Pagellus bellottii	5.04 8	2.30		
Saurida brasiliensis	3.84 1296	1.75		
Priacanthus arenatus	2.72 84	1.24		
Dentes canariensis	2.60 6	1.19		
Citharus linguatula	2.16 48	0.99		
Pseudupeneus prayensis	2.16 16	0.99		
Fistularia petimba	1.84 8	0.84		
Octopus vulgaris	1.44 2	0.66		
Lophiodes kempfi	1.12 4	0.51		
Brachydeuterus auritus	1.04 8	0.47		
Raja miraletus	1.04 2	0.47		
'Spider crab 2'	0.96 96	0.44		
Grammoplites griseus</				

PROJECT STATION: 224  
 DATE: 12/ 9/00 GEAR TYPE: PT No:6 POSITION: Lat N 444  
 TIME : 20:20:36 start stop duration Long W 605  
 LOG : 3211.03 3212.54 1.43 Purpose code: 1  
 FDEPTH: 2 2 Area code: 1  
 BDEPTH: 74 68 GearCond.code:  
 Towing dir: 340° Wire out: 140 m Speed: 30 kn\*10  
 Sorted: 30 Kg Total catch: 72.36 CATCH/HOUR: 144.72

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Engraulis encrasicolus* 105.28 20846 72.75  
*Trichiurus lepturus* 23.24 26 16.08  
*Saurida brasiliensis* 6.02 3512 4.18  
*Sardinella aurita* 3.64 518 2.52  
*Stromateus fiatola* 1.80 2 1.24  
*Sardinella maderensis* 1.54 8 1.06 606  
*Trachurus trecae* 1.12 64 0.77  
*Scomber japonicus* 0.70 56 0.48  
*Ariommabondi* 0.56 64 0.39  
*Sphyraena sphyraena* 0.52 2 0.36  
*Alloteuthis africana* 0.14 92 0.10  
*Sepia officinalis hierredda* 0.08 8 0.06  
*Selene dorsalis* 0.08 8 0.06  
 Total 144.72 100.01

PROJECT STATION: 225  
 DATE: 12/ 9/00 GEAR TYPE: PT No:7 POSITION: Lat N 449  
 TIME : 23:27:33 start stop duration Long W 616  
 LOG : 3230.89 3232.19 1.23 Purpose code: 1  
 FDEPTH: 2 2 Area code: 1  
 BDEPTH: 31 32 GearCond.code:  
 Towing dir: 252° Wire out: 140 m Speed: 30 kn\*10  
 Sorted: 18 Kg Total catch: 18.05 CATCH/HOUR: 34.94

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Ilisha africana* 8.71 368 24.93  
*Chloroscombrus chrysurus* 8.36 112 23.93 611  
*Brachydeuterus auritus* 6.08 468 17.40  
*Selene dorsalis* 4.03 46 11.53  
*Sardinella maderensis* 2.98 195 8.53 609  
*Trichiurus lepturus* 1.56 118 5.32  
*Trachurus trecae* 1.20 132 3.49 610  
*Sardinella maderensis* 0.85 6 2.43 608  
*Sardinella aurita* 0.54 4 1.55  
*Pagellus bellottii* 0.31 2 0.89 607  
*Sepiella ornata* 0.02 2 0.06  
 Total 34.94 100.00

PROJECT STATION: 226  
 DATE: 13/ 9/00 GEAR TYPE: PT No:4 POSITION: Lat N 437  
 TIME : 02:14:47 start stop duration Long W 622  
 LOG : 3252.14 3253.92 1.76 Purpose code: 1  
 FDEPTH: 0 0 Area code: 1  
 BDEPTH: 85 106 GearCond.code:  
 Towing dir: 360° Wire out: 160 m Speed: 35 kn\*10  
 Sorted: 27 Kg Total catch: 26.71 CATCH/HOUR: 53.42

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Sphyraena afra* 1.60 2 47.92  
*Trichiurus lepturus* 22.80 34 42.68  
*Trachurus trecae, juvenile* 2.00 2000 3.70  
*Stromateus fiatola* 1.60 2 9.00  
*Trachinotus ovatus* 0.60 2 1.12  
*Trachurus trecae* 0.56 20 1.05  
*Psenes pellucidus* 0.24 6 0.45  
*Ariommabondi* 0.02 2 0.04  
 Total 53.42 100.00

PROJECT STATION: 227  
 DATE: 13/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 438  
 TIME : 06:30:19 start stop duration Long W 615  
 LOG : 3270.41 3271.88 1.46 Purpose code: 3  
 FDEPTH: 88 83 Area code: 1  
 BDEPTH: 88 83 GearCond.code:  
 Towing dir: 60° Wire out: 270 m Speed: 30 kn\*10  
 Sorted: 204 Kg Total catch: 204.00 CATCH/HOUR: 408.00

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Dentex angolensis* 15.92 1122 28.41 612  
*Brotula barbata* 91.88 110 22.52  
*Priacanthus arenatus* 31.76 106 7.78  
*Umbrina canariensis* 31.76 174 7.78 613  
*Pteroscion peli* 26.84 166 6.58  
*Dentex congoliensis* 25.84 188 6.33 614  
*Branchiostegus semifasciatus* 19.68 26 4.82  
*Lepidotrigla cadmani* 9.68 98 2.37  
*Scorpaena scrofa* 7.32 10 1.79  
*Raja miraletus* 6.60 14 1.62  
*Dentex canariensis* 6.44 12 1.58  
*Pagellus bellottii* 5.60 100 1.37 615  
*Synanceia ovalis* 4.80 4 1.18  
*Todaropsis elongatus* 3.76 140 0.92  
*Sarcogentron hastatum* 3.02 16 0.86  
*Boops boops* 3.04 52 0.86  
*Trichiurus lepturus* 2.92 4 0.73  
*Trachurus trecae* 2.52 28 0.62  
*Epinephelus goreensis* 2.44 2 0.60  
*Sepia officinalis hierredda* 1.40 10 0.34  
*Zeus faber* 0.72 2 0.18  
*Cheilodonichthys gabonensis* 0.72 6 0.18  
*Lophiodes kempfi* 0.56 2 0.14  
*Uranoscopus polli* 0.52 4 0.13  
*Scomber japonicus* 0.48 4 0.12  
*Chloroscombrus chrysurus* 0.40 4 0.10  
*Sardinella aurita* 0.32 2 0.08  
*Citharus linguatula* 0.20 2 0.05  
*Brachydeuterus auritus* 0.20 2 0.05  
*Sphoeroides pachaster* 0.08 2 0.02  
*Grammoplites griseus* 0.08 2 0.02  
*Argoglossus imperialis* 0.06 2 0.01  
*Sardinella maderensis* 0.02 2  
 Total 408.00 100.00

PROJECT STATION: 228  
 DATE: 13/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 447  
 TIME : 08:25:39 start stop duration Long W 617  
 LOG : 3282.26 3283.58 1.31 Purpose code: 3  
 FDEPTH: 40 40 Area code: 1  
 BDEPTH: 40 40 GearCond.code:  
 Towing dir: 260° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 35 Kg Total catch: 58.96 CATCH/HOUR: 110.55

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Brachydeuterus auritus* 43.65 825 39.48 616  
*Trichiurus lepturus* 14.55 1161 13.16  
*Pagellus bellottii* 5.40 120 4.88 617  
*Grammoplites griseus* 5.36 386 4.85  
*Chloroscombrus chrysurus* 4.13 38 3.74  
*Raja miraletus* 4.05 11 3.66  
*Citharus linguatula* 3.80 165 3.53  
*Sepia officinalis hierredda* 3.86 6 3.22  
*Octopus vulgaris* 2.89 4 2.61  
*Selene dorsalis* 1.91 6 1.73  
*Perulibatrachus elminensis* 1.88 45 1.70  
*Ephippion guttifer* 1.76 4 1.59  
*Sphyraena guachancho* 1.76 4 1.59  
*Cynoglossus canariensis* 1.58 11 1.43  
*Priacanthus arenatus* 1.50 4 1.36  
*Alloteuthis africana* 1.43 49 1.29  
*Cynoponticus ferox* 1.28 4 1.16  
*Penaeus notialis* 1.28 38 1.15  
*C R A B S* 0.88 128 0.99  
*Scyllarides herklotsii* 0.98 368 0.89  
*Cynoglossus canariensis* 0.90 2 0.81  
*Trachurus trecae* 0.75 45 0.68  
*Dicologoglossa hexophthalma* 0.75 56 0.68  
*Syacium microrurum* 0.68 26 0.62  
*Illex coindetii* 0.60 49 0.54  
*Epinephelus aeneus* 0.53 2 0.48  
*Sea urchins (strong spines)* 0.45 79 0.41  
*G A L A P O G O S* 0.45 34 0.41  
*Sicyonia galeata* 0.30 161 0.27  
*GOBIIDAE* 0.30 244 0.27  
*Microcirrus frechkipi* 0.30 23 0.27  
*Pomadasys incisus* 0.23 4 0.21  
*Stromateus fiatola* 0.19 23 0.21  
*Dicologoglossa cuneata* 0.08 4 0.07  
*Starfish* 0.08 15 0.07  
*PORTUNIDAE* 0.04 4 0.04  
*'Spider crab'* 0.04 4 0.04  
*Selene dorsalis* 0.04 15 0.04  
*Zeus faber* 0.04 15 0.04  
*Blennius normani* 0.04 19 0.04  
 Total 110.62 100.08

PROJECT STATION: 229  
 DATE: 13/ 9/00 GEAR TYPE: BT No:7 POSITION: Lat N 449  
 TIME : 09:54:49 start stop duration Long W 618  
 LOG : 3288.89 3289.23 0.31 Purpose code: 3  
 FDEPTH: 28 29 Area code: 1  
 BDEPTH: 28 29 GearCond.code:  
 Towing dir: 250° Wire out: 100 m Speed: 30 kn\*10  
 Sorted: 37 Kg Total catch: 71.15 CATCH/HOUR: 533.63

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Pomadasys peroteti* 170.85 203 32.02 618  
*Ilisha africana* 142.25 1013 26.84 619  
*Sardinella maderensis* 44.25 3000 8.29  
*Brachydeuterus auritus* 33.75 1913 6.32  
*Pteroscion peli* 29.25 825 5.48  
*Trichiurus lepturus* 23.25 2288 4.36  
*Pseudotolithus senegalensis* 15.00 188 2.81 620  
*Galeoides decadactylus* 14.70 53 2.75  
*Selene dorsalis* 14.63 488 2.74  
*Dasyatis margarita* 14.10 8 2.64  
*Parapenaeopsis atlantica* 4.35 8 0.82  
*Pomadasys incisus* 4.05 38 0.76  
*Umbrina canariensis* 3.90 8 0.73  
*MAJIDAE* 3.75 488 0.70  
*Sea urchins (strong spines)* 3.25 38 0.70  
*B I V A L V E S* 2.25 4 0.42  
*Loilligocula mercatoris* 2.25 3 0.42  
*Parapenaeopsis atlantica* 1.80 308 0.34  
*Schedophilus pemarco* 1.50 38 0.28  
*Ephippion guttifer* 0.75 38 0.14  
*Penaeus notialis* 0.75 45 0.14  
*Alectis alexandrinus* 0.38 75 0.07  
*Alloteuthis africana* 0.38 150 0.07  
*Trachurus trecae* 0.38 113 0.07  
*Stromateus fiatola* 0.38 188 0.07  
 Total 533.65 99.98

PROJECT STATION: 230  
 DATE: 13/ 9/00 GEAR TYPE: PT No:4 POSITION: Lat N 444  
 TIME : 12:14:39 start stop duration Long W 634  
 LOG : 3308.44 3309.10 0.58 Purpose code: 1  
 FDEPTH: 0 0 Area code: 1  
 BDEPTH: 26 27 GearCond.code:  
 Towing dir: 0 Wire out: 140 m Speed: 38 kn\*10  
 Sorted: 18 Kg Total catch: 17.82 CATCH/HOUR: 53.46

SPECIES CATCH/HOUR % OF TOT. C SAMP  
 weight numbers  
*Trachurus trecae, juvenile* 44.46 9798 83.16  
*Sphyraena guachancho* 2.88 6 5.39  
*Sepia officinalis hierredda* 2.16 3 4.04  
*Engraulis encrasicolus* 1.56 333 2.92 624  
*Sardinella maderensis* 0.84 6 1.57 622  
*Sardinella aurita - Juveniles* 0.78 177 1.46 623  
*Sardinella aurita* 0.48 3 0.90 621  
*Trachinotus ovatus* 0.30 6 0.56  
 Total 53.46 100.00

DATE:13/ 9/00 GEAR TYPE: BT No:7 POSITION:Lat N 444  
 start stop duration Long W 634  
 TIME :13:03:46 13:28:33 25 (min) Purpose code: 3  
 LOG :3310.09 3311.29 1.00 Area code: 1  
 FDEPTH: 27 26 GearCond.code:  
 BDEPTH: 27 26 Validity code:  
 Towing dir: 255° Wire out: 120 m Speed: 30 kn\*10

Sorted: 55 Kg Total catch: 220.12 CATCH/HOUR: 528.29

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Brachydeuterus auritus	234.00	2297	44.29	
Trichurus lepturus	63.96	3842	12.11	
Sardinella rouxi	57.72	3041	10.93	626
Ilisha africana	53.04	1805	10.04	
Pteroscion peli	28.08	1344	5.32	
Chloroscombrus chrysurus	17.78	235	3.17	
Selene dorsalis	14.04	3209	2.66	
Galeoides decadactylus	12.24	36	2.32	
Dasyatis margarita	7.20	5	1.36	
Torpedo nobiliana	7.20	12	1.36	
Pseudotolithus senegalensis	4.32	36	0.82	625
Pseudotolithus senegalensis	3.74	31	0.71	
Sepia officinalis hierredda	3.60	7	0.68	
Pomadasys incisus	3.13	62	0.58	
Ephippion guttifer	3.13	5	0.58	
Raja miraletus	2.64	5	0.50	
Parapenaeopsis atlantica	2.18	468	0.41	
Sphyraena guachancho	2.16	7	0.41	
Galeoides decadactylus	1.56	31	0.30	
Trachurus trecae	1.42	79	0.27	
Epinephelus aeneus	1.20	2	0.23	
Cynoglossus canariensis	0.96	5	0.18	
Torpedo torpedo	0.96	2	0.18	
Stromateus fiatola	0.94	142	0.18	
Pseudotolithus typus	0.48	2	0.09	
Sepiella ornata	0.31	31	0.06	

Total 528.28 100.02

DATE:13/ 9/00 GEAR TYPE: BT No:2 POSITION:Lat N 442  
 start stop duration Long W 635  
 TIME :18:02:58 18:32:08 29 (min) Purpose code: 3  
 LOG :3317.89 3319.73 1.82 Area code: 1  
 FDEPTH: 36 38 GearCond.code:  
 BDEPTH: 36 38 Validity code:  
 Towing dir: 75° Wire out: 130 m Speed: 30 kn\*10

Sorted: 61 Kg Total catch: 192.78 CATCH/HOUR: 398.86

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Brachydeuterus auritus	286.45	3906	71.82	627
Trichurus lepturus	40.14	6813	10.06	
Trichurus lepturus	33.19	33	8.32	
Pomadasys rogeri	12.50	8	3.13	
Trachurus trecae	9.72	300	2.44	628
Sepia officinalis hierredda	5.67	8	1.42	
Penaeus notialis	5.09	228	1.28	
Pteroscion peli	2.69	93	0.67	
Mustelus mustelus	1.66	2	0.42	
Torpedo torpedo	1.45	10	0.36	
Syacium micrurum	0.10	10	0.03	

Total 398.66 99.95

DATE:13/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 433  
 start stop duration Long W 634  
 TIME :20:35:42 21:05:33 30 (min) Purpose code: 1  
 LOG :3331.64 3333.30 1.66 Area code: 1  
 FDEPTH: 2 2 GearCond.code:  
 BDEPTH: 95 85 Validity code:  
 Towing dir: 287° Wire out: 150 m Speed: 30 kn\*10

Sorted: 96 Kg Total catch: 231.88 CATCH/HOUR: 463.76

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Daphus sp.	338.60	119920	73.01	
Trichurus lepturus	121.08	172	26.11	
Sepia officinalis hierredda	1.92	2	0.41	
Scomber japonicus	1.68	10	0.36	
Sardinella aurita	0.32	2	0.07	
Trachurus trecae	0.08	4	0.02	
Illex coindetii	0.04	2	0.01	
Todaropsis eblanae	0.04	2	0.01	

Total 463.76 100.00

DATE:13/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 434  
 start stop duration Long W 645  
 TIME :22:42:25 23:12:27 30 (min) Purpose code: 1  
 LOG :3345.32 3346.66 1.34 Area code: 1  
 FDEPTH: 2 2 GearCond.code:  
 BDEPTH: 53 62 Validity code:  
 Towing dir: 194° Wire out: 150 m Speed: 30 kn\*10

Sorted: 76 Kg Total catch: 227.85 CATCH/HOUR: 455.70

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trichurus lepturus	362.40	506	79.53	
Selene dorsalis	11.12	84	5.29	
Scomberomorus tritor	22.22	18	5.03	
Alectis alexandrinus	16.68	6	3.66	
Chloroscombrus chrysurus	12.00	148	2.63	630
Engraulis encrasiculus	5.64	1316	1.24	632
Trachurus trecae	4.20	168	0.92	629
Brachydeuterus auritus	3.35	36	0.74	
Trachurus trecae, juvenile	2.88	1128	0.63	
Sardinella maderensis	0.96	6	0.21	631
Sardinella aurita - Juveniles	0.48	126	0.11	
Saurida brasiliensis	0.06	18	0.01	

Total 455.70 100.00

DATE:14/ 9/00 GEAR TYPE: PT No:4 POSITION:Lat N 430  
 start stop duration Long W 652  
 TIME :02:26:43 02:46:30 20 (min) Purpose code: 1  
 LOG :3366.46 3367.79 1.32 Area code: 1  
 FDEPTH: 0 0 GearCond.code:  
 BDEPTH: 77 77 Validity code:  
 Towing dir: 250° Wire out: 160 m Speed: 38 kn\*10

Sorted: 87 Kg Total catch: 86.76 CATCH/HOUR: 260.28

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trichurus lepturus	248.40	375	95.44	
Trachurus trecae	9.42	2190	2.62	
Sardinella aurita	1.20	6	0.66	633
Sardinella maderensis	1.02	6	0.39	634
Todaropsis eblanae	0.12	6	0.05	
Sepia officinalis hierredda	0.12	9	0.05	

Total 260.28 100.01

DATE:14/ 9/00 GEAR TYPE: PT No:1 POSITION:Lat N 432  
 start stop duration Long W 655  
 TIME :04:58:42 05:24:37 26 (min) Purpose code: 1  
 LOG :3385.22 3386.90 1.74 Area code: 1  
 FDEPTH: 20 26 GearCond.code:  
 BDEPTH: 54 51 Validity code:  
 Towing dir: 270° Wire out: 120 m Speed: 40 kn\*10

Sorted: 55 Kg Total catch: 55.47 CATCH/HOUR: 128.01

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trichurus lepturus	122.54	194	95.73	
Saurida brasiliensis	2.31	1015	1.80	
Trichurus lepturus	0.88	51	0.69	
Trachurus trecae, juvenile	0.76	295	0.59	
Brachydeuterus auritus	0.42	22	0.33	
Bregmaceros sp.	0.39	884	0.30	
Sardinella maderensis	0.32	2	0.05	
Lolliguncula mercatoris	0.18	83	0.14	
Sepia officinalis hierredda	0.09	18	0.07	
Engraulis encrasiculus	0.09	18	0.07	
Fistularia tabacaria	0.02	2	0.02	

Total 128.00 99.99

DATE:14/ 9/00 GEAR TYPE: BT No:2 POSITION:Lat N 431  
 start stop duration Long W 654  
 TIME :06:57:08 07:08:40 12 (min) Purpose code: 3  
 LOG :3397.01 3397.57 0.55 Area code: 1  
 FDEPTH: 65 67 GearCond.code:  
 BDEPTH: 65 67 Validity code:  
 Towing dir: 220° Wire out: 210 m Speed: 30 kn\*10

Sorted: 155 Kg Total catch: 393.24 CATCH/HOUR: 1966.20

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trachurus trecae, juvenile	1175.00	376290	59.77	
Trichurus lepturus	67.40	1005	34.45	
Brotula barbata	30.00	100	1.55	
Dentex angelensis	16.20	145	0.22	635
Umbrina canariensis	13.10	75	0.67	
Lolliguncula mercatoris	11.30	1130	0.57	
Illex coindetii	11.30	1130	0.57	
Sepia officinalis hierredda	6.40	10	0.33	
Pagellus bellottii	4.80	35	0.24	636
Pteroscion peli	4.70	30	0.24	
Octopus vulgaris	4.50	5	0.23	
Zeus faber	3.10	10	0.16	
Uranoscopus polli	2.60	10	0.13	
Chthamalus lingula	2.00	20	0.10	
Pagellus gracilisosteictus	1.70	5	0.09	
Fistularia petimba	0.60	5	0.03	
Dentex canariensis	0.50	10	0.03	
Grammoplites gruveli	0.30	5	0.02	
Priacanthus arenatus	0.10	5	0.01	

Total 1966.20 100.01

DATE:14/ 9/00 GEAR TYPE: PT No:6 POSITION:Lat N 430  
 start stop duration Long W 654  
 TIME :08:17:43 08:47:42 30 (min) Purpose code: 1  
 LOG :3399.13 3400.74 1.46 Area code: 1  
 FDEPTH: 2 2 GearCond.code: 9  
 BDEPTH: 71 71 Validity code: 9  
 Towing dir: 70° Wire out: 150 m Speed: 30 kn\*10

Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
N O C A T C H	weight numbers	0.00		
Total				

DATE:14/ 9/00 GEAR TYPE: BT No:2 POSITION:Lat N 434  
 start stop duration Long W 650  
 TIME :10:26:59 10:57:33 31 (min) Purpose code: 3  
 LOG :3411.26 3413.05 1.78 Area code: 1  
 FDEPTH: 47 48 GearCond.code:  
 BDEPTH: 47 48 Validity code:  
 Towing dir: 250° Wire out: 150 m Speed: 30 kn\*10

Sorted: 169 Kg Total catch: 614.33 CATCH/HOUR: 1189.03

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trachurus trecae	784.45	290650	65.97	
Trichurus lepturus	262.34	4221	22.06	
Brachydeuterus auritus	120.77	1248	10.16	638
Trichurus lepturus	16.84	1713	1.42	
Caranx cryos	1.78	2	0.15	
Stromateus fiatola	1.32	2	0.11	
Boops boops	0.58	29	0.05	
Todaropsis eblanae	0.29	58	0.02	
Engraulis encrasiculus	0.29	116	0.02	
Stromateus fiatola	0.29	29	0.02	
Penaeus notialis	0.08	2	0.01	

Total 1189.03 99.99

PROJECT STATION: 240  
 DATE: 14/ 9/00 GEAR TYPE: BT No:2 POSITION: Lat N 425  
 start stop duration Long W 716  
 TIME : 15:12:53 15:42:32 30 (min) Purpose code: 3  
 LOG : 3445.89 3447.40 1.52 Area code: 1  
 FDEPTH: 45 48 GearCond.code:  
 BDEPTH: 45 48 Validity code:  
 Towing dir: 60° Wire out: 160 m Speed: 31 kn\*10  
 Sorted: 36 Kg Total catch: 252.62 CATCH/HOUR: 505.24

PROJECT STATION: 243  
 DATE: 14/ 9/00 GEAR TYPE: PT No:6 POSITION: Lat N 420  
 start stop duration Long W 713  
 TIME : 21:38:46 22:08:12 29 (min) Purpose code: 1  
 LOG : 3480.92 3482.27 1.35 Area code: 1  
 FDEPTH: 72 72 GearCond.code:  
 BDEPTH: 72 69 Validity code:  
 Towing dir: 40° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 13 Kg Total catch: 39.20 CATCH/HOUR: 81.10

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Brachydeuterus auritus	386.58	6374	76.51	639
Selene dorsalis	58.82	766	11.64	
Pagellus bellottii	18.36	222	3.63	640
Trachurus trecae	10.54	800	2.09	641
Trichiurus lepturus	10.20	4420	2.02	
Raja miraletus	3.36	6	0.67	
Grammoplites gruveli	3.06	120	0.61	
Pomadasy perreti	2.16	2	0.43	
Zeus faber	1.66	2	0.39	
Sepia officinalis hierredda	1.68	2	0.37	
Galeoides decadactylus	1.56	4	0.45	
Octopus vulgaris	1.44	2	0.28	
Penaeus notialis	0.96	46	0.19	
Trachurus trecae, juvenile	0.68	544	0.13	
Sphyraena guachancho	0.52	4	0.10	
Cynoglossus canariensis	0.40	2	0.08	
Syacium micrurum	0.40	2	0.08	
Brotula barbata	0.36	2	0.07	
Saurida brasiliensis	0.34	154	0.07	
Priacanthus arenatus	0.34	18	0.07	
Sardinella aurita - Juveniles	0.18	34	0.04	
C R A B S	0.18	18	0.04	
GOBIIDAE	0.18	18	0.04	
Stromateus fiatola	0.18	18	0.04	
Engraulis encrasiculus	0.18	86	0.04	
Citharus linguatula	0.18	18	0.04	
Alloteuthis africana	0.18	102	0.04	
Lolliguncula mercatoris	0.18	238	0.04	
Total		505.36		100.07

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Engraulis encrasicolus	48.06	9505	59.26	
Trachurus lepturus	13.66	23	16.84	
Caranx cryos	8.73	10	10.76	653
Saurida brasiliensis	3.27	3331	4.03	
Decapterus punctatus	2.19	54	2.70	
Scomber japonicus	1.92	46	2.27	652
Trachurus trecae, juvenile	1.10	54	1.36	
Ariommha bondi	1.10	163	1.36	
Todarodes sagittatus	0.54	54	0.67	
Todaropsis eblanae	0.54	54	0.67	
Total		81.11		100.02

PROJECT STATION: 241  
 DATE: 14/ 9/00 GEAR TYPE: BT No:2 POSITION: Lat N 424  
 start stop duration Long W 714  
 TIME : 16:32:16 17:02:10 30 (min) Purpose code: 3  
 LOG : 3449.94 3451.58 1.63 Area code: 1  
 FDEPTH: 56 56 GearCond.code:  
 BDEPTH: 56 56 Validity code:  
 Towing dir: 240° Wire out: 180 m Speed: 30 kn\*10  
 Sorted: 44 Kg Total catch: 173.21 CATCH/HOUR: 346.42

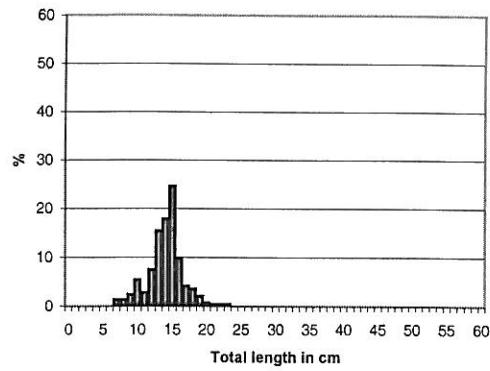
SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Engraulis encrasiculus	163.24	56506	47.12	644
Pagellus bellottii	68.08	600	19.65	642
Trichiurus lepturus	34.12	52	9.85	
Sardinella aurita - Juveniles	18.48	4774	5.33	
Dentex angelensis	14.20	274	4.10	643
Mustelus mustelus	6.72	2	1.94	
Ilex coindetii	6.16	1848	1.78	
Sepia officinalis hierredda	5.00	10	1.44	
Octopus vulgaris	4.64	6	1.34	
Brachydeuterus auritus	4.58	60	1.32	
Zenus faber	4.52	12	1.30	
Parupeneus caeruleostictus	3.26	8	0.94	
Priacanthus arenatus	2.82	30	0.81	
Boops boops	1.54	154	0.44	
Lolliguncula mercatoris	1.54	616	0.44	
Dentex canariensis	1.48	8	0.43	
Epinephelus aeneus	1.20	2	0.35	
Raja miraletus	1.20	2	0.35	
Brotula barbata	1.04	2	0.30	
Perulibatrachus elminensis	0.88	14	0.25	
Grammoplites gruveli	0.44	14	0.13	
Citharus linguatula	0.36	14	0.10	
Dicologoglossa hexophthalma	0.30	8	0.09	
Scomber japonicus	0.30	22	0.09	
Fistularia petimba	0.24	2	0.07	
Parapenaeus longirostris	0.08	8	0.02	
Total		346.42		99.98

PROJECT STATION: 242  
 DATE: 14/ 9/00 GEAR TYPE: PT No:6 POSITION: Lat N 421  
 start stop duration Long W 721  
 TIME : 19:17:41 19:47:21 30 (min) Purpose code: 1  
 LOG : 3461.42 3462.79 1.36 Area code: 1  
 FDEPTH: 46 50 GearCond.code:  
 BDEPTH: 46 50 Validity code:  
 Towing dir: 232° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 152 Kg Total catch: 268.56 CATCH/HOUR: 537.12

SPECIES	CATCH/HOUR	% OF TOT.	C	SAMP
Trichiurus lepturus	275.56	462	51.30	
Engraulis encrasiculus	100.08	52542	18.63	648
Trachurus trecae, juvenile	64.08	19224	11.93	651
Saurida brasiliensis	48.96	2276	9.12	
Selene dorsalis	35.00	392	6.26	647
Sardinella aurita - Juveniles	26.94	1980	0.01	650
Sepia officinalis hierredda	2.68	4	0.50	
Lagocephalus laevigatus	1.80	2	0.34	
Sardinella maderensis	1.68	10	0.31	646
Scomber japonicus	1.44	144	0.27	649
Lolliguncula mercatoris	0.72	468	0.13	
Sardinella aurita	0.68	4	0.13	645
Brachydeuterus auritus	0.32	8	0.06	
Sphyraena sphyraena	0.32	2	0.06	
Trichiurus lepturus	0.16	8	0.03	
Total		537.12		100.01

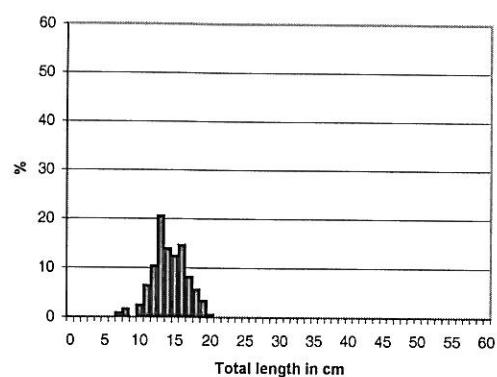


## Annex II Length distributions of main species



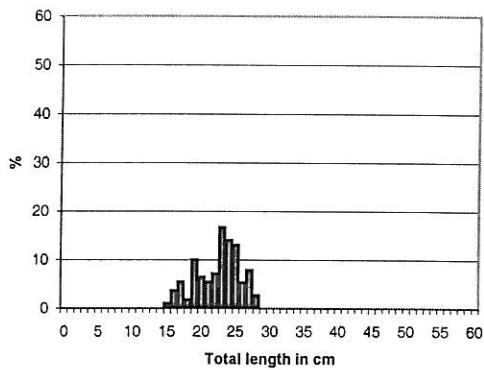
*Pagellus bellottii*  
Mean length = 14.6 cm

Benin  
N = 96



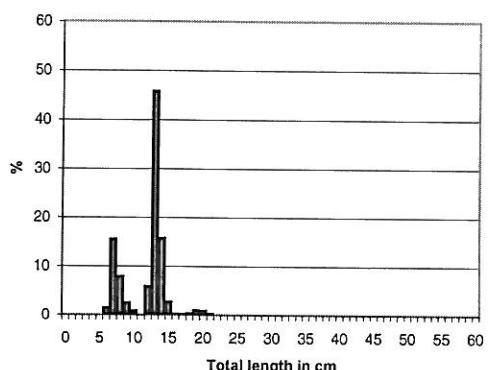
*Brachydeuterus auritus*  
Mean length = 10.6 cm

Benin  
N = 103



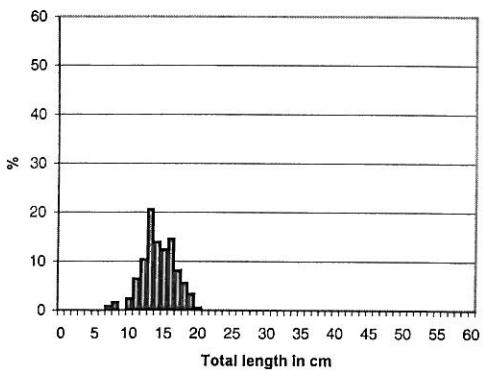
*Dentex angolensis*  
Mean length = 23.0 cm

Benin  
N = 53



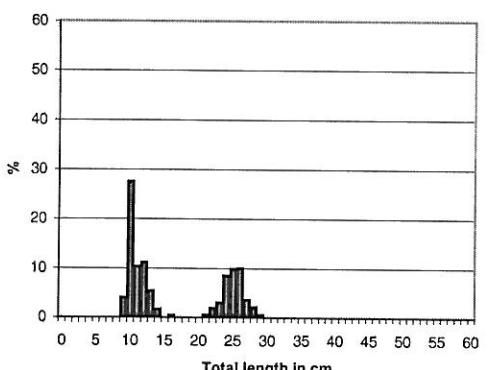
*Sardinella aurita*  
Mean length = 12.3 cm

Benin  
N = 252



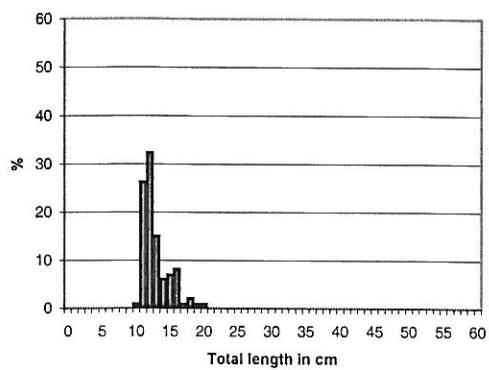
*Dentex congoensis*  
Mean length = 14.7 cm

Benin  
N = 152



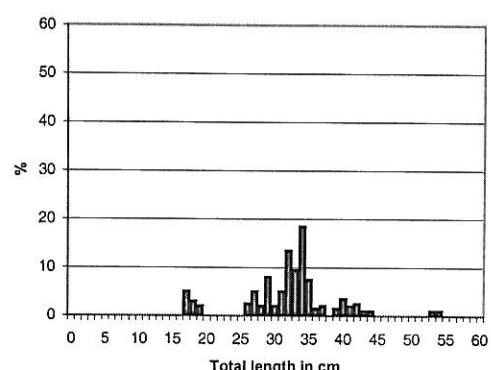
*Sardinella maderensis*  
Mean length = 17.0 cm

Benin  
N = 167



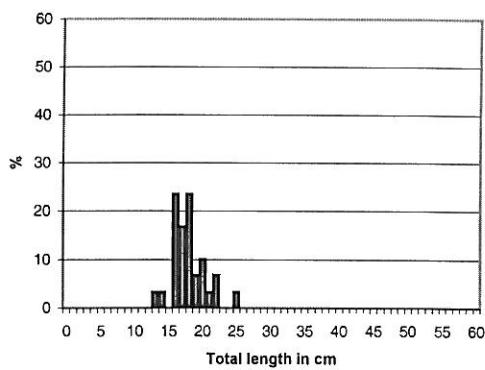
*Decapterus rhonchus*  
Mean length = 13.2 cm

Benin  
N = 100



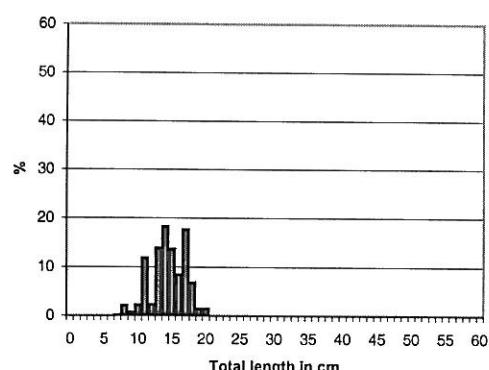
*Dentex canariensis*  
Mean length = 32.6 cm

Togo  
N = 56



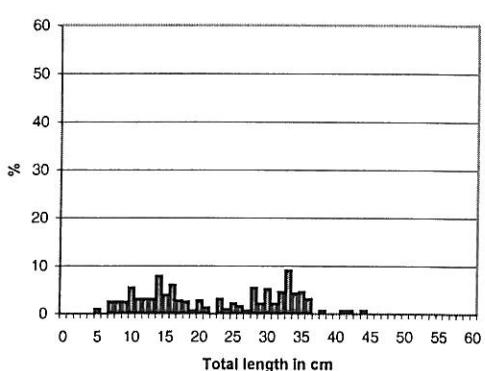
*Pagellus bellottii*  
Mean length = 18.4 cm

Togo  
N = 30



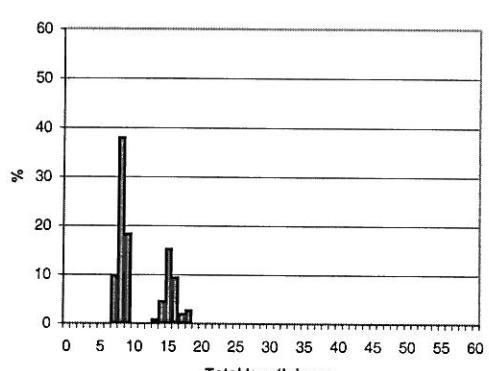
*Dentex congoensis*  
Mean length = 15.0 cm

Togo  
N = 171



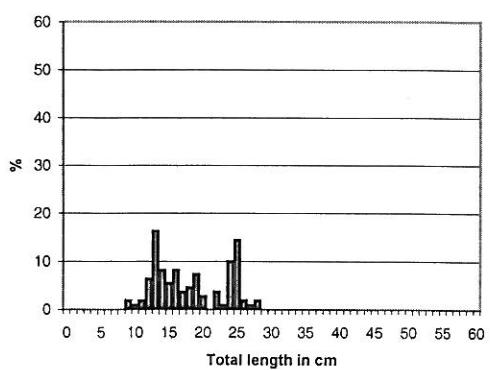
*Pagrus caeruleostictus*  
Mean length = 22.9 cm

Togo  
N = 133



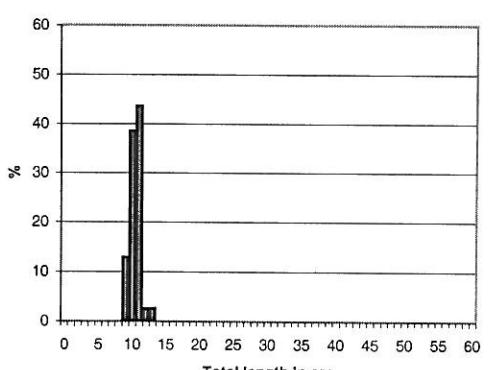
*Sardinella aurita*  
Mean length = 11.1 cm

Togo  
N = 101



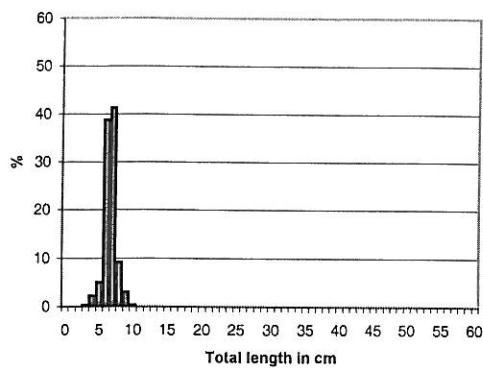
*Dentex angolensis*  
Mean length = 18.6 cm

Togo  
N = 111

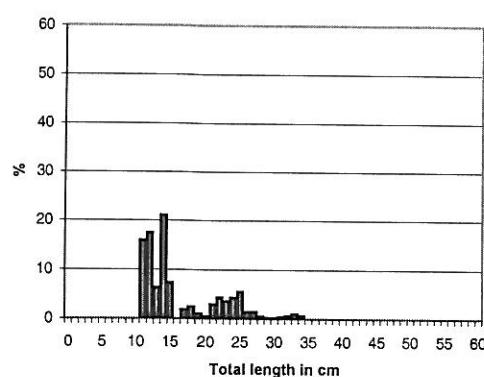


*Sardinella maderensis*  
Mean length = 11.9 cm

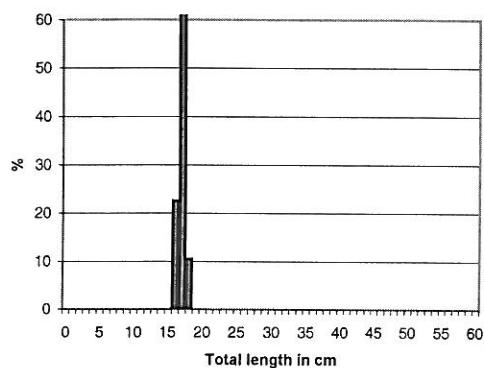
Togo  
N = 39



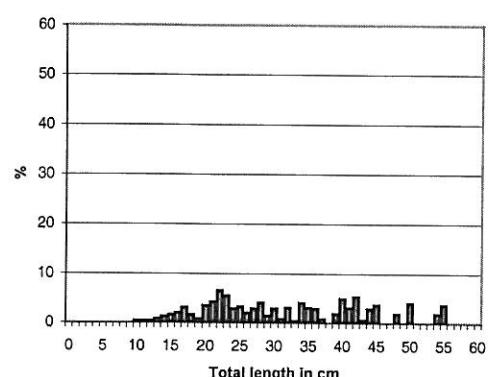
*Engraulis encrasicolus* Togo  
Mean length = 7.1 cm N = 309



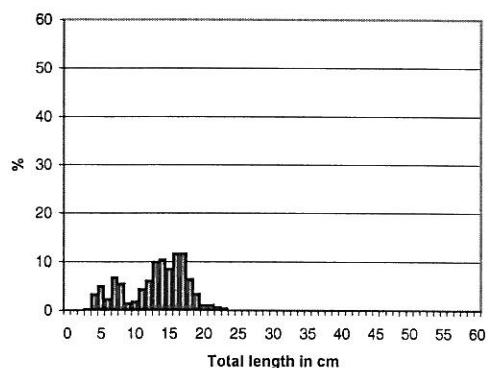
*Dentex angolensis* Ghana  
Mean length = 16.7 cm N = 203



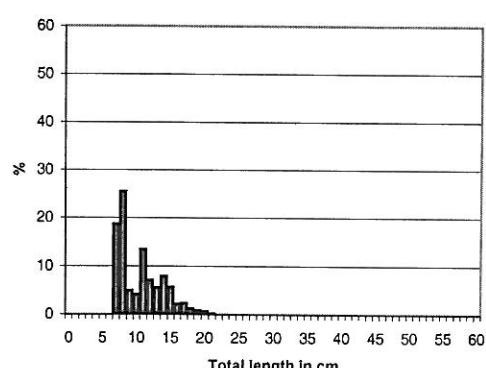
*Trachurus trecae* Togo  
Mean length = 17.4 cm N = 75



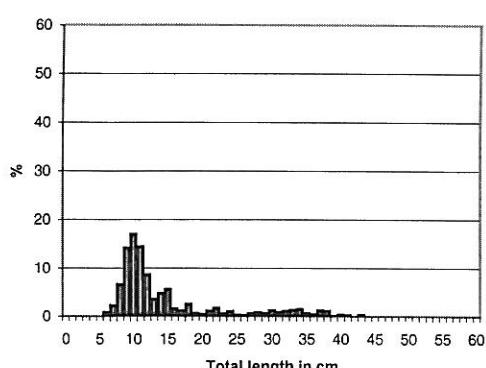
*Dentex canariensis* Ghana  
Mean length = 32.3 cm N = 121



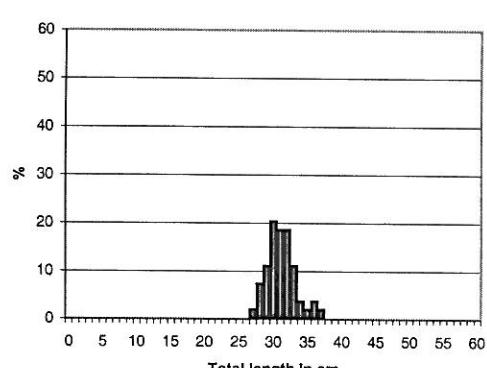
*Pagellus bellottii* Ghana  
Mean length = 13.6 cm N = 576



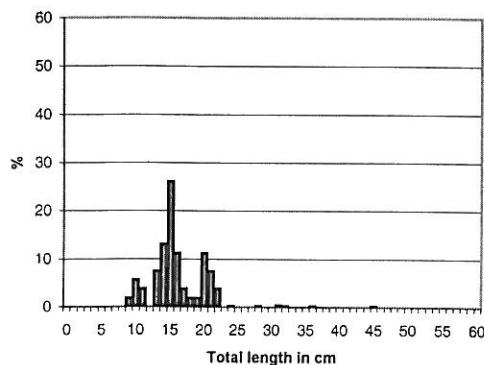
*Dentex congoensis* Ghana  
Mean length = 11.0 cm N = 238



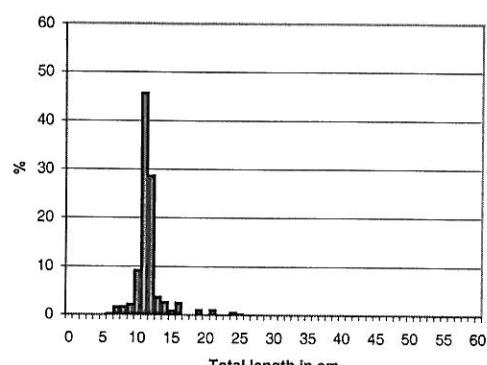
*Pagrus caeruleostictus* Ghana  
Mean length = 14.9 cm N = 477



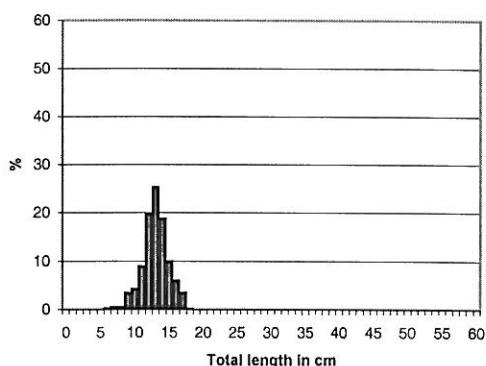
*Lutjanus fulgens* Ghana  
Mean length = 31.7 cm N = 54



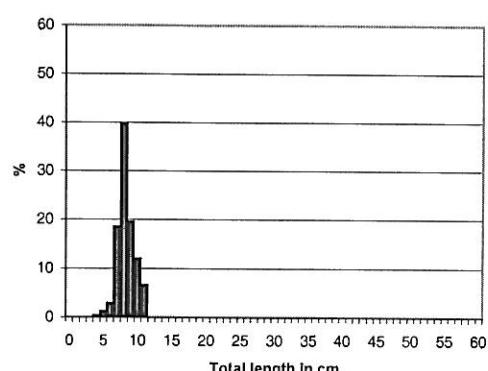
*Pseudotolithus senegalensis*  
Mean length = 16.48 cm  
Ghana  
N = 60



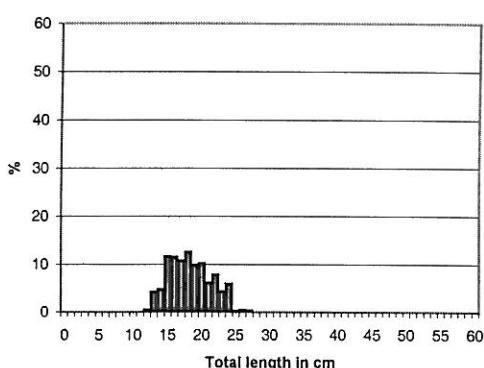
*Sardinella maderensis*  
Mean length = 12.1 cm  
Ghana  
N = 165



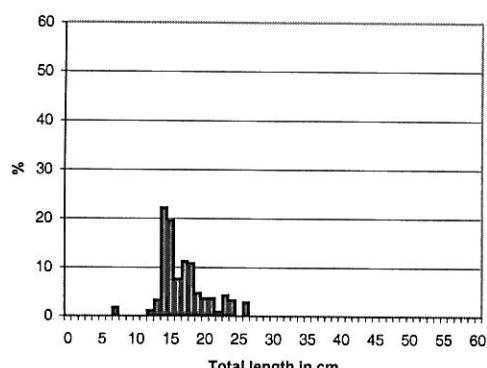
*Brachydeuterus auritus*  
Mean length = 13.5 cm  
Ghana  
N = 286



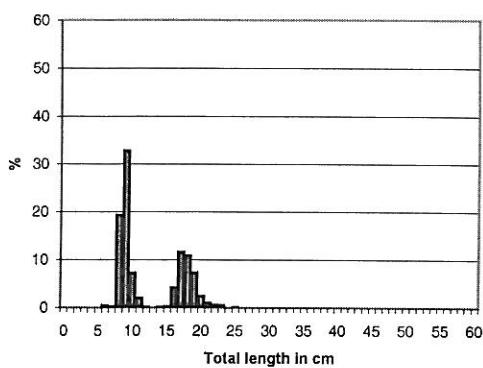
*Engraulis encrasicolus*  
Mean length = 8.8 cm  
Ghana  
N = 1028



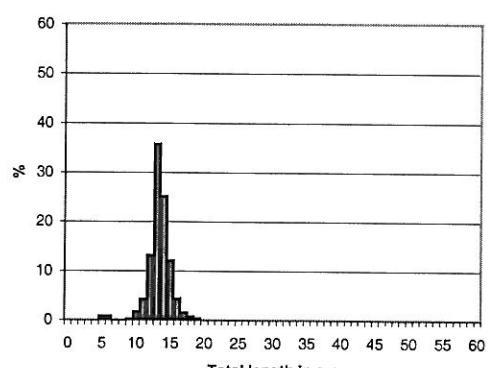
*Pseudupeneus prayensis*  
Mean length = 18.8 cm  
Ghana  
N = 172



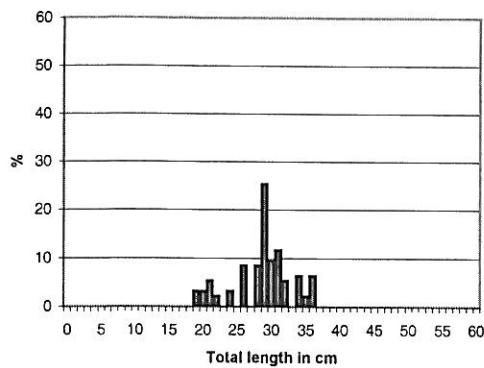
*Chloroscombrus chrysurus*  
Mean length = 17.2 cm  
Ghana  
N = 106



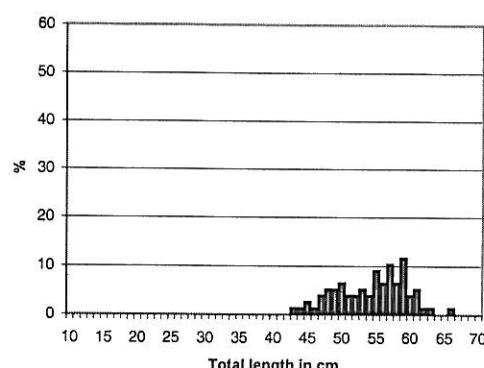
*Sardinella aurita*  
Mean length = 12.9 cm  
Ghana  
N = 1012



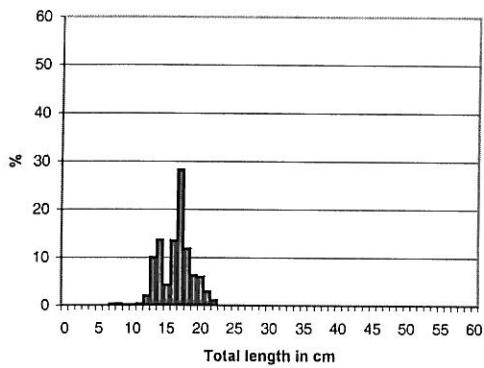
*Decapterus punctatus*  
Mean length = 13.8 cm  
Ghana  
N = 475



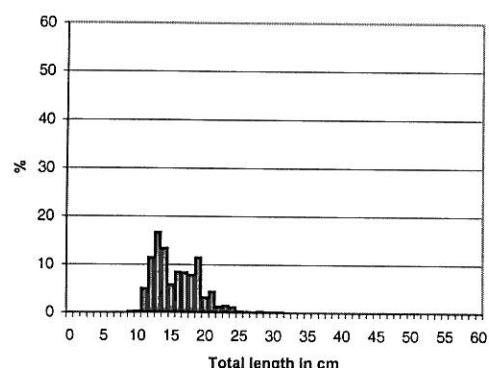
*Selene dorsalis*  
Mean length = 29.2 cm



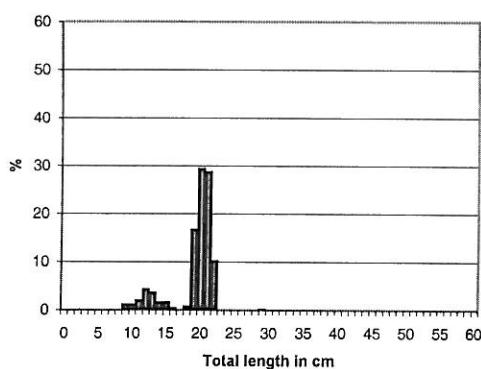
*Zenopsis conchifer*  
Mean length = 54.9 cm



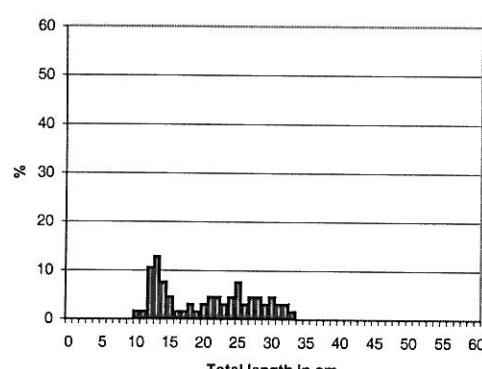
*Trachurus trecae*  
Mean length = 16.9 cm



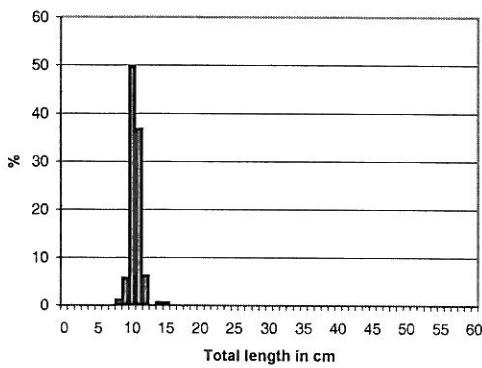
*Pagellus bellottii*  
Mean length = 16.2 cm



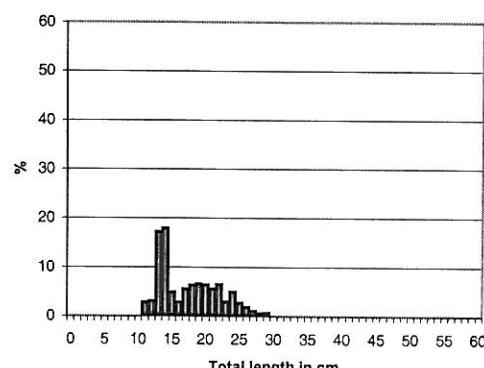
*Scomber japonicus*  
Mean length = 19.7 cm



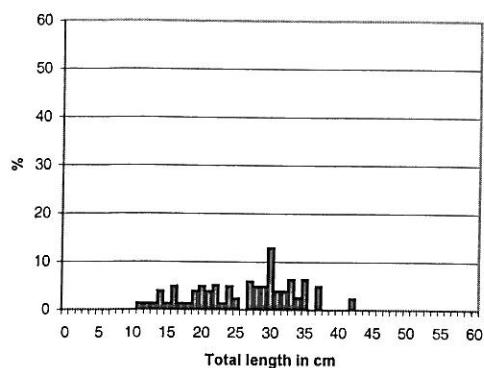
*Pagrus caeruleostictus*  
Mean length = 20.9 cm



*Priacanthus arenatus*  
Mean length = 11.0 cm

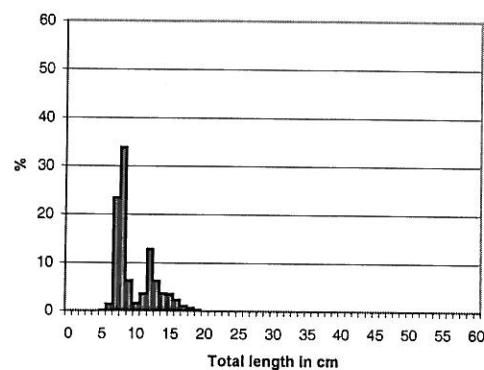


*Dentex angolensis*  
Mean length = 17.9 cm



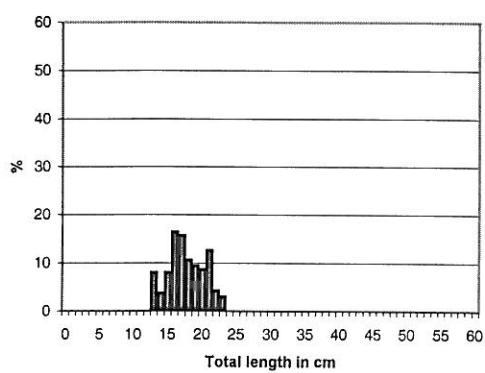
*Dentex canariensis*  
Mean length = 26.9 cm

Côte d'Ivoire  
N = 71



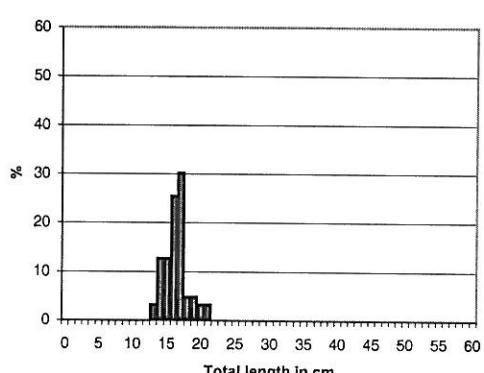
*Brachdeuterus auritus*  
Mean length = 10.1 cm

Côte d'Ivoire  
N = 727



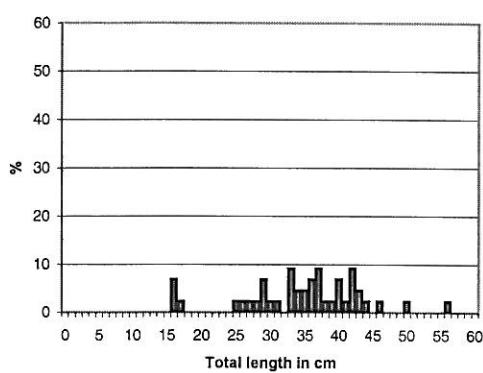
*Dentex congoensis*  
Mean length = 18.2 cm

Côte d'Ivoire  
N = 103



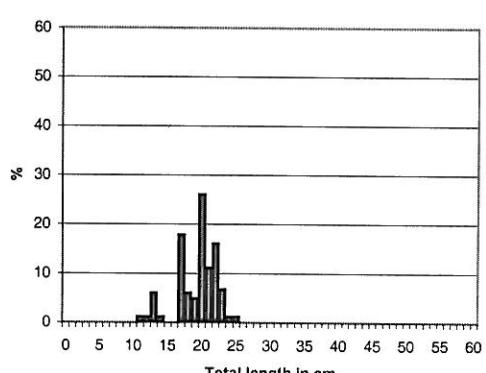
*Pomadasys incisus*  
Mean length = 16.9 cm

Côte d'Ivoire  
N = 63



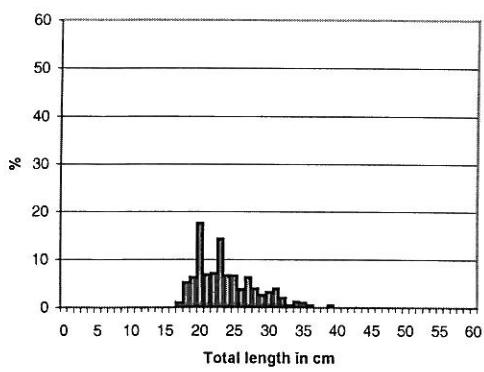
*Dentex gibbosus*  
Mean length = 35.3 cm

Côte d'Ivoire  
N = 44



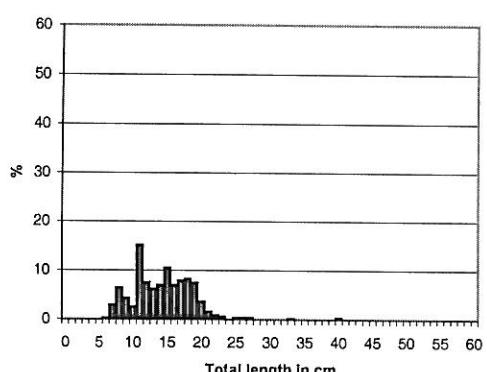
*Pseudupeneus prayensis*  
Mean length = 19.9 cm

Côte d'Ivoire  
N = 48



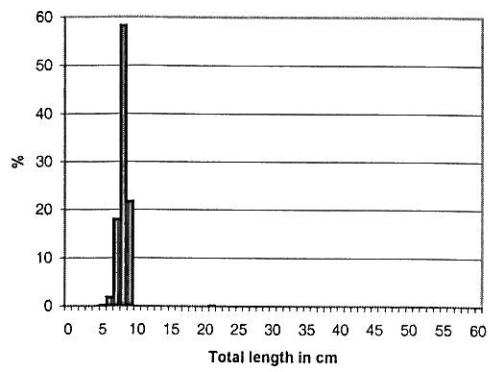
*Umbrina canariensis*  
Mean length = 24.3 cm

Côte d'Ivoire  
N = 138

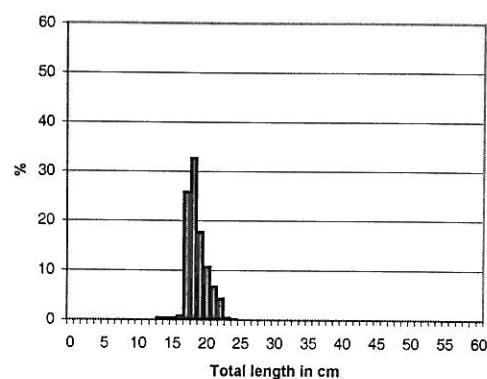


*Galeoides decadactylus*  
Mean length = 14.7 cm

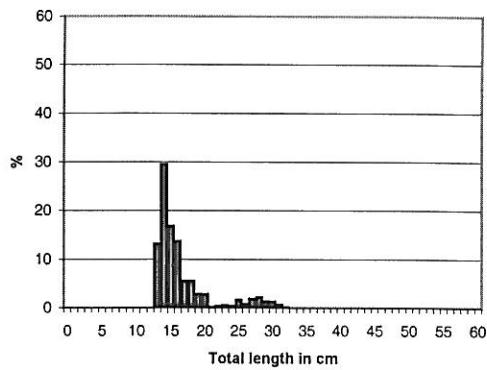
Côte d'Ivoire  
N = 190



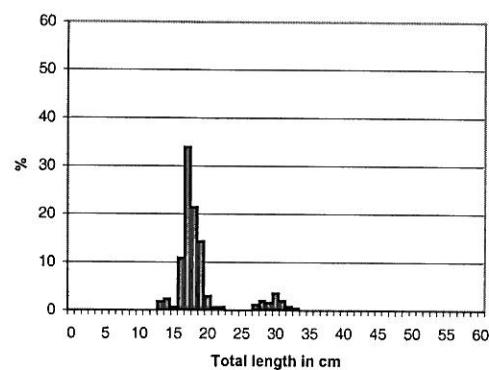
*Sardinella aurita*  
Mean length = 8.5 cm



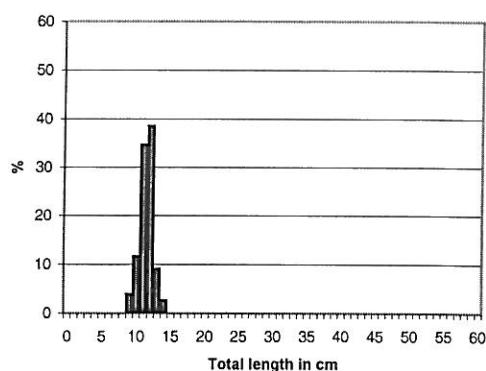
*Chloroscombrus chrysurus*  
Côte d'Ivoire  
Mean length = 19.0 cm  
N = 227



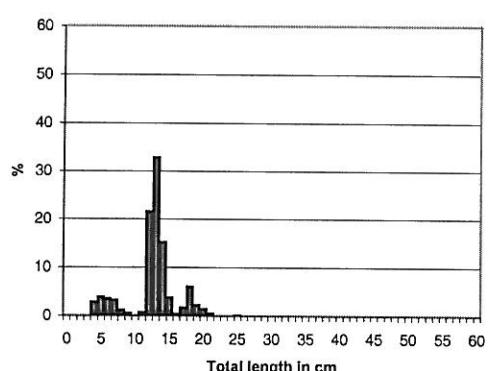
*Sardinella maderensis*  
Côte d'Ivoire  
Mean length = 12.9 cm  
N = 390



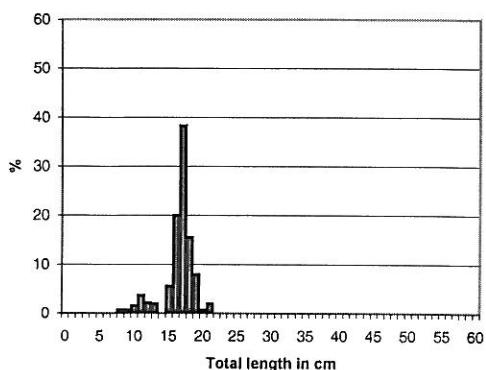
*Selene dorsalis*  
Côte d'Ivoire  
Mean length = 19.3 cm  
N = 100



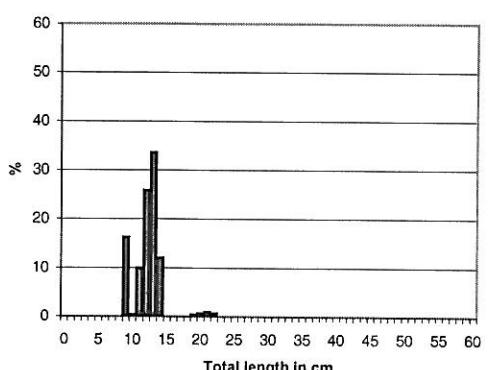
*Sardinella rouxi*  
Côte d'Ivoire  
Mean length = 12.0 cm  
N = 78



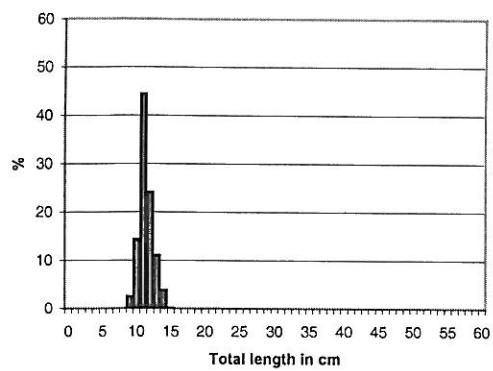
*Trachurus trecae*  
Côte d'Ivoire  
Mean length = 13.1 cm  
N = 1115



*Engraulis encrasicolus*  
Côte d'Ivoire  
Mean length = 8.3 cm  
N = 563



*Scomber japonicus*  
Côte d'Ivoire  
Mean length = 12.7 cm  
N = 50



*Priacanthus arenatus*  
Mean length = 11.9 cm

Côte d'Ivoire  
N = 122

### **Annex III Families/genera in swept area estimates**

#### **1) Main groups in swept-area bottom trawl hauls:**

**Demersal:** Sciaenidae, Sparidae, Haemulidae, Ariidae, Serranidae, Lutjanidae, Merluccidae, Ophididae, Lethrinidae

**Pelagic:**

Canangidae, Scombridae, Sphyraenidae, Trichiuridae, Clupeidae, Engraulididae

**Shrimp:**

Shrimps

**Cephalopods:**

Cephalopods

**Sharks:**

Sharks

#### **2) Main pelagic families in swept-area bottom trawl hauls:**

**Clupeids:**

Clupeidae, Engraulididae

**Carangids:**

Canangidae

**Scombrids:**

Scombridae

**Hairtails:**

Trichiuridae

**Barracudas:**

Sphyraenidae

#### **3) Commercially important demersal species grouped by families in swept-area bottom trawl hauls:**

**Seabream:** *Dentex* spp., *Diplodus* spp., *Lithognathus* spp., *Pagellus* spp., *Pagrus* spp.,  
*Sparus* spp.

**Snappers:**

Lutjanidae

**Groupers:**

Serranidae

**Grunts:**

*Plectorhynchus* spp., *Pomadasys* spp.

**Croakers:**

Sciaenidae



## Annex IV Swept-area biomass estimates

SWEPT AREA ANALYSIS FROM STATION 115 TO STATION 126

Bénin 2000

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/mm >0 10 30 100 300 1000								- 30m	30- 50m	50-100m	100-100m
Boops boops		1					11	2.11			6.33	
Decapterus punctatus	1		1				22	1.51			4.53	
Sardinella aurita	2		1				33	0.71	0.01		2.12	
Dentex congensis	1		1				22	0.70			2.09	
Engraulis encrasicolus	1		1				11	0.39	1.17			
Sepia officinalis hierredda	7	1					67	0.38	0.10	0.23	0.81	
Brachydeuterus auritus	5	1					67	0.37	0.07	1.03	0.02	
Priacanthus arenatus	2	1					22	0.30		0.01	0.90	
Chloroscombrus chrysurus	6						67	0.19	0.34	0.22		
Ilisha africana	1	1					22	0.17	0.50	0.01		
Selene dorsalis	7						78	0.15	0.09	0.36		
Brachydeuterus auritus Juv.		1					11	0.13		0.39		
Pomadasys jubelini	2						11	0.11	0.07	0.25		
Sphyraena guachancho	3						33	0.10	0.08	0.21		
Selar crumenophthalmus	5						56	0.10	0.10	0.04	0.15	
Pagrus caeruleostictus	7						78	0.08	0.07	0.09	0.08	
Pagellus bellottii	4						33	0.08		0.02	0.21	
Epinephelus aeneus	2						11	0.08			0.24	
Ariommabondi	1						11	0.08			0.25	
Penaeus notialis	3						33	0.07		0.21		
Alectis alexandrinus	6						67	0.07	0.05	0.08	0.07	
Dentex angolensis	1						11	0.06			0.19	
Squatina oculata	3						33	0.06			0.17	
Galeoides decadactylus	5						56	0.06	0.13	0.07		
Fistularia petimba	5						56	0.06	0.05	0.02	0.09	
Trichiurus lepturus	5						56	0.05	0.03	0.09	0.01	
Rhizoprionodon acutus	1						11	0.05		0.14		
Pseudotolithus senegalensis	3						33	0.05	0.15	0.01		
Lutjanus fulgens	2						22	0.05		0.04	0.10	
Branchiostegus semifasciatus	2						22	0.05			0.15	
Penaeus kerathurus	1						11					
Other fish								0.75	0.76	0.61	0.84	
Sum all species								9.12	3.77	4.13	19.35	
Sum Snappers								0.05	0.01	0.04	0.10	
Sum Groupers								0.08			0.24	
Sum Grunts								0.62	0.14	1.71	0.02	
Sum Croakers								0.08	0.18	0.01	0.05	
Sum Seabreams								3.07	0.11	0.12	8.96	
Sum Sharks								0.11		0.14	0.17	
Sum Rays								0.06	0.01	0.12	0.04	
Sum Squids								0.42	0.10	0.27	0.90	
Sum Carangids								2.04	0.60	0.74	4.75	
Sum Barracuda								0.15	0.18	0.24		
0.21												

Number of stations included in analysis, total and by depth strata

9      3      3      3

## SWEEP AREA ANALYSIS FROM STATION 127 TO STATION 136

Togo 2000

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/nm								- 30m	30- 50m	50-100m	100-100m
	>0	10	30	100	300	1000						
Dentex congensis	1	1					33	1.71				
Dactylopterus volitans	2	1					50	1.13	3.30	0.09	5.14	
Dentex canariensis	5	1					83	0.64	0.91	0.57	0.45	
Pagrus caeruleostictus	3	1					67	0.60	0.27	1.53		
Sepia officinalis hierredda	6	1					100	0.56	1.08	0.51	0.10	
Trachurus trecae	1	1					33	0.54			1.60	
Engraulis encrasicolus		1						0.43	1.28		1.07	
Dentex angolensis	1	1					17	0.36				
Selene dorsalis	2	1					50	0.35	0.12	0.92		
Sea urchins (strong spines)	1	1					33	0.31	0.92	0.01		
Pagellus bellottii	1	1					17	0.22		0.67		
Squatina oculata	2						33	0.21			0.63	
Alectis alexandrinus	4						67	0.21	0.33	0.29		
Balistes capriscus	1	1					33	0.18	0.53	0.01		
Fistularia petimba	7						83	0.16	0.07	0.18	0.22	
Alloteuthis africana	3						50	0.15		0.17	0.29	
Pagrus africanus	1							0.12		0.36		
Epinephelus aeneus	3						50	0.11		0.29	0.04	
Scomberomorus tritor	2						33	0.09	0.14		0.12	
Balistes punctatus	2						33	0.08	0.21	0.03		
Raja miraletus	4						67	0.06	0.03	0.11	0.04	
Sphyraena sphyraena	2						33	0.05	0.12	0.02		
Umbrina canariensis	1						17	0.05		0.14		
Aluterus blankerti	4						67	0.05	0.05	0.11		
Sardinella aurita	3						50	0.05	0.03	0.10	0.03	
Other fish								0.70	0.68	0.69	0.64	
Sum all species								9.12	10.07	6.80	10.37	
Sum Snappers								0.03		0.10		
Sum Groupers								0.14		0.35	0.06	
Sum Grunts								0.02		0.06		
Sum Croakers								0.05		0.14		
Sum Seabreams								3.70	1.18	3.14	6.81	
Sum Sharks								0.25			0.75	
Sum Rays								0.08	0.09	0.13	0.04	
Sum Squids								0.75	1.08	0.80	0.40	
Sum Carangids								1.16	0.49	1.30	1.65	
Sum Barracuda								0.07	0.15	0.04		

Number of stations included in analysis, total and by depth strata

6 2 2 2

## SWEPT AREA ANALYSIS FROM STATION 137 TO STATION 192

Ghana 2000

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/nm								- 30m	30- 50m	50-100m	100-100m
	>0	10	30	100	300	1000						
Priacanthus arenatus	15		2				57	4.36	0.01	0.06	11.82	
Trachurus trecae	8		6				47	3.79	0.17	0.01	10.20	
Seriola dumerili			1				3	2.58		7.03		
Chlamys purpuratus	4	3	2				30	1.69	2.96	2.46	0.01	
Brachydeuterus auritus	5	3	2				33	1.64	2.60	2.40	0.18	
Boops boops	8		3	1			40	1.46	0.03	0.89	3.07	
Chromis cadei	6	1		1			27	1.34		0.03	3.62	
Scomber japonicus	6		1	1			27	1.27	0.01		3.45	
Sardinella aurita	5		4	1			33	1.25	0.91	0.05	2.71	
Lutjanus fulgens	3	1	1	1			17	0.67	0.87	1.05	0.15	
Sepia officinalis hierredda	26	1		1			90	0.66	1.88	0.25	0.17	
Pagellus bellottii	21	4	1				77	0.55	0.53	0.51	0.60	
Dentex canariensis	18	1		1			63	0.55	0.21	1.13	0.22	
Pomadasys incisus	5	1		1			23	0.55	0.03	0.25	1.23	
Pagrus caeruleostictus	25	2	1				77	0.48	0.36	0.90	0.14	
Dasyatis pastinaca			1				3	0.46		1.26		
Acanthurus monroviae	4	1	1				20	0.42	0.37	0.08	0.80	
Dentex congensis	3	2	1				20	0.38			1.03	
Chloroscombrus chrysurus	5	1	2				27	0.34	0.41	0.41	0.21	
Pseudupeneus prayensis	18	3					70		0.05	0.42	0.26	
Mustelus mustelus	7		1				27	0.21		0.48	0.10	
Alloteuthis africana	13	2					50	0.20	0.04	0.26	0.25	
Apsilus fuscus	3	1	1				17	0.20		0.40	0.14	
Mycteroperca rubra			1				3	0.19		0.51		
Fistularia petimba	19	1					67	0.18	0.05	0.12	0.32	
Balistes punctatus	4		1				17	0.14	0.06	0.35		
Sphyraena sphyraena	4		1				17	0.13	0.47	0.01		
Decapterus punctatus	6	2					27	0.13	0.28	0.15	0.01	
Epinephelus aeneus	9	1					33	0.12	0.04	0.06	0.24	
Selene dorsalis	9	1					30	0.12	0.16	0.20	0.01	
Dactylopterus volitans	11						37	0.11		0.08	0.21	
Ariomma bondi	2	2					13	0.11			0.29	
Trichiurus lepturus	2	1					10	0.09		0.24	0.01	
Dentex angolensis	2	1					10	0.09			0.25	
Pteroscion peli		1						0.09		0.25		
Pseudotolithus senegalensis	1	1						0.09		0.25		
Lethrinus atlanticus	6						20	0.09	0.04	0.21		
Squatina oculata	1	1					7	0.08			0.23	
Zeus faber	12						40	0.07			0.18	
Dasyatis marmorata	1	1					7	0.07		0.19	0.01	
Plectrohinchus mediterraneus		1					3	0.07		0.19		
Grammoplites griseus	18						60	0.07	0.01	0.07	0.12	
Sea urchins (strong spines)	8	1					23	0.07		0.02	0.18	
Lepidotrigla cadmanii	9						30	0.06		0.02	0.15	
Engraulis encrasicolus	3	1					10	0.06	0.24			
Drepane africana	2	1					10	0.06	0.20	0.01	0.10	
Balistes capricornis	9						30	0.06			0.05	
Aluterus blankerti	2	1					10	0.05	0.04		0.05	
Lutjanus dentatus	1	1					7	0.05	0.18		0.09	
Trachurus trecae, juvenile	2						7	0.05	0.06	0.08		
Syacium micrum	18						60	0.05		0.10	0.04	
Penaeus notialis	7						23	0.02	0.01	0.04		
Parapenaeopsis atlantica	1						3	0.01		0.03		
Penaeus kerathurus	1						3					
Other fish								0.76	1.12	0.80	0.55	
Sum all species								28.65	14.40	24.41	43.30	
Sum Snappers								0.93	1.07	1.46	0.29	
Sum Groupers								0.32	0.04	0.57	0.25	
Sum Grunts								2.27	2.66	2.85	1.41	
Sum Croakers								0.18	0.01	0.50		
Sum Seabreams								3.58	1.21	3.47	5.38	
Sum Sharks								0.29		0.48	0.33	
Sum Rays								0.58	0.08	1.49	0.04	
Sum Squids								0.87	1.93	0.54	0.43	
Sum Carangids								7.11	1.29	8.00	10.44	
Sum Barracuda	0.07							0.17	0.56	0.06		

Number of stations included in analysis, total and by depth strata

30 8 11 11

## SWEEP AREA ANALYSIS FROM STATION 193 TO STATION 243

Côte d'Ivoire 2000

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/num >0 10 30 100 300 1000								- 30m	30- 50m	50-100m	100-100m
Brachydeuterus auritus	8	4	6	3	1		66	7.36	19.32	3.79	0.05	
Trachurus trecae	17	4	2	5	1		88	4.65	3.14	2.79	7.88	
Engraulis encrasicolus	3	1	1	1	1		22	4.26	0.19	11.77	0.46	
Priacanthus arenatus	16	2		2			63	3.61	4.51	0.14	6.26	
Trachurus trecae, juvenile	3		2	1			19	2.32	1.93	1.11	3.89	
Trichiurus lepturus	21	8	2	1			72	1.87	1.41	1.36	2.81	
Sardinella aurita - Juveniles	4			1			16	1.02	0.03	2.89	0.05	
Pagellus bellottii	22	4	2				78	0.88	0.51	1.08	1.02	
Chloroscombrus chrysurus	8	1		1			31	0.79	2.50	0.02		
Dentex angolensis	8	3	2				34	0.51			1.49	
Ilisha africana	3	3	2				25	0.50	1.59			
Sepia officinalis hierredda	28	3	1				94	0.44	0.91	0.27	0.18	
Pteroscion peli	8	4	1				41	0.38	0.69	0.01	0.48	
Brachydeuterus auritus Juv.				1			3	0.35	1.12			
Boops boops	13	3	1				53	0.33	0.18	0.02	0.77	
Umbrina canariensis	4	3	1				25	0.30	0.02		0.84	
Galeoides decadactylus	9	1	1				25	0.28	0.89	0.01		
Pomadasys incisus	7		1				22	0.25	0.06		0.67	
Brotula barbata	7	2	1				31	0.24			0.70	
Pomadasys peroteti	1		1				6	0.23	0.74	0.01		
Mustelus mustelus	10	2					38	0.16	0.02	0.13	0.31	
Uranoscopus albesca	2		1				9	0.15			0.43	
Dentex canariensis	8	2					31	0.15	0.07	0.24	0.37	
Selene dorsalis	12	1					38	0.14	0.18			
Sardinella maderensis	9	2					31	0.13	0.42			
Raja miraletus	14	1					47	0.12	0.02	0.28	0.04	
Balistes capricrus	6	1					19	0.12	0.02	0.34		
Sphyraena guachancho	8	1					28	0.11	0.32	0.02		
Dentex congogensis	2	1					9	0.11			0.31	
Saurida brasiliensis	10	1					34	0.10		0.01	0.27	
Pseudotolithus senegalensis	10						25	0.10	0.27	0.05		
Chelidonichthys gabonensis	3	1					13	0.08	0.01	0.22		
Octopus vulgaris	11						34	0.08	0.18	0.06		
Alloteuthis africana	14						44	0.08	0.10	0.12		
Pseudupeneus prayensis	11						34	0.08	0.10	0.02	0.12	
Sardinella rouxi		1					3	0.08	0.24			
Citharus linguatula	17						53	0.08	0.03	0.21		
Zeus faber	13						41	0.07	0.03	0.16		
Illex coindetii	10						31	0.07	0.01	0.18		
Pomadasys rogeri	3	1					13	0.07	0.11	0.09		
Dactylopterus volitans	7	1					25	0.07	0.01	0.20		
Branchiostegus semifasciatus	4	1					16	0.07			0.22	
Dentex gibbosus		1					3	0.06			0.16	
Parapenaeopsis atlantica	8						22	0.06	0.19			
Epinephelus aeneus	7	1					25	0.06	0.03	0.01	0.14	
Scomber japonicus	13						38	0.06	0.01	0.07	0.09	
Grammoplites gruveli	20						59	0.06	0.12	0.05		
Lepidotrigla cadmani	5	1					19	0.05			0.14	
Polydactylus quadridfilis		1					3	0.05	0.14			
Penaeus notialis	13						41	0.03	0.05	0.04		
Penaeus kerathurus	3						9	0.02	0.05			
Sicyonia galeata	8						22	0.01	0.01			
Sicyonia sp.	1						3					
Parapenaeus longirostris	2						6					
Shrimps, small, non comm.	1						3					
Other fish								0.64	0.69	0.39	0.91	
Sum all species							33.88	42.69	27.65	32.06		
Sum Snappers							0.01	0.01			0.02	
Sum Groupers							0.06	0.03	0.01		0.16	
Sum Grunts							8.26	21.35	3.89		0.72	
Sum Croakers							0.78	0.98	0.06		1.32	
Sum Seabreams							2.08	0.77	1.11		4.21	
Sum Sharks							0.20	0.02	0.13		0.42	
Sum Rays							0.19	0.21	0.33		0.05	
Sum Squids							0.72	0.95	0.59		0.64	
Sum Carangids							7.91	7.76	4.20		11.77	
Sum Barracuda							0.12	0.32	0.02		0.04	
0.05												

Number of stations included in analysis, total and by depth strata

32 10 11 11

## Annex V Total length-fork length and L-W-relationships

### CONVERSION FACTORS

Species	$L_t = x * L_f$	$W = aL_t^b$		N
		a	b	
<i>Sardinella aurita</i>	1.145	0.0039	3.274	89
<i>Sardinella maderensis</i>	1.178	0.0243	2.681	78
<i>Sardinella</i> sp.	1.159	0.0053	3.181	167
<i>Engraulis encrasicolus</i>	1.088	0.0054	3.131	173
<i>Dentex angolensis</i>	1.140	0.0015	3.734	71
<i>Sparus caeruleostictus</i>	1.152	0.0212	2.897	49
<i>Dentex canariensis</i>	1.144	0.0151	2.974	36
<i>Pagellus bellottii</i>	1.147	0.0145	2.973	90
<i>Dentex gibbosus</i>	1.134	*	*	35**
<i>Dentex congensis</i>	1.097	0.0124	3.021	79
<i>Selene dorsalis</i>	1.180	0.0420	2.616	43
<i>Chloroscombrus chrysurus</i>	1.200	0.0157	2.769	80
<i>Trachurus trecae</i>	1.076	0.0147	2.874	157
<i>Scomber japonicus</i>	1.070	0.0058	3.141	46
<i>Brachydeuterus auritus</i>	1.100	0.0145	2.941	60
<i>Balistes capriscus</i>	1.142	*	*	200**
<i>Pseudupeneus prayensis</i>	1.135	0.0091	3.110	62
<i>Galeoides decadactylus</i>	1.217	0.0341	2.667	75
<i>Lutjanus fulgens</i>	1.077	*	*	52**
<i>Lethrinus atlanticus</i>	1.104	0.0189	2.919	37

\* insufficient data

\*\* used for LF-LT conversion only

Source: Koranteng et al. (in prep.)



## **Annex VI Instruments and fishing gear used**

### **Echo sounder**

The SIMRAD EK500/38 kHz scientific sounder was used during the survey for fish abundance estimation. The lowering keel was not submerged during the survey. The Bergen Echo Integrator system (BEI) was used to scrutinise the acoustic records. System calibration experiment using a standard copper sphere was performed 12.06.2000 (see BENEFIT Cruise Report 4/2000). The settings of 38 kHz echo sounder were as follows:

#### **Tranceiver-1 menu (38 kHz, mounted in lowering keel)**

Transducer depth	5.5 m (lowering keel not submerged)
Absorption coeff.	10 dB/km
Pulse length	medium (1 ms)
Bandwith	wide
Max Power	2000 Watt
2-way beam angle	-21.0 dB
Sv Transducer gain	27.39 dB
TS Transducer gain	27.52 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 ° alongship 6.7 ° athwardship
Alongship offset	-0.03 °
Athwardship effect	0.06 °

### **Display menu**

Echogram	1 (38 kHz)
Bottom range	15 m
Bottom range start	10 m
Sv colour min	-67 dB

### **Printer menu**

Echogram	1 (38 kHz)
Range	100 m, 250 m, 500 m
Range start	0
Bottom range	12 m
Bottom range start	10 m
TVG	20 log R
Sv Colour min	- 67 dB

### **Bottom detection menu**      Minimum level -50 dB

## Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl".

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernet of 10 mm meshsize. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m<sup>2</sup>, 1670 kg, their distance while trawling about 45 - 55 m in average, depending on the depth (least distance at low depths). This distance can be kept constant (about 50 m) at all depths by the use of a 9.5 m strap between the wires at 130 m distance from the doors (normally applied at depths greater than 80 m). On the present survey, however, the strap was not applied because most of the trawl hauls were made at bottom depths less than 60 m.

The SCANMAR system was used on all trawl hauls. This equipment consists of sensors, a hydrophone, a receiver, a display unit and a battery charger. Communication between sensors and ship is based on acoustic transmission. The doors are fitted with sensors to provide information on their distance and a height sensor is fitted to the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

The pelagic trawl can be equipped with a trawleye that provides information on the trawl opening and the distance of the footrope to the bottom.