

**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**

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Abidjan
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**Marine Fisheries Research Division
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Ghana**

**Direction de l'Élevage et de la Pêche
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Togo**

**Institute of Marine Research (IMR)
Bergen
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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

CRUISE REPORTS "DR. FRIDTJOF NANSEN"

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19 April - 6 May 1999

Revised edition

by

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Bergen, 2002**

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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. The objectives of the survey had been previously discussed and agreed upon by responsible from Marine Fisheries Research Division in Tema, Ghana and responsible for the Nansen programme at IMR.

1.1 Objectives

The main objectives of the survey were to:

- Map the distribution and estimate the abundance of the main pelagic species.
- Describe the distribution, composition and abundance of the demersal fish stocks by a swept-area trawl programme.
- Map the general hydrographic regime by using a CTD-sonde to monitor the temperature, salinity and oxygen regimes at bottom trawl stations and some transects.
- Sampling of plankton at some bottom trawl stations.
- On-the-job training on the main survey routines.

1.2 Participation

The scientific staff consisted of:

Marine Fisheries Research Division, Tema, Ghana:

Kwame A. Koranteng, Paul O. Bannerman, Daniel W. Ofori-Adu, Joseph K. Teye

Direction l'Elevage de la Pêche, Lomé, Togo:

Yaovi Acakpo-Addra

Direction des Pêches, Cotonou, Benin:

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1.3 Narrative

The vessel left Tema (Ghana) on the afternoon of 19 April and steamed to the Benin-Nigerian border where the survey started at daylight 20 April. During daytime (0600 to 1800) the shelf was surveyed by parallel course tracks 24 NM (nautical miles) apart from approximately 20 m depth to beyond the 400 m isobath. 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 Ghana a few additional bottom trawl hauls were made deeper than 100 m at night-time in areas with suitable trawling grounds. Acoustic registration and integration of main groups were done throughout the survey. To obtain a better acoustic coverage, night-time registrations were made in between the daytime-course tracks. Pelagic trawling with the mid-water trawl was carried out during dark hours. The majority of the CTD-profiles were made at locations of fish-trawl stations, i.e. bottom trawls. In addition, some CTD profiles were made from surface down to depths of 500 m. In Ghana and Côte d'Ivoire a few plankton hauls were made at depths from 30 to 50 m.

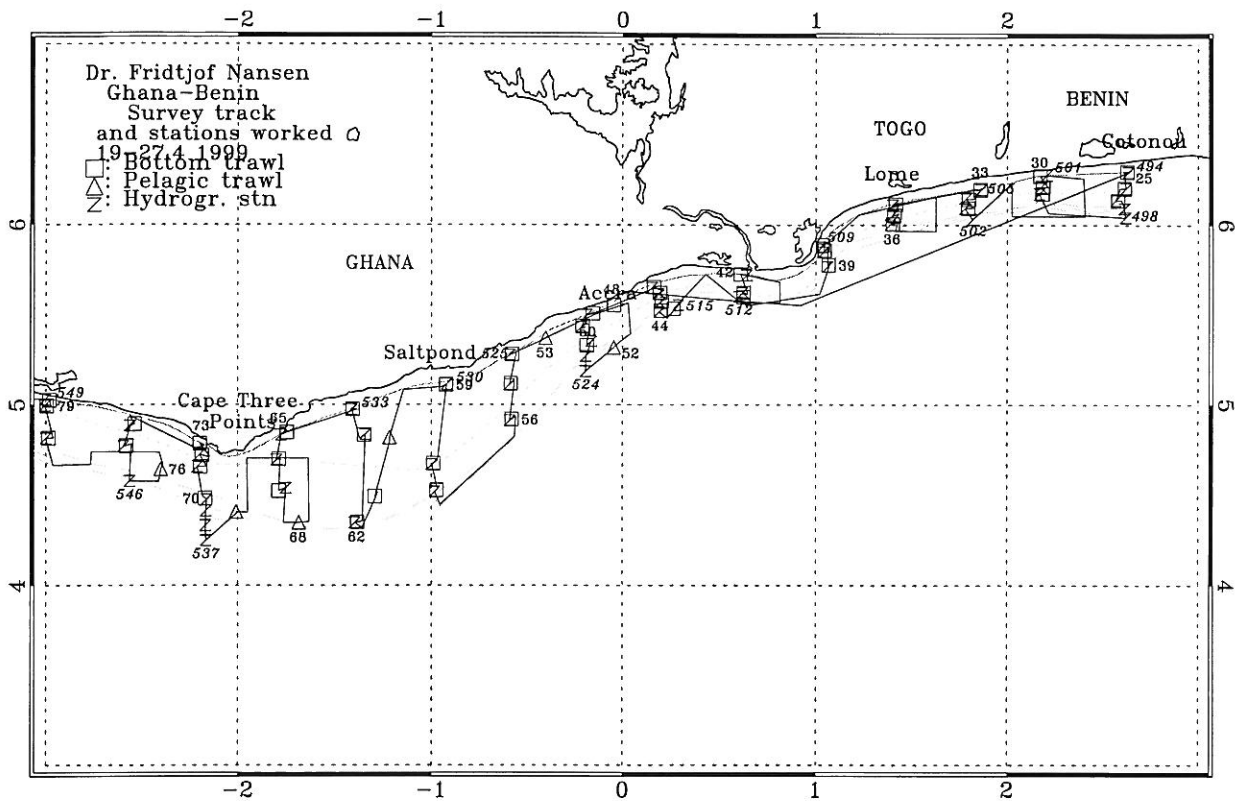
The shelf off Benin-Togo was covered from 20 to 21 April. One hydrographic transect was made in this area, off Cotonou. The shelf off Ghana was surveyed from 22 to 27 April. Two hydrographic transects were made in this area, off Accra and Cape Three Points. At noon on 27 April the vessel steamed from the Ghana-Côte d'Ivoire border to Abidjan for change of crew. The ship left Abidjan at noon on 29 April and steamed towards the Côte d'Ivoire-Liberia border where the survey continued 10 NM east of the border. The shelf off Côte d'Ivoire was covered from 30 April to 5 May and two hydrographic transects were made, off Grand Bérébi and Grand Jacques. The survey was completed at the Ghana-Côte d'Ivoire border at noon on 5 May and the vessel arrived in Tema in the morning of 6 May.

1.4 Survey effort

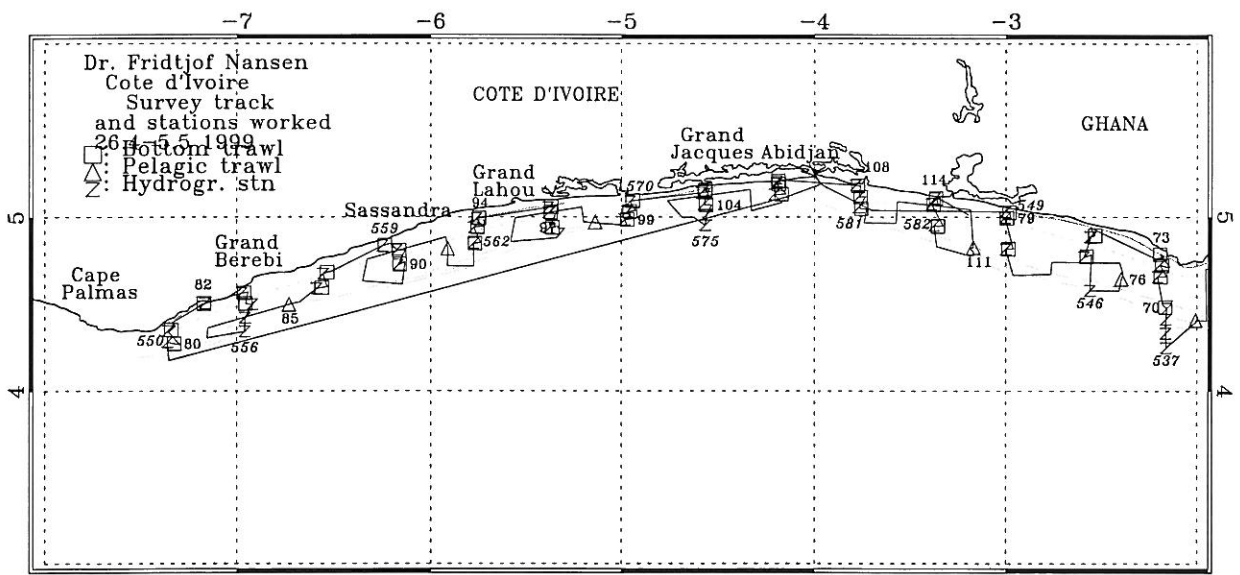
Figure 1 shows the cruise tracks with fishing, hydrographic and plankton stations. Table 1 summarises the survey effort in each sector.

Table 1. Number of hydrographic (CTD), plankton (P), pelagic trawl (PT) and bottom trawl (BT) stations, swept-area hauls (interrupted hauls not included) and distance surveyed (NM) by area.

Region	CTD	P	PT	BT	Swept-area hauls			Distance surveyed (NM)
					0-30 m	31-50 m	51-100 m	
Benin – Togo	15	-	-	12	4	4	4	300
Ghana	41	4	6	37	10	12	10	955
Côte D'Ivoire	35	4	4	31	9	11	11	810
Total	91	8	10	80	23	27	25	2 065



a) Ghana-Benin



b) Côte d'Ivoire-Ghana

Figure 1. Course track with fishing and hydrographic stations for a) Ghana-Benin and b) Côte d'Ivoire-Ghana. 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 one 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, 15 samples out of 15 were accepted for the calibration. A linear regression gave the following formula for correcting the oxygen values:

$$O_2 = O_{2ctd} * 1.106 - 0.436$$

For the salinity calibration, a total of 12 out of 15 samples were accepted. The average difference between laboratory and CTD values was 0.003 with a standard deviation of 0.003, and hence the CTD values were accepted and used.

Current speed and direction measurements (ADCP)

A ship-borne 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 8 seconds, 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). In general, for important species the fork length was recorded to the nearest 1 cm below for fish and carapace length to the nearest 1 mm below for shrimp. 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 station, i.e. trawl haul, is presented in Annex I. Pooled length frequency distributions, raised to catch per hour, of selected species by area are shown in Annex II. A description of the fishing gear used, acoustic instruments and their standard settings, is given in Annex IV.

2.3 Biomass estimates

Acoustic abundance estimation

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, scombrids and carangids):

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

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 fish conversion factor. The following formula was used to calculate the number of fish in length groups (cm) for each fish concentration:

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

where:

- N_i = number of fish in length group i
- A = area (NM^2) of fish concentration
- s_A = mean integrator value (echo density) in area A (m^2/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 each trawl sample 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 observed weights by length (W_i) when available or theoretical weights (calculated by using condition factors), multiplied with number of fish in the same length group (N_i). 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. 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

Biomass estimates based on swept-area method

In the bottom trawl survey, stock biomasses were 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 σ_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 R/V ‘‘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 (NM²) used in the swept-area biomass estimates for the different regions.

Depth stratum (m)	Benin-Togo	Ghana	Côte d’Ivoire
0 – 30	536	1 412	563
31 – 50	212	2 064	701
51 – 100	344	2 751	1 619

CHAPTER 3 OCEANOGRAPHIC CONDITIONS

Temperature and salinity

Surface distribution

Figures 2 and 3 show the horizontal distribution of sea surface temperature (SST) and salinity, respectively, for the Benin-Togo-Ghana and west Ghana-Côte d'Ivoire area. Generally, the temperature was around 29°C in both areas with slightly cooler waters towards the shore. In the Côte d'Ivoire sector, the SST was slightly lower and there were pockets of water within the vicinity of Abidjan, with temperature less than 28°C.

In the Benin-Togo-Ghana area, the salinity ranged from 35.2-35.4‰ near the shore to 34.7-34.8‰ on the outer part of the shelf. In the west Ghana-Côte d'Ivoire sector, the salinity generally varied between 35.0 and 35.2‰. In the central part of this sector, there were areas with surface water salinity of less than 35‰.

Vertical sections

In Fig. 4 the vertical distribution of temperature, salinity and oxygen are shown for the five hydrographic transects made during this survey. There are very little differences between the environmental profiles obtained from the five hydrographic transects. A thermo-cline was found between 20 and 60 m depth and a relatively flat structure was observed in most sections with no clear signs of vertical water displacement and upwelling. This is expected at this time of the year when the thermocline is strongest (Longhurst 1962, Mensah and Koranteng 1988). On the onset of upwelling, which usually occurs in the beginning June, the thermocline is expected to weaken.

There was no sign of low bottom oxygen content on the shelf. Dissolved oxygen values ranged between 2 and 5 ml/l (non-corrected).

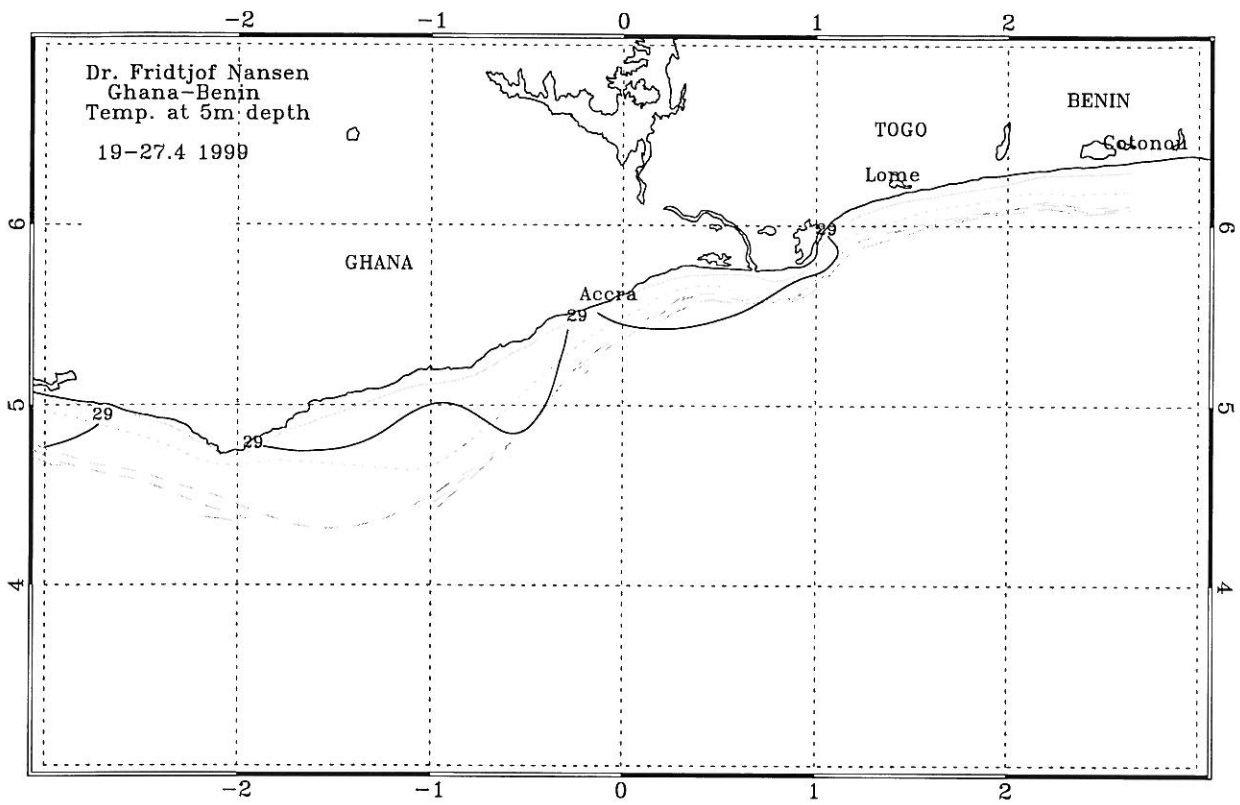
Current measurements (ADCP)

A subset of vectors obtained at 19 m depth is shown in Fig. 5. No averaging was 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.

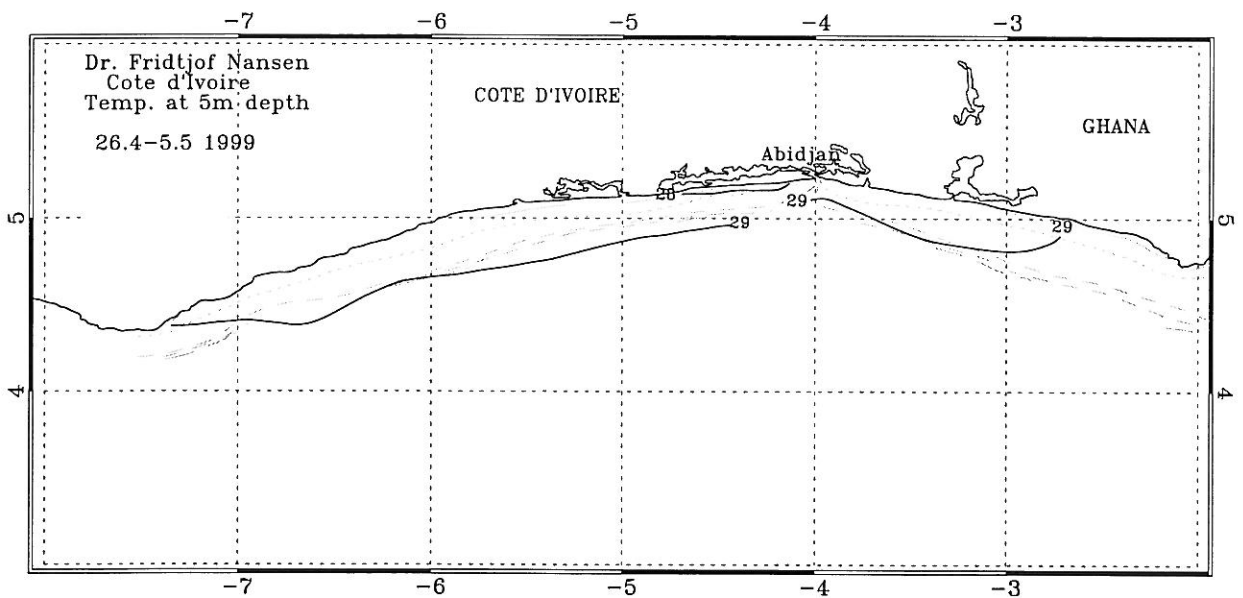
However, the vectors show a marked and strong current parallel to the coastline, and going from west to east. This is the Guinea Current. The strength of the current was about 2 NM/h

or approx. 1 m s^{-1} . This is in accordance to Anon (1996) that reported an average speed of the Guinea Current to be about 0.8 m s^{-1} , and that occasionally reaches a maximum of 1.0 m s^{-1} . It appears that the measurements close to the bottom have been taken within the Guinea-Under-Current that flows westward and underlies the Guinea Current. This is according to Binet and Marchal (1993) because the Guinea Current extends only to the 25 m depth offshore and is shallower closer inshore.

The intensity of the current to the immediate east of Cape Palmas (west off Côte d'Ivoire) and Cape Three Points (western Ghana) is quite significant. Marchal and Picaut (1977) argued that the dynamic interaction between the flow of the Guinea Current and these two large capes leads to a rise in the thermocline downstream and accumulation of water upstream. These events contribute to the oceanographic conditions in the area.

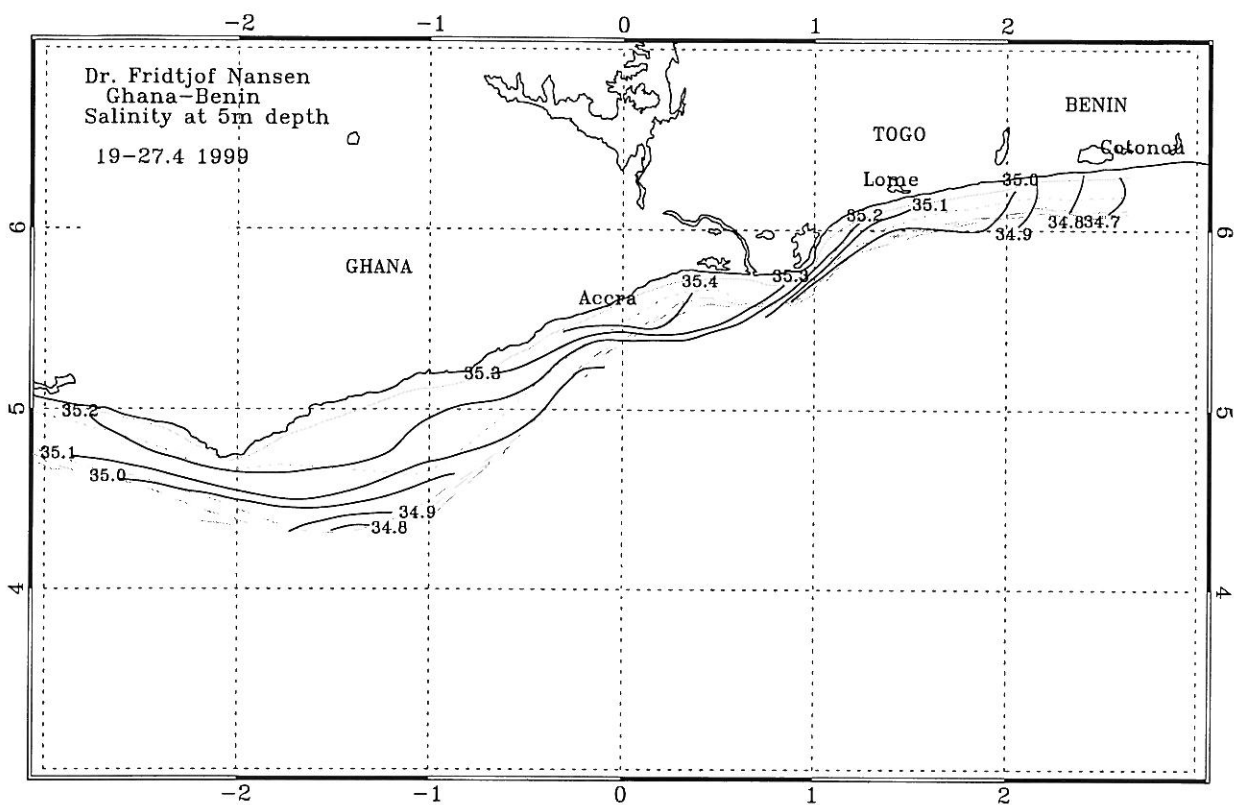


a) Ghana-Benin

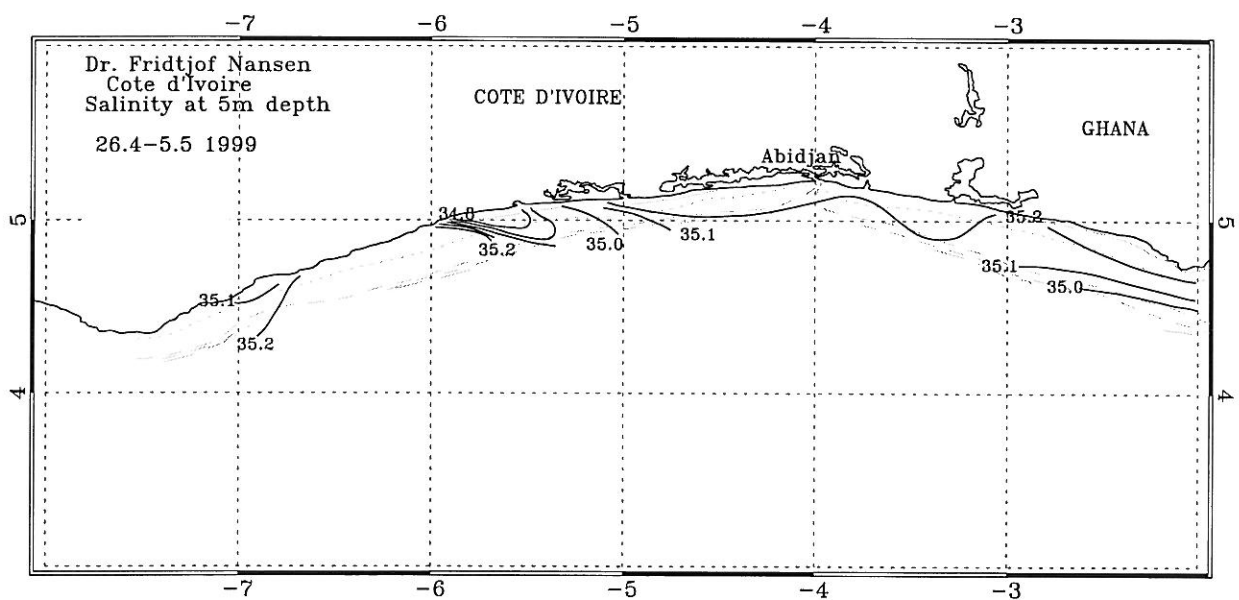


b) Côte d'Ivoire-Ghana

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

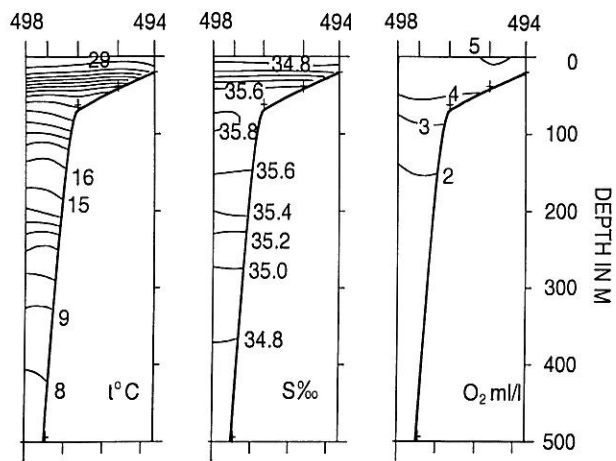


a) Ghana-Benin

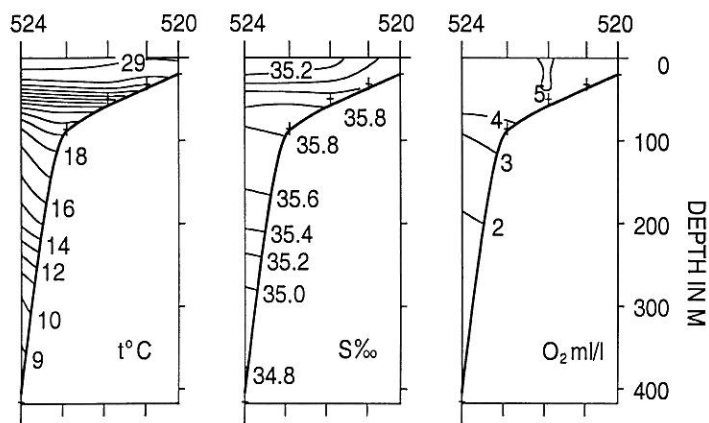


b) Côte d'Ivoire-Ghana

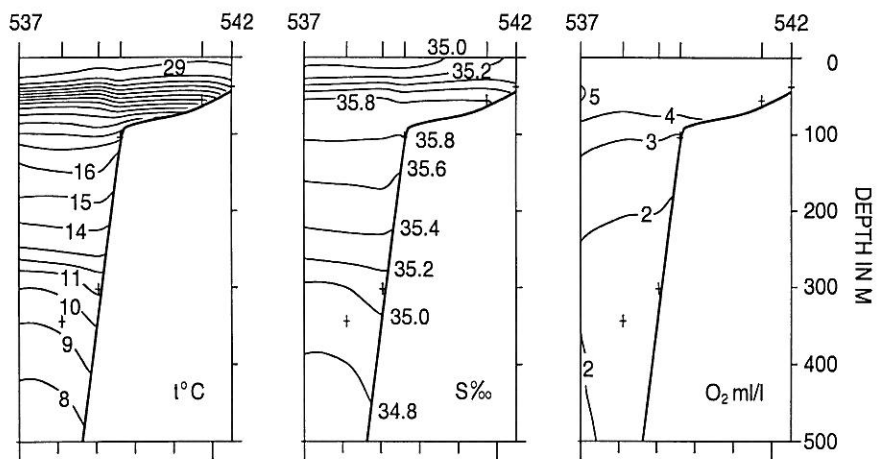
Figure 3. Horizontal distribution of surface salinity (5 m depth) at a) Ghana-Benin and b) Côte d'Ivoire-Ghana. Depth contours as in Fig. 1.



a) Cotonou - 20.04.1999

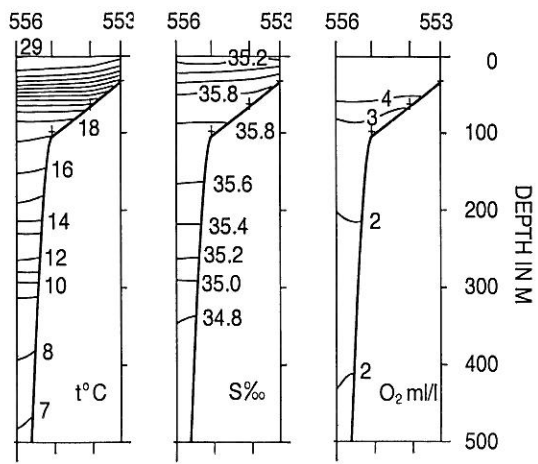


b) Accra - 23.04.1999

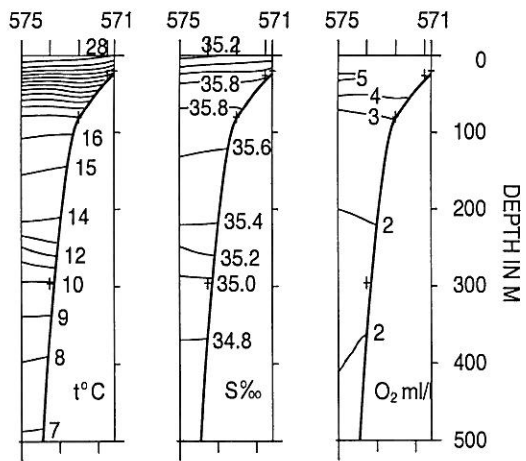


b) Cape Three Points - 26.04.1999

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



d) Grand Bérébi - 30.04.1999



e) Grand Jacques - 03.05.1999

Figure 4. Continuation.

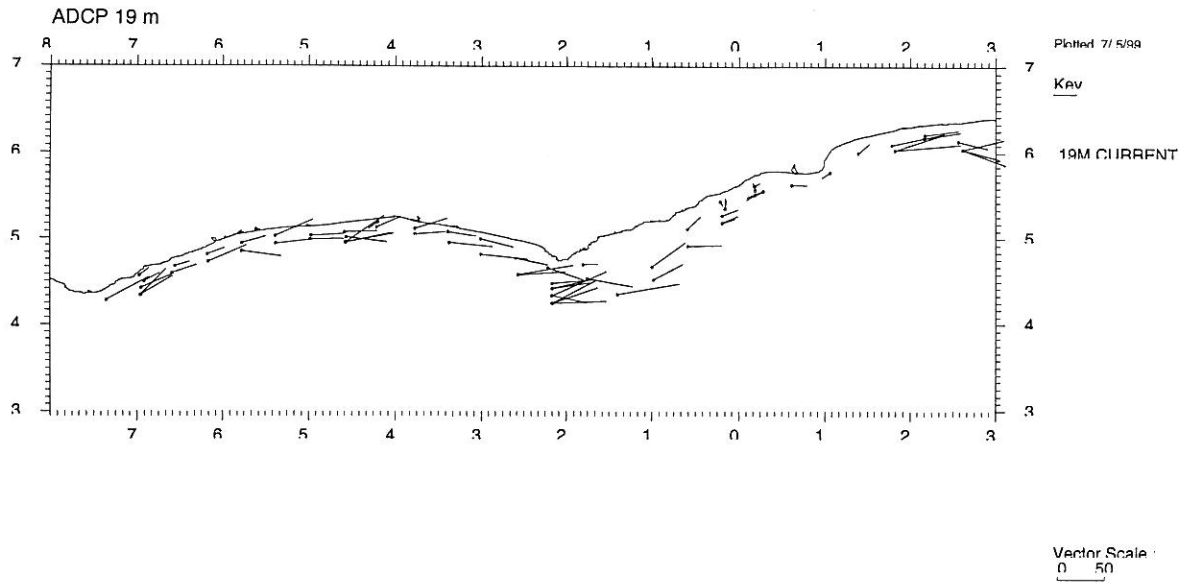


Figure 5. ADCP current at 19 m depth vectors (scale = 50 cm/s) off Benin - Côte d'Ivoire.

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

Figures 6-8 illustrate the distribution and abundance of sardinellas, anchovies and fish category PEL 2 (mainly carangids) as observed with the acoustic integration system. The unit of acoustic reflection is m^2/NM^2 , and a scale normally used on acoustic surveys with R/V “Dr. Fridtjof Nansen” was used to illustrate different levels of concentration.

4.1 Benin - Togo

Clupeids

Both *Sardinella aurita* and *S. maderensis* were caught in small quantities in the bottom trawl hauls in Benin-Togo waters. *S. aurita* of 14-18 cm total length (TL) were found both on the inner and outer shelf, while juvenile *S. maderensis* (8-12 cm) were found only on the inner shelf. Some low-density fish schools in this area (Fig. 6a) were attributed to sardinella, but unfortunately no pelagic trawl hauls were made to establish the species composition and length distribution of the schools. The biomass of the two species together was estimated to be about 5 000 tonnes.

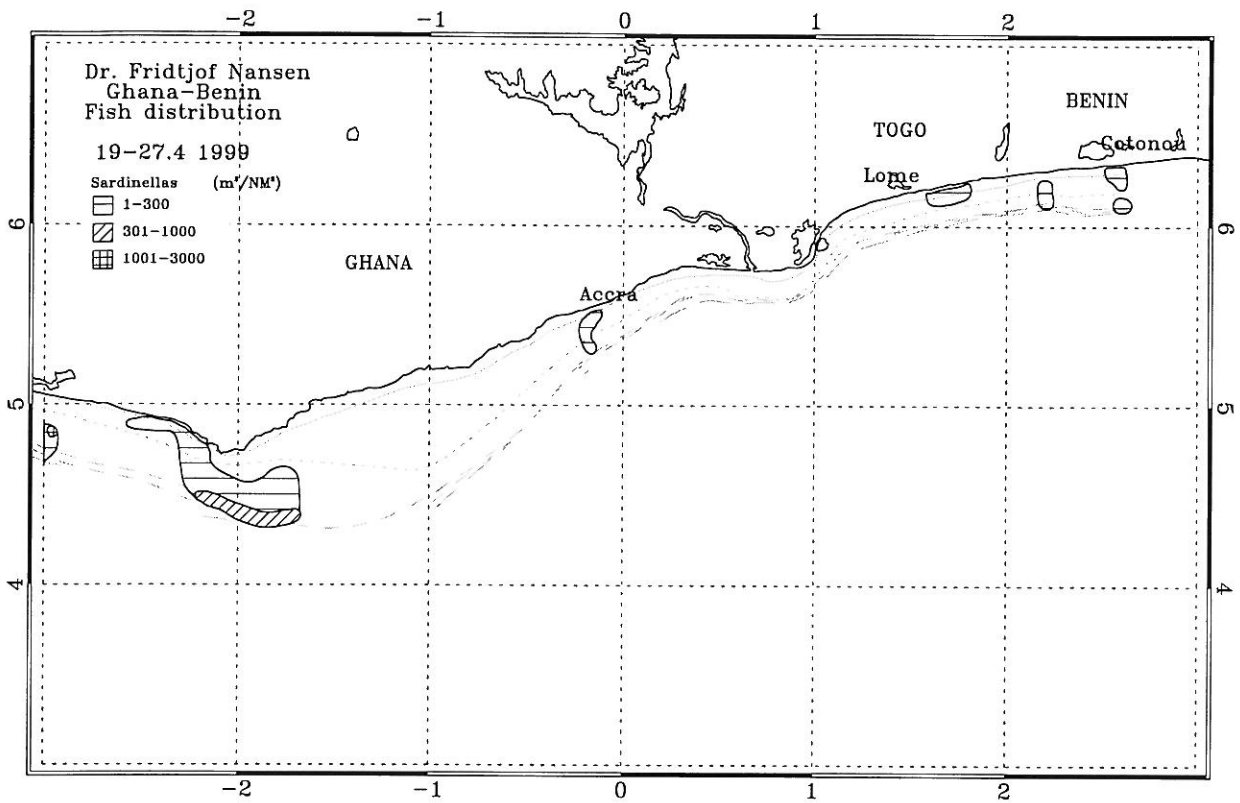
Ilisha africana was recorded in some of the bottom-trawl stations in Benin waters, but no s_A -values were attributed to this species and no estimate of abundance was made.

Anchovy

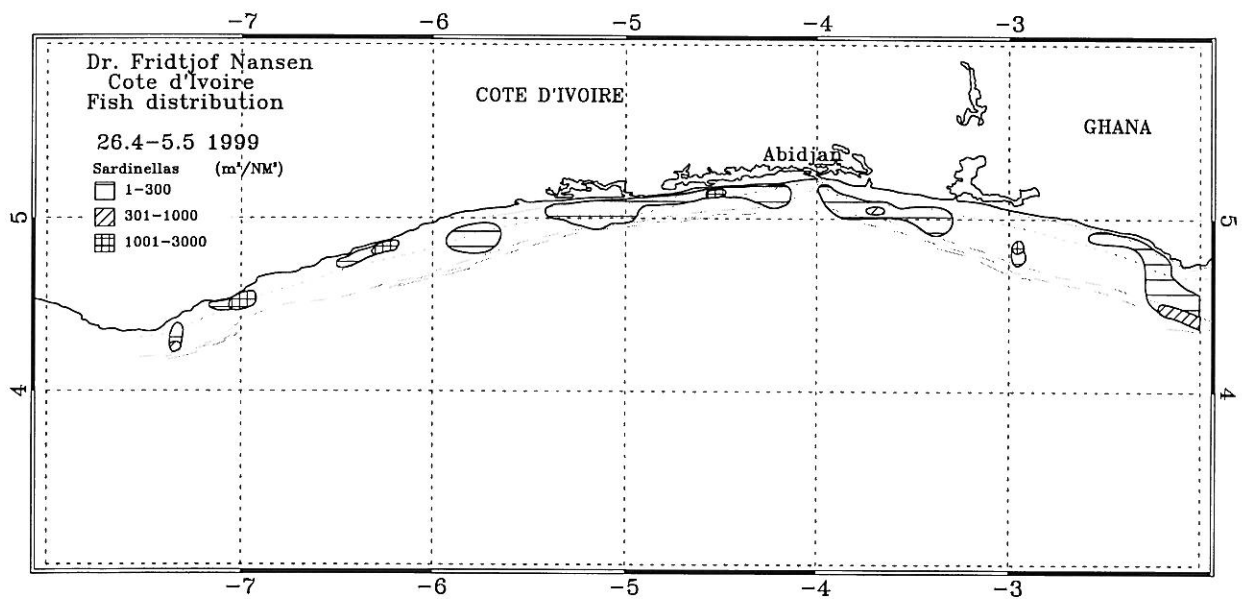
A few schools of juvenile (3-5 cm TL) *Engraulis encrasicolus* were recorded in shallow waters (20-30 m) at the Benin-Togo border (Fig. 7a). The biomass of these schools was estimated to be 250 tonnes.

PEL 2 (carangids, scombrids, barracudas and hairtail)

This group consisted mainly of carangids with *Selene dorsalis* and *Alectis alexandrinus* as the most abundant species in the bottom-trawl hauls. They were caught both on the inner and outer shelf. Other common carangids were *Chloroscombrus chrysurus* and *Decapterus macarellus*, while *Trachurus trecae* was found only at a couple of stations. Only one scombrid species, *Scomberomorus tritor*, was caught but again only at few stations. The

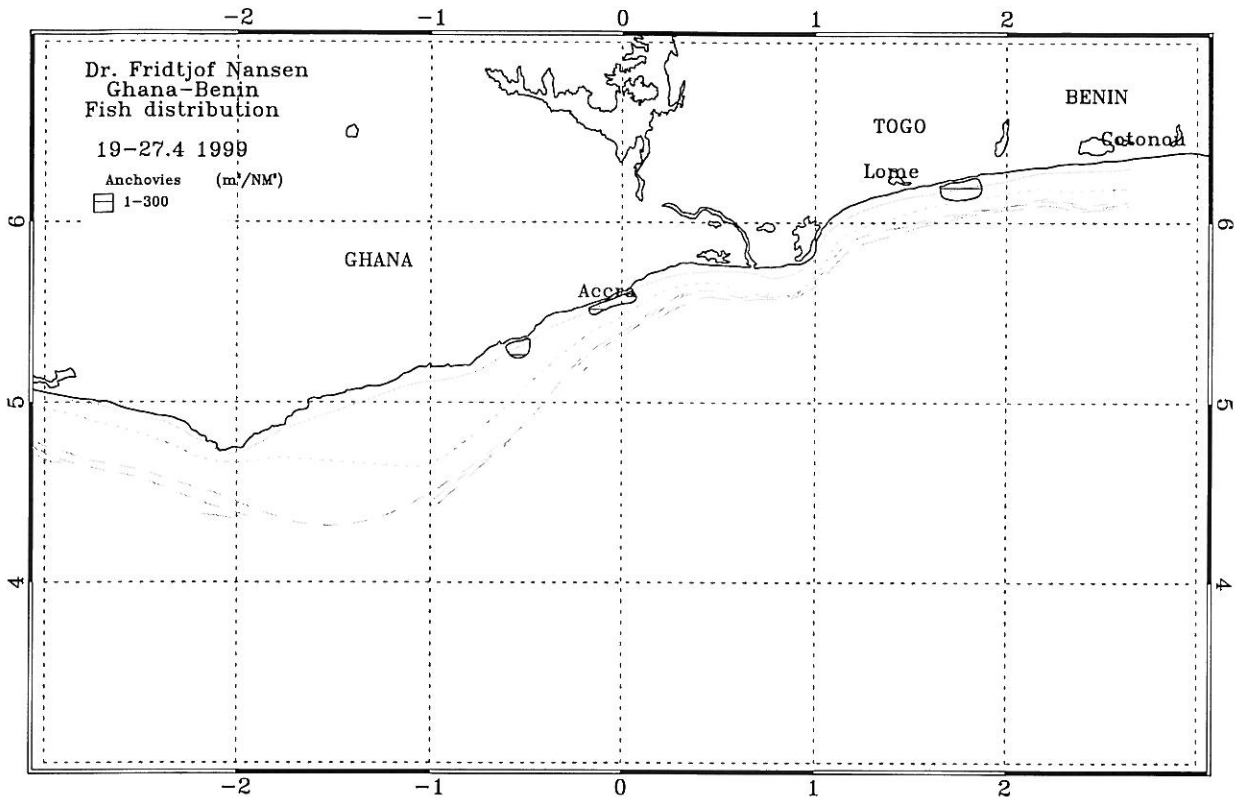


a) Ghana-Benin

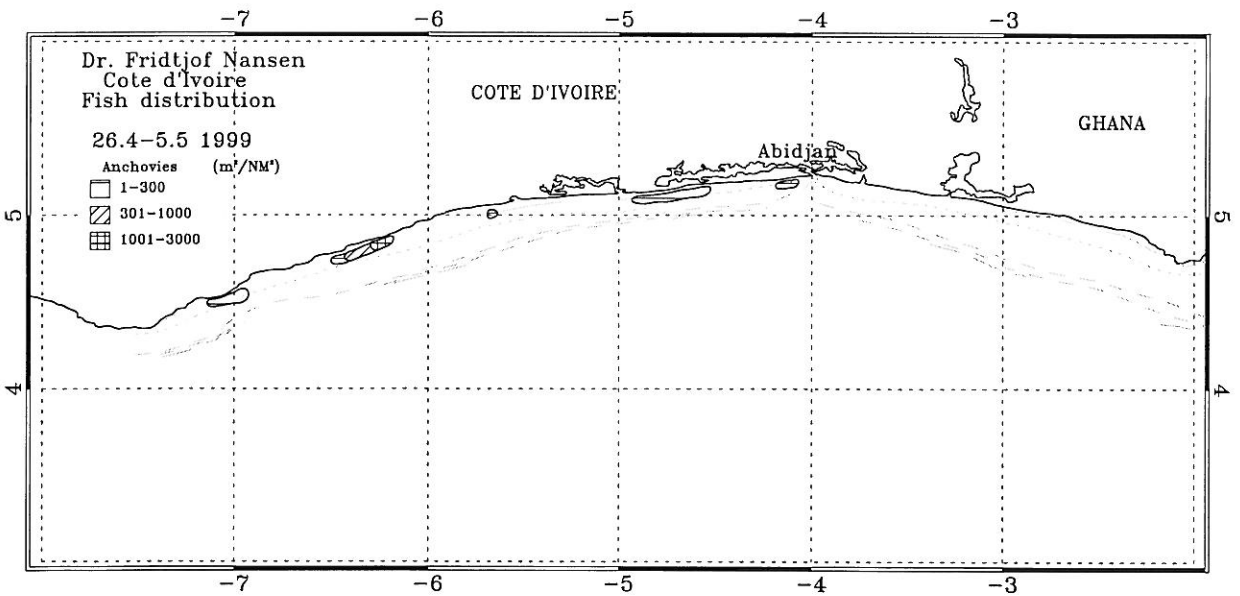


b) Côte d'Ivoire-Ghana

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

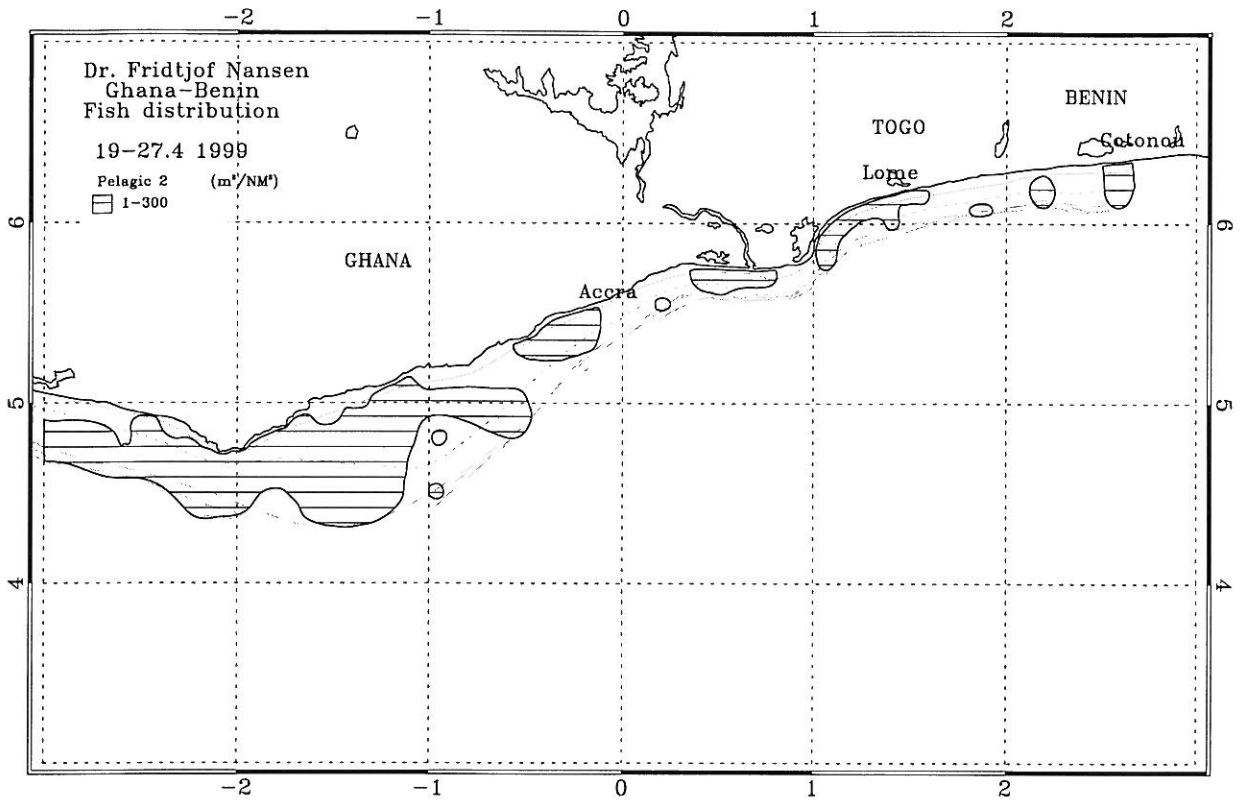


a) Ghana-Benin

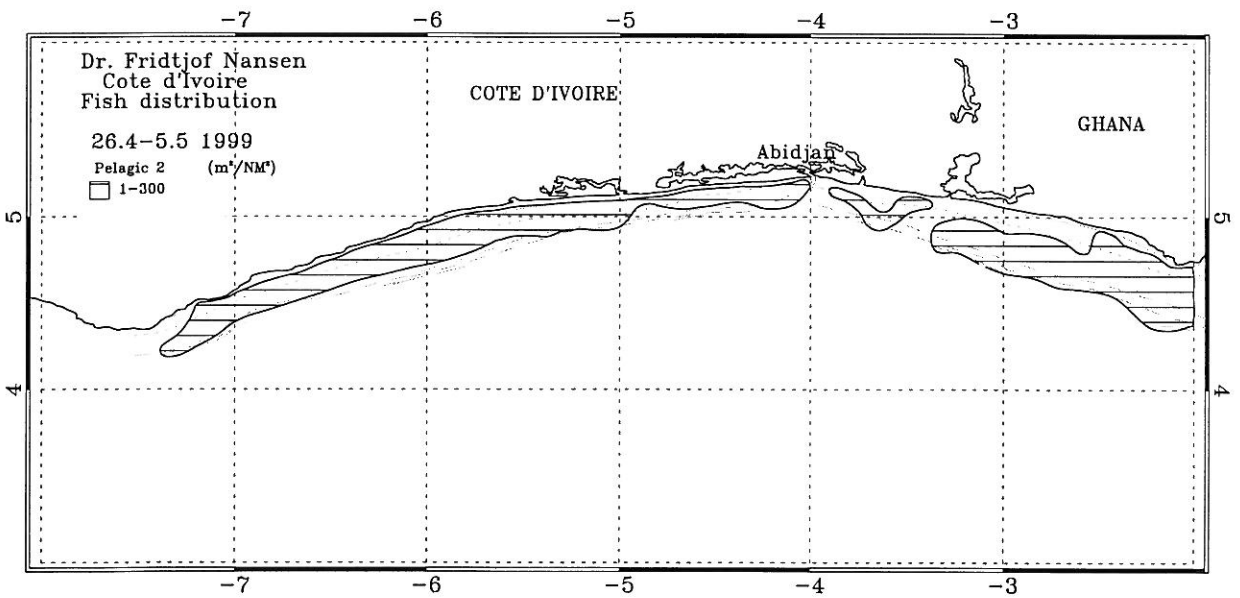


b) Côte d'Ivoire-Ghana

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



a) Ghana-Benin



b) Côte d'Ivoire-Ghana

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

barracuda *Sphyraena guachancho* was common in most of the bottom-trawl hauls, while the hairtail *Trichiurus lepturus* was caught at one station only. A few larger schools and some smaller ones, all of low density, were attributed to this group (Fig. 8a). Based on length distributions of *Selene dorsalis* and *Alectis alexandrinus* from bottom trawl hauls (mean TL of about 30 cm), the biomass of this group was estimated to be about 3 900 tonnes.

4.2 Ghana

Clupeids

In addition to a few large pelagic catches, *S. aurita* was found at about two-thirds of the bottom-trawl stations, both on the inner and outer shelf. *S. maderensis* was much less abundant and was mainly found 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 off Cape Three Points, where the main species was *S. aurita*, both juvenile of about 10 cm TL and adults of about 20 cm TL. Fig. 9 shows the length distribution of *S. aurita* as estimated from the acoustics. The total biomass of sardinellas was estimated to be about 40 000 tonnes.

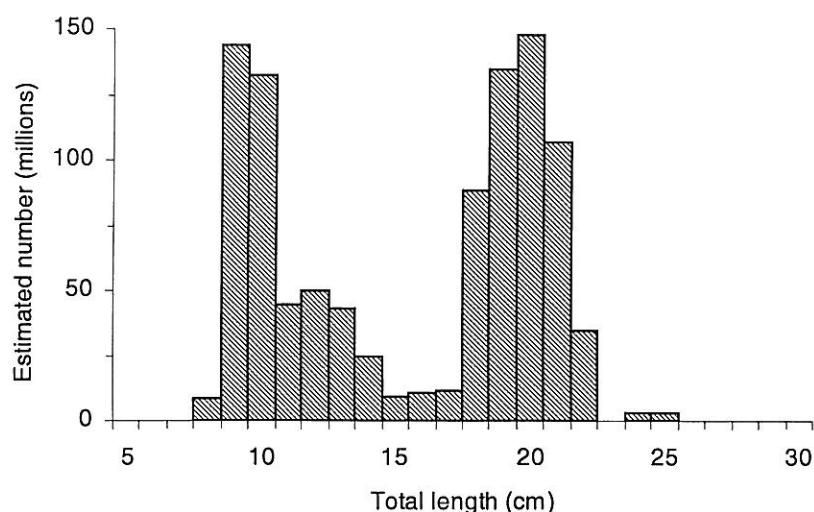


Figure 9. Length distribution (in million) of *Sardinella aurita* in the Ghana area, estimated acoustically.

Ilisha africana was caught in a few bottom trawl hauls in shallow waters, but no s_A -values were attributed to this species and no estimate of abundance was made.

Anchovy

Some schools of small *E. encrasicolus* (4-8 cm TL) were recorded in shallow waters off Accra (Fig. 7). The biomass of these schools was estimated to be about 400 tonnes. Anchovy was also caught in the bottom trawl at a couple of stations both east and west of Accra.

PEL 2 (carangids, scombrids, barracudas and hairtail)

As in Benin - Togo waters this group consisted mainly of carangids. In addition to *Alectis alexandrinus* and *S. dorsalis*, the species *Caranx crysos*, *Chloroscombrus chrysurus*, *D. macarellus*, *Selar crumenophthalmus* and *T. trecae* were relatively abundant in the bottom trawl catches in Ghana. *Scomberomorus tritor* was the most common scombrid in the bottom-trawl hauls, while a large quantity of *Scomber japonicus* was caught with the pelagic trawl during night-time. Most of the carangids were juveniles (5-15 cm). The barracuda *S. guachancho* was found in about half of the bottom-trawl hauls, while hairtail *T. lepturus* was only caught at a few stations. 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 of low density, and the highest values were usually found on the outer shelf. The biomass of PEL 2 was estimated to approximately 50 000 tonnes, applying an over-all average length of 17 cm (pooled length distributions, weighted by catch, for carangids, scombrids, barracudas and hairtails). This estimate also includes a few larger and denser schools *S. japonicus*, 23-31 cm TL, recorded on the outer shelf off Cape Three Points. The total biomass of these schools was estimated to be about 6 000 tonnes and the estimated length distribution is shown in Fig. 10.

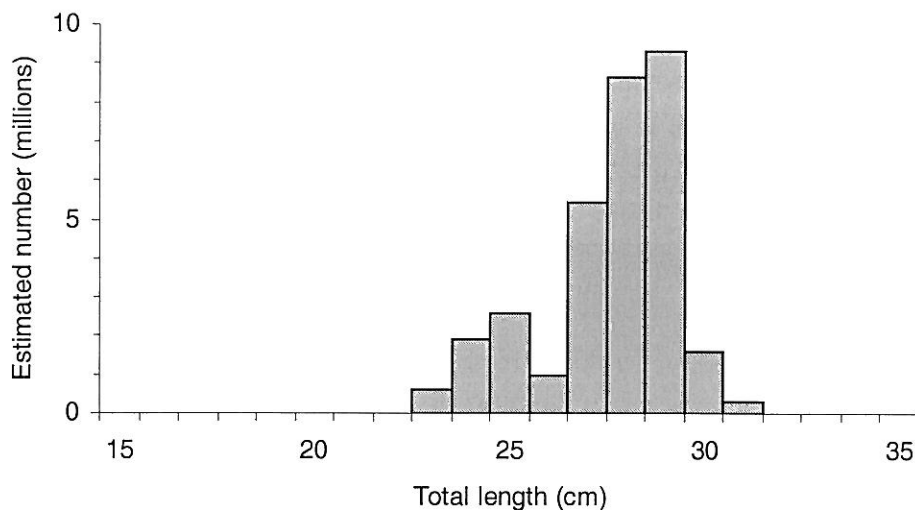


Figure 10. Length distribution (in million) of *Scomber japonicus* off Cape Three Points, estimated acoustically.

4.3 Côte d'Ivoire

Clupeids

Schools of 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 *S. aurita* and *S. maderensis* occurred frequently in the bottom-trawl catches, and were also caught in a few pelagic-trawl hauls. *S. maderensis* was most abundant and dominated the inner shelf, while *S. aurita* was common on the outer shelf. Most of the sardinellas found on the shelf off Côte d'Ivoire were small in size (Fig. 11), and the total biomass was estimated to be about 37 000 tonnes.

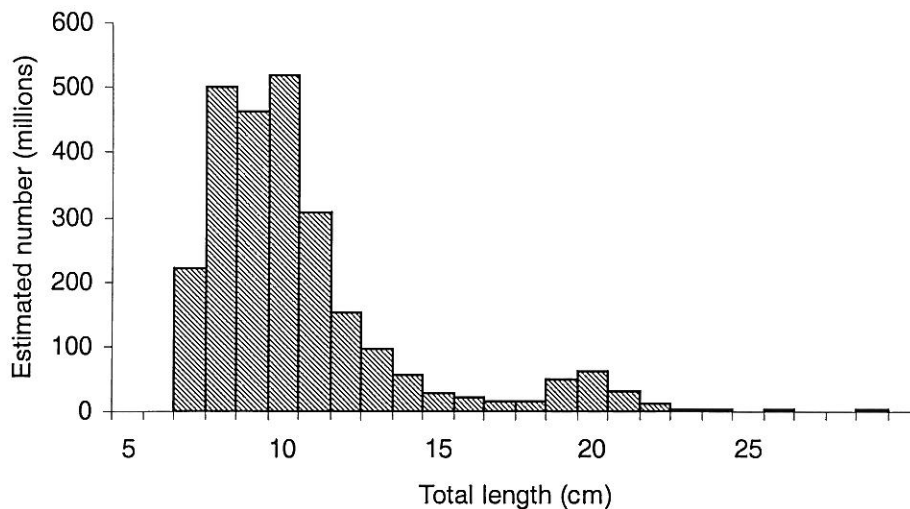


Figure 11. Length distribution of *Sardinella* spp. in the Côte d'Ivoire area, estimated acoustically.

Anchovy

Several schools of *E. encrasicolus* (5-11 cm TL) were recorded in shallow waters off Côte d'Ivoire. The main concentrations were found off Pointe Klama (10 NM west off Grand Bérébi), Sassandra and in the area between Grand Lahou and Abidjan (Fig. 7b). Anchovy was also caught at several of the bottom-trawl stations on the inner shelf (see Annex I). The biomass of anchovy was estimated to be 5 100 tonnes.

PEL 2 (carangids, scombrids, barracudas and hairtail)

Like in Benin-Togo and Ghana the species category PEL 2 consisted mostly of carangids, but also barracudas occurred in many of the bottom-trawl hauls with relatively high catch rates. The main species of carangids were *S. dorsalis*, *C. chrysurus* and *T. trecae*. Other carangids such as *A. alexandrinus*, *Caranx crysos*, *Selar crumenophthalmus* and *Decapterus* sp. also occurred but at lower densities. The two species of barracuda found are *Sphyaena guachancho* and *S. sphyraena*. The first was found in approximately half of the bottom-trawl stations and the second species at about one quarter of the stations. The most common species of scombrids were *Scomberomorus tritor* and *Scomber japonicus*, occurring less frequently than the barracudas and at lower catch rates. The hairtail, *T. lepturus*, was found at about one third of the bottom-trawl stations and at low-to-moderate densities.

Schools of PEL 2 species were found on most of the shelf, both on the inner and outer shelf. The schools were of low-to-medium densities; the highest densities usually found on the outer shelf (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 approximately 30 000 tonnes.

4.4 Review of results

Table 3 presents estimated biomass 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) and 1999 (this survey). The Benin-Togo sector was covered only during the present survey.

As in 1989, pelagic fishes were present over large parts of the area, especially the central and western parts. In addition to schools recorded with the acoustic system, pelagic fish also occurred in dispersed distributions. This was confirmed by random pelagic trawl hauls made in the area. Sardinellas and anchovy dominated on the inner shelf, while carangids, scombrids and barracudas were more widely distributed over the entire shelf. Triggerfish (*Balistes capriscus*) was found only at a few stations in each area. In Ghana the biomasses estimated in this survey are similar to those estimated in 1989 and about twice the 1981 estimates. In Côte d'Ivoire the total biomass of sardinellas and anchovy was much higher in the present survey than in 1989 but at the same level as in 1981, while the PEL 2 biomass was slightly lower than in 1989 and much higher than in 1981. The total biomass of pelagic fish in the Ghana-Côte d'Ivoire area has increased by almost 80% since 1981, mainly due to an increase in the biomass of carangids. As previously indicated by Anon. (1989) this increase may be related to

the decrease in the stock of triggerfish, from 500 000 tonnes in 1981 to 140 000 tonnes in 1986 (Oliver and Miquel 1987) and almost nothing in 1989 and 1999. The distribution of carangids was found to cover the whole shelf area, as for the triggerfish.

Table 3. Acoustic biomass estimates of main pelagic groups 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 and this current survey in April/May 1999. Note that Benin-Togo was only covered during this present survey.

a) Sardinellas and anchovies (PEL 1)

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin - Togo	Total
1981	June	39 000	40 000	not covered	79 000
1989	12 – 20.10	6 000	41 000	not covered	47 000
1999	19.4 – 6.5	42 000	40 000	5 000	87 000

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

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin - Togo	Total
1981	June	2 000	10 000	not covered	12 000
1989	12 – 20.10	33 000	57 000	not covered	90 000
1999	19.4 – 6.5	30 000	50 000	4 000	84 000

CHAPTER 5 RESULTS FROM THE TRAWL SURVEY: CATCH DISTRIBUTION, COMPOSITION AND SWEEP- 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 comprises commercially important families as Sciaenidae, Haemulidae (=Pomadasyidae), 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 Fig. 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 III.

5.1 Benin - Togo

In the Benin-Togo area, 12 swept-area trawl stations were successfully fulfilled on the shelf, while no hauls were made in areas deeper than 100 m due to a steep slope and rough bottom. Tables 4a and b show catch rates by main groups for the inner shelf (20-50 m) and outer shelf (51-100 m) respectively.

The pelagic group dominated on the inner shelf with a relative contribution of 38%. The group “other” was the second most important, contributing to 33% of the catches, while the demersal group made up 26%. Shrimps and cephalopods had small average catch rates, and no sharks were caught on the inner shelf. On the outer shelf the demersal group was the most important with 45% of the average catch rate. The pelagic group made up 28% of the catches, cephalopods 20% and non-commercial fish 7%. *Alloteuthis africana* and *Sepia officinalis hierredda* were the dominant cephalopods. The catch rate of sharks was low, and no commercially important shrimps were caught in this zone.

Table 4. Benin – Togo. Catch rates (kg/hour) 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
25	21	73.4	86.6	0.9	0.0	0.0	90.7	251.7
26	42	55.2	50.7	1.9	1.5	0.0	13.8	123.1
29	32	11.8	31.7	0.0	0.0	0.0	12.0	55.5
30	21	12.6	23.8	1.6	0.0	0.0	142.2	180.3
32	40	20.1	115.2	0.1	1.3	0.0	25.7	162.4
33	25	0.0	13.2	0.0	1.5	0.0	5.5	20.1
34	21	0.6	23.3	0.0	0.0	0.0	13.2	37.1
35	44	90.8	37.6	0.0	20.5	0.0	29.4	178.3
Mean	31	33.1	47.8	0.6	3.1	0.0	41.6	126.1
SE		12.4	12.5	0.3	2.5	0.0	17.3	28.9
% Catch		26.2	37.9	0.5	2.5	0.0	33.0	

b) Outer shelf, 51-100 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
27	71	37.8	90.4	0.0	6.0	0.0	7.2	141.3
28	59	25.8	112.8	0.0	36.5	5.7	13.5	194.2
31	63	209.0	3.9	0.0	49.5	0.0	20.4	282.8
36	56	64.8	0.8	0.0	59.2	0.0	9.4	134.2
Mean	62	84.3	52.0	0.0	37.8	1.4	12.6	188.1
SE		42.4	29.0	0.0	11.6	1.4	2.9	34.3
% Catch		44.8	27.6	0.0	20.1	0.8	6.7	

Catch rates of the most important pelagic families, caught by bottom trawl in the swept-area survey, are presented in Tables 5a and b. Carangids dominated both on the inner and outer shelf, and the average catch rate was slightly higher on the latter than the former. *S. dorsalis* and *A. alexandrinus* occurred most frequently and had the highest catch rates. Barracudas (Sphyraenidae) were the second most important group, with the highest average catch rate on the inner shelf. The catch rates and frequency of occurrence of clupeids, scombrids and hairtails were all low, and no scombrids and hairtails were caught on the outer shelf. The clupeids consisted of *Sardinella aurita*, *S. maderensis*, *Ilisha africana* and *Engraulis encrasicolus*, while *Scomberomorus tritor* was the only species in the Scombridae family.

Table 5. Benin – Togo. Catch rates (kg/hour) 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
25	21	15.1	31.0	16.4	1.4	22.6	165.1	251.7
26	42	0.0	45.1	0.0	0.0	5.6	72.4	123.1
29	32	0.0	21.8	8.1	0.0	1.8	23.8	55.5
30	21	10.0	7.2	0.0	0.0	6.7	156.4	180.3
32	40	0.1	85.4	0.0	0.0	29.7	47.2	162.4
33	25	4.3	4.2	0.0	0.0	4.7	7.0	20.1
34	21	1.7	8.3	13.3	0.0	0.0	13.7	37.1
35	44	0.0	37.6	0.0	0.0	0.0	140.7	178.3
Mean	31	3.9	30.1	4.7	0.2	8.9	78.3	126.1
SE		2.0	9.5	2.4	0.2	3.9	23.4	28.9
% Catch		3.1	23.9	3.8	0.1	7.1	62.1	

b) Outer shelf, 51-100 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
27	71	0.2	89.9	0.0	0.0	0.3	50.9	141.3
28	59	0.7	110.6	0.0	0.0	1.5	81.4	194.2
31	63	0.0	2.6	0.0	0.0	1.3	278.8	282.8
36	56	0.0	0.0	0.0	0.0	0.8	133.4	134.2
Mean	62	0.2	50.8	0.0	0.0	1.0	136.1	188.1
SE		0.2	28.9	0.0	0.0	0.3	50.5	34.3
% Catch		0.1	27.0	0.0	0.0	0.5	72.4	

Tables 6a and b 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). All groups had low catch rates on the inner shelf. Seabreams had the highest average catch rate, followed by croakers and groupers. The catch rates of grunts and snappers were very low on the inner shelf, and together with croakers, these groups were not found on the outer shelf. Seabreams were more abundant on the outer shelf and dominated with an average catch rate of 57 kg/h, or 30% of the total average catch rate. The most common species were *Pagellus bellottii*, *Dentex angolensis*, *D. canariensis* and *Pagrus caeruleostictus*. Groupers were also more abundant on the outer than on the inner shelf, with an average catch rate of 25 kg/h. *Epinephelus aeneus* was the dominant species in this group.

Table 6. Benin – Togo. Catch rates (kg/hour) 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, 0-50m

STAT	Depth	Seabream ¹	Snappers	Groupers	Grunts	Croakers	Other ¹	Total
25	21	1.7	2.1	0.0	7.2	51.9	188.9	251.7
26	42	25.0	0.0	5.7	0.0	0.0	92.4	123.1
29	32	11.8	0.0	0.0	0.0	0.0	43.8	55.5
30	21	1.8	1.9	0.0	4.7	3.1	168.8	180.3
32	40	0.0	0.0	0.0	0.0	0.0	162.4	162.4
33	25	0.0	0.0	0.0	0.0	0.0	20.1	20.1
34	21	0.6	0.0	0.0	0.0	0.0	36.4	37.0
35	44	75.3	0.0	15.5	0.0	0.0	95.4	186.2
Mean	31	14.5	0.5	2.7	1.5	6.9	101.0	127.0
SE		9.2	0.3	2.0	1.0	6.4	23.2	29.2
% Catch		11.4	0.4	2.1	1.2	5.4	79.5	

b) Outer shelf, 51-100 m

STAT	Depth	Seabream ¹	Snappers	Groupers	Grunts	Croakers	Other ¹	Total
27	71	4.7	0.0	27.1	0.0	0.0	109.6	141.3
28	59	22.7	0.0	2.1	0.0	0.0	169.4	194.2
31	63	165.5	0.0	40.5	0.0	0.0	76.7	282.8
36	56	33.6	0.0	31.2	0.0	0.0	69.4	134.2
Mean	62	56.6	0.0	25.2	0.0	0.0	106.3	188.1
SE		36.8	0.0	8.2	0.0	0.0	22.8	34.3
% Catch		30.1	0.0	13.4	0.0	0.0	56.5	

¹ Corrected

In Annex IIIA, swept-area estimates of mean densities based on 12 random bottom trawl hauls are presented for the demersal species on the shelf, to depths of 100 m. *Galeoides decadactylus*, *Polydactylus quadrifilis* and *P. senegalensis* had the highest densities in the shallowest depth zone (≤ 30 m), *P. caeruleostictus* and *B. auritus* in the 31-50 m zone, while *Dentex angolensis* had the highest density in the 51-100 m zone, followed by *Epinephelus aeneus*, *Alloteuthis africana* and *P. bellottii*. *E. aeneus* had the highest over all mean density, closely followed by *P. caeruleostictus*, *D. angolensis* and *A. africana*.

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 only about 1 500 tonnes, with approximately 70% in Benin and 30% in Togo waters. Seabreams had highest biomass, followed by groupers and croakers. Seabreams and groupers

had the highest biomass in the deepest zone (51-100 m), while croakers, grunts and snappers were found only in the shallowest zone (≤ 30 m). Of the pelagic and semi-pelagic groups, carangids had the highest estimated biomass.

Table 7. Benin – Togo. 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	16	198	609	823	0	1 686
Grunts	59	0	0	59	0	136
Croakers	280	0	0	280	0	797
Groupers	0	39	273	312	127	498
Snappers	22	0	0	22	18	25
Sum dem.val.	377	237	882	1 495	341	2 650
Bigeye grunt	59	84	28	171	25	316
Carangids	242	350	550	1 143	44	1 842
Barracudas	167	69	10	246	27	462

5.2 Ghana

Thirty-two swept-area trawl stations were made on the shelf off Ghana. In addition a couple of bottom-trawl hauls were made in waters deeper than 100 m. Tables 8a and b present catch rates by main groups for the inner and outer shelf. On the inner shelf the “other” species group (after considering the main groups) had the highest average catch rate with a relative contribution of 39%. The pelagic and demersal groups had about the same share of the catch (30 and 26%, respectively). Cephalopods made up about 10% of the catch, while shrimps and sharks were scarce. On the outer shelf the demersal group dominated with 82% of the overall average catch rate due to some large catches of *Brachydeuterus auritus*. Both the pelagic and “other” group had similar average catch rates as on the inner shelf, while catch rates of cephalopods were several times higher than on the inner shelf (37 kg/h). *Alloteuthis africana* and *Sepia officinalis hierredda* were the dominating cephalopods. The catch rate of sharks was also low on the outer shelf, and no commercially important shrimps were caught on this part of the shelf.

Table 8. Ghana. Catch rates (kg/hour) 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)

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
37	25	0.0	115.0	0.0	58.7	0.0	15.4	189.0
38	39	36.9	20.5	0.0	0.6	0.0	8.4	66.4
40	47	36.6	0.8	0.1	35.1	0.0	11.6	84.2
41	36	15.7	20.3	0.0	2.6	0.0	14.1	52.6
42	24	6.8	31.9	2.2	0.0	0.0	45.9	86.9
46	46	0.8	0.0	0.0	16.2	0.0	29.5	46.4
47	28	5.0	8.8	0.0	1.4	0.0	218.5	233.6
49	21	0.8	76.5	0.0	1.3	0.0	4.8	83.4
50	37	4.5	38.5	0.0	10.8	0.0	2.9	56.7
54	22	79.7	43.4	0.0	0.0	0.0	70.2	193.3
55	38	32.3	19.2	0.0	6.1	0.0	35.3	92.8
58	48	42.7	5.8	0.0	4.1	0.0	99.4	152.0
59	25	20.7	34.3	0.0	11.8	0.0	55.4	122.2
63	40	8.2	3.1	0.0	6.6	0.0	15.5	33.3
64	27	2.1	5.8	0.0	8.8	0.0	455.3	471.9
65	25	53.3	55.5	0.0	0.3	7.2	18.9	135.2
66	47	150.6	176.8	0.0	6.4	0.0	14.3	348.0
72	42	11.3	27.7	0.1	0.7	0.0	5.4	45.1
73	29	107.4	130.8	0.6	0.1	0.0	139.2	378.1
74	39	304.4	253.6	0.0	11.0	0.0	151.4	720.3
78	42	6.0	3.3	0.0	22.1	0.0	8.0	39.4
79	28	0.1	0.7	0.0	0.0	0.0	1.6	2.4
Mean	34	42.1	48.7	0.1	9.3	0.3	64.6	165.2
SE		15.0	14.0	0.1	3.0	0.3	22.3	37.1
% Catch		25.5	29.5	0.1	5.6	0.2	39.1	

b) Outer shelf, 51-100m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
39	54	66.5	6.8	0.0	43.0	0.0	9.4	125.6
45	64	100.2	0.2	0.0	89.2	11.5	35.0	236.0
51	60	345.7	208.5	0.0	144.6	0.0	176.8	875.6
56	61	32.5	30.6	0.0	6.8	0.0	114.9	184.9
57	83	5 462.6	15.4	0.0	37.7	6.7	55.9	5 578.2
62	80	211.4	20.3	0.0	28.6	7.3	72.7	340.3
67	62	181.6	26.8	0.0	10.7	0.0	83.0	302.1
71	60	663.4	180.4	0.0	0.7	0.0	41.6	886.0
75	63	144.2	1.1	0.0	4.2	6.0	67.4	222.9
77	83	121.4	5.0	0.0	5.2	14.2	29.7	175.5
Mean	67	733.0	49.5	0.0	37.1	4.6	68.6	892.7
SE		528.7	24.5	0.0	14.7	1.7	15.3	528.0
% Catch		82.1	5.6	0.0	4.2	0.5	7.7	

Tables 9a 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 similar catch rates of about 30 kg/h. The most abundant species were *Alectis alexandrinus*, *Chloroscombrus chrysurus*, *Decapterus macarellus*, *Selar crumenophthalmus*, *Selene dorsalis* and *Trachurus trecae*. Barracudas constituted the second most important group on the inner shelf, closely followed by clupeids. Clupeids had somewhat higher catch rates on the outer shelf and formed the second most important pelagic group here, while barracudas came third. The most frequently found clupeid was *Sardinella aurita*, while *S. maderensis* and *Ilisha africana* were less abundant. Hairtails (*Trichiurus lepturus*) occurred in low numbers at only two stations, one on the inner and one on the outer shelf. Scombrids were caught at about half of the stations on the inner shelf but not on the outer shelf. The most abundant species in this group was *Scomberomorus tritor*. The seemingly high catch rate of over 5 500 kg/hr of other was mainly due to a large catch of *Brachydeuterus auritus* off Saltpond (Table 8b).

Table 9. Ghana. Catch rates (kg/hour) 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, 0-50m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
37	25	0.0	108.3	0.0	0.0	6.6	74.0	189.0
38	39	1.1	15.5	3.3	0.0	0.5	46.0	66.4
40	47	0.0	0.8	0.0	0.0	0.0	83.4	84.2
41	36	0.0	20.3	0.0	0.0	0.0	32.3	52.6
42	24	0.0	22.6	0.0	0.0	9.3	55.0	86.9
46	46	0.0	0.0	0.0	0.0	0.0	46.4	46.4
47	28	0.0	5.3	3.4	0.0	0.0	224.9	233.6
49	21	49.5	25.2	0.0	0.0	1.8	6.9	83.4
50	37	0.0	21.2	16.6	0.0	0.7	18.2	56.7
54	22	0.3	37.7	0.0	0.0	5.4	149.9	193.3
55	38	0.0	8.1	11.0	0.0	0.0	73.7	92.8
58	48	0.0	5.8	0.0	0.0	0.0	146.2	152.0
59	25	1.2	30.0	0.0	0.0	3.2	87.9	122.2
63	40	0.1	3.0	0.0	0.0	0.0	30.2	33.3
64	27	0.0	0.0	5.8	0.0	0.0	466.2	471.9
65	25	6.8	30.2	5.6	5.8	7.1	79.7	135.2
66	47	4.6	172.2	0.0	0.0	0.0	171.2	348.0
72	42	1.0	21.2	1.9	0.0	3.7	17.4	45.1
73	29	13.7	55.9	2.4	0.0	58.8	247.3	378.1
74	39	39.6	161.5	7.4	0.0	45.1	466.8	720.3
78	42	0.0	3.3	0.0	0.0	0.0	36.1	39.4
79	28	0.0	0.7	0.0	0.0	0.0	1.7	2.4
Mean	34	5.4	34.0	2.6	0.3	6.5	116.4	165.2
SE		2.8	10.5	0.9	0.3	3.2	28.1	37.1
% Catch		3.3	20.6	1.6	0.2	3.9	70.5	

b) Outer shelf 51-100 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
39	54	0.0	5.6	0.0	0.0	1.2	118.8	125.6
45	64	0.0	0.2	0.0	0.0	0.0	235.9	236.0
51	60	93.5	88.0	0.0	0.0	27.1	667.1	875.6
56	61	0.0	30.2	0.0	0.0	0.4	154.2	184.9
57	83	0.0	15.4	0.0	0.0	0.0	5 562.8	5 578.2
62	80	0.5	19.8	0.0	0.0	0.0	320.0	340.3
67	62	0.5	26.2	0.0	0.0	0.0	275.3	302.1
71	60	38.5	125.0	0.0	0.0	17.0	705.6	886.0
75	63	0.0	1.1	0.0	0.0	0.0	221.8	222.9
77	83	0.0	4.0	0.0	1.0	0.0	170.5	175.5
Mean	67	13.3	31.5	0.0	0.1	4.6	843.2	892.7
SE		9.7	13.2	0.0	0.1	3.0	528.4	528.0
% Catch		1.5	3.5	0.0	0.0	0.5	94.5	

Catch rates of the most valuable demersal groups on the shelf are presented in Tables 10a and b. Like in Benin-Togo waters the average catch rates were low on the inner shelf. Seabreams had the highest average catch rate. Grunts came second due to one large catch of mainly *Pomadasys jubelini* and some *P. incisus* and *P. rogeri*. Groupers had the third highest average catch rate on the inner shelf, but much lower than the first two groups. Seabreams dominated on the outer shelf with an average catch rate of 72 kg/h. *Dentex angolensis*, *D. canariensis*, *Pagellus bellottii* and *Pagrus caeruleostictus* were the most common species. Groupers with *Epinephelus aeneus* constituted the second most important demersal group on the outer shelf. Snappers and croakers were only caught in low numbers at a few stations on both the inner and outer shelf.

Annex IIIB gives the swept-area estimates of mean densities based on 32 random trawl stations for demersal species on the shelf. *B. auritus*, *Drepane africana*, *S. officinalis hierredda* and *D. canariensis* had the highest densities in the shallowest depth zone; *P. jubelini*, *B. auritus*, and *P. caeruleostictus* in the 31-50 m zone, while *B. auritus* dominated in the 51-100 m zone. These were followed by *P. bellottii*, *S. officinalis hierredda*, *Fistularia petimba*, *P. caeruleostictus*, *Pseudupeneus prayensis*, *Priacanthus arenatus*, *A. africana* and *D. angolensis*. *B. auritus* had the highest over all mean density, followed by *P. bellottii* and *S. officinalis hierredda*.

Table 10. Ghana. Catch rates (kg/hour) 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

STAT	Depth	Seabream ¹	Snappers	Groupers	Grunts	Croakers	Other ¹	Total
37	25	0.0	0.0	0.0	0.0	0.0	189.0	189.0
38	39	26.0	0.0	10.8	0.0	0.0	29.6	66.4
40	47	36.6	0.0	0.0	0.0	0.0	47.6	84.2
41	36	12.4	0.0	3.2	0.0	0.0	37.1	52.6
42	24	5.5	0.0	0.0	0.0	0.0	81.5	86.9
46	46	0.8	0.0	0.0	0.0	0.0	45.7	46.4
47	28	5.0	0.0	0.0	0.0	0.0	228.6	233.6
49	21	0.8	0.0	0.0	0.0	0.0	82.6	83.4
50	37	3.7	0.0	0.7	0.0	0.0	52.3	56.7
54	22	79.3	0.4	0.0	0.0	0.0	113.6	193.3
55	38	22.8	9.5	0.0	0.0	0.0	60.6	92.8
58	48	23.3	6.7	12.0	0.0	0.0	110.0	152.0
59	25	6.1	0.0	0.0	0.2	0.0	115.9	122.2
63	40	8.2	0.0	0.0	0.0	0.0	25.1	33.3
64	27	2.1	0.0	0.0	0.0	0.0	469.8	471.9
65	25	0.0	0.0	0.0	3.1	2.8	129.3	135.2
66	47	33.4	2.9	7.8	2.0	0.0	301.9	348.0
72	42	0.0	0.0	0.0	0.0	0.6	44.5	45.1
73	29	0.0	0.0	0.0	0.0	8.3	369.8	378.1
74	39	61.6	0.0	2.6	207.2	0.0	448.9	720.3
78	42	3.0	0.0	3.0	0.0	0.0	33.4	39.4
79	28	0.0	0.0	0.0	0.0	0.0	2.4	2.4
Mean	34	15.0	0.9	1.8	9.7	0.5	137.2	165.2
SE		4.6	0.5	0.8	9.4	0.4	29.8	37.1
% Catch		9.1	0.5	1.1	5.9	0.3	83.1	

b) Outer shelf 51-100 m

STAT	Depth	Seabream ¹	Snappers	Groupers	Grunts	Croakers	Other ¹	Total
39	54	52.9	0.0	13.6	0.0	0.0	59.1	125.6
45	64	2.9	0.0	0.0	0.0	0.0	233.2	236.0
51	60	52.3	0.0	20.1	0.0	0.0	803.2	875.6
56	61	30.4	0.9	1.2	0.0	0.0	152.4	184.9
57	83	31.1	0.0	0.0	0.0	0.0	5 547.1	5 578.2
62	80	208.6	2.7	0.0	0.0	0.0	128.9	340.3
67	62	58.7	0.0	3.4	0.0	7.1	232.9	302.1
71	60	46.8	0.0	0.0	0.0	0.0	839.2	886.0
75	63	113.8	0.0	0.0	15.0	3.1	91.0	222.9
77	83	121.0	0.0	0.0	0.0	0.0	54.5	175.5
Mean	67	71.9	0.4	3.8	1.5	1.0	814.1	892.7
SE		19.0	0.3	2.3	1.5	0.7	533.9	528.0
% Catch		8.1	0.0	0.4	0.2	0.1	91.2	

¹ Corrected

Table 11 presents swept-area biomass estimates for valuable demersal groups. Estimated total biomass was about 10 000 tonnes of which Seabreams made up almost 80%. The highest biomass of seabreams was found between depths of 51 and 100 m. Grunts had the second highest biomass with almost 1 400 tonnes, followed by groupers, while snappers and croakers both had low biomass estimates. Of the pelagic and semi-pelagic groups, Bigeye grunt (*B. auritus*) dominated with an estimated biomass of more than 70 000 tonnes. However, the 95% confidence limits show that this estimate is quite uncertain since it is based on a few very large catches. The biomass of carangids was estimated to be about 7 000 tonnes.

Table 11. Ghana. 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	452	1 342	6 685	8 478	4 470	12 487
Grunts	14	1 280	138	1 431	0	3 981
Croakers	42	0	83	125	0	261
Groupers	0	227	330	557	132	982
Snappers	0	124	28	151	1	302
Sum dem. val.	508	2 972	7 263	10 743	5 247	16 239
Bigeye grunt	706	970	68 637	70 314	0	182 324
Carangids	1 426	2 683	2 751	6 860	3 236	10 485
Barracudas	409	289	385	1 084	204	1 963

5.3 Côte d'Ivoire

A total of 31 swept-area trawl hauls were carried out on the shelf of Côte d'Ivoire. No trawl hauls were made in waters deeper than 100 m. Tables 12a and b show catch rates by main groups for the inner (20-50 m) and outer (51-100 m) shelf. The pelagic group had highest average catch rate on the inner shelf with a relative contribution of 62% (Table 12 a). The demersal group was the second most important group contributing to 21% of the catches, followed by the group "other", which had a relative contribution of 16%. Both shrimps and cephalopods had low average catch rates, and no sharks were found on this part of the shelf. On the outer shelf the demersal group had the highest average catch rate, contributing 60% to the total (Table 12 b). The pelagic group and the group "other" contributed 24% and 14% respectively. The average catch rate of shrimps on the outer shelf was very low, whereas the catch rate of cephalopods was somewhat higher with a relative contribution of 1.5% as compared to 1% on the inner shelf. Sharks contributed 0.7% to the total on this part of the shelf. The species of shrimp found in Côte d'Ivoire were *Penaeus notialis*, *Penaeus kerathurus* and *Parapenaeopsis atlantica* and the main species of cephalopods were *Sepia officinalis hierredda*, *Octopus vulgaris* and *Alloteuthis africana*.

Table 12. Côte d'Ivoire. Catch rates (kg/hour) 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

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
81	46	29.0	14.7	0.0	4.2	0.0	9.6	57.4
82	27	39.5	273.7	0.0	0.6	0.0	95.6	409.4
83	36	31.3	1 205.7	0.0	0.0	0.0	391.6	1 628.5
87	49	90.8	90.0	0.4	2.0	0.0	15.9	199.0
88	29	54.7	2012.5	0.0	0.0	0.0	64.2	2 131.4
89	43	0.8	9.7	0.0	2.2	0.0	8.1	20.8
93	45	140.3	144.9	0.0	1.8	0.0	44.3	331.3
94	24	10.2	46.1	0.0	1.8	0.0	17.0	75.1
95	27	39.4	48.7	0.0	0.0	0.0	26.8	115.0
96	41	7.4	59.8	0.0	0.0	0.0	3.5	70.7
100	45	0.6	13.2	0.0	10.2	0.0	6.9	30.9
101	26	43.5	148.3	0.4	0.0	0.0	20.1	212.2
102	33	14.0	65.8	0.0	7.1	0.0	10.3	97.2
103	24	48.7	34.8	1.6	0.6	0.0	37.9	123.6
106	48	412.3	78.3	0.0	8.9	0.0	25.8	525.3
107	28	52.3	252.7	0.5	19.6	0.0	56.0	381.0
108	23	182.4	37.1	0.0	0.0	0.0	102.0	321.4
109	40	15.3	37.2	0.0	1.1	0.0	12.7	66.3
113	45	183.1	12.2	0.0	1.7	0.0	183.5	380.6
114	28	128.4	17.6	0.0	1.9	0.0	76.5	224.4
Mean	35	76.2	230.2	0.1	3.2	0.0	60.4	370.1
SE		21.8	110.7	0.1	1.1	0.0	20.1	121.3
% Catch		20.6	62.2	0.0	0.9	0.0	16.3	

b) Outer shelf 51-100 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
80	75	26.8	18.0	0.0	0.1	0.0	6.8	51.7
84	62	45.5	25.9	0.6	1.3	0.0	17.4	90.7
86	77	124.4	31.3	0.0	9.5	0.0	15.0	180.2
90	67	55.5	9.3	0.0	10.6	0.0	5.3	80.7
92	75	85.5	39.6	0.0	0.9	0.0	4.1	130.1
97	91	264.1	3.4	0.0	9.7	6.5	15.0	298.8
99	85	1 656.5	737.8	0.0	0.0	0.0	191.8	2 586.1
104	85	87.3	16.6	0.0	7.4	0.0	14.5	125.8
105	84	350.6	82.6	0.0	26.0	15.8	30.7	505.5
110	75	81.4	58.0	0.0	2.2	2.7	337.3	481.5
112	81	194.3	188.4	0.0	1.8	10.3	44.9	439.8
Mean	78	270.2	110.1	0.1	6.3	3.2	62.1	451.9
SE		141.9	64.7	0.1	2.3	1.6	31.9	219.4
% Catch		59.8	24.4	0.0	1.4	0.7	13.7	

Tables 13a 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 150 kg/h (Table 13a). The clupeid species that occurred most frequently and with the highest catch rates were the sardinellas, *Sardinella aurita* and *S. maderensis* and the anchovy, *Engraulis encrasicolus*. *Ilisha africana* and *Ethmalosa fimbriata* were also found. The second most important group was the carangids, which contributed 15% to the total. The most frequently caught species of this group were *Chloroscombrus chrysurus* and *Selene dorsalis*, which also had the highest catch rates. Barracudas had a relative contribution of 5%, while scombrids and hairtails contributed little to the total catch. The carangids had the highest average catch rate on the outer shelf (73 kg/h) followed by the clupeids (31 kg/h). 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 kg/h, which is lower than on the inner shelf where the catch rate was 18 kg/h. As for the inner shelf, scombrids and hairtails contributed little to the total catch.

Table 13. Côte d'Ivoire. Catch rates (kg/hour) 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
81	46	4.6	5.0	1.4	0.0	3.8	42.7	57.4
82	27	59.5	148.6	5.6	6.4	53.6	135.7	409.4
83	36	914.3	150.2	0.0	7.4	133.8	422.8	1 628.5
87	49	1.1	17.1	0.8	0.0	71.0	109.0	199.0
88	29	1 873.4	107.4	3.3	0.0	28.4	118.8	2 131.4
89	43	0.6	9.1	0.0	0.0	0.0	11.1	20.8
93	45	6.9	117.3	0.0	0.0	20.7	186.4	331.3
94	24	2.4	43.7	0.0	0.0	0.0	29.0	75.1
95	27	3.9	41.6	0.0	1.4	1.8	66.3	115.0
96	41	27.6	29.7	2.5	0.0	0.0	10.9	70.7
100	45	0.5	12.6	0.0	0.0	0.0	17.7	30.9
101	26	72.1	51.0	0.0	0.6	24.6	63.9	212.2
102	33	16.4	47.2	0.0	0.0	2.2	31.4	97.2
103	24	8.2	13.3	0.0	6.0	7.3	88.8	123.6
106	48	5.3	73.0	0.0	0.0	0.0	447.0	525.3
107	28	48.4	184.1	0.0	3.0	17.2	128.3	381.0
108	23	10.6	25.7	0.0	0.0	0.8	284.3	321.4
109	40	1.2	35.0	0.0	0.0	1.1	29.1	66.3
113	45	3.4	8.8	0.0	0.0	0.0	368.4	380.6
114	28	4.5	11.9	0.6	0.0	0.6	206.8	224.4
Mean	35	153.3	56.6	0.7	1.2	18.3	139.9	370.1
SE		101.2	12.3	0.3	0.5	7.5	30.9	121.3
% Catch		41.4	15.3	0.2	0.3	5.0	37.8	

b) Outer shelf 51-100 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
80	75	1.8	16.0	0.0	0.1	0.0	33.7	51.7
84	62	8.8	9.9	0.0	2.1	5.0	64.9	90.7
86	77	2.0	18.3	0.0	1.2	9.8	148.9	180.2
90	67	0.1	4.0	0.0	0.0	5.2	71.4	80.7
92	75	0.4	18.7	0.0	18.8	1.8	90.5	130.1
97	91	0.0	3.4	0.0	0.0	0.0	295.4	298.8
99	85	133.8	591.8	0.0	0.0	12.2	1 848.3	2 586.1
104	85	0.4	16.2	0.0	0.0	0.0	109.2	125.8
105	84	27.2	55.4	0.0	0.0	0.0	423.0	505.5
110	75	0.7	52.9	0.0	0.0	4.3	423.6	481.5
112	81	169.5	8.8	6.2	0.0	3.8	251.4	439.8
Mean	78	31.3	72.3	0.6	2.0	3.8	341.8	451.9
SE		18.3	52.2	0.6	1.7	1.3	156.5	219.4
% Catch		6.9	16.0	0.1	0.5	0.9	75.6	

Catch rates of the most valuable demersal groups on the shelf are presented in Tables 14a and b. From Table 14a it can be seen that the catch rates of the valuable demersal species on the inner shelf were low. This is similar to what was observed in Togo-Benin and Ghana. Grunts (excluding *Brachydeuterus auritus*) had highest catch rate of 10.3 kg/h, and a relative contribution to the total catch of 2.8%. The most frequently occurring grunts were *Pomadasys rogeri* and *P. jubelini*, the latter generally having the highest catch rate of the two. Croakers constituted the second most important group followed by seabreams, snappers and groupers. On the outer shelf, seabreams were dominant with a relative contribution of 14% and an average catch rate of 63 kg/h. *Dentex angolensis*, *Pagellus bellottii* and *D. canariensis* were the most frequently occurring species. Croakers, with *Pteroscion mbizi* and *Umbrina canariensis*, constituted the second most important group followed by the groupers. The catches of snappers and grunts were negligible on the outer shelf.

Table 14. Côte d'Ivoire. Catch rates (kg/hour) 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

STAT	Depth	Seabream ¹	Snappers	Groupers	Grunts	Croakers	Other ¹	Total
81	46	0.9	0.0	0.0	0.0	0.0	56.5	57.4
82	27	0.0	0.0	0.0	1.9	4.6	402.9	409.4
83	36	0.0	0.0	0.0	5.2	1.0	1 622.3	1 628.5
87	49	1.0	0.0	0.0	0.0	0.0	198.0	199.0
88	29	0.0	0.0	0.0	0.0	54.7	2 076.7	2 131.4
89	43	0.6	0.0	0.0	0.0	0.0	20.2	20.8
93	45	27.3	0.0	0.0	12.6	7.7	283.8	331.3
94	24	0.0	0.0	0.0	0.0	0.0	75.1	75.1
95	27	9.6	5.8	4.9	9.5	5.1	80.1	115.0
96	41	1.1	1.1	0.0	0.9	2.5	65.1	70.7
100	45	0.0	0.0	0.0	0.0	0.0	30.9	30.9
101	26	0.0	0.0	0.0	5.8	8.0	198.4	212.2
102	33	9.1	0.0	0.0	0.8	0.0	87.3	97.2
103	24	0.0	0.0	5.2	16.4	23.9	78.2	123.6
106	48	25.0	0.0	1.3	0.0	0.0	499.1	525.3
107	28	0.1	0.0	0.0	3.0	3.7	374.2	381.0
108	23	1.7	0.0	0.0	6.3	4.3	309.1	321.4
109	40	8.6	0.0	0.0	0.0	0.0	57.7	66.3
113	45	27.0	9.4	0.0	108.6	34.2	201.4	380.6
114	28	5.2	55.7	8.4	33.8	2.1	119.1	224.3
Mean	35	5.9	3.6	1.0	10.3	7.6	341.8	370.1
SE		2.1	2.8	0.5	5.5	3.2	120.4	121.3
% Catch		1.6	1.0	0.3	2.8	2.1	92.4	

¹ Corrected

b) Outer shelf 51-100 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
80	75	5.9	0.0	0.0	0.0	0.6	45.2	51.7
84	62	9.8	0.0	0.0	0.0	0.0	80.9	90.7
86	77	75.2	0.0	33.6	0.0	1.2	70.2	180.2
90	67	6.3	0.0	0.0	0.0	0.0	74.4	80.7
92	75	7.3	0.0	0.0	0.0	0.0	122.8	130.1
97	91	164.3	0.0	0.0	0.0	99.9	34.6	298.8
99	85	22.8	0.0	0.0	0.0	27.8	2 535.4	2 586.1
104	85	25.1	0.0	23.5	0.4	2.2	74.5	125.8
105	84	200.0	0.0	0.0	0.0	12.5	293.8	506.3
110	75	4.0	0.0	0.0	0.0	0.0	477.6	481.5
112	81	171.6	0.0	0.0	0.0	0.0	268.1	439.8
Mean	78	62.9	0.0	5.2	0.0	13.1	370.7	452.0
SE		23.3	0.0	3.5	0.0	9.1	220.4	219.4
% Catch		13.9	0.0	1.2	0.0	2.9	82.0	

Appendix III B gives the swept-area estimates of mean densities (t/NM²) based on 31 random trawl stations for demersal species on the shelf. *B. auritus* had the highest mean densities in all the three depth zones (0-30 m, 31-50 m and 51-100 m) followed by *Galeoides decadactylus* and *Drepane africana* in the shallowest depth zone; *G. decadactylus* and *Elops lacerta* in the 31-50 m zone and *Priacanthus arenatus*, *D. angolensis* and *P. bellottii* in the 51-100 m zone. *B. auritus* had the highest over all mean density, followed by *Priacanthus arenatus* and *G. decadactylus*.

Table 15 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 6 000 tonnes of which seabreams made up about 70%. The highest biomass of seabreams was found between depths from 51 to 100 m. Croakers had the second highest biomass with 950 tonnes followed by grunts, groupers and snappers. Croakers had the highest biomass in the 0-30 m depth interval followed by grunts, while grunts and seabreams had the highest biomass between 31-50 m. In the deepest depth interval (51-100 m), seabreams had the highest biomass, followed by croakers and groupers. No grunts or snappers were found at these depths.

Of the pelagic and semi-pelagic species, the bigeye grunt (*B. auritus*) had the highest estimated biomass followed by the carangids.

Table 15. 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	34	217	3 206	3 457 ¹	1 072	5 842
Grunts	158	259	0	417	0	960
Croakers	203	91	648	941	15	1 868
Groupers	39	7	259	305	0	663
Snappers	124	21	0	145	0	371
Sum dem. val.	557	596	4 112	5 265¹	2 269	8 262
Bigeye grunt	631	1 430	7 852	9 913	0	23 014
Carangids	1 165	960	3 351	5 477	540	10 414
Barracudas	248	386	178	811	285	1 337

¹ Corrected

5.3 Review of results

Table 16 summarizes the catch rates of valuable demersal groups and a few other common groups in the three regions covered during the present survey. Average catch rates for the whole shelf area from 20 to 100 m is used in the comparisons.

Table 16. Catch rates (kg/h) of valuable demersal and some other groups in swept-area bottom-trawl hauls on the shelf (20-100 m) off Benin-Togo, Ghana and Côte d'Ivoire.

Group/species	Benin-Togo	Ghana	Côte d'Ivoire
Seabreams ¹	28.6	32.8	26.1
Grunts	0.9	7.1	6.6
Croakers	4.6	0.7	9.5
Groupers	10.3	2.5	2.5
Snappers	0.3	0.7	2.3
Sum dem. val.	44.7	43.8	47.0
Bigeye grunt	5.5	213.4	91.9
Carangids	37.0	33.3	62.2
Barracudas	6.3	5.9	13.2

¹ Corrected

The highest overall catch rate of valuable demersal fish was in Côte d'Ivoire waters of 47.0 kg/h, and consisted mainly of seabreams and croakers. The corresponding rate in the Ghana and Benin-Togo sectors was almost the same, 44-45 kg/h in each sector, with seabreams and grunts as major groups in the Ghana catches and seabreams and groupers in the Benin-Togo catches.

Of the separate species groups, the highest catch rate of seabreams was in Ghana (32.8 kg/h), followed by Benin-Togo (28.6 kg/h) and then Côte d'Ivoire (26.1 kg/h). The catch rate of snappers showed the same trend between the areas. The Benin-Togo sector had the highest catch rate of groupers, being over four times higher than the rate in Ghana and Côte d'Ivoire. For grunts and the bigeye grunt (*Brachydeuterus auritus*) catch rates were highest in Ghana, 7.1 and 213.4 kg/h respectively. The corresponding rates were 6.0 and 91.9 kg/h for Côte d'Ivoire, and 0.9 and 5.5 kg/h for Benin-Togo. Carangids and barracudas were most abundant in Côte d'Ivoire followed by the Benin-Togo and least abundant in Ghana.

Generally, the area beyond the 100 m depth in all three sectors was not trawlable. Two hauls were made east of Tema (Ghana) at 310 and 105 m depths. At those two stations, the average catch rates were 312.3 and 17.1 kg/hr for demersal and pelagic species respectively.

Appreciable catch rates were obtained for deep-water sharks (e.g. *Centrophorus squamosus*), seabreams (*Dentex congolensis* and *D. angolensis*) and deep-water shrimps (e.g. *Parapenaeus longirostris*).

Considering the limited area available for trawling beyond 100 m depth, it appears unlikely that a viable deep-water fishery can exist in this area in the western Gulf of Guinea. However, a better coverage is needed in order to reach a solid conclusion on this matter.

Table 17 summarizes the biomass estimates for the three sectors covered in this 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-Togo had the lowest biomass of most fish groups. The biomass of croakers was highest off Côte d'Ivoire. Bigeye grunt was more abundant in Ghana than in the two other areas.

Table 17. Biomass estimates (tonnes) of valuable demersal and some other groups in swept-area bottom-trawl hauls on the on the shelf (20 - 100 m) off Benin - Togo, Ghana and Côte d'Ivoire. The shelf area (NM²) in each area is given.

Group/species	Benin – Togo	Ghana	Côte d'Ivoire	Total
Seabreams	823	8 478	3 457 ¹	12 758 ¹
Grunts	59	1 431	417	1 907
Croakers	280	125	941	1 346
Groupers	312	557	305	1 174
Snappers	22	151	145	318
Sum dem. val.	1 495	10 743	5 265¹	17 503¹
Bigeye grunt	171	70 314	9 913	80 398
Carangids	1 143	6 860	5 477	13 480
Barracudas	246	1 084	811	2 141
Area (NM ²) 0-100 m	1 092	6 227	2 883	10 202

¹ Corrected

Table 18 summarizes the average densities of valuable demersal groups and a few other ones for the whole area covered during the present survey. For comparison, corresponding average densities found on the shelf of Congo-Gabon (Mehl 1995) and Angola (Mehl 1997) in recent years are also given. The total density of valuable demersal groups was highest in Angolan waters and lowest in the western Gulf of Guinea area. This was mainly due to much lower catch rates of seabreams and croakers, although the catch rates of grunts (excluding bigeye grunt), were also lower in the western Gulf of Guinea than off Angola. Even though the catch rates of groupers and snappers were low in this survey, they were similar to those obtained in the other two areas.

Among the other groups, the average density of bigeye grunt (*B. auritus*) was almost the same as found in Angolan waters but much higher than off Congo-Gabon. The densities of carangids caught in the bottom trawl were much lower than on the Angolan shelf but higher than what has been obtained in Congo-Gabon waters. The density of barracudas was low, but higher than off Congo-Gabon and lower than off Angola.

Table 18. Average densities (tonnes/NM²) of valuable demersal species, and some other groups in swept-area bottom-trawl hauls on the shelf off Benin-Togo-Ghana-Côte d'Ivoire, Congo-Gabon, and Angola.

Group / species	Benin-Togo-Ghana-Côte d'Ivoire 1999 (20-100m)	Congo - Gabon 1994 - 1995 (20-200m)	Angola 1995-96-97 (20-100m)
Seabreams	1.25	2.09	2.39
Grunts	0.19	0.20	1.32
Croakers	0.13	1.08	1.74
Groupers	0.12	0.03	0.22
Snappers	0.03	0.08	+
Sum val. dem. groups	1.72	3.49	5.67
Bigeye grunt	7.88	2.94	9.01
Carangids	1.32	0.91	11.09
Barracudas	0.21	+	0.48

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Annex I Records of fishing stations

PROJECT STATION: 25
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 618 Long E 237
 start stop duration
 TIME :06:30:05 06:54:39 25 (min) Purpose code: 3
 LOG :4084.93 4086.04 1.09 Area code : 1
 FDEPTH: 20 21 GearCond.code:
 BDEPTH: 20 21 Validity code:
 Towing dir: 270° Wire out: 130 m Speed: 30 kn*10

Sorted: 105 Kg Total catch: 104.86 CATCH/HOUR: 251.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pseudotolithus senegalensis	38.40	326	15.26	77
Galeoides decadactylus	34.78	494	13.82	75
Polydactylus quadrifiliis	29.90	2	11.88	
Scomberomorus tritor	16.44	36	6.53	
Chloroscombrus chrysurus	15.05	218	5.98	
Ilisha africana	13.99	773	5.56	
Pteroscion peli	13.49	360	5.36	
Sphyræna afra	13.03	2	5.18	
Miscellaneous fishes	10.78	3533	4.28	
Brachydeuterus auritus	10.61	206	4.22	
Sphyræna guachancho	9.60	53	3.81	76
Caranx crysos	8.33	55	3.31	
Selene dorsalis	7.58	94	3.01	
Pomadysys rogeri	7.18	26	2.85	
Elops lacerta	4.82	22	1.92	
Dasyatis margarita	3.91	7	1.55	
Drepane africana	2.74	46	1.09	
Lutjanus goreensis	2.06	5	0.82	
Dentex canariensis	1.68	5	0.67	
Trichiurus lepturus	1.44	74	0.57	
Sardinella maderensis	1.13	70	0.45	78
Parapenaeopsis atlantica	0.94	185	0.37	
Pentaneus quinquarius	0.82	24	0.33	
Cynoglossus sp.	0.72	5	0.29	
Ephippion guttifer	0.50	7	0.20	
Callinectes sp.	0.43	17	0.17	
Lehrinus atlanticus	0.43	2	0.17	
Pseudupeneus prayensis	0.38	7	0.15	
Lagocephalus laevigatus	0.31	2	0.12	
Uranoscopus polli	0.17	5	0.07	
Squilla aculeata calmani	0.02	2	0.01	
Total	251.66		100.00	

PROJECT STATION: 26
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 612 Long E 237
 start stop duration
 TIME :08:08:34 08:38:53 30 (min) Purpose code: 3
 LOG :4092.98 4094.40 1.39 Area code : 1
 FDEPTH: 42 42 GearCond.code:
 BDEPTH: 42 42 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10

Sorted: 62 Kg Total catch: 61.57 CATCH/HOUR: 123.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	32.92	132	26.73	
Brachydeuterus auritus	24.48	654	19.88	81
Sparus caeruleostictus *	22.22	64	18.04	80
Alectis alexandrinus	11.68	10	9.49	
Epinephelus aeneus	5.66	8	4.60	
Sphyræna guachancho	5.62	84	4.56	
Pagellus bellottii	2.82	36	2.29	79
Callinectes sp.	2.60	4	2.11	
Diodon hystrix	2.42	10	1.95	
Cynoglossus senegalensis	2.30	12	1.87	
Galeoides decadactylus	2.10	10	1.71	
Peneus notialis	1.92	116	1.56	
Chilomycterus sp.	1.82	12	1.48	
Sepia officinalis hierredda	1.52	50	1.23	
Balistes caprisicus	1.16	8	0.94	
Psettodes belcheri	0.92	4	0.75	
Chloroscombrus chrysurus	0.50	6	0.41	
Calappa rubroguttata	0.26	2	0.21	
Torpedo torpedo	0.22	6	0.18	
Total	123.14		100.01	

PROJECT STATION: 27
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 608 Long E 235
 start stop duration
 TIME :10:00:05 10:22:07 22 (min) Purpose code: 3
 LOG :4104.73 4105.88 1.14 Area code : 1
 FDEPTH: 71 71 GearCond.code:
 BDEPTH: 71 71 Validity code:
 Towing dir: 90° Wire out: 230 m Speed: 30 kn*10

Sorted: 52 Kg Total catch: 51.80 CATCH/HOUR: 141.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	88.09	35	62.36	
Epinephelus aeneus	26.95	5	19.08	84
Sepia officinalis hierredda	6.00	16	4.25	
Brachydeuterus auritus	6.00	139	4.25	83
Pagellus bellottii	4.09	150	2.90	82
Raja miraletus	2.67	8	1.89	
Lepidotrigla cadmani	1.42	35	1.01	
Decapterus macarellus	1.09	46	0.77	
Priacanthus arenatus	0.93	155	0.66	
Selene dorsalis	0.71	3	0.50	
Fistularia petimba	0.65	5	0.46	
Dactylopterus volitans	0.60	3	0.42	
Sparus caeruleostictus *	0.33	3	0.23	
Sphyræna guachancho	0.27	8	0.19	
Dentex angolensis	0.27	11	0.19	
Sardinella aurita	0.22	8	0.16	
Lagocephalus laevigatus	0.22	3	0.16	
Balistes caprisicus	0.22	3	0.16	
Uranoscopus polli	0.16	3	0.11	
Pseudupeneus prayensis	0.16	8	0.11	
Serranus accraensis	0.11	3	0.08	
Grammolites gruvelli	0.11	3	0.08	
Callinectes pallidus	0.03	8	0.02	
Total	141.30		100.04	

PROJECT STATION: 28
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 610 Long E 211
 start stop duration
 TIME :15:16:00 15:45:00 29 (min) Purpose code: 3
 LOG :4147.80 4149.40 1.60 Area code : 1
 FDEPTH: 60 58 GearCond.code:
 BDEPTH: 60 58 Validity code:
 Towing dir: 90° Wire out: 200 m Speed: 30 kn*10

Sorted: 80 Kg Total catch: 93.86 CATCH/HOUR: 194.19

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	101.79	68	52.42	
Alloteuthis africana	36.12	12852	18.60	
Pagellus bellottii	15.35	172	7.90	85
Mustelus mustelus	5.67	2	2.92	
Selene dorsalis	5.30	14	2.73	
Fistularia petimba	4.51	29	2.32	
Sparus caeruleostictus *	3.52	17	1.81	
Decapterus macarellus	3.48	1113	1.79	
Aluterus punctata	3.31	4	1.70	
Dentex canariensis	3.31	12	1.70	
Rhinobatos albomaculatus	2.69	2	1.39	
Epinephelus aeneus	1.94	4	1.00	
Raja miraletus	1.53	4	0.79	
Sphyræna guachancho	1.53	8	0.79	
Brachydeuterus auritus	1.03	19	0.53	
Sardinella aurita	0.70	211	0.36	
Lagocephalus laevigatus	0.58	2	0.30	
Dentex angolensis	0.50	2	0.26	
Sepia officinalis hierredda	0.33	2	0.17	
Lepidotrigla cadmani	0.33	4	0.17	
Uranoscopus polli	0.25	2	0.13	
Bothus podas africanus	0.17	4	0.09	
Serranus accraensis	0.12	6	0.06	
Grammolites gruvelli	0.08	4	0.04	
Calappa pelii	0.04	2	0.02	
Total	194.18		99.99	

PROJECT STATION: 29
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 613 Long E 211
 start stop duration
 TIME :16:38:29 17:08:14 30 (min) Purpose code: 3
 LOG :4155.07 4156.65 1.54 Area code : 1
 FDEPTH: 32 31 GearCond.code:
 BDEPTH: 32 31 Validity code:
 Towing dir: 90° Wire out: 120 m Speed: 30 kn*10

Sorted: 28 Kg Total catch: 27.76 CATCH/HOUR: 55.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	21.32	20	38.40	
Sparus caeruleostictus *	10.72	18	19.31	86
Scomberomorus tritor	8.12	8	14.63	
Lagocephalus laevigatus	5.80	10	10.45	
Sphyræna guachancho	1.80	6	3.24	
Fistularia tabacaria	1.52	4	2.74	
MCNACANTHIDAE	1.44	4	2.59	
Diodon hystrix	1.08	4	1.95	
Pagellus bellottii	1.04	4	1.87	
Dactylopterus volitans	0.72	2	1.30	
Fistularia petimba	0.64	2	1.15	
Trachurus trecae	0.48	2	0.86	
Chilomycterus spinosus mauret.	0.36	2	0.65	
Uranoscopus polli	0.24	2	0.43	
Aluterus punctata	0.24	8	0.43	
Total	55.52		100.00	

PROJECT STATION: 30
 DATE:20/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 616 Long E 210
 start stop duration
 TIME :18:00:40 18:30:59 30 (min) Purpose code: 3
 LOG :4163.85 4165.51 1.63 Area code : 1
 FDEPTH: 21 21 GearCond.code:
 BDEPTH: 21 21 Validity code:
 Towing dir: 90° Wire out: 100 m Speed: 30 kn*10

Sorted: 90 Kg Total catch: 90.14 CATCH/HOUR: 180.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	40.16	702	22.28	87
Miscellaneous fishes	33.56	10068	18.62	
Elops lacerta	25.28	92	14.02	
Drepane africana	18.56	70	10.30	
Polydactylus quadrifiliis	13.44	4	7.46	
Ilisha africana	9.96	484	5.52	
Sphyræna guachancho	6.72	34	3.73	
Pomadysys rogeri	3.48	4	1.93	
Panulirus regius	3.36	10	1.86	
Pseudotolithus senegalensis	3.12	8	1.73	
Caranx crysos	2.84	16	1.58	
Chloroscombrus chrysurus	2.48	42	1.38	
Dasyatis margarita	2.36	4	1.31	
Lutjanus goreensis	1.92	2	1.07	
Dentex canariensis	1.76	10	0.98	
Peneus kerathurus	1.60	6	0.89	
Selene dorsalis	1.52	16	0.84	
Plectorhynchus macrolepis	1.24	2	0.69	
Chaetodipterus goreensis	1.16	2	0.64	
Brachydeuterus auritus	1.12	50	0.62	88
Eucinostomus melanopterus	0.96	28	0.53	
Lethrinus atlanticus	0.92	2	0.51	
Chilomycterus spinosus mauret.	0.88	4	0.49	
Aluterus punctata	0.40	2	0.22	
Cynoglossus senegalensis	0.32	2	0.18	
Alectis alexandrinus	0.32	4	0.18	
Uranoscopus polli	0.28	2	0.16	
Trachinocephalus myops	0.24	6	0.13	
Pseudupeneus prayensis	0.20	4	0.11	
Bothus podas africanus	0.12	2	0.07	
Total	180.28		100.03	

PROJECT STATION: 31
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 606
 start stop duration Long E 148
 TIME :05:54:40 06:24:47 30 (min) Purpose code: 3
 LOG :4255.08 4256.74 1.62 Area code : 1
 FDEPTH: 62 63 GearCond.code:
 BDEPTH: 62 63 Validity code:
 Towing dir: 90e Wire out: 220 m Speed: 30 kn*10

Sorted: 141 Kg Total catch: 141.38 CATCH/HOUR: 282.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	90.90	696	32.15	89
Pagellus bellottii	49.20	450	17.40	92
Epinephelus aeneus	40.52	12	14.33	94
Loligo sp.	29.98	15944	10.60	
Sepia officinalis hierredda	19.48	22	6.89	
Fistularia petimba	13.88	52	4.91	
Dentex canariensis	12.96	46	4.58	90
Sparus caeruleostictus *	12.48	48	4.41	93
Brachydeuterus auritus	2.96	46	1.05	91
Priacanthus arenatus	2.68	20	0.95	
Selene dorsalis	1.36	8	0.48	
Sphyræna guachancho	1.28	6	0.45	
Branchiostegus semifasciatus	1.04	2	0.37	
Lepidotrigla cadmani	0.92	20	0.33	
Selar crumenophthalmus	0.76	6	0.27	
Citharus linguatula	0.68	22	0.24	
Chilomycterus spinosus mauret.	0.40	2	0.14	
Pseudupeneus prayensis	0.36	6	0.13	
Caranx hippos	0.28	2	0.10	
Lagocephalus laevigatus	0.24	2	0.08	
Grammolites gruvelli	0.16	2	0.06	
Trachurus trecae	0.16	10	0.06	
Decapterus macarellus	0.08	4	0.03	
Total		282.76	100.01	

PROJECT STATION: 34
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 607
 start stop duration Long E 125
 TIME :12:51:20 13:21:31 30 (min) Purpose code: 3
 LOG :4301.66 4303.19 1.55 Area code : 1
 FDEPTH: 21 20 GearCond.code:
 BDEPTH: 21 20 Validity code:
 Towing dir: 80e Wire out: 110 m Speed: 30 kn*10

Sorted: 19 Kg Total catch: 18.53 CATCH/HOUR: 37.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	13.28	6	35.83	
Alectis alexandrinus	8.34	6	22.50	
Aluterus punctata	2.82	2	7.61	
Balistes punctatus	2.70	2	7.29	
MONACANTHIDAE	2.46	4	6.64	
Sardinella aurita	1.70	36	4.59	98
Albula vulpes	1.38	2	3.72	
Ephippion guttifer	1.34	2	3.62	
Lagocephalus laevigatus	1.26	2	3.40	
Xyrichtys novacula	0.66	10	1.78	
Dentex canariensis	0.58	2	1.57	
Acanthostracion quadricornis	0.46	2	1.24	
Bothus podas africanus	0.08	2	0.22	
Total		37.06	100.01	

PROJECT STATION: 32
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 609
 start stop duration Long E 148
 TIME :08:05:05 08:35:52 31 (min) Purpose code: 3
 LOG :4264.42 4265.97 1.52 Area code : 1
 FDEPTH: 40 39 GearCond.code:
 BDEPTH: 40 39 Validity code:
 Towing dir: 100e Wire out: 150 m Speed: 30 kn*10

Sorted: 84 Kg Total catch: 83.90 CATCH/HOUR: 162.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	56.83	213	35.00	96
Sphyræna guachancho	29.65	120	18.26	
Selene dorsalis	24.19	1210	14.90	
Brachydeuterus auritus	20.13	546	12.40	95
Paetodes belcheri	9.41	19	5.79	
Miscellaneous fishes	8.23	5	5.07	
Stromateus fiatola	3.41	4	2.10	
Alectis alexandrinus	2.55	6	1.57	
Rhinobatos albomaculatus	1.63	2	1.00	
Sepia officinalis hierredda	1.28	2	0.79	
Dasyatis margarita	1.05	2	0.65	
Aluterus punctata	0.54	2	0.33	
Selar crumenophthalmus	0.54	2	0.33	
Bothus podas africanus	0.43	4	0.26	
Uraspis secunda	0.39	2	0.24	
Chilomycterus spinosus mauret.	0.35	2	0.22	
Decapterus rhonchus	0.35	2	0.22	
Priacanthus arenatus	0.31	6	0.19	
Decapterus macarellus	0.27	14	0.17	
Chloroscombrus chrysurus	0.19	2	0.12	
Calappa rubroguttata	0.19	2	0.12	
Lagocephalus laevigatus	0.19	2	0.12	
Sardinella maderensis	0.12	12	0.07	
Penaeus notialis	0.08	2	0.05	
Trachurus trecae	0.06	4	0.04	
Naucrates ductor	0.02	2	0.01	
Sardinella aurita	0.02	6	0.01	
Total		162.41	100.03	

PROJECT STATION: 35
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 603
 start stop duration Long E 125
 TIME :14:23:25 14:54:15 31 (min) Purpose code: 3
 LOG :4310.59 4312.19 1.59 Area code : 1
 FDEPTH: 45 43 GearCond.code:
 BDEPTH: 45 43 Validity code:
 Towing dir: 70e Wire out: 180 m Speed: 30 kn*10

Sorted: 92 Kg Total catch: 92.11 CATCH/HOUR: 178.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	56.32	101	31.59	100
Alectis alexandrinus	18.43	25	10.34	103
Selene dorsalis	16.03	33	8.99	102
Epinephelus aeneus	15.54	6	8.72	
Balistes capricus	14.36	25	8.05	101
Dentex canariensis	13.94	21	7.82	99
Alloteuthis africana	11.96	8700	6.71	
Paetodes belcheri	10.53	15	5.91	104
Sepia officinalis hierredda	7.55	10	4.23	
Decapterus macarellus	3.14	658	1.76	
Sparus pagrus pagrus *	2.98	14	1.67	105
Pagellus bellottii	2.01	21	1.13	106
Lagocephalus laevigatus	1.90	12	1.07	
Octopus vulgaris	0.97	2	0.54	
Conger conger	0.70	2	0.39	
Dactylopterus volitans	0.66	2	0.37	
Chilomycterus spinosus mauret.	0.54	2	0.30	
Fistularia petimba	0.43	8	0.24	
Syacium micrurum	0.15	2	0.08	
Eucinostomus melanopterus	0.14	2	0.08	
Grammolites gruvelli	0.02	4	0.01	
Total		178.30	100.00	

PROJECT STATION: 33
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 612
 start stop duration Long E 152
 TIME :09:29:28 09:59:52 30 (min) Purpose code: 3
 LOG :4272.54 4274.11 1.54 Area code : 1
 FDEPTH: 25 24 GearCond.code:
 BDEPTH: 25 24 Validity code:
 Towing dir: 270e Wire out: 120 m Speed: 30 kn*10

Sorted: 10 Kg Total catch: 10.07 CATCH/HOUR: 20.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyræna guachancho	4.68	16	23.24	
Engraulis encrasicolus	4.30	8488	21.35	97
Alectis alexandrinus	4.00	2	19.86	
Ephippion guttifer	2.20	2	10.92	
Lagocephalus laevigatus	1.92	4	9.53	
Loligo sp.	1.50	938	7.45	
Dactylopterus volitans	1.24	2	6.16	
Selene dorsalis	0.18	252	0.89	
Balistes capricus	0.12	2	0.60	
Total		20.14	100.00	

PROJECT STATION: 36
 DATE:21/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 600
 start stop duration Long E 124
 TIME :15:57:20 16:27:32 30 (min) Purpose code: 3
 LOG :4319.63 4321.23 1.57 Area code : 1
 FDEPTH: 56 55 GearCond.code:
 BDEPTH: 56 55 Validity code:
 Towing dir: 75e Wire out: 220 m Speed: 30 kn*10

Sorted: 67 Kg Total catch: 67.12 CATCH/HOUR: 134.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alloteuthis africana	35.80	25160	26.67	
Epinephelus aeneus	31.20	14	23.24	107
Dentex angolensis	25.16	184	18.74	109
Sepia officinalis hierredda	22.08	32	16.45	
Sparus caeruleostictus *	4.36	14	3.25	112
Pseudupeneus prayensis	3.80	82	2.83	111
Dentex canariensis	3.32	34	2.47	108
Octopus vulgaris	1.36	2	1.01	
Chilomycterus spinosus mauret.	1.16	6	0.86	
Fistularia petimba	1.04	8	0.77	
Priacanthus arenatus	0.92	16	0.69	
Sphyræna guachancho	0.80	2	0.60	
Syacium micrurum	0.80	8	0.60	
Pagellus bellottii	0.72	16	0.54	110
Torpedo torpedo	0.64	4	0.48	
Dactylopterus volitans	0.52	2	0.39	
Rypticus saponaceus	0.40	4	0.30	
Grammolites gruvelli	0.08	2	0.06	
Decapterus macarellus	0.04	2	0.03	
Dentex congoensis	0.04	8	0.03	
Total		134.24	100.01	

PROJECT STATION: 37
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 553
 start stop duration Long E 102
 TIME :05:56:00 06:26:00 30 (min) Purpose code: 3
 LOG :4400.40 4401.90 1.50 Area code : 2
 FDEPTH: 25 25 GearCond.code:
 BDEPTH: 25 25 Validity code:
 Towing dir: 35e Wire out: 120 m Speed: 30 kn*10
 Sorted: 95 Kg Total catch: 94.50 CATCH/HOUR: 189.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	107.32	90	56.78	113
Sepia officinalis hierredda	57.36	94	30.35	
Ephippion guttifer	7.88	6	4.17	
Sphyraena guachancho	6.58	4	3.48	
Lagocephalus laevigatus	4.62	20	2.44	
Octopus vulgaris	1.30	2	0.69	
Balistes capricus	1.16	5	0.61	
Caranx crysos	0.92	2	0.49	
Chilomycterus spinosus mauret.	0.84	2	0.44	
BIVALVES	0.16	14	0.08	
Fistularia petimba	0.10	2	0.05	
Decapterus macarellus	0.10	16	0.05	115
Dentex angolensis	0.02	4	0.01	
Stephanolepis hispidus	0.02	2	0.01	
Sardinella aurita	0.02	2	0.01	
Engraulis encrasicolus	0.02	12	0.01	114
Total	188.42		99.67	

PROJECT STATION: 40
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 536
 start stop duration Long E 37
 TIME :14:25:59 14:55:56 30 (min) Purpose code: 3
 LOG :4463.20 4464.88 1.67 Area code : 2
 FDEPTH: 46 48 GearCond.code:
 BDEPTH: 46 48 Validity code:
 Towing dir: 100e Wire out: 200 m Speed: 30 kn*10
 Sorted: 42 Kg Total catch: 42.10 CATCH/HOUR: 84.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	27.28	84	32.40	122
Sepia officinalis hierredda	17.96	40	21.33	
Alloteuthis africana	13.56	14408	16.10	
Dentex canariensis	8.92	32	10.59	123
Psettodes belcheri	6.08	12	7.22	
Octopus vulgaris	3.56	2	4.23	
Lagocephalus laevigatus	3.28	8	3.90	
Raja miraletus	1.40	4	1.66	
Seriola carpenteri	0.56	2	0.67	
Pagellus bellottii	0.40	10	0.48	
Grammolites gruvelli	0.32	14	0.38	
Decapterus macarellus	0.28	14	0.33	
Fistularia petimba	0.24	2	0.29	
Chilomycterus spinosus mauret.	0.16	2	0.19	
Penaeus notialis	0.12	4	0.14	
Sphoeroides marmoratus	0.08	2	0.10	
Total	84.20		100.01	

PROJECT STATION: 38
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 552
 start stop duration Long E 103
 TIME :08:09:39 08:39:14 30 (min) Purpose code: 3
 LOG :4409.49 4410.96 1.45 Area code : 2
 FDEPTH: 38 40 GearCond.code:
 BDEPTH: 38 40 Validity code:
 Towing dir: 40e Wire out: 150 m Speed: 30 kn*10
 Sorted: 33 Kg Total catch: 33.22 CATCH/HOUR: 66.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	23.36	58	35.16	116
Alectis alexandrinus	13.16	28	19.81	
Epinephelus aeneus	10.80	12	16.26	
Scomberomorus tritor	3.32	6	5.00	
Torpedo torpedo	2.64	10	3.97	
Psettodes belcheri	2.12	6	3.19	
Balistes capricus	1.44	4	2.17	
Dentex gibbosus	1.36	4	2.05	
Sea cucumbers	1.28	2	1.93	
Chloroscombrus chrysurus	1.24	22	1.87	
Engraulis encrasicolus	1.10	1816	1.66	117
Sparus pagrus africanus *	1.08	2	1.63	
Decapterus punctatus	0.60	12	0.90	
Alloteuthis africana	0.56	294	0.84	
Dasyatis margarita	0.56	2	0.84	
Sphyraena guachancho	0.52	2	0.78	
Decapterus macarellus	0.40	108	0.60	118
Pagellus bellottii	0.24	4	0.36	
Decapterus sp.	0.14	98	0.21	
Fistularia petimba	0.12	2	0.18	
Syacium micrurum	0.12	6	0.18	
Ephippion guttifer	0.12	14	0.18	
Brachydeuterus auritus	0.08	2	0.12	
Penaeus notialis	0.04	2	0.06	
Grammolites gruvelli	0.04	2	0.06	
Total	66.44		100.01	

PROJECT STATION: 41
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 537
 start stop duration Long E 37
 TIME :16:33:01 17:03:04 30 (min) Purpose code: 3
 LOG :4472.08 4473.52 1.43 Area code : 2
 FDEPTH: 36 36 GearCond.code:
 BDEPTH: 36 36 Validity code:
 Towing dir: 110e Wire out: 170 m Speed: 30 kn*10
 Sorted: 26 Kg Total catch: 26.32 CATCH/HOUR: 52.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	18.20	28	34.57	
Sparus caeruleostictus *	11.78	36	22.38	124
Balistes capricus	6.14	6	11.66	
Epinephelus aeneus	3.18	4	6.04	
Albula vulpes	2.76	4	5.24	
Octopus vulgaris	2.56	2	4.86	
Miscellaneous fishes	2.26	1356	4.29	
Selene dorsalis	1.88	4	3.57	
Diodon holocanthus	1.28	4	2.43	
Lagocephalus laevigatus	0.90	2	1.71	
Pagellus bellottii	0.62	4	1.18	
Torpedo torpedo	0.30	2	0.57	
Chilomycterus spinosus mauret.	0.24	2	0.46	
Decapterus macarellus	0.22	114	0.42	125
Brachydeuterus auritus	0.12	38	0.23	126
Trachinocephalus myops	0.08	4	0.15	
Grammolites gruvelli	0.06	4	0.11	
Syacium micrurum	0.04	4	0.08	
Pseudupeneus prayensis	0.02	2	0.04	
Total	52.64		99.99	

PROJECT STATION: 39
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 547
 start stop duration Long E 104
 TIME :09:44:02 10:14:51 31 (min) Purpose code: 3
 LOG :4419.20 4420.71 1.50 Area code : 2
 FDEPTH: 54 53 GearCond.code:
 BDEPTH: 54 53 Validity code:
 Towing dir: 30e Wire out: 180 m Speed: 30 kn*10
 Sorted: 65 Kg Total catch: 64.89 CATCH/HOUR: 125.59

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	40.34	112	32.12	120
Alloteuthis africana	31.39	11774	24.99	
Epinephelus aeneus	13.59	8	10.82	
Sepia officinalis hierredda	11.57	31	9.21	
Dentex canariensis	7.82	15	6.23	119
Alectis alexandrinus	5.46	8	4.35	
Pagellus bellottii	4.76	50	3.79	121
Panulirus regius	3.54	4	2.82	
Fistularia petimba	2.55	27	2.03	
Lagocephalus laevigatus	1.82	4	1.45	
Chilomycterus spinosus mauret.	1.34	2	1.07	
Sphyraena guachancho	1.20	4	0.96	
Trachurus trercae	0.08	2	0.06	
Citharus linguatula	0.06	2	0.05	
Priacanthus arenatus	0.04	2	0.03	
Chaetodon luciae	0.02	2	0.02	
Decapterus macarellus	0.02	6	0.02	
Total	125.60		100.02	

PROJECT STATION: 42
 DATE:22/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 544
 start stop duration Long E 37
 TIME :18:06:14 18:36:35 30 (min) Purpose code: 3
 LOG :4482.82 4484.45 1.62 Area code : 2
 FDEPTH: 24 23 GearCond.code:
 BDEPTH: 24 23 Validity code:
 Towing dir: 95e Wire out: 120 m Speed: 30 kn*10
 Sorted: 43 Kg Total catch: 43.47 CATCH/HOUR: 86.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Miscellaneous fishes	25.60	9600	29.45	
Alectis alexandrinus	12.96	2	14.91	
Sphyraena guachancho	9.32	16	10.72	
Elops lacerta	8.68	38	9.98	
Caranx crysos	5.40	84	6.21	
Sparus caeruleostictus *	3.52	30	4.05	
Galeoides decadactylus	2.80	22	3.22	128
Conger conger	2.00	2	2.30	
Eucinostomus melanopterus	1.96	50	2.25	
Selar crumenophthalmus	1.84	24	2.12	
Torpedo marmorata	1.72	4	1.98	
Chloroscombrus chrysurus	1.44	40	1.66	127
Trachinocephalus myops	1.36	36	1.56	
Dentex canariensis	1.36	18	1.56	
Brachydeuterus auritus	1.36	88	1.56	129
Penaeus kerathurus	1.12	34	1.29	
Penaeus notialis	1.12	42	1.29	
Calappa rubroguttata	0.84	6	0.97	
Pagellus bellottii	0.60	16	0.69	
Selene dorsalis	0.56	4	0.64	
Pseudupeneus prayensis	0.40	12	0.46	
Decapterus macarellus	0.36	182	0.41	
Lysiosquilla hoevernii	0.28	6	0.32	
Syacium micrurum	0.18	4	0.21	
CONGRIDAE	0.12	2	0.14	
Sardinella aurita	0.04	4	0.05	
Total	86.94		100.00	

PROJECT STATION: 43
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 532
 start stop duration Long E 16
 TIME :01:43:12 02:14:24 31 (min) Purpose code: 3
 LOG :4547.15 4548.66 1.48 Area code : 2
 FDEPTH: 312 324 GearCond.code:
 BDEPTH: 312 324 Validity code:
 Towing dir: 55e Wire out: 950 m Speed: 30 kn*10

Sorted: 96 Kg Total catch: 238.77 CATCH/HOUR: 462.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	205.39	4107	44.44	
Centrophorus squamosus	126.97	43	27.47	
Chlorophthalmus fraser	42.00	1109	9.09	
Lepidopus caudatus	19.51	1034	4.22	
Lophius vaillanti	12.58	2	2.72	
Zenion hololepis	10.58	528	2.29	
Malacocephalus occidentalis	9.75	163	2.11	
Aristeus varidens	8.94	488	1.93	
Shrimps, small, non comm.	6.77		1.46	
Trigla lyra	5.42	27	1.17	
Parapenaeus longirostris	5.15	447	1.11	
Laemonema laureysi	2.17	27	0.47	
Nezumia sp.	1.63	54	0.35	
Gadella imberbis	1.35	68	0.29	
Photichthys argenteus	0.81	68	0.18	
Epigonus telescopus	0.81	54	0.18	
Monolene microstoma	0.81	41	0.18	
MYCTOPHIDAE	0.54	68	0.12	
Chascanopsetta lugubris	0.54	54	0.12	
Peristedion cataphractum	0.27	95	0.06	
GALATHEIDAE	0.14	27	0.03	
Total	462.13		99.99	

PROJECT STATION: 47
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 539
 start stop duration Long E 10
 TIME :10:55:10 11:25:28 30 (min) Purpose code: 3
 LOG :4589.70 4591.25 1.53 Area code : 2
 FDEPTH: 28 27 GearCond.code:
 BDEPTH: 28 27 Validity code:
 Towing dir: 75e Wire out: 110 m Speed: 30 kn*10

Sorted: 117 Kg Total catch: 116.82 CATCH/HOUR: 233.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chelonia mydas	120.00	2	51.36	
Caretta caretta	60.00	2	25.68	
Balistes punctatus	8.96	28	3.83	
Lagocephalus laevisgatus	7.00	8	3.00	
Aluterus punctata	5.88	16	2.52	
Dentex canariensis	4.56	22	1.95	137
Alectis alexandrinus	4.44	4	1.90	
Dactylopterus volitans	4.08	8	1.75	
Chilomycterus spinosus mauret.	4.04	10	1.73	
Scomberomorus tritor	3.44	2	1.47	
Fistularia tabacaria	3.28	12	1.40	
Acanthostracion quadricornis	2.16	14	0.92	
Priacanthus arenatus	1.60	2	0.68	
Sepia officinalis hierredda	1.36	4	0.58	
Decapterus macarellus	0.88	28	0.38	
Trachinus radiatus	0.76	2	0.33	
Fistularia petimba	0.56	10	0.24	
Sparus caeruleostictus *	0.44	4	0.19	
Xyrichtys novacula	0.12	2	0.05	
Lethrinus atlanticus	0.08	2	0.03	
Total	233.64		99.99	

PROJECT STATION: 44
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 531
 start stop duration Long E 12
 TIME :05:59:18 06:28:56 30 (min) Purpose code: 3
 LOG :4563.87 4565.39 1.51 Area code : 2
 FDEPTH: 105 102 GearCond.code:
 BDEPTH: 105 102 Validity code:
 Towing dir: 50e Wire out: 350 m Speed: 30 kn*10

Sorted: 119 Kg Total catch: 434.48 CATCH/HOUR: 868.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	376.20	11642	43.29	132
Dentex canariensis	109.52	48	12.60	130
Zeus faber	72.12	112	8.30	
Umbrina canariensis	59.60	156	6.86	
Sepia officinalis hierredda	51.64	86	5.94	
Ariomma bondi	37.80	446	4.35	
Priacanthus arenatus	30.72	268	3.54	
Boops boops	24.48	3268	2.82	
Pagellus bellottii	24.04	512	2.77	131
Dentex angolensis	23.60	178	2.72	133
Lepidotrigla cadmani	20.04	446	2.31	
Trachurus trecae	14.70	934	1.69	
Dentex gibbosus	7.20	10	0.83	134
Dasyatis margarita	6.24	22	0.72	
Spherooides cutaneus	3.64	2	0.42	
Torpedo torpedo	3.00	2	0.35	
Citharus linguatula	1.78	112	0.20	
Scorpaena scrofa	1.52	2	0.17	
Grammolites gruvelli	0.90	22	0.10	
Peristedion sp.	0.22	22	0.03	
Total	868.96		100.01	

PROJECT STATION: 48
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 533
 start stop duration Long W 3
 TIME :13:21:31 13:31:05 10 (min) Purpose code: 1
 LOG :4608.99 4609.47 0.48 Area code : 2
 FDEPTH: 32 32 GearCond.code:
 BDEPTH: 32 32 Validity code:
 Towing dir: 70e Wire out: 120 m Speed: 30 kn*10

Sorted: 38 Kg Total catch: 37.68 CATCH/HOUR: 226.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	225.36	101412	99.68	138
Decapterus macarellus	0.36	180	0.16	140
Sardinella aurita	0.24	150	0.11	139
Alloteuthis africana	0.06	36	0.03	
Sardinella maderensis	0.06	12	0.03	
Total	226.08		100.01	

PROJECT STATION: 49
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 530
 start stop duration Long W 9
 TIME :14:31:20 15:01:15 30 (min) Purpose code: 3
 LOG :4617.67 4619.26 1.59 Area code : 2
 FDEPTH: 21 21 GearCond.code:
 BDEPTH: 21 21 Validity code:
 Towing dir: 250e Wire out: 100 m Speed: 30 kn*10

Sorted: 42 Kg Total catch: 41.70 CATCH/HOUR: 83.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	42.90	10890	51.44	143
Decapterus macarellus	5.90	5446	11.87	145
Chloroscombrus chrysurus	8.32	172	9.98	141
Chloroscombrus chrysurus	6.60	8746	7.91	
Sardinella aurita	6.60	1816	7.91	144
Drepane africana	2.84	8	3.41	
Sphyræna guachancho	1.80	6	2.16	
Sepia officinalis hierredda	1.28	2	1.53	
Sparus caeruleostictus *	0.80	16	0.96	142
Elops lacerta	0.64	2	0.77	
Paedupeneus prayensis	0.56	6	0.67	
Bucinoscomus melanopterus	0.36	8	0.43	
Balistes capricus	0.24	2	0.29	
Alectis alexandrinus	0.20	4	0.24	
Calappa rubroguttata	0.16	2	0.19	
Caranx crysos	0.16	2	0.19	
Cyclopterus cadenati	0.04	2	0.05	
Total	83.40		100.00	

PROJECT STATION: 50
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 526
 start stop duration Long W 12
 TIME :16:05:30 16:35:27 30 (min) Purpose code: 3
 LOG :4625.52 4627.07 1.55 Area code : 2
 FDEPTH: 37 37 GearCond.code:
 BDEPTH: 37 37 Validity code:
 Towing dir: 60e Wire out: 140 m Speed: 30 kn*10

Sorted: 24 Kg Total catch: 28.33 CATCH/HOUR: 56.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	16.64	10	29.37	
Alectis alexandrinus	15.48	18	27.32	146
Alloteuthis africana	6.20	2558	10.94	
Decapterus macarellus	4.80	3240	8.47	
Sepia officinalis hierredda	4.64	6	8.19	
Sparus caeruleostictus *	2.94	30	5.19	147
Lagocephalus laevisgatus	1.12	4	1.98	
Drepane africana	0.76	2	1.34	
Dentex canariensis	0.72	4	1.27	
Selene dorsalis	0.68	2	1.20	
Sphyræna guachancho	0.68	2	1.20	
Epinephelus aeneus	0.68	2	1.20	
Balistes capricus	0.60	6	1.06	
Fistularia petimba	0.40	6	0.71	
Chloroscombrus chrysurus	0.20	390	0.35	
Brachydeuterus auritus	0.12	2	0.21	
Total	56.66		100.00	

PROJECT STATION: 46
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 537
 start stop duration Long E 12
 TIME :09:26:56 09:56:42 30 (min) Purpose code: 3
 LOG :4580.81 4582.37 1.55 Area code : 2
 FDEPTH: 46 45 GearCond.code:
 BDEPTH: 46 45 Validity code:
 Towing dir: 55e Wire out: 150 m Speed: 30 kn*10

Sorted: 23 Kg Total catch: 23.22 CATCH/HOUR: 46.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	16.16	28	34.80	
Lagocephalus laevisgatus	12.16	24	26.18	
Miscellaneous fishes	11.80	3372	25.41	
Fistularia petimba	4.04	98	8.70	
Sparus caeruleostictus *	0.68	20	1.46	
Raja miraletus	0.52	2	1.12	
Dactylopterus volitans	0.40	2	0.86	
Priacanthus arenatus	0.32	6	0.69	
Syacium micrurum	0.28	10	0.60	
Pagellus bellottii	0.08	2	0.17	
Total	46.44		99.99	

PROJECT STATION: 51
 DATE:23/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 520
 start stop duration Long W 11
 TIME :18:05:25 18:35:23 30 (min) Purpose code: 3
 LOG :4636.91 4638.51 1.57 Area code : 2
 FDEPTH: 60 59 GearCond.code:
 BDEPTH: 60 59 Validity code:
 Towing dir: 52ø Wire out: 230 m Speed: 30 kn*10

Sorted: 38 Kg Total catch: 437.81 CATCH/HOUR: 875.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	272.00	5136	31.06	148
Sepia officinalis hierredda	129.20	124	14.76	
Sardinella aurita	89.20	4130	10.19	151
Fistularia petimba	81.20	154	9.27	
Priacanthus arenatus	47.34	738	5.41	
Decapterus macarellus	46.76	2764	5.34	150
Trachurus trereas	35.06	2460	4.00	149
Pagellus bellottii	27.68	1754	3.16	152
Sphyræna guachancho	27.06	30	3.09	
Pseudupeneus prayensis	20.30	308	2.32	
Epinephelus aeneus	20.12	2	2.30	
Alloteuthis africana	15.38	10766	1.76	
Sparus caeruleostictus *	13.54	154	1.55	
Torpedo torpedo	12.30	30	1.40	
Dentex angolensis	11.08	92	1.27	
Miscellaneous fishes	7.38	2584	0.84	
Citharus linguatula	6.16	400	0.70	
Selar crumenophthalmus	6.16	30	0.70	
Sardinella maderensis	4.30	30	0.49	
Boops boops	1.24	92	0.14	
Trigla lyra	1.24	92	0.14	
Syacium micrurum	0.92	124	0.11	
Total	875.62		100.00	

PROJECT STATION: 52
 DATE:23/ 4/99 GEAR TYPE: PT No: 5 POSITION:Lat N 519
 start stop duration Long W 3
 TIME :21:43:25 22:13:44 30 (min) Purpose code: 1
 LOG :4662.18 4664.21 2.00 Area code : 2
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 118 110 Validity code:
 Towing dir: 48ø Wire out: 150 m Speed: 38 kn*10

Sorted: 17 Kg Total catch: 17.23 CATCH/HOUR: 34.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ommastrephes pteropus	11.56	94	33.55	
Sardinella aurita	7.34	94	21.30	152
Selar crumenophthalmus	5.40	20	15.67	
Scomber japonicus	3.56	34	10.33	153
Trichirurus lepturus	2.94	10	8.53	
Euthynnus alletteratus	2.88	8	8.36	
Balistes capricus	0.38	8	1.10	
Ariomma bondi	0.16	2	0.46	
Orcynopsis unicolor	0.14	6	0.41	
Priacanthus arenatus	0.10	2	0.29	
Total	34.46		100.00	

PROJECT STATION: 53
 DATE:24/ 4/99 GEAR TYPE: PT No: 7 POSITION:Lat N 522
 start stop duration Long W 24
 TIME :02:30:59 03:01:26 30 (min) Purpose code: 1
 LOG :4707.99 4709.54 1.54 Area code : 2
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 26 26 Validity code:
 Towing dir: 24ø Wire out: 150 m Speed: 30 kn*10

Sorted: 22 Kg Total catch: 21.95 CATCH/HOUR: 43.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	28.46	18608	64.83	154
Sardinella maderensis	6.56	2842	14.94	156
Sardinella aurita	4.38	1752	9.98	155
Decapterus macarellus	2.18	2616	4.97	157
Sphyræna guachancho	1.04	10	2.37	
Elops lacerta	0.80	2	1.82	
Selar crumenophthalmus	0.48	6	1.09	
Total	43.90		100.00	

PROJECT STATION: 54
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 517
 start stop duration Long W 35
 TIME :06:00:29 06:30:04 30 (min) Purpose code: 3
 LOG :4722.66 4724.22 1.54 Area code : 2
 FDEPTH: 22 21 GearCond.code:
 BDEPTH: 22 21 Validity code:
 Towing dir: 68ø Wire out: 110 m Speed: 30 kn*10

Sorted: 97 Kg Total catch: 96.63 CATCH/HOUR: 193.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex canariensis	56.28	190	29.12	159
Chloroscombrus chrysurus	31.60	536	16.35	158
Sparus caeruleostictus *	22.72	132	11.76	160
Acanthostracion quadricornis	18.20	98	9.42	
Balistes punctatus	16.72	60	8.65	
Lethrinus atlanticus	15.08	84	7.80	
Pseudupeneus prayensis	5.64	84	2.92	161
Sphyræna guachancho	5.44	12	2.81	
Bodianus speciosus	3.46	4	1.79	
Selene dorsalis	3.28	8	1.70	
Acanthurus monroviae	2.04	6	1.06	
Lagocephalus laevigatus	2.02	2	1.05	
Decapterus macarellus	1.88	360	0.97	
Sparisoma rubripinne	1.74	2	0.90	
Scorpaena scrofa	1.68	4	0.87	
Psetodes belcheri	1.20	2	0.62	
Diodon hystrix	0.84	2	0.43	
Elops lacerta	0.82	2	0.42	
Caranx crysos	0.80	2	0.41	
Aluterus punctata	0.56	2	0.29	
Lutjanus fulgens	0.36	12	0.19	
Pagellus bellottii	0.32	8	0.17	
Selar crumenophthalmus	0.12	2	0.06	
Sardinella maderensis	0.12	2	0.06	
Engraulis encrasicolus	0.10	30	0.05	
Chaetodon hoefleri	0.06	4	0.03	
Sardinella aurita	0.06	12	0.03	
Calappa rubroguttata	0.04	2	0.02	
Spherooides marmoratus	0.04	2	0.02	
Ecneis naucrates	0.02	2	0.01	
Chromis cadenati	0.02	2	0.01	
Total	193.26		99.99	

PROJECT STATION: 55
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 507
 start stop duration Long W 35
 TIME :08:12:12 08:42:15 30 (min) Purpose code: 3
 LOG :4737.45 4738.97 1.50 Area code : 2
 FDEPTH: 38 38 GearCond.code:
 BDEPTH: 38 38 Validity code:
 Towing dir: 59ø Wire out: 150 m Speed: 30 kn*10

Sorted: 46 Kg Total catch: 46.42 CATCH/HOUR: 92.84

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus caeruleostictus *	15.32	54	16.50	
Scomberomorus tritor	11.00	4	11.85	
Stephanolepis hispidus	8.68	18	9.35	
Lutjanus fulgens	8.56	18	9.22	
Decapterus macarellus	7.80	3620	8.40	
Sepia officinalis hierredda	6.08	14	6.55	
Fistularia petimba	6.08	44	6.55	
Lethrinus atlanticus	5.76	12	6.20	
Chilomycterus spinosus mauret.	4.24	8	4.57	
Pagellus bellottii	4.12	84	4.44	
Dentex canariensis	3.32	8	3.58	
Balistes punctatus	2.96	8	3.19	
Dactylopterus volitans	1.96	6	2.11	
Priacanthus arenatus	1.52	12	1.64	
Apsilus fuscus	0.96	2	1.03	
Pseudupeneus prayensis	0.92	14	0.99	
Balistes capricus	0.84	2	0.90	
Aluterus sp.	0.72	2	0.78	
Lagocephalus laevigatus	0.72	2	0.78	
Syacium micrurum	0.48	8	0.52	
Acanthostracion quadricornis	0.44	2	0.47	
Chloroscombrus chrysurus	0.32	6	0.34	
Sardinella aurita	0.04	4	0.04	
Total	92.84		100.00	

PROJECT STATION: 56
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 455
 start stop duration Long W 35
 TIME :10:28:03 10:58:18 30 (min) Purpose code: 3
 LOG :4754.33 4756.03 1.68 Area code : 2
 FDEPTH: 61 61 GearCond.code:
 BDEPTH: 61 61 Validity code:
 Towing dir: 30ø Wire out: 200 m Speed: 30 kn*10

Sorted: 92 Kg Total catch: 92.43 CATCH/HOUR: 184.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pseudupeneus prayensis	56.04	550	30.31	162
Priacanthus arenatus	29.32	196	15.86	
Pagellus bellottii	26.16	206	14.15	163
Selar crumenophthalmus	15.36	54	8.31	
Decapterus rhonchus	9.68	64	5.24	
Chromis cadenati	8.84	102	4.78	
Sepia officinalis hierredda	6.08	12	3.29	
Trachinocephalus myops	5.20	30	2.81	
Decapterus punctatus	4.52	54	2.45	
Sparus caeruleostictus *	4.22	26	2.28	164
Fistularia petimba	4.00	26	2.16	
Dactylopterus volitans	2.84	12	1.54	
Bodianus speciosus	2.72	4	1.47	
Lagocephalus laevigatus	2.04	8	1.10	
Lepidotrigla cadmani	1.24	14	0.67	
Cephalopholis taeniodops	1.20	2	0.65	
Raja miraletus	1.12	2	0.61	
Xyrichtys novacula	1.08	14	0.58	
Lutjanus fulgens	0.92	2	0.50	
Octopus vulgaris	0.76	2	0.41	
Caranx crysos	0.64	2	0.35	
Sphyræna guachancho	0.44	2	0.24	
Coris julis	0.24	2	0.13	
Rypticus saponaceus	0.08	2	0.04	
Bothus podas africanus	0.08	2	0.04	
Grammolites gruvelli	0.04	2	0.02	
Total	184.86		99.99	

PROJECT STATION: 57
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 432
 start stop duration Long W 58
 TIME :16:06:03 16:15:37 10 (min) Purpose code: 3
 LOG :4805.60 4806.03 0.42 Area code : 2
 FDEPTH: 82 83 GearCond.code:
 BDEPTH: 82 83 Validity code:
 Towing dir: 40ø Wire out: 280 m Speed: 30 kn*10

Sorted: 127 Kg Total catch: 929.70 CATCH/HOUR: 5578.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	5409.60	97740	96.98	165
Sepia officinalis hierredda	37.68	90	0.68	
Boops boops	21.84	276	0.39	
Fistularia petimba	21.84	138	0.39	
Pagellus bellottii	19.98	1020	0.36	166
Zeus faber	18.60	90	0.33	
Decapterus macarellus	15.36	276	0.28	
Dentex congoensis	11.16	372	0.20	
Lepidotrigla carolae	7.44	372	0.13	
Raja miraletus	6.96	48	0.12	
Mustelus mustelus	6.66	6	0.12	
Lophodes kempii	1.08	6	0.02	
Total	5578.20		100.00	

PROJECT STATION: 58
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 441
 start stop duration Long W 59
 TIME :17:42:42 18:12:35 30 (min) Purpose code: 3
 LOG :4818.62 4820.36 1.73 Area code : 2
 FDEPTH: 48 48 GearCond.code:
 BDEPTH: 48 48 Validity code:
 Towing dir: 52ø Wire out: 200 m Speed: 30 kn*10
 Sorted: 76 Kg Total catch: 75.98 CATCH/HOUR: 151.96

PROJECT STATION: 61
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 430
 start stop duration Long W 118
 TIME :03:26:35 03:56:38 30 (min) Purpose code: 1
 LOG :4900.52 4902.04 1.51 Area code : 2
 FDEPTH: 57 54 GearCond.code:
 BDEPTH: 57 54 Validity code:
 Towing dir: 20ø Wire out:2390 m Speed: 30 kn*10
 Sorted: 57 Kg Total catch: 143.40 CATCH/HOUR: 286.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dactylopterus volitans	32.24	148	21.22	
Fistularia petimba	12.24	96	8.05	
Epinephelus aeneus	12.04	2	7.92	
Sparus caeruleostictus *	10.72	38	7.05	
Balistes punctatus	9.40	14	6.19	
Pseudupeneus prayensis	8.08	68	5.32	167
Pagellus bellottii	7.76	50	5.11	
Acanthurus monroviae	7.48	12	4.92	
Priacanthus arenatus	7.36	42	4.84	
Chromis lineatus	5.76	74	3.79	
Lagocephalus laevigatus	5.72	10	3.76	
Lutjanus fulgens	5.00	16	3.29	
Dentex canariensis	4.80	12	3.16	
Caranx crysos	4.72	12	3.11	
Sepia officinalis hierredda	4.12	6	2.71	
Trachinocephalus myops	2.80	10	1.84	
Diodon hystrix	2.04	2	1.34	
Lethrinus atlanticus	1.92	6	1.26	
Apsilus fuscus	1.68	10	1.11	
Sparisoma rubripinne	1.36	2	0.89	
Decapterus macarellus	1.08	10	0.71	
Balistes capricus	0.80	2	0.53	
Boops boops	0.68	10	0.45	
Sargocentron hastatus	0.44	2	0.29	
Stephanolepis hispidus	0.36	2	0.24	
Lepidotrigla carolae	0.36	4	0.24	
Scorpaena scrofa	0.32	2	0.21	
Acanthostracion quadricornis	0.24	2	0.16	
Xyrichtys novacula	0.24	4	0.16	
Rypticus saponaceus	0.20	2	0.13	
Total	151.96		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dactylopterus volitans	86.20	552	30.06	
Chelidonichthys capensis	26.50	260	9.24	
Lagocephalus laevigatus	24.50	56	8.54	
Pseudupeneus prayensis	23.10	186	8.05	170
Balistes capricus	15.00	30	5.58	
Priacanthus arenatus	12.30	176	4.29	
Chromis cadenati	11.90	116	4.15	
Trachinocephalus myops	11.80	80	4.11	
Pomadasy incisus	11.80	110	4.11	171
Sparus caeruleostictus *	11.20	46	3.91	173
Dicologlossa hexophthalma	9.40	160	3.28	
Pagellus bellottii	7.50	56	2.62	172
Lutjanus fulgens	4.40	16	1.53	
Albula vulpes	4.20	6	1.46	
Citharus linguatula	3.70	26	1.29	
Acanthurus monroviae	3.36	6	1.17	
Bothus podas africanus	2.90	50	1.01	
Sepia officinalis hierredda	2.70	16	0.94	
Decapterus rhonchus	2.64	6	0.92	
Fistularia petimba	2.40	16	0.84	
Boops boops	2.40	190	0.84	
Scomber japonicus	2.20	20	0.77	
Trachinus lineolatus	1.00	20	0.35	
Sargocentron hastatus	0.96	6	0.33	
Sardinella aurita	0.84	6	0.29	
Conger conger	0.50	30	0.17	
Grammolites gruvelli	0.40	10	0.14	
Total	286.80		99.99	

PROJECT STATION: 59
 DATE:24/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 507
 start stop duration Long W 55
 TIME :20:51:32 21:21:36 30 (min) Purpose code: 3
 LOG :4847.97 4849.54 1.57 Area code : 2
 FDEPTH: 24 25 GearCond.code:
 BDEPTH: 24 25 Validity code:
 Towing dir: 245ø Wire out: 120 m Speed: 30 kn*10
 Sorted: 61 Kg Total catch: 61.10 CATCH/HOUR: 122.20

PROJECT STATION: 62
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 421
 start stop duration Long W 123
 TIME :06:15:18 06:45:04 30 (min) Purpose code: 3
 LOG :4921.11 4922.66 1.53 Area code : 2
 FDEPTH: 80 79 GearCond.code:
 BDEPTH: 80 79 Validity code:
 Towing dir: 90ø Wire out: 310 m Speed: 30 kn*10
 Sorted: 170 Kg Total catch: 170.15 CATCH/HOUR: 340.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selar crumenophthalmus	24.48	240	20.03	
Albula vulpes	19.08	74	15.61	
Brachydeuterus auritus	14.40	644	11.78	
Lagocephalus laevigatus	13.64	32	11.16	
Sepia officinalis hierredda	11.84	26	9.69	
Galeoides decadactylus	8.62	48	7.05	
Trachinocephalus myops	3.80	100	3.11	
Pagellus bellottii	3.80	70	3.11	168
Sphyrna guachancho	3.16	40	2.59	
Syacium micrum	2.96	56	2.42	
Chloroscombrus chrysurus	2.76	38	2.26	
Decapterus macarellus	2.56	42	2.09	
Dactylopterus volitans	2.44	34	2.00	
Sparus caeruleostictus *	2.28	62	1.87	
Rachycentron canadum	1.24	2	1.01	
Pseudupeneus prayensis	1.12	42	0.92	
Priacanthus arenatus	0.76	4	0.62	
Ilisha africana	0.52	20	0.43	
Bothus podas africanus	0.48	30	0.39	
Sardinella maderensis	0.44	2	0.36	
Fistularia petimba	0.36	2	0.29	
Eucinostomus melanopterus	0.24	4	0.20	
Engraulis encrasicolus	0.24	84	0.20	
Uranoscopus polli	0.20	2	0.16	
Lethrinus atlanticus	0.20	4	0.16	
Pomadasy incisus	0.20	4	0.16	
Caranx crysos	0.16	4	0.13	
Apogon sp.	0.10	8	0.08	
Synodus synodus	0.04	6	0.03	
Sphaeroides spengleri	0.04	2	0.03	
Grammolites gruvelli	0.02	2	0.02	
Trachinus lineolatus	0.02	2	0.02	
Total	122.20		99.98	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	126.20	1230	37.08	174
Dentex canariensis	36.80	114	10.81	
Sparus caeruleostictus *	31.56	114	9.27	
Sepia officinalis hierredda	28.64	70	8.42	
Fistularia petimba	19.36	78	5.69	
Decapterus macarellus	19.32	556	5.68	
Chromis limbatus	18.04	172	5.30	
Pseudupeneus prayensis	10.16	102	2.99	175
Dentex gibbosus	10.08	24	2.96	
Lagocephalus laevigatus	7.32	18	2.15	
Mustelus mustelus	7.28	4	2.14	
Anthias anthias	5.44	122	1.60	
Fagus pagrus	4.00	8	1.18	
Dactylopterus volitans	3.12	16	0.92	
Priacanthus arenatus	2.76	10	0.81	
Lepidotrigla cadmani	2.72	28	0.80	
Lutjanus fulgens	2.28	6	0.67	
Zeus faber	1.80	4	0.53	
Raja miraletus	1.24	2	0.36	
Selar crumenophthalmus	0.52	4	0.15	
Sardinella aurita	0.48	26	0.14	
Apsilus fuscus	0.44	2	0.13	
Chaetodon hoeffleri	0.40	2	0.12	
Sargocentron hastatus	0.28	2	0.08	
Dicologlossa hexophthalma	0.06	2	0.02	
Total	340.30		100.00	

PROJECT STATION: 63
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 450
 start stop duration Long W 121
 TIME :09:43:08 10:14:27 31 (min) Purpose code: 3
 LOG :4953.66 4955.21 1.52 Area code : 2
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 40 40 Validity code:
 Towing dir: 230ø Wire out: 150 m Speed: 30 kn*10
 Sorted: 17 Kg Total catch: 17.20 CATCH/HOUR: 33.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus punctatus	1.32	19	75.86	169
Selar crumenophthalmus	0.43	4	24.71	
Total	1.75		100.57	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	6.58	8	19.77	
Sparus caeruleostictus *	6.08	15	18.26	
Dactylopterus volitans	3.48	12	10.45	
Fistularia petimba	3.37	23	10.12	
Pseudupeneus prayensis	3.21	15	9.64	
Caranx crysos	2.13	8	6.40	
Pagellus bellottii	1.39	10	4.18	
Trachinocephalus myops	1.39	8	4.18	
Citharus linguatula	1.24	6	3.72	
Decapterus macarellus	0.85	25	2.55	
Stephanolepis hispidus	0.77	4	2.31	
Lethrinus atlanticus	0.70	2	2.10	
Dentex canariensis	0.70	2	2.10	
Xyrichtys novacula	0.39	6	1.17	
Chelidonichthys gabonensis	0.35	2	1.05	
Balistes capricus	0.32	2	0.96	
Bothus podas africanus	0.23	6	0.69	
Sardinella aurita	0.12	2	0.36	
Total	33.30		100.01	

PROJECT STATION: 64
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 458
 start stop duration Long W 124
 TIME :12:05:57 12:36:08 30 (min) Purpose code: 3
 LOG :4968.38 4969.81 1.42 Area code : 2
 FDEPTH: 27 27 GearCond.code:
 BDEPTH: 27 27 Validity code:
 Towing dir: 90° Wire out: 120 m Speed: 30 kn*10

Sorted: 85 Kg Total catch: 235.96 CATCH/HOUR: 471.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
PECTINIDAE	452.28	54096	95.84	
Sepia officinalis hierredda	8.80	14	1.86	
Scomberomorus tritor	5.76	6	1.22	
Dactylopterus volitans	2.60	8	0.55	
Pagellus bellottii	2.08	24	0.44	
Stephanolepis hispidus	0.40	2	0.08	
Total	471.92		99.99	

PROJECT STATION: 68
 DATE:25/ 4/99 GEAR TYPE: PT No: 2 POSITION:Lat N 421
 start stop duration Long W 141
 TIME :21:15:48 21:38:22 23 (min) Purpose code: 1
 LOG :5040.04 5041.26 1.21 Area code : 2
 FDEPTH: 45 60 GearCond.code:
 BDEPTH: 88 92 Validity code:
 Towing dir: 270° Wire out: 160 m Speed: 35 kn*10

Sorted: 106 Kg Total catch: 2406.05 CATCH/HOUR: 6276.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomber japonicus	3872.30	19591	61.69	184
Sardinella aurita	2404.36	34685	38.31	183
Total	6276.66		100.00	

PROJECT STATION: 65
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 451
 start stop duration Long W 145
 TIME :14:56:01 15:27:19 31 (min) Purpose code: 3
 LOG :4993.71 4995.42 1.70 Area code : 2
 FDEPTH: 25 24 GearCond.code:
 BDEPTH: 25 24 Validity code:
 Towing dir: 250° Wire out: 120 m Speed: 30 kn*10

Sorted: 30 Kg Total catch: 69.84 CATCH/HOUR: 135.17

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	47.42	3977	35.08	177
Chloroscombrus chrysurus	30.00	2203	22.19	176
Elops lacerata	13.74	54	10.26	
Rhizoprionodon acutus	7.24	2	5.36	
Sphyrana guachancho	7.06	151	5.22	
Ilisha africana	6.48	629	4.79	178
Trichiurus lepturus	5.81	93	4.30	
Scomberomorus tritor	5.61	39	4.15	
Pseudotolithus senegalensis	2.81	6	2.08	
Galeoides decadactylus	2.52	29	1.86	
Pomadasy s rogeri	2.32	10	1.72	
Stromateus fiatola	1.55	6	1.15	
Drepane africana	0.87	10	0.64	
Pomadasy s jubelini	0.77	6	0.57	
Sepiella ornata	0.29	25	0.21	
Engraulis encrasicolus	0.29	39	0.21	
Panulirus regius	0.14	2	0.10	
Caranx crysos	0.10	6	0.07	
Selene dorsalis	0.10	10	0.07	
Pentanemus quinquarius	0.06	6	0.04	
Total	135.18		99.97	

PROJECT STATION: 69
 DATE:26/ 4/99 GEAR TYPE: PT No: 2 POSITION:Lat N 425
 start stop duration Long W 200
 TIME :04:37:14 04:47:44 11 (min) Purpose code: 1
 LOG :5111.08 5111.79 0.45 Area code : 2
 FDEPTH: 50 50 GearCond.code:
 BDEPTH: 118 114 Validity code:
 Towing dir: 95° Wire out: 160 m Speed: 40 kn*10

Sorted: 31 Kg Total catch: 61.72 CATCH/HOUR: 336.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	300.00	7353	89.11	185
Trachurus trecae	25.09	1353	7.45	186
Scomber japonicus	8.73	131	2.59	187
Engraulis encrasicolus	2.18	185	0.65	188
Ariomma bondi	0.65	11	0.19	
Total	336.65		99.99	

PROJECT STATION: 66
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 442
 start stop duration Long E 147
 TIME :16:56:46 17:06:30 10 (min) Purpose code: 3
 LOG :5006.31 5006.76 0.43 Area code : 2
 FDEPTH: 47 47 GearCond.code: 9
 BDEPTH: 47 47 Validity code: 1
 Towing dir: 165° Wire out: 180 m Speed: 30 kn*10

Sorted: 58 Kg Total catch: 58.00 CATCH/HOUR: 348.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	131.52	1734	37.79	179
Brachydeuterus auritus	104.04	1614	29.90	
Selene dorsalis	40.44	174	11.62	
Sparus caeruleostictus *	17.04	48	4.90	
Dentex canariensis	8.40	36	2.41	
Elops senegalensis	8.04	18	2.31	
Pagellus bellottii	7.92	162	2.28	
Epinephelus aeneus	7.80	6	2.24	
Alloteuthis africana	6.36	2340	1.83	
Torpedo torpedo	5.04	6	1.45	
Sardinella maderensis	3.84	18	1.10	
Lutjanus fulgens	2.88	18	0.83	
Pomadasy s incisus	2.04	84	0.59	
Syacium micrurum	1.20	29	0.34	
Sardinella aurita	0.72	72	0.21	
Boops boops	0.48	24	0.14	
Decapterus macarellus	0.24	30	0.07	
Total	348.00		100.01	

PROJECT STATION: 70
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 429
 start stop duration Long W 210
 TIME :09:01:44 09:23:05 21 (min) Purpose code: 1
 LOG :5142.87 5143.97 1.09 Area code : 2
 FDEPTH: 113 111 GearCond.code:
 BDEPTH: 113 111 Validity code:
 Towing dir: 290° Wire out: 345 m Speed: 30 kn*10

Sorted: 53 Kg Total catch: 482.70 CATCH/HOUR: 1379.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	742.40	16637	53.83	191
Scomber japonicus	259.20	2980	18.79	190
Sardinella aurita	124.00	2000	8.99	189
Dentex congensis	76.00	1520	5.51	192
Boops boops	62.40	4320	4.52	
Sepia officinalis hierredda	42.00	57	3.05	
Dentex angolensis	24.00	160	1.74	
Mustelus mustelus	15.54	6	1.13	
Chelidonichthys gabonensis	14.40	200	1.04	
Priacanthus arenatus	13.60	80	0.99	
Pagellus bellottii	4.80	200	0.35	
Engraulis naukrates	0.80	40	0.06	
Total	1379.14		100.00	

PROJECT STATION: 67
 DATE:25/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 431
 start stop duration Long W 147
 TIME :18:33:10 19:03:43 31 (min) Purpose code: 3
 LOG :5020.01 5021.72 1.70 Area code : 2
 FDEPTH: 64 60 GearCond.code:
 BDEPTH: 64 60 Validity code:
 Towing dir: 45° Wire out: 200 m Speed: 30 kn*10

Sorted: 66 Kg Total catch: 156.07 CATCH/HOUR: 302.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	112.45	1606	37.23	181
Pagellus bellottii	50.13	1144	16.60	180
Decapterus rhonchus	19.22	185	6.36	
Fistularia petimba	18.85	64	6.24	
Priacanthus arenatus	16.84	242	5.57	
Dactylopterus volitans	15.29	56	5.06	
Octopus vulgaris	8.48	10	2.81	
Chromis cadenati	8.38	83	2.77	
Faedeutenus prayensis	8.38	87	2.77	182
Umbrina canariensis	7.12	37	2.36	
Raja miraletus	6.81	15	2.25	
Caranx crysos	6.50	15	2.15	
Sparus caeruleostictus *	4.24	25	1.40	
Chelidonichthys gabonensis	3.41	52	1.13	
Epinephelus aeneus	3.41	2	1.13	
Sepia officinalis hierredda	2.17	10	0.72	
Dentex canariensis	2.07	10	0.69	
Dentex angolensis	1.76	6	0.58	
Lagocephalus laevis	1.14	6	0.38	
Syacium micrurum	1.14	62	0.38	
Grammolites gruvelli	1.03	37	0.34	
Citharus linguatula	0.62	21	0.21	
Dicologlossa hexophthalma	0.62	10	0.21	
Decapterus macarellus	0.52	6	0.17	
Dentex congensis	0.45	6	0.15	
Trachinus collignoni	0.31	6	0.10	
Sardinella aurita	0.31	6	0.10	
Microchirus boscanion	0.21	10	0.07	
Sardinella maderensis	0.21	6	0.07	
Total	302.07		100.00	

PROJECT STATION: 71
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 440
 start stop duration Long W 212
 TIME :10:56:38 11:31:33 35 (min) Purpose code: 3
 LOG :5157.03 5158.93 1.88 Area code : 2
 FDEPTH: 62 57 GearCond.code:
 BDEPTH: 62 57 Validity code:
 Towing dir: 90° Wire out: 200 m Speed: 30 kn*10

Sorted: 69 Kg Total catch: 516.85 CATCH/HOUR: 886.03

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	616.63	75365	69.59	193
Selene dorsalis	115.20	309	13.00	196
Pagellus bellottii	46.80	631	5.28	197
Sardinella aurita	34.71	4653	3.32	194
Sphyrana guachancho	16.97	26	1.92	
Fistularia petimba	12.34	39	1.39	
Raja miraletus	11.57	26	1.31	
Chloroscombrus chrysurus	9.77	129	1.10	
Torpedo torpedo	5.14	39	0.58	
Lagocephalus laevis	5.14	14	0.58	
Chaetodon hoefleri	3.86	14	0.44	
Engraulis encrasicolus	3.74	552	0.42	195
Grammolites gruvelli	2.45	103	0.28	
Citharus linguatula	0.91	65	0.10	
Sepia officinalis hierredda	0.65	26	0.07	
COBIIDAE	0.14	14	0.02	
Total	886.02		100.00	

PROJECT STATION: 72
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 443
 start stop duration Long W 211
 TIME :12:31:57 13:04:27 33 (min) Purpose code: 3
 LOG :5165.95 5167.60 1.62 Area code : 2
 FDEPTH: 43 41 GearCond.code:
 BDEPTH: 43 41 Validity code:
 Towing dir: 110° Wire out: 180 m Speed: 30 kn*10

Sorted: 25 Kg Total catch: 24.81 CATCH/HOUR: 45.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	19.31	91	42.81	198
Brachydeuterus auritus	10.65	2131	23.61	
Sphyræna guachancho	3.67	5	8.14	
Raja miraletus	2.95	7	6.54	
Scomberomorus tritor	1.85	2	4.10	
Chloroscombrus chrysurus	1.05	11	2.33	
Chaetodipterus gorensis	0.98	2	2.17	
Sardinella aurita	0.80	98	1.77	199
Alectis alexandrinus	0.76	2	1.68	
Alloteuthis africana	0.65	269	1.44	
Pseudotolithus senegalensis	0.62	2	1.37	
Galeoides decadactylus	0.62	2	1.37	
Grammolites gruvelli	0.29	22	0.64	
Syacium micrurum	0.29	5	0.64	
Engraulis encrasicolus	0.18	27	0.40	200
C R A B S	0.09	7	0.20	
Torpedo torpedo	0.07	2	0.16	
Penaeus notialis	0.07	4	0.16	
GOBIIDAE	0.05	13	0.11	
Sepiella ornata	0.04	4	0.09	
SCYLLARIDAE	0.04	4	0.09	
Chloroscombrus chrysurus	0.04	60	0.09	
Citharus linguatula	0.02	2	0.04	
Total	45.09		99.95	

PROJECT STATION: 75
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 446
 start stop duration Long W 235
 TIME :20:50:47 21:20:48 30 (min) Purpose code: 3
 LOG :5224.44 5226.12 1.65 Area code : 2
 FDEPTH: 65 61 GearCond.code:
 BDEPTH: 65 61 Validity code:
 Towing dir: 67° Wire out: 210 m Speed: 30 kn*10

Sorted: 57 Kg Total catch: 111.45 CATCH/HOUR: 222.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	112.88	3108	50.64	
Pomadasy inciscus	14.96	268	6.71	
Chelidonichthys gabonensis	13.92	244	6.24	
Brachydeuterus auritus	10.96	200	4.92	
Dactylopterus volitans	9.84	56	4.41	
Syacium micrurum	7.92	1754	3.55	
Fistularia petimba	6.88	24	3.09	
Mustelus mustelus	6.02	2	2.70	
Cynoglossus canariensis	5.68	36	2.55	
Priacanthus arenatus	5.28	52	2.37	
Raja miraletus	5.04	12	2.26	
Octopus vulgaris	3.84	4	1.72	
Umbrina canariensis	3.12	12	1.40	
Saurida brasiliensis	2.96	646	1.33	
Brotila barbata	2.80	132	1.26	
Citharus linguatula	2.64	100	1.18	
Pseudupeneus prayensis	1.76	16	0.79	
Grammolites gruvelli	1.36	52	0.61	
Boops boops	1.28	76	0.57	
Scorpaena scrofa	0.72	16	0.32	
Decapterus macarellus	0.64	16	0.29	
Microchirus freckhopsi	0.56	20	0.25	
Decapterus rhonchus	0.48	4	0.22	
Sparus caeruleostictus *	0.48	4	0.22	
Dentex angolensis	0.48	4	0.22	
Ommastrephes pteropus	0.40	4	0.18	
Total	222.90		100.00	

PROJECT STATION: 73
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 447
 start stop duration Long W 212
 TIME :14:35:32 15:05:37 30 (min) Purpose code: 3
 LOG :5177.42 5179.07 1.63 Area code : 2
 FDEPTH: 28 30 GearCond.code:
 BDEPTH: 28 30 Validity code:
 Towing dir: 112° Wire out: 130 m Speed: 30 kn*10

Sorted: 40 Kg Total catch: 189.05 CATCH/HOUR: 378.10

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Drepane africana	106.40	238	28.14	
Brachydeuterus auritus	99.12	10082	26.22	
Chloroscombrus chrysurus	54.88	3072	14.51	204
Sphyræna guachancho	36.40	1592	9.63	205
Sphyræna guachancho	22.44	58	5.93	201
Galeoides decadactylus	20.72	196	5.48	
Ilisha africana	8.68	728	2.30	202
Elops lacerta	5.32	14	1.41	
Sardinella maderensis	5.04	364	1.33	203
Dasyatis margarita	4.20	14	1.11	
Pseudotolithus typus	3.40	6	0.90	
Pteroscion peli	3.08	112	0.81	
Scomberomorus tritor	2.40	2	0.63	
Lagocephalus laevigatus	2.24	14	0.59	
Pseudotolithus senegalensis	1.80	8	0.48	
Alectis alexandrinus	0.84	14	0.22	
Penaeus notialis	0.44	6	0.12	
Pentaneus quinquarius	0.28	14	0.07	
Sepiella ornata	0.14	14	0.04	
Parapaneopsis atlantica	0.14	56	0.04	
Selene dorsalis	0.14	14	0.04	
Total	378.10		100.00	

PROJECT STATION: 74
 DATE:26/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 454
 start stop duration Long W 232
 TIME :18:43:34 19:13:12 30 (min) Purpose code: 3
 LOG :5212.76 5214.19 1.41 Area code : 2
 FDEPTH: 37 41 GearCond.code:
 BDEPTH: 37 41 Validity code:
 Towing dir: 258° Wire out: 200 m Speed: 30 kn*10

Sorted: 58 Kg Total catch: 360.16 CATCH/HOUR: 720.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasy jubelini	172.48	902	23.94	206
Chloroscombrus chrysurus	88.44	1848	12.28	
Galeoides decadactylus	63.80	880	8.86	207
Selene dorsalis	45.20	374	7.94	
Sphyræna afra	45.12	58	6.26	
Engraulis encrasicolus	33.44	7744	4.64	
Sparus caeruleostictus *	33.44	198	4.64	
Brachydeuterus auritus	33.00	1232	4.58	
Eucinostomus melanopterus	29.92	528	4.15	
Dactylopterus volitans	27.72	44	3.85	
Pomadasy rogeri	19.80	132	2.75	
Syacium micrurum	15.40	330	2.14	
Selar crumenophthalmus	14.96	88	2.08	
Pomadasy inciscus	14.96	528	2.08	
Dentex canariensis	14.52	66	2.02	
Pagellus bellottii	13.64	88	1.89	
Pseudupeneus prayensis	11.44	66	1.59	
Octopus vulgaris	11.00	22	1.53	
Scomberomorus tritor	7.36	6	1.02	
Ilisha africana	5.72	220	0.79	
Psettodes belcheri	3.08	22	0.43	
Epinephelus aeneus	2.56	2	0.36	
Caranx crysos	0.88	22	0.12	
Sardinella maderensis	0.44	22	0.06	
Total	720.32		100.00	

PROJECT STATION: 76
 DATE:27/ 4/99 GEAR TYPE: PT No: 5 POSITION:Lat N 439
 start stop duration Long W 224
 TIME :00:13:45 00:43:16 30 (min) Purpose code: 1
 LOG :5252.84 5254.69 1.82 Area code : 2
 FDEPTH: 15 15 GearCond.code:
 BDEPTH: 79 77 Validity code:
 Towing dir: 360° Wire out: 150 m Speed: 35 kn*10

Sorted: 4 Kg Total catch: 4.22 CATCH/HOUR: 8.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	5.60	2	66.35	
Buthynnus alletteratus	2.84	8	33.65	
Total	8.44		100.00	

PROJECT STATION: 77
 DATE:27/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 449
 start stop duration Long W 259
 TIME :06:14:09 06:44:32 30 (min) Purpose code: 3
 LOG :5308.97 5310.47 1.49 Area code : 2
 FDEPTH: 83 83 GearCond.code:
 BDEPTH: 83 83 Validity code:
 Towing dir: 90° Wire out: 270 m Speed: 30 kn*10

Sorted: 88 Kg Total catch: 87.76 CATCH/HOUR: 175.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	62.36	900	35.53	208
Dentex angolensis	50.12	352	28.56	209
Squatina oculata	14.24	2	8.11	
Zeus faber	8.08	28	4.60	
Raja miraletus	6.52	16	3.71	
Dentex canariensis	6.08	12	3.46	
Sepia officinalis hierredda	5.16	14	2.94	
Fistularia petimba	4.52	28	2.58	
Lagocephalus laevigatus	4.04	8	2.30	
Chloroscombrus chrysurus	3.32	48	1.89	210
Chelidonichthys gabonensis	2.56	50	1.46	
Dentex gibbosus	2.00	6	1.14	
Pseudupeneus prayensis	1.56	10	0.89	
Dactylopterus volitans	1.40	6	0.80	
Trichiurus lepturus	1.04	6	0.59	
Dentex congensis	0.48	6	0.27	
Selar crumenophthalmus	0.44	2	0.25	
Citharus linguatula	0.40	14	0.23	
Brachydeuterus auritus	0.40	8	0.23	
Chilomycterus spinosus mauret.	0.32	2	0.18	
Trachurus trecae	0.20	12	0.11	
Chaetodon marcellae	0.12	2	0.07	
Grammolites gruvelli	0.06	2	0.03	
Priacanthus arenatus	0.04	2	0.02	
Syacium micrurum	0.04	4	0.02	
Sardinella aurita	0.02	2	0.01	
Total	175.52		99.98	

PROJECT STATION: 78
 DATE:27/ 4/99 GEAR TYPE: BT No:12 POSITION:Lat N 500
 start stop duration Long W 300
 TIME :08:12:59 08:42:14 29 (min) Purpose code: 3
 LOG :5323.95 5325.48 1.92 Area code : 2
 FDEPTH: 41 42 GearCond.code:
 BDEPTH: 41 42 Validity code:
 Towing dir: 110° Wire out: 150 m Speed: 30 kn*10

Sorted: 19 Kg Total catch: 19.04 CATCH/HOUR: 39.39

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	22.06	41	56.00	
Lagocephalus laevigatus	3.64	8	9.24	
Epinephelus aeneus	3.02	2	7.67	
Sparus caeruleostictus *	2.94	4	7.46	
Chloroscombrus chrysurus	2.86	31	7.26	
Dactylopterus volitans	1.57	8	3.98	
Trachinocephalus myops	1.37	6	3.48	
Priacanthus arenatus	0.54	8	1.37	
Fistularia petimba	0.46	12	1.17	
Trachurus trachurus	0.25	2	0.63	
Syacium micrurum	0.21	2	0.53	
Decapterus rhonchus	0.21	2	0.53	
Grammolites gruvelli	0.08	2	0.20	
Pagellus bellottii	0.08	2	0.20	
Bochus podas africanus	0.06	2	0.15	
Citharus linguatula	0.06	2	0.15	
Total	39.41		100.03	

PROJECT STATION: 79
 DATE: 27/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 501
 start stop duration Long W 259
 TIME :09:21:53 09:41:02 19 (min) Purpose code: 3
 LOG :5329.95 5330.90 1.14 Area code : 2
 FDEPTH: 28 28 GearCond.code:
 BDEPTH: 28 28 Validity code:
 Towing dir: 285e Wire out: 130 m Speed: 30 kn*10
 Sorted: 1 Kg Total catch: 0.77 CATCH/HOUR: 2.43

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dactylopterus volitans	1.45 6	59.67	
Selar crumenophthalmus	0.54 13	22.22	
Decapterus punctatus	0.16 3	6.58	
Fistularia petimba	0.09 3	3.70	
Eucinostomus melanopterus	0.09 3	3.70	
Brachydeuterus auritus Juv.	0.06 120	2.47	
Dentex gibbosus	0.03 3	1.23	
Total	2.42	99.57	

PROJECT STATION: 82
 DATE: 30/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 430
 start stop duration Long W 710
 TIME :15:02:23 15:32:38 30 (min) Purpose code: 3
 LOG :5684.83 5686.55 1.67 Area code : 3
 FDEPTH: 25 28 GearCond.code:
 BDEPTH: 25 28 Validity code:
 Towing dir: 250e Wire out: 140 m Speed: 30 kn*10
 Sorted: 56 Kg Total catch: 204.72 CATCH/HOUR: 409.44

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Chloroscombrus chrysurus	112.32 3448	27.43	213
Galeoides decadactylus	71.68 636	17.51	212
Sphyræna guachancho	50.56 712	12.35	
Brachydeuterus auritus	32.96 868	8.05	217
Selene dorsalis	31.52 848	7.70	214
Ilisha africana	31.04 1410	7.58	218
Sardinella maderensis	22.40 2318	5.47	216
Lagocephalus laevigatus	8.80 8	2.15	
Drepane africana	7.12 8	1.74	
Trichiurus lepturus	6.40 104	1.56	
Scomberomorus tritor	5.60 32	1.37	
Pseudotolithus senegalensis	4.64 16	1.13	
Ethmalosa fimbriata	4.00 24	0.98	
Dasyatis margarita	3.80 4	0.93	
Sphyræna guachancho	3.00 6	0.73	
Alectis alexandrinus	2.72 24	0.66	
Sardinella aurita	2.08 272	0.51	215
Selar crumenophthalmus	2.08 40	0.51	
Eucinostomus melanopterus	1.44 24	0.35	
Elops lacerta	1.44 8	0.35	
Ephippion guttifer	1.28 16	0.31	
Pomadasys rogeri	1.12 8	0.27	
Pomadasys jubelini	0.80 8	0.20	
Sepiella ornata	0.64 16	0.16	
Total	409.44	100.00	

PROJECT STATION: 80
 DATE: 30/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 416
 start stop duration Long W 719
 TIME :10:52:39 11:22:09 30 (min) Purpose code: 3
 LOG :5655.97 5657.74 1.76 Area code : 3
 FDEPTH: 73 77 GearCond.code:
 BDEPTH: 73 77 Validity code:
 Towing dir: 110e Wire out: 230 m Speed: 30 kn*10
 Sorted: 25 Kg Total catch: 25.86 CATCH/HOUR: 51.72

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Boops boops	20.28 1244	39.21	
Decapterus macarellus	16.04 460	31.01	
Pseudupeneus prayensis	2.32 14	4.49	
Pagellus bellottii	2.04 54	3.94	211
Dentex canariensis	2.00 6	3.87	
Dentex angolensis	1.88 16	3.63	
Sardinella aurita	1.84 44	3.56	
Fistularia petimba	1.48 8	2.86	
Priacanthus arenatus	1.12 4	2.17	
Zeus faber	0.76 4	1.47	
Umbrina canariensis	0.60 2	1.16	
Scorpaena normani	0.48 2	0.93	
Anchias anthias	0.36 22	0.70	
Lepidotrigla cadmani	0.16 2	0.31	
Trichiurus lepturus	0.12 14	0.23	
Lepidotrigla carolae	0.06 4	0.12	
Scomber japonicus	0.04 2	0.08	
Sepia officinalis hierredda	0.04 2	0.08	
Chromis cadenati	0.04 4	0.08	
Cmmastrophes pteropus	0.02 4	0.04	
Saurida brasiliensis	0.02 2	0.04	
Syacium micrurum	0.02 2	0.04	
Total	51.72	100.02	

PROJECT STATION: 83
 DATE: 30/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 434
 start stop duration Long W 658
 TIME :17:11:00 17:34:00 23 (min) Purpose code: 3
 LOG :5702.00 5703.60 1.60 Area code : 3
 FDEPTH: 35 37 GearCond.code:
 BDEPTH: 35 37 Validity code:
 Towing dir: 80e Wire out: 140 m Speed: 30 kn*10
 Sorted: 66 Kg Total catch: 624.27 CATCH/HOUR: 1628.53

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardinella maderensis	540.03 7310	33.16	221
Engraulis encrasicolus	345.23 100320	21.20	
Elops lacerta	303.34 670	18.63	
Sphyræna guachancho	133.83 918	8.22	
Chloroscombrus chrysurus	112.02 2927	6.88	219
Drepane africana	37.17 76	2.28	
Selene dorsalis	28.25 347	1.73	
Galeoides decadactylus	27.76 99	1.70	
Sardinella aurita	26.03 4122	1.60	220
Brachydeuterus auritus	25.04 3892	1.54	
Lagocephalus laevigatus	15.37 26	0.94	
Caranx crysos	9.91 50	0.61	
Raja miraletus	7.93 26	0.49	
Trichiurus lepturus	7.43 125	0.46	
Pomadasys rogeri	5.22 26	0.32	
Ilisha africana	2.97 76	0.18	
Pteroscion peli	0.99 26	0.06	
Total	1628.52	100.00	

PROJECT STATION: 81
 DATE: 30/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 421
 start stop duration Long W 720
 TIME :12:34:22 13:07:48 33 (min) Purpose code: 3
 LOG :5666.03 5668.08 1.99 Area code : 3
 FDEPTH: 48 44 GearCond.code:
 BDEPTH: 48 44 Validity code:
 Towing dir: 80e Wire out: 180 m Speed: 30 kn*10
 Sorted: 31 Kg Total catch: 31.56 CATCH/HOUR: 57.38

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	28.04 4480	48.87	
Raja miraletus	5.64 9	9.83	
Selene dorsalis	4.18 13	7.28	
Sphyræna sphyraena	3.75 4	6.54	
Engraulis encrasicolus	3.35 691	5.84	
Lagocephalus laevigatus	2.87 2	5.00	
Octopus vulgaris	2.58 4	4.50	
Scomberomorus tritor	1.38 2	2.41	
Alloteuthis africana	1.35 460	2.35	
Alectis alexandrinus	0.80 2	1.39	
Syacium micrurum	0.73 40	1.27	
Sardinella aurita	0.69 53	1.20	
Pagellus bellottii	0.65 25	1.13	
Sardinella maderensis	0.51 64	0.89	
Sparus caeruleostictus *	0.29 2	0.51	
Sepia officinalis hierredda	0.25 187	0.44	
C R A B S	0.07 11	0.12	
COBIIDAE	0.07 9	0.12	
Scyllarides herklotsii	0.07 11	0.12	
Saurida brasiliensis	0.04 4	0.07	
Grammolites gruvelli	0.04 4	0.07	
PORTUNIDAE	0.02 2	0.03	
Penaeus notialis	0.02 2	0.03	
Total	57.39	100.01	

PROJECT STATION: 84
 DATE: 30/ 4/99 GEAR TYPE: BT No:12 POSITION: Lat N 430
 start stop duration Long W 657
 TIME :18:14:18 18:43:57 30 (min) Purpose code: 3
 LOG :5708.91 5710.62 1.68 Area code : 3
 FDEPTH: 59 65 GearCond.code:
 BDEPTH: 59 65 Validity code:
 Towing dir: 150e Wire out: 200 m Speed: 30 kn*10
 Sorted: 45 Kg Total catch: 45.37 CATCH/HOUR: 90.74

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	35.52 3792	39.14	
Brotula barbata	8.04 12	8.86	
Selene dorsalis	7.88 36	8.68	
Saurida brasiliensis	7.62 1154	8.40	
Pagellus bellottii	7.00 216	7.71	
Engraulis encrasicolus	6.76 916	7.45	
Sphyræna guachancho	5.04 12	5.55	
Dentex angolensis	2.80 26	3.09	
Trichiurus lepturus	2.12 24	2.34	
Sardinella maderensis	1.30 86	1.43	
Trachurus treræ	1.00 46	1.10	
Alloteuthis africana	0.88 264	0.97	
Uranoscopus albesca	0.84 4	0.93	
Sardinella aurita	0.72 6	0.79	
Uraspis helvola	0.64 2	0.71	
Parapenaeopsis atlantica	0.60 98	0.66	
Citharus linguatula	0.52 14	0.57	
Sepia officinalis hierredda	0.42 32	0.46	
Cynoglossus canariensis	0.36 2	0.40	
Chloroscombrus chrysurus	0.32 2	0.35	
Boops boops	0.22 22	0.24	
Selar crumenophthalmus	0.08 2	0.09	
Grammolites gruvelli	0.04 2	0.04	
Cepola pauciradiatus	0.02 2	0.02	
Total	90.74	99.98	

PROJECT STATION: 85
 DATE: 1/ 5/99 GEAR TYPE: PT No: 5 POSITION: Lat N 430
 start stop duration Long W 644
 TIME :01:34:25 02:06:34 32 (min) Purpose code: 1
 LOG :5765.16 5767.63 2.46 Area code : 3
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 103 101 Validity code:
 Towing dir: 0 Wire out: 150 m Speed: 35 kn*10
 Sorted: 6 Kg Total catch: 6.14 CATCH/HOUR: 11.51

PROJECT STATION: 88
 DATE: 1/ 5/99 GEAR TYPE: BT No:12 POSITION: Lat N 450
 start stop duration Long W 614
 TIME :11:04:08 11:34:08 30 (min) Purpose code: 3
 LOG :5818.55 5820.33 1.77 Area code : 3
 FDEPTH: 29 28 GearCond.code:
 BDEPTH: 29 28 Validity code:
 Towing dir: 80e Wire out: 110 m Speed: 30 kn*10
 Sorted: 127 Kg Total catch: 1065.68 CATCH/HOUR: 2131.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Coryphaena equiselis	11.51	11	100.00	222
Total	11.51		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	1595.28	419810	74.85	237
Sardinella maderensis	270.64	34582	12.70	236
Selene dorsalis	70.04	238	3.29	
Stromateus fiatola	42.56	60	1.75	
Chloroscombrus chrysurus	37.40			
Pseudolithus senegalensis	28.80	58	1.35	235
Sphyræna guachancho	28.36	70	1.33	233
Pseudolithus typus	25.88	4	1.21	234
Elops senegalensis	14.28	34	0.67	
Ethmalosa fimbriata	7.48	34	0.35	
Galeoides decadactylus	5.08	14	0.24	
Scomberomorus tritor	3.32	8	0.16	
Drepane africana	2.24	2	0.11	
Total	2131.36		100.01	

PROJECT STATION: 86
 DATE: 1/ 5/99 GEAR TYPE: BT No:12 POSITION: Lat N 436
 start stop duration Long W 634
 TIME :06:27:22 06:57:21 30 (min) Purpose code: 3
 LOG :5787.31 5788.98 1.65 Area code : 3
 FDEPTH: 77 77 GearCond.code:
 BDEPTH: 77 77 Validity code:
 Towing dir: 90e Wire out: 240 m Speed: 30 kn*10
 Sorted: 90 Kg Total catch: 90.10 CATCH/HOUR: 180.20

PROJECT STATION: 89
 DATE: 1/ 5/99 GEAR TYPE: BT No:12 POSITION: Lat N 449
 start stop duration Long W 610
 TIME :12:36:10 13:06:11 30 (min) Purpose code: 3
 LOG :5827.07 5828.97 1.88 Area code : 3
 FDEPTH: 42 43 GearCond.code:
 BDEPTH: 42 43 Validity code:
 Towing dir: 85e Wire out: 160 m Speed: 30 kn*10
 Sorted: 10 Kg Total catch: 10.40 CATCH/HOUR: 20.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	44.32	246	24.59	225
Epinephelus aeneus	33.56	6	18.62	
Dentex canariensis	25.40	42	14.10	
Brachydeuterus auritus	10.96	142	6.08	
Sphyræna guachancho	9.80	32	5.44	
Selene dorsalis	8.12	112	4.51	
Trachurus trecae	6.20	270	3.44	224
Dentex angolensis	5.48	74	3.04	223
Alloteuthis africana	3.78	1746	2.10	
Boops boops	3.44	194	1.91	
Octopus vulgaris	2.96	4	1.64	
Priacanthus arenatus	2.72	50	1.51	
Scorpaena scrofa	2.52	4	1.40	
Sepia officinalis hierredda	2.44	6	1.35	
Selar crumenophthalmus	2.12	14	1.18	
Pseudupeneus prayensis	2.12	14	1.18	
Raja miraletus	1.60	4	0.89	
Caranx crysos	1.28	2	0.71	
Umbrina canariensis	1.20	4	0.67	
Trichurus lepturus	1.16	6	0.64	
Sardinella aurita	1.04	52	0.58	
Engraulis encrasicolus	0.92	116	0.51	
Brotula barbata	0.92	6	0.51	
Citharus linguatula	0.80	20	0.44	
Balistes capricus	0.68	2	0.38	
Decapterus rhonchus	0.60	8	0.33	
Zeus faber	0.48	2	0.27	
Chilomycterus spinosus mauret.	0.44	2	0.24	
Saurida brasiliensis	0.44	88	0.24	
Ommastrephes pteropus	0.36	10	0.20	
Lepidotrigla cadmani	0.36	4	0.20	
Dicologlossa cuneata	0.32	2	0.18	
Lagocephalus laevigatus	0.32	2	0.18	
Lepidotrigla sp.	0.20	6	0.11	
Fistularia petimba	0.20	6	0.11	
Scorpaena normani	0.16	2	0.09	
Grammolites gruvelli	0.16	2	0.09	
Blennius normani	0.08	4	0.04	
Syacium micrurus	0.08	18	0.04	
Cepola pauciradiatus	0.08	4	0.04	
Chaetodon marcellae	0.08	2	0.04	
Lepidotrigla carolae	0.08	4	0.04	
C R A B S	0.06	4	0.03	
Uranoscopus albesca	0.06	2	0.03	
Anthias anthias	0.04	2	0.02	
Scomber japonicus	0.04	2	0.02	
GOBIIDAE	0.02	4	0.01	
Total	180.20		99.97	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	6.92	8	33.27	
Lagocephalus laevigatus	6.44	8	30.96	
Octopus vulgaris	2.16	4	10.38	
Caranx crysos	1.80	4	8.65	
Balistes capricus	1.00	4	4.81	
Ethmalosa fimbriata	0.60	2	2.88	
Raja miraletus	0.56	2	2.69	
Sparus caeruleostictus *	0.56	2	2.69	
Chloroscombrus chrysurus	0.40	2	1.92	
Brachydeuterus auritus	0.20	6	0.96	
Eucinostomus melanopterus	0.08	2	0.38	
Pagellus bellottii	0.04	2	0.19	
Arnoglossus imperialis	0.02	2	0.10	
Grammolites gruvelli	0.02	2	0.10	
Total	20.80		99.98	

PROJECT STATION: 87
 DATE: 1/ 5/99 GEAR TYPE: BT No:12 POSITION: Lat N 441
 start stop duration Long W 632
 TIME :08:23:45 08:53:35 30 (min) Purpose code: 3
 LOG :5797.27 5799.08 1.80 Area code : 3
 FDEPTH: 48 49 GearCond.code:
 BDEPTH: 48 49 Validity code:
 Towing dir: 80e Wire out: 180 m Speed: 30 kn*10
 Sorted: 100 Kg Total catch: 99.52 CATCH/HOUR: 199.04

PROJECT STATION: 90
 DATE: 1/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 444
 start stop duration Long W 610
 TIME :17:18:04 17:48:14 30 (min) Purpose code: 3
 LOG :5844.96 5846.73 1.73 Area code : 3
 FDEPTH: 68 66 GearCond.code:
 BDEPTH: 68 66 Validity code:
 Towing dir: 50e Wire out: 240 m Speed: 30 kn*10
 Sorted: 40 Kg Total catch: 40.34 CATCH/HOUR: 80.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	89.76	13600	45.10	226
Sphyræna sphyraena	71.00	118	35.67	
Selene dorsalis	13.64	76	6.85	230
Galeoides decadactylus	12.16	16	6.11	232
Chloroscombrus chrysurus	2.32	24	1.17	231
Lagocephalus laevigatus	2.20	2	1.11	
Octopus vulgaris	1.92	2	0.96	
Elops lacerta	1.24	2	0.62	
Caranx crysos	1.16	2	0.58	
Pagellus bellottii	1.04	6	0.52	
Scomberomorus tritor	0.76	2	0.38	
Engraulis encrasicolus	0.60	56	0.30	229
Penaeus notialis	0.40	8	0.20	
Sardinella maderensis	0.32	22	0.16	228
Grammolites gruvelli	0.20	4	0.10	
Sardinella aurita	0.20	14	0.10	227
MAJIDAE	0.04	6	0.02	
Sepiella ornata	0.04	2	0.02	
Scyllarides herklotsii	0.02	8	0.01	
Saurida brasiliensis	0.02	4	0.01	
Total	199.04		99.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	49.08	632	60.83	238
Alloteuthis africana	9.80	2740	12.15	
Dentex angolensis	6.32	34	7.83	239
Sphyræna guachancho	5.16	8	6.40	
Fistularia petimba	4.12	22	5.11	
Selene dorsalis	3.32	14	4.12	
Octopus vulgaris	0.76	2	0.94	
Zeus faber	0.56	4	0.69	
Decapterus rhonchus	0.52	6	0.64	
Priacanthus arenatus	0.32	4	0.40	
Lagocephalus laevigatus	0.28	2	0.35	
Selar crumenophthalmus	0.20	2	0.25	
Boops boops	0.12	14	0.15	
Sardinella aurita	0.08	6	0.10	
Dactylopterus volitans	0.02	2	0.02	
Saurida brasiliensis	0.02	4	0.02	
Total	80.68		100.00	

PROJECT STATION: 91
 DATE: 2/ 5/99 GEAR TYPE: PT No: 5 POSITION: Lat N 449
 start stop duration Long W 555
 TIME :01:22:27 01:52:31 30 (min) Purpose code: 1
 LOG :5905.12 5906.88 1.74 Area code : 3
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 68 77 Validity code:
 Towing dir: 0 Wire out: 150 m Speed: 40 kn*10
 Sorted: 1 Kg Total catch: 0.44 CATCH/HOUR: 0.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	0.66	58	75.00	241
Sepiella ornata	0.10	6	11.36	
Alloteuthis africana	0.06	34	6.82	
Sardinella aurita	0.06	6	6.82	240
Total	0.88		100.00	

PROJECT STATION: 92
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 451
 start stop duration Long W 546
 TIME :06:25:20 06:55:09 30 (min) Purpose code: 3
 LOG :5934.05 5935.78 1.72 Area code : 3
 FDEPTH: 75 75 GearCond.code:
 BDEPTH: 75 75 Validity code:
 Towing dir: 70e Wire out: 230 m Speed: 30 kn*10
 Sorted: 65 Kg Total catch: 65.04 CATCH/HOUR: 130.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	78.24	1016	60.15	246
Trichurus lepturus	16.80	120	14.45	
Solar crumenophthalmus	17.16	62	13.19	
Pagellus bellottii	4.56	40	3.51	244
Priacanthus arenatus	2.44	8	1.88	
Dentex angolensis	2.08	22	1.60	245
Sphyræna guachancho	1.76	6	1.35	
Pseudupeneus prayensis	0.84	6	0.65	
Trachurus trecae	0.76	12	0.58	243
Decapterus rhonchus	0.76	10	0.58	
Alloteuthis africana	0.64	216	0.49	
Fistularia petimba	0.40	4	0.31	
Lagocephalus laevigatus	0.40	2	0.31	
Sardinella aurita	0.36	4	0.28	242
Sparus caeruleostictus *	0.36	2	0.28	
Dentex canariensis	0.28	2	0.22	
Ommastrephes pteropus	0.24	2	0.18	
Total	130.08		100.01	

PROJECT STATION: 93
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 457
 start stop duration Long W 545
 TIME :08:58:33 09:28:08 30 (min) Purpose code: 3
 LOG :5945.14 5946.83 1.68 Area code : 3
 FDEPTH: 44 46 GearCond.code:
 BDEPTH: 44 46 Validity code:
 Towing dir: 70e Wire out: 140 m Speed: 30 kn*10
 Sorted: 33 Kg Total catch: 165.66 CATCH/HOUR: 331.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	92.70	2710	27.98	248
Chloroscombrus chrysurus	79.80	1066	24.09	247
Selene dorsalis	37.20	406	11.23	
Galeoides decadactylus	29.62	182	8.94	250
Pagellus bellottii	27.30	76	8.24	
Sphyræna guachancho	20.70	60	6.25	
Pomadasys jubelini	9.30	30	2.81	
Pseudotolithus typus	7.36	8	2.22	
Sardinella maderensis	6.50	450	1.99	249
Lagocephalus laevigatus	6.52	8	1.97	
Dactylopterus volitans	3.44	2	1.04	
Pomadasys rogeri	3.30	16	1.00	
Elops lacerta	2.32	6	0.70	
Sepia officinalis hierredda	1.84	2	0.56	
Syacium micrurum	1.50	16	0.45	
Eucinostomus melanopterus	0.90	16	0.27	
Hemicaranx bicolor	0.30	76	0.09	
Pteroscion peli	0.30	16	0.09	
Engraulis encrasicolus	0.16	16	0.05	
Ilisha africana	0.16	30	0.05	
Total	331.32		100.02	

PROJECT STATION: 94
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 500
 start stop duration Long W 545
 TIME :10:29:41 10:49:16 20 (min) Purpose code: 3
 LOG :5952.60 5953.82 1.19 Area code : 3
 FDEPTH: 24 24 GearCond.code:
 BDEPTH: 24 24 Validity code:
 Towing dir: 80e Wire out: 90 m Speed: 30 kn*10
 Sorted: 7 Kg Total catch: 25.04 CATCH/HOUR: 75.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	33.90	930	45.13	
Galeoides decadactylus	15.54	75	20.69	
Brachydeuterus auritus	10.20	360	13.58	
Trachinotus teraia	3.48	3	4.63	
Hemicaranx bicolor	3.30	255	4.39	
Ommastrephes pteropus	1.80	15	2.40	
Alectis alexandrinus	1.80	15	2.40	
Sardinella aurita	1.50	75	2.00	
Elops lacerta	1.50	3	2.00	
Selene dorsalis	1.20	30	1.60	
Engraulis encrasicolus	0.90	150	1.20	251
Total	75.12		100.02	

PROJECT STATION: 95
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 503
 start stop duration Long W 522
 TIME :13:00:45 13:30:39 30 (min) Purpose code: 3
 LOG :5975.84 5977.53 1.70 Area code : 3
 FDEPTH: 27 26 GearCond.code:
 BDEPTH: 27 26 Validity code:
 Towing dir: 70e Wire out: 120 m Speed: 30 kn*10
 Sorted: 57 Kg Total catch: 57.48 CATCH/HOUR: 114.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	32.40	316	28.18	255
Pomadasys jubelini	9.24	32	8.04	
Lethrinus atlanticus	7.96	30	6.92	258
Selene dorsalis	7.04	58	6.12	252
Sparus caeruleostictus *	5.68	14	4.94	254
Lutjanus gorensis	5.36	10	4.66	
Pseudupeneus prayensis	5.32	42	4.63	256
Umbrina canariensis	5.00	10	4.35	
Epinephelus aeneus	4.92	4	4.28	
Elops lacerta	4.76	12	4.14	
Brachydeuterus auritus	4.56	504	3.97	
Dentex canariensis	3.92	22	3.41	257
Sardinella maderensis	3.76	232	3.27	253
Ballistes punctatus	2.40	4	2.09	
Hemicaranx bicolor	2.20	38	1.91	
Sphyræna guachancho	1.84	6	1.60	
Rypticus saponaceus	1.38	10	1.20	
Galeoides decadactylus	1.36	4	1.18	
Trichurus lepturus	1.36	4	1.18	
Lagocephalus laevigatus	0.96	2	0.84	
Eucinostomus melanopterus	0.66	8	0.57	
Chaetodipterus gorensis	0.60	6	0.52	
Drepane africana	0.56	2	0.49	
Calappa rubroguttata	0.52	4	0.45	
Lutjanus fulgens	0.40	14	0.35	
Trachinocephalus myops	0.28	2	0.24	
Pomadasys rogeri	0.28	2	0.24	
Sardinella aurita	0.10	4	0.09	
Pteroscion peli	0.08	2	0.07	
Scorpaena stephanica	0.04	2	0.03	
APOGONIDAE	0.02	2	0.02	
Total	114.96		99.98	

PROJECT STATION: 96
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 502
 start stop duration Long W 522
 TIME :14:23:05 14:53:21 30 (min) Purpose code: 3
 LOG :5983.22 5985.10 1.87 Area code : 3
 FDEPTH: 41 40 GearCond.code:
 BDEPTH: 41 40 Validity code:
 Towing dir: 80e Wire out: 150 m Speed: 31 kn*10
 Sorted: 35 Kg Total catch: 35.36 CATCH/HOUR: 70.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	27.60	256	39.03	
Sardinella maderensis	20.16	1228	28.51	262
Ilisha africana	3.76	4	5.32	261
Lagocephalus laevigatus	3.36	4	4.75	
Engraulis encrasicolus	3.16	302	4.47	260
Pseudotolithus senegalensis	2.52	2	3.56	
Scomberomorus tritor	2.48	2	3.51	
Brachydeuterus auritus	1.76	260	2.49	
Selene dorsalis	1.64	12	2.32	
Lutjanus fulgens	1.08	2	1.53	
Pagellus bellottii	1.08	2	1.53	
Pomadasys rogeri	0.92	6	1.30	
Sardinella aurita	0.56	32	0.79	263
Solar crumenophthalmus	0.48	2	0.68	
Galeoides decadactylus	0.16	2	0.23	
Total	70.72		100.02	

PROJECT STATION: 97
 DATE: 2/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 456
 start stop duration Long W 522
 TIME :16:04:02 16:34:51 31 (min) Purpose code: 3
 LOG :5993.45 5995.10 1.64 Area code : 3
 FDEPTH: 91 91 GearCond.code:
 BDEPTH: 91 91 Validity code:
 Towing dir: 80e Wire out: 310 m Speed: 30 kn*10
 Sorted: 62 Kg Total catch: 154.36 CATCH/HOUR: 298.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	162.23	755	54.30	265
Pentheroscion mbizi	91.24	532	30.54	
Umbrina canariensis	8.63	75	2.89	266
Sepia officinalis hierredda	7.24	8	2.42	
Raja miraletus	5.54	15	1.85	
Zeus faber	4.26	15	1.43	
Mustelus mustelus	4.26	2	1.43	
Trachurus trecae	3.39	77	1.13	264
Squatina oculata	2.25	2	0.75	
Dentex congoensis	2.03	21	0.68	
Aricomma bondi	1.82	21	0.61	
Octopus vulgaris	1.63	6	0.55	
Uranoscopus albesca	1.16	6	0.39	
Lepidotrigla cadmani	1.16	12	0.39	
Fistularia petimba	1.06	15	0.35	
Illex coindetii	0.54	6	0.18	
Alloteuthis africana	0.33	97	0.11	
Total	298.77		100.00	

PROJECT STATION: 98
DATE: 3/ 5/99 GEAR TYPE: PT No: 2 POSITION:Lat N 458
start stop duration Long W 508
TIME :01:46:35 02:20:13 34 (min) Purpose code: 1
LOG :6057.48 6059.16 1.64 Area code : 3
FDEPTH: 40 40 GearCond.code:
BDEPTH: 86 85 Validity code:
Towing dir: 270e Wire out: 120 m Speed: 40 kn*10
Sorted: 32 Kg Total catch: 90.64 CATCH/HOUR: 159.95

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	127.06	1811	79.44	267
Sardinella maderensis	8.26	270	5.16	268
Brachydeuterus auritus	7.62	90	4.76	
Selene dorsalis	5.40	106	3.38	
Scomber japonicus	3.78	32	2.36	270
Trachurus trecae	3.49	154	2.18	269
Ariomma bondi	1.69	26	1.06	
Decapterus punctatus	1.38	32	0.86	
Trichiurus lepturus	0.64	5	0.40	
Ruthynnus alleteratus	0.64	5	0.40	
Total	159.96		100.00	

PROJECT STATION: 99
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 459
start stop duration Long W 458
TIME :06:27:41 06:57:07 29 (min) Purpose code: 3
LOG :6082.99 6084.74 1.73 Area code : 3
FDEPTH: 85 84 GearCond.code:
BDEPTH: 85 84 Validity code:
Towing dir: 80e Wire out: 250 m Speed: 30 kn*10
Sorted: 78 Kg Total catch: 1249.92 CATCH/HOUR: 2586.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1592.81	44855	61.59	
Trachurus trecae	591.77	18852	22.88	273
Priacanthus arenatus	152.94	3650	5.91	
Sardinella aurita	117.31	3128	4.54	271
Pentheroscion mbizi	27.81	174	1.08	
Pagellus bellottii	19.28	176	0.75	272
Sardinella maderensis	16.51	434	0.64	274
Hoopoe hoops	13.03	391	0.50	
Sphyræna sphyræna	12.17	43	0.47	
Stromateus fiatola	11.59	25	0.45	
Fistularia petimba	9.56	87	0.37	
Lagocephalus laevigatus	7.82	43	0.30	
Ballistes capricus	4.34	43	0.17	
Raja miraletus	3.81	12	0.15	
Dentex angolensis	3.52	25	0.14	275
Torpedo torpedo	1.78	4	0.07	
Total	2586.05		100.01	

PROJECT STATION: 100
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 502
start stop duration Long W 457
TIME :08:12:31 08:42:03 30 (min) Purpose code: 3
LOG :6090.06 6091.80 1.72 Area code : 3
FDEPTH: 46 44 GearCond.code:
BDEPTH: 46 44 Validity code:
Towing dir: 80e Wire out: 150 m Speed: 30 kn*10
Sorted: 15 Kg Total catch: 15.45 CATCH/HOUR: 30.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Octopus vulgaris	10.16	10	32.88	
Alectis alexandrimus	8.88	4	28.74	
Ballistes capricus	4.08	10	13.20	
Caranx crysos	1.72	2	5.57	
Selar crumenophthalmus	1.48	16	4.79	
Aluterus punctatus	1.48	2	4.79	
Lagocephalus laevigatus	1.28	2	4.14	
Brachydeuterus auritus	0.64	16	2.07	
Sardinella aurita	0.44	8	1.42	
Trachurus trecae	0.40	12	1.29	
Chloroscombrus chrysurus	0.16	2	0.52	
Sardinella maderensis	0.08	2	0.26	
Illex coindetii	0.04	60	0.13	
Alloteuthis africana	0.04	10	0.13	
Dactylopterus volitans	0.02	2	0.06	
Total	30.90		99.99	

PROJECT STATION: 101
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 506
start stop duration Long W 457
TIME :09:39:35 10:09:04 29 (min) Purpose code: 3
LOG :6097.83 6099.60 1.75 Area code : 3
FDEPTH: 26 25 GearCond.code:
BDEPTH: 26 25 Validity code:
Towing dir: 80e Wire out: 90 m Speed: 30 kn*10
Sorted: 39 Kg Total catch: 102.57 CATCH/HOUR: 212.21

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	33.77	3708	15.91	
Brachydeuterus auritus	29.67	2294	13.98	
Ilisha africana	29.54	1672	13.92	278
Engraulis encrasicolus	28.92	4676	13.63	
Sphyræna guanchancho	24.58	261	11.58	
Trachinotus teraia	12.29	2	5.79	
Sardinella maderensis	8.69	621	4.10	276
Galeoides decadactylus	8.57	137	4.04	
Ballistes capricus	8.07	19	3.80	
Pseudotolithus senegalensis	5.09	10	2.40	
Pomadasya jubelini	4.97	6	2.34	
Sardinella aurita	4.97	341	2.34	277
Pentheroscion mbizi	2.86	62	1.35	
Selene dorsalis	2.48	68	1.17	
Drepane africana	2.11	12	0.99	
Alectis alexandrimus	1.37	12	0.65	
Caranx senegalensis	0.99	6	0.47	
Pomadasya rogeri	0.87	6	0.41	
Trichiurus lepturus	0.62	19	0.29	
Chaetodipterus goreensis	0.50	6	0.24	
Eucinostomus melanopterus	0.50	6	0.24	
Penaeus notialis	0.37	12	0.17	
Scyllarides herklotsii	0.12	31	0.06	
Lagocephalus laevigatus	0.12	6	0.06	
CALAPPIDAE	0.06	12	0.03	
Echeneis naucrates	0.06	6	0.03	
Hemicaranx bicolor	0.06	81	0.03	
Total	212.22		100.02	

PROJECT STATION: 102
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 509
start stop duration Long W 434
TIME :12:30:00 13:00:00 30 (min) Purpose code: 3
LOG :6120.60 6122.00 1.40 Area code : 3
FDEPTH: 33 33 GearCond.code:
BDEPTH: 33 33 Validity code:
Towing dir: 90e Wire out: 140 m Speed: 30 kn*10
Sorted: 31 Kg Total catch: 48.60 CATCH/HOUR: 97.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	30.56	1146	31.44	
Engraulis encrasicolus	16.40	4334	16.87	281
Sepia officinalis hierredda	7.08	6	7.28	
Sparus caeruleostictus *	6.36	16	6.54	279
Selene dorsalis	6.16		6.34	
Decapterus rhonchus	5.76	72	5.93	280
Lagocephalus laevigatus	4.12	4	4.24	
Brachydeuterus auritus	4.08	332	4.20	
Galeoides decadactylus	3.12	12	3.21	
Sphyræna sphyræna	2.20	10	2.26	
Pagellus bellottii	1.68	10	1.73	
Selar crumenophthalmus	1.52	16	1.56	
Eucinostomus melanopterus	1.20	20	1.23	
Caranx senegalensis	1.20	8	1.23	
Caranx crysos	1.20	8	1.23	
Dentex canariensis	1.08	6	1.11	
Pomadasys lacerta	1.08	4	1.11	
Fomadasy rogeri	0.80	8	0.82	
Hemicaranx bicolor	0.80	36	0.82	
Trachinocephalus myops	0.48	4	0.49	
Syacium micrurum	0.28	2	0.29	
Sepiella ornata	0.04	8	0.04	
Total	97.20		99.97	

PROJECT STATION: 103
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 509
start stop duration Long W 434
TIME :13:35:43 14:05:28 30 (min) Purpose code: 3
LOG :6126.05 6127.45 1.38 Area code : 3
FDEPTH: 25 22 GearCond.code:
BDEPTH: 25 22 Validity code:
Towing dir: 80e Wire out: 120 m Speed: 30 kn*10
Sorted: 32 Kg Total catch: 61.82 CATCH/HOUR: 123.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	27.52	172	22.26	
Pseudotolithus senegalensis	18.08	24	14.62	285
Pomadasya jubelini	15.68	84	12.68	
Elops lacerta	9.76	40	7.89	
Chloroscombrus chrysurus	8.00	312	6.47	
Sphyræna guanchancho	7.28	152	5.89	
Trichiurus lepturus	6.00	64	4.85	
Pteroscion peli	5.84	8	4.72	
Epinephelus aeneus	5.16	2	4.17	
Ilisha africana	3.84	278	3.11	284
Engraulis encrasicolus	3.52	1290	2.85	282
Selene dorsalis	3.28	84	2.65	
Brachydeuterus auritus	3.20	108	2.59	
Penaeus notialis	1.56	48	1.26	
Sardinella maderensis	0.88	96	0.71	283
Caranx crysos	0.88	4	0.71	
Sepiella ornata	0.64	36	0.52	
Alectis alexandrimus	0.56	4	0.45	
Pseudupeneus prayensis	0.56	4	0.45	
Hemicaranx bicolor	0.56	4	0.45	
Pomadasy rogeri	0.40	8	0.32	
Pomadasya incinus	0.32	8	0.26	
Eucinostomus melanopterus	0.08	4	0.06	
Penaeus kerathurus	0.04	4	0.03	
Total	123.64		99.97	

PROJECT STATION: 104
DATE: 3/ 5/99 GEAR TYPE: BT No: 2 POSITION:Lat N 504
start stop duration Long W 434
TIME :15:55:39 16:25:14 30 (min) Purpose code: 3
LOG :6137.17 6138.86 1.68 Area code : 3
FDEPTH: 84 85 GearCond.code:
BDEPTH: 84 85 Validity code:
Towing dir: 90e Wire out: 270 m Speed: 30 kn*10
Sorted: 63 Kg Total catch: 62.88 CATCH/HOUR: 125.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	36.00	732	28.63	286
Dentex angolensis	23.80	130	18.92	287
Epinephelus aeneus	23.48	2	18.67	
Trachurus trecae	16.00	558	12.72	285
Sepia officinalis hierredda	3.68	4	2.93	
Fistularia petimba	3.16	24	2.51	
Zeus faber	2.44	4	1.94	
Raja miraletus	2.36	4	1.88	
Octopus vulgaris	2.28	6	1.81	
Pentheroscion mbizi	2.24	10	1.78	
Lepidotrigla cadmani	1.56	14	1.24	
Loligo vulgaris	1.48	386	1.18	
Scorpaena angolensis	1.36	4	1.08	
Pagellus bellottii	1.32	16	1.05	
Galeoides decadactylus	1.20	4	0.95	
Priacanthus arenatus	1.08	24	0.86	
Pomadasy jubelini	0.44	2	0.35	
Dactylopterus volitans	0.40	2	0.32	
Pseudupeneus prayensis	0.40	4	0.32	
Sardinella aurita	0.40	8	0.32	
Citharus linguatula	0.28	8	0.22	
Uranoscopus albesca	0.24	2	0.19	
Decapterus punctatus	0.16	2	0.13	
Total	125.76		100.00	

PROJECT STATION: 105
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 508
 start stop duration Long W 410
 TIME :06:22:21 06:52:20 30 (min) Purpose code: 3
 LOG :6221.63 6223.13 1.48 Area code : 3
 FDEPTH: 83 85 GearCond.code:
 BDEPTH: 83 85 Validity code:
 Towing dir: 80° Wire out: 250 m Speed: 30 kn*10
 Sorted: 80 Kg Total catch: 253.16 CATCH/HOUR: 506.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Boops boops	138.08	2740	27.27	
Dentex congensis	82.08	1118	16.21	288
Pagellus bellottii	70.08	924	13.84	289
Trachurus trecae	54.24	1238	10.71	291
Sardinella aurita	27.20	478	5.37	292
Dentex canariensis	24.16	320	4.77	290
Dentex canariensis	23.68	96	4.68	
Sepia officinalis hierredda	20.04	24	3.96	
Squatina oculata	15.76	20	3.11	
Pentheroscion mbizi	11.20	48	2.21	
Priacanthus arenatus	8.00	88	1.58	
Ommastrephes pteropus	5.92	48	1.17	
Zeus faber	5.44	32	1.07	
Uranoscopus albesca	3.68	16	0.73	
Raja miraletus	3.00	6	0.59	
Lepidotrigla cadmani	2.72	40	0.54	
Torpedo marmorata	2.48	2	0.49	
Branchiostegus semifasciatus	1.64	2	0.32	
Fistularia petimba	1.60	8	0.32	
Umbrina canariensis	1.28	8	0.25	
Citharus linguatula	1.12	16	0.22	
Decapterus macarellus	1.12	24	0.22	
Scorpaena scrofa	0.60	2	0.12	
Cynoglossus cadenati	0.40	2	0.08	
Total	505.52		99.83	

PROJECT STATION: 106
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 511
 start stop duration Long W 411
 TIME :08:31:25 09:01:30 30 (min) Purpose code: 3
 LOG :6231.25 6232.52 1.26 Area code : 3
 FDEPTH: 46 49 GearCond.code:
 BDEPTH: 46 49 Validity code:
 Towing dir: 80° Wire out: 150 m Speed: 30 kn*10
 Sorted: 91 Kg Total catch: 262.66 CATCH/HOUR: 525.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	385.80	8884	73.44	
Chloroscombrus chrysurus	54.24	1424	10.33	293
Pagellus bellottii	23.76	542	4.52	294
Trachurus trecae	17.04	624	3.24	
Trachinocephalus myops	13.08	60	2.49	
Sepia officinalis hierredda	8.88	6	1.69	
Pseudupeneus prayensis	3.84	42	0.73	
Sardinella aurita	3.24	60	0.62	
Dactylopterus volitans	2.24	6	0.43	
Lagocephalus laevigatus	2.16	2	0.41	
Balistes capricus	2.08	2	0.40	
Sardinella maderensis	2.04	48	0.39	
Selar crumenophthalmus	1.68	30	0.32	
Priacanthus arenatus	1.56	18	0.30	
Epinephelus aeneus	1.28	2	0.24	
Sparus caeruleostictus *	1.20	6	0.23	
Dicologlossa hexophthalma	0.60	6	0.11	
Boops boops	0.30	6	0.06	
Fistularia petimba	0.24	6	0.05	
Engraulis encrasicolus	0.06	2	0.01	
Total	525.32		100.01	

PROJECT STATION: 107
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 512
 start stop duration Long W 411
 TIME :09:56:07 10:27:10 31 (min) Purpose code: 3
 LOG :6237.11 6238.78 1.67 Area code : 3
 FDEPTH: 28 28 GearCond.code:
 BDEPTH: 28 28 Validity code:
 Towing dir: 80° Wire out: 95 m Speed: 30 kn*10
 Sorted: 63 Kg Total catch: 196.83 CATCH/HOUR: 380.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	168.00	11323	44.10	
Galeoides decadactylus	50.13	1632	13.16	
Brachydeuterus auritus	45.52	1678	11.95	
Engraulis encrasicolus	24.25	4471	6.37	296
Sardinella maderensis	22.90	2485	6.01	295
Sepia officinalis hierredda	19.55	14	5.13	
Sphyræna guanchano	17.21	130	4.52	
Selene dorsalis	15.04	197	3.95	
Pentheroscion mbizi	3.66	75	0.96	
Trichiurus lepturus	2.98	41	0.78	
Balistes capricus	2.71	14	0.71	
Pomadasy jubelini	2.57	14	0.67	
Elops lacerta	1.63	8	0.43	
Ilisha africana	1.22	35	0.32	
Decapterus rhonchus	1.08	14	0.28	
Lagocephalus laevigatus	1.08	8	0.28	
Pomadasy rogeri	0.41	27	0.11	
Eucinostomus melanopterus	0.41	8	0.11	
Penaeus kerathurus	0.27	8	0.07	
Penaeus notialis	0.21	8	0.06	
Sparus caeruleostictus *	0.14	8	0.04	
Total	380.97		100.01	

PROJECT STATION: 108
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 511
 start stop duration Long W 346
 TIME :13:01:47 13:17:18 16 (min) Purpose code: 3
 LOG :6263.35 6264.16 0.81 Area code : 3
 FDEPTH: 23 22 GearCond.code:
 BDEPTH: 23 22 Validity code:
 Towing dir: 110° Wire out: 100 m Speed: 30 kn*10
 Sorted: 65 Kg Total catch: 85.69 CATCH/HOUR: 321.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	170.10	15949	52.93	
Elops lacerta	40.80	128	12.70	
Polydactylus quadrifilis	28.35	4	8.82	
Galeoides decadactylus	24.75	596	7.70	
Chloroscombrus chrysurus	22.84	469	7.11	
Sardinella maderensis	10.46	761	3.26	297
Drepane africana	4.95	23	1.54	
Pomadasy jubelini	4.73	23	1.47	
Pseudotolithus senegalensis	4.28	4	1.33	
Selene dorsalis	2.81	34	0.87	
Torpedo marmorata	2.55	4	0.79	
Pomadasy rogeri	1.58	19	0.49	
Sparus caeruleostictus *	1.58	4	0.49	
Sphyræna guanchano	0.83	4	0.26	
Eucinostomus melanopterus	0.56	11	0.17	
Engraulis encrasicolus	0.11	30	0.03	
Dentex canariensis	0.08	4	0.02	
Total	321.36		99.98	

PROJECT STATION: 109
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 507
 start stop duration Long W 345
 TIME :14:04:10 14:34:47 31 (min) Purpose code: 3
 LOG :6269.64 6271.24 1.58 Area code : 3
 FDEPTH: 41 39 GearCond.code:
 BDEPTH: 41 39 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: 34 Kg Total catch: 34.24 CATCH/HOUR: 66.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alectis alexandrinus	18.08	15	27.28	
Chloroscombrus chrysurus	16.41	331	24.76	301
Balistes capricus	8.36	54	12.62	300
Pagellus bellottii	6.93	50	10.46	299
Brachydeuterus auritus	6.74	294	10.17	
Lagocephalus laevigatus	2.55	6	3.85	
Sardinella maderensis	1.16	29	1.75	298
Sepia officinalis hierredda	1.08	2	1.63	
Sphyræna sphyraena	1.05	4	1.58	
Dactylopterus volitans	0.97	4	1.46	
Sparus caeruleostictus *	0.85	6	1.28	
Dentex canariensis	0.81	4	1.22	
Selar crumenophthalmus	0.43	10	0.65	
MONACANTHIDAE	0.35	2	0.53	
Fistularia petimba	0.31	2	0.47	
Eucinostomus melanopterus	0.12	2	0.18	
Selene dorsalis	0.08	2	0.12	
Total	66.28		100.01	

PROJECT STATION: 110
 DATE: 4/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 503
 start stop duration Long W 345
 TIME :15:28:00 15:58:00 30 (min) Purpose code: 3
 LOG :6277.40 6279.10 1.70 Area code : 3
 FDEPTH: 75 75 GearCond.code:
 BDEPTH: 75 75 Validity code:
 Towing dir: 100° Wire out: 250 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 240.77 CATCH/HOUR: 481.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Priacanthus arenatus	313.20	20324	65.04	
Brachydeuterus auritus	70.20	2240	14.58	
Trachurus trecae	30.78	1864	6.39	302
Fistularia petimba	15.84	36	3.29	
Chloroscombrus chrysurus	9.36	108	1.94	
Raja miraletus	8.28	18	1.72	
Selar crumenophthalmus	8.28	36	1.72	
Boops boops	7.20	378	1.50	
Sphyræna sphyraena	4.32	18	0.90	
Pagellus bellottii	3.96	72	0.82	
Alectis alexandrinus	2.72	4	0.56	
Mustelus mustelus	2.68	2	0.56	
Sepia officinalis hierredda	2.20	4	0.46	
Decapterus rhonchus	1.80	18	0.37	
Sardinella aurita	0.72	36	0.15	
Total	481.54		100.00	

PROJECT STATION: 111
 DATE: 5/ 5/99 GEAR TYPE: PT No: 2 POSITION: Lat N 450
 start stop duration Long W 310
 TIME :01:51:37 02:09:39 18 (min) Purpose code: 1
 LOG :6344.27 6345.24 0.96 Area code : 3
 FDEPTH: 45 45 GearCond.code:
 BDEPTH: 100 104 Validity code:
 Towing dir: 270° Wire out: 120 m Speed: 40 kn*10
 Sorted: 159 Kg Total catch: 159.40 CATCH/HOUR: 531.33

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	469.87	24903	88.43	304
Ariomma bondi	37.33	507	7.03	
Trichiurus lepturus	15.67	30	2.95	
Scomber japonicus	6.53	47	1.23	303
Sphyræna sphyraena	1.07	3	0.20	
Auxis thazard	0.87	7	0.16	
Total	531.34		100.00	

PROJECT STATION: 112
 DATE: 5/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 457 Long W 321
 start stop duration
 TIME :06:24:22 06:54:08 30 (min) Purpose code: 3
 LOG :6373.25 6374.93 1.66 Area code : 3
 FDEPTH: 81 80 GearCond.code:
 BDEPTH: 81 80 Validity code:
 Towing dir: 80° Wire out: 250 m Speed: 30 kn*10
 Sorted: 67 Kg Total catch: 219.89 CATCH/HOUR: 439.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	169.54	2758	38.55	305
Dentex congensis	61.60	728	14.01	309
Pagellus bellottii	60.90	694	13.85	306
Dentex angolensis	49.14	308	11.17	307
Priacanthus arenatus	35.00	442	7.96	
Brachydeuterus auritus	22.40	328	5.09	308
Mustelus mustelus	10.32	6	2.35	
Decapterus macarellus	7.84	134	1.78	
Scomber japonicus	6.24	64	1.42	
Fistularia petimba	5.04	22	1.15	
Sphyraena sphyraena	3.78	14	0.86	
Zeus faber	2.66	14	0.60	
Illex coindetii	1.84	22	0.35	
Pseudupeneus prayensis	1.26	8	0.29	
Lepidotrigla cadmani	0.98	14	0.22	
Trachurus trachurus	0.98	14	0.22	
Alloteuthis africana	0.28	134	0.06	
Boops boops	0.28	8	0.06	
Total	439.78		99.99	

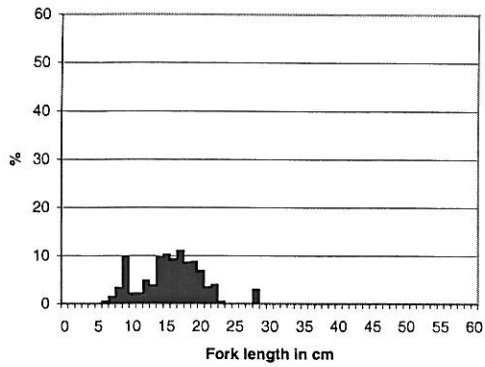
PROJECT STATION: 113
 DATE: 5/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 504 Long W 323
 start stop duration
 TIME :08:46:13 09:16:24 30 (min) Purpose code: 3
 LOG :6386.13 6387.74 1.60 Area code : 3
 FDEPTH: 45 44 GearCond.code:
 BDEPTH: 45 44 Validity code:
 Towing dir: 100° Wire out: 150 m Speed: 30 kn*10
 Sorted: 95 Kg Total catch: 190.30 CATCH/HOUR: 380.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	171.44	428	45.04	
Pomadasy peroteti	37.68	152	9.90	
Pomadasy jubelini	35.68	120	9.37	
Umbrina canariensis	34.24	100	9.00	
Pomadasy incisus	28.48	152	7.48	
Dentex canariensis	10.64	24	2.80	
Lutjanus fulgens	9.36	20	2.46	
Sparus caeruleostictus *	8.88	20	2.33	
Pagellus bellottii	7.44	28	1.95	
Pomadasy rogeri	6.80	32	1.79	
Pseudupeneus prayensis	6.72	56	1.77	
Caranx crysos	3.76	20	0.99	
Boops boops	3.68	216	0.97	
Selene dorsalis	3.44	8	0.90	
Sardinella aurita	3.28	128	0.86	
Lagocephalus laevis	2.40	4	0.63	
Raja miraletus	2.08	8	0.55	
Alloteuthis africana	1.68	620	0.44	
Balistes caprisus	0.72	4	0.19	
Chloroscombrus chrysurus	0.64	4	0.17	
Decapterus macarellus	0.56	16	0.15	
Alectis alexandrinus	0.40	4	0.11	
Brachydeuterus auritus	0.24	4	0.06	
Chaetodon hoefleri	0.16	4	0.04	
Sardinella maderensis	0.16	12	0.04	
Sepiella ornata	0.04	4	0.01	
Total	380.60		100.00	

PROJECT STATION: 114
 DATE: 5/ 5/99 GEAR TYPE: BT No: 2 POSITION: Lat N 506 Long W 322
 start stop duration
 TIME :10:26:51 10:56:03 29 (min) Purpose code: 3
 LOG :6393.39 6394.90 1.49 Area code : 3
 FDEPTH: 27 28 GearCond.code:
 BDEPTH: 27 28 Validity code:
 Towing dir: 105° Wire out: 95 m Speed: 30 kn*10
 Sorted: 108 Kg Total catch: 108.48 CATCH/HOUR: 224.44

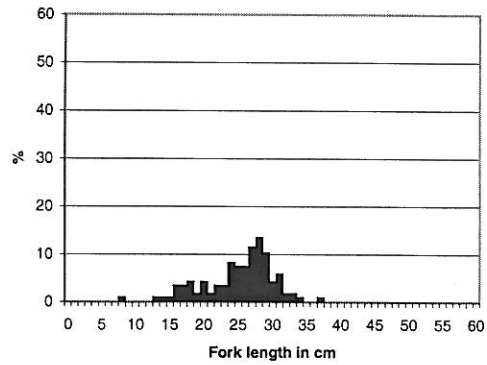
SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lutjanus goreensis	55.70	25	24.82	
Drepane africana	53.38	176	23.78	
Brachydeuterus auritus	23.17	2174	10.32	
Plectorhynchus macrolepis	18.91	19	8.43	
Pomadasy jubelini	14.07	19	6.27	
Epinephelus goreensis	8.44	17	3.76	
Acanthurus monroviae	7.82	14	3.48	
Selene dorsalis	5.50	35	2.45	
Chloroscombrus chrysurus	5.50	317	2.45	
Dentex canariensis	4.59	12	2.05	
Sardinella maderensis	4.51	420	2.01	310
Rhinobatos rhinobatos	2.52	2	1.12	
Balistes punctatus	2.48	6	1.10	
Acanthostracion quadricornis	2.19	8	0.98	
Pseudolithus senegalensis	2.07	4	0.92	
Sepia officinalis hierredda	1.90	2	0.85	
Lethrinus atlanticus	1.86	4	0.83	
Aluterus punctata	1.45	2	0.65	
Eucinostomus melanopterus	1.16	35	0.52	
Galeoides decadactylus	1.12	27	0.50	
Alectis alexandrinus	0.83	4	0.37	
Elops lacerta	0.70	2	0.31	
Lagocephalus laevis	0.70	2	0.31	
Pagellus bellottii	0.62	2	0.28	
Bodianus speciosus	0.58	2	0.26	
Scomberomorus tritor	0.58	2	0.26	
Sphyraena guachancho	0.58	2	0.26	
Pomadasy rogeri	0.46	2	0.20	
Pomadasy incisus	0.37	2	0.16	
Rypticus saponaceus	0.29	2	0.13	
Pseudupeneus prayensis	0.17	2	0.08	
Chaetodon robustus	0.12	2	0.05	
Decapterus macarellus	0.08	2	0.04	
Total	224.42		100.00	

Annex II Length distributions of main species



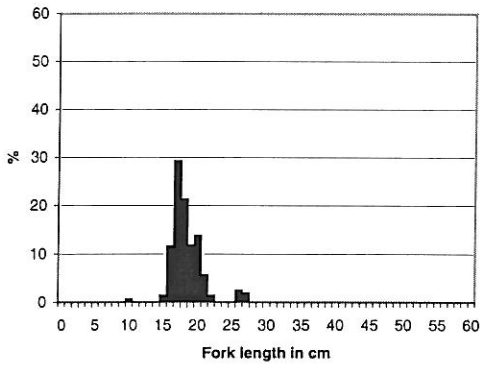
Pagellus bellottii
Mean length = 16.2 cm

Benin - Togo
N = 171



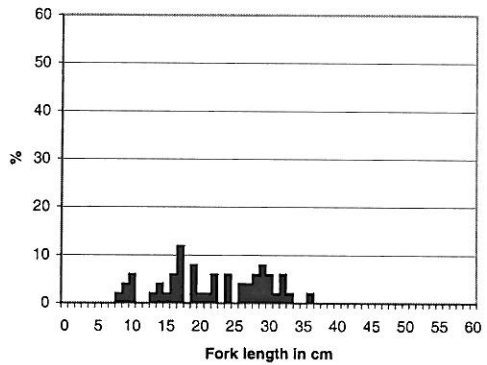
Pagrus caeruleostictus
Mean length = 25.7 cm

Benin - Togo
N = 124



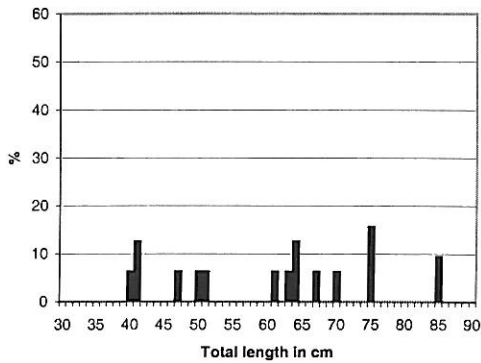
Dentex angolensis
Mean length = 18.9 cm

Benin - Togo
N = 66



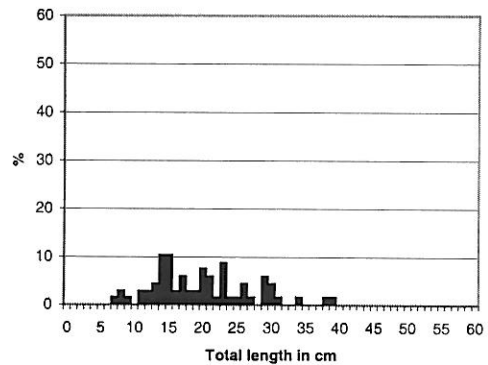
Dentex canariensis
Mean length = 22.3 cm

Benin - Togo
N = 51



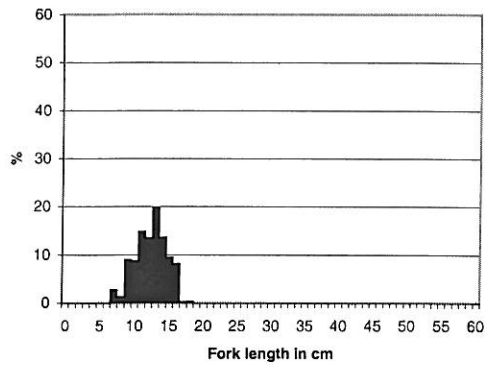
Epinephelus aeneus
Mean length = 61.4 cm

Benin - Togo
N = 15

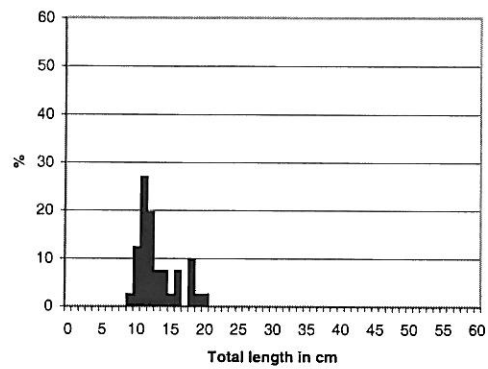


Pseudotolithus senegalensis
Mean length = 20.3 cm

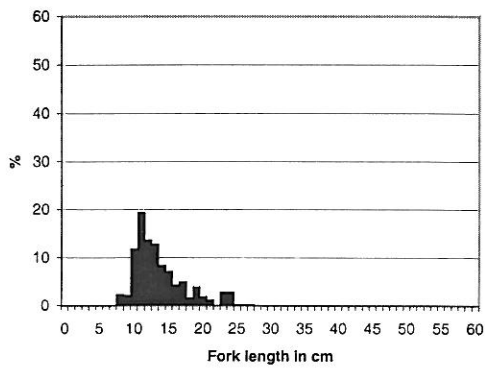
Benin - Togo
N = 68



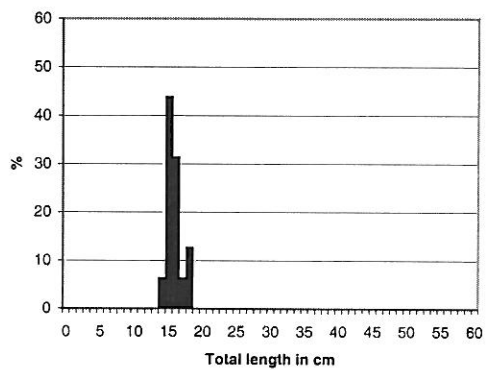
Brachydeuterus auritus Benin - Togo
Mean length = 12.8 cm N = 181



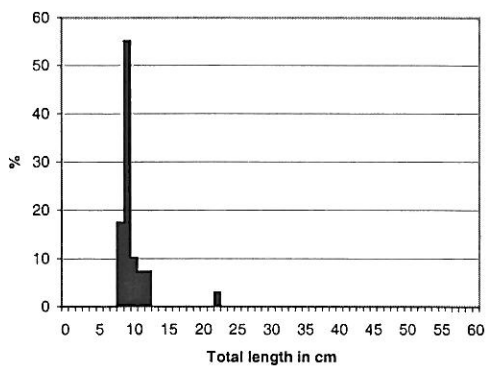
Pseudupeneus prayensis Benin - Togo
Mean length = 13.5 cm N = 41



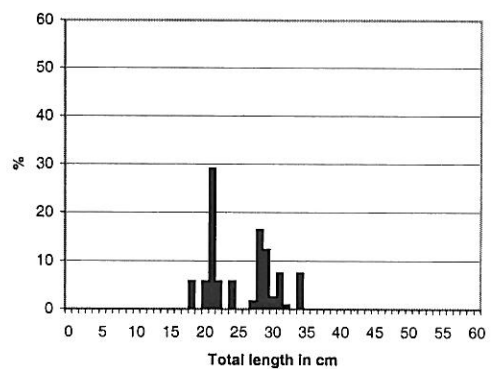
Galeoides decadactylus Benin - Togo
Mean length = 14.2 cm N = 119



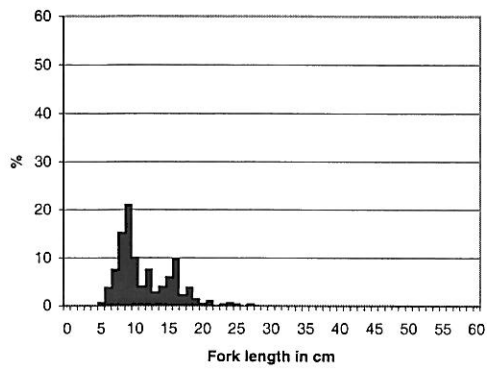
Sardinella aurita Benin - Togo
Mean length = 16.2 cm N = 16



Sardinella maderensis Benin - Togo
Mean length = 10.2 cm N = 29

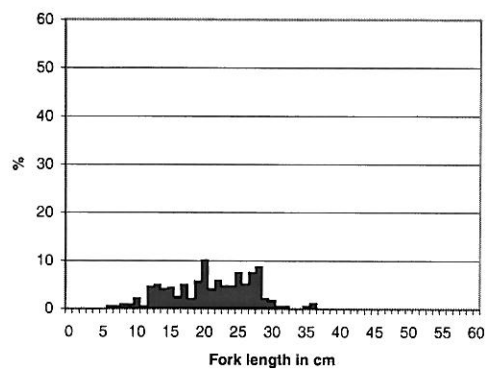


Selene dorsalis Benin - Togo
Mean length = 25.7 cm N = 32



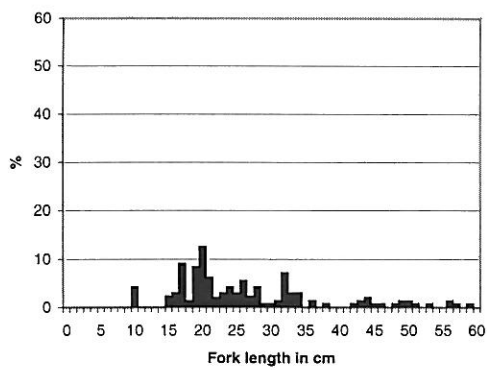
Pagellus bellottii
Mean length = 11.7 cm

Ghana
N = 329



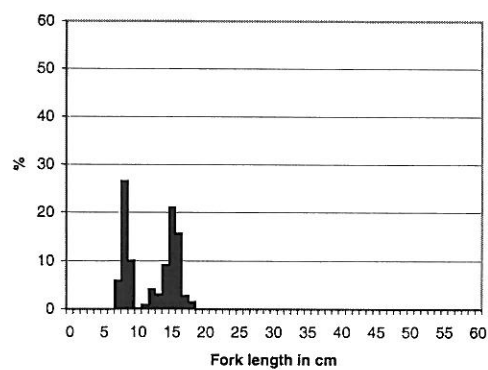
Pagrus caeruleostictus
Mean length = 21.5 cm

Ghana
N = 203



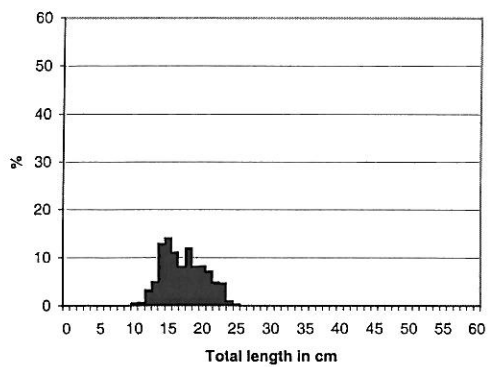
Dentex canariensis
Mean length = 26.8 cm

Ghana
N = 88



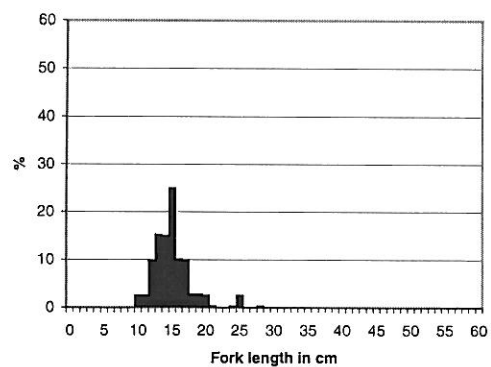
Brachydeuterus auritus
Mean length = 12.5 cm

Ghana
N = 273



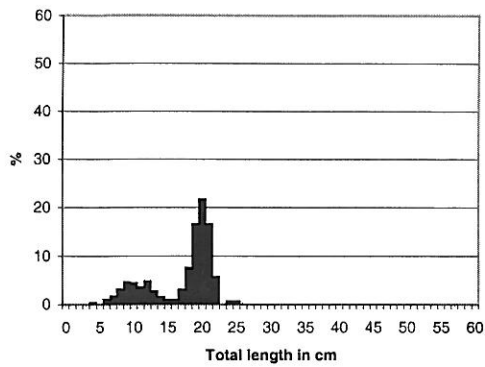
Pseudupeneus prayensis
Mean length = 17.7 cm

Ghana
N = 201



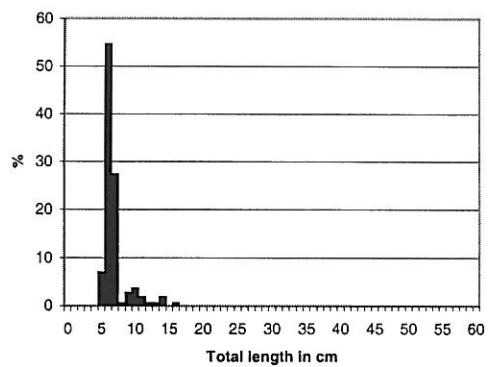
Galeoides decadactylus
Mean length = 15.5 cm

Ghana
N = 51



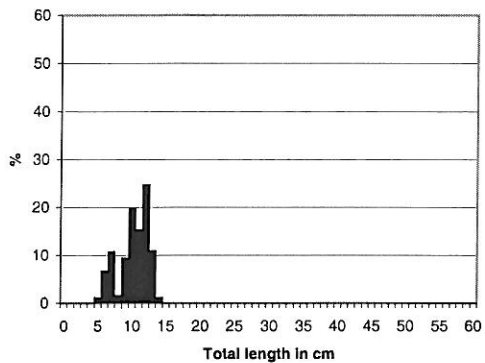
Sardinella aurita
Mean length = 17.7 cm

Ghana
N = 475



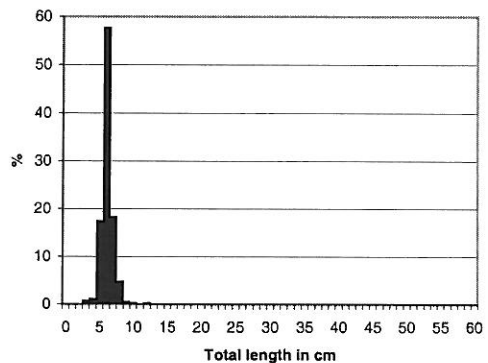
Sardinella maderensis
Mean length = 7.3 cm

Ghana
N = 39



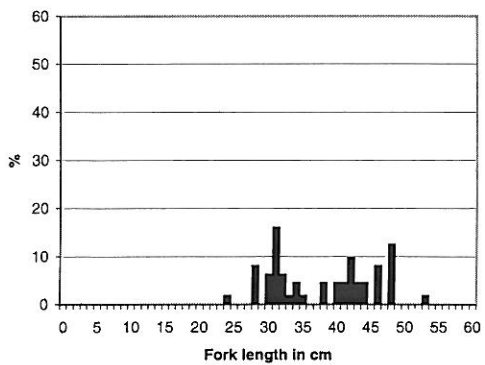
Ilisha africana
Mean length = 10.8 cm

Ghana
N = 83



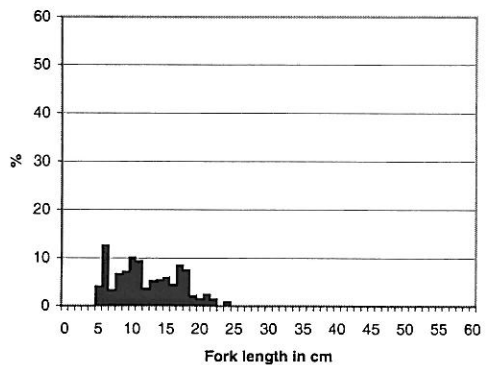
Engraulis encrasicolus
Mean length = 6.6 cm

Ghana
N = 463



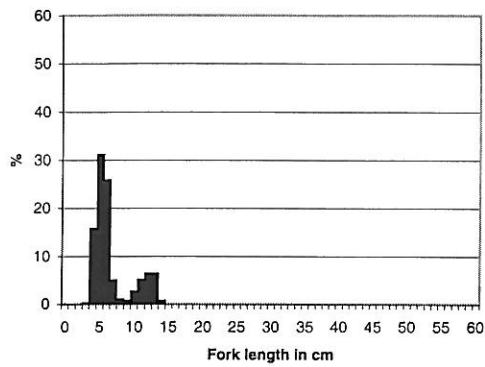
Alectis alexandrinus
Mean length = 38.4 cm

Ghana
N = 29

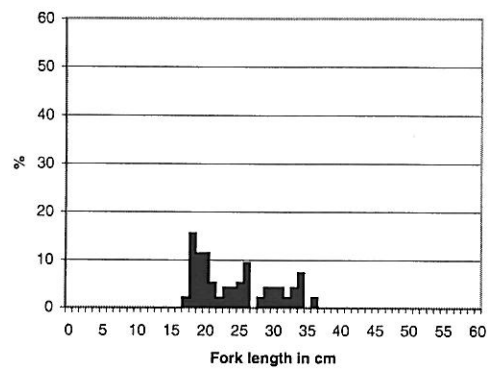


Chloroscombrus chrysurus
Mean length = 12.6 cm

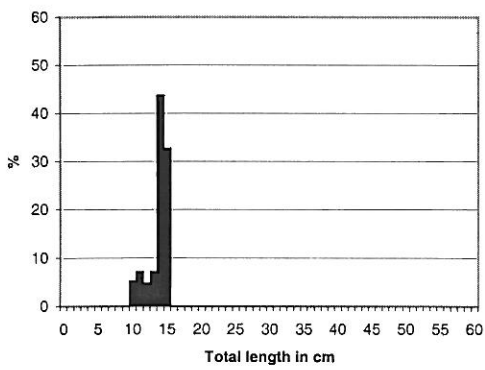
Ghana
N = 412



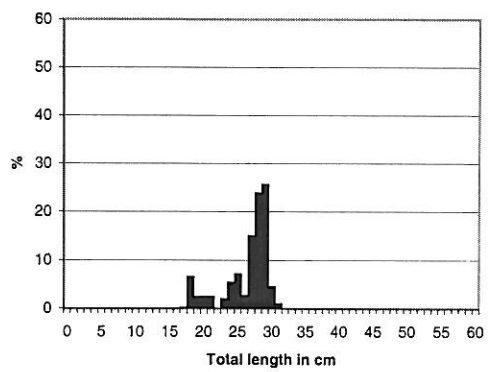
Decapterus macarellus Ghana
Mean length = 7.2 cm N = 233



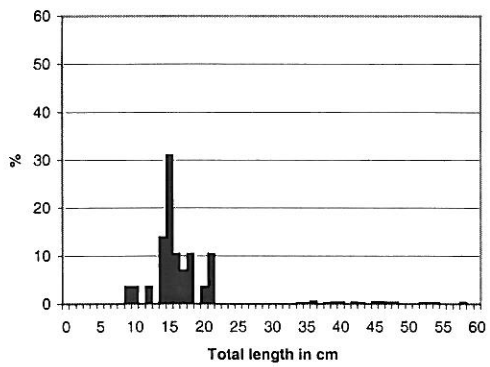
Selene dorsalis Ghana
Mean length = 24.7 cm N = 52



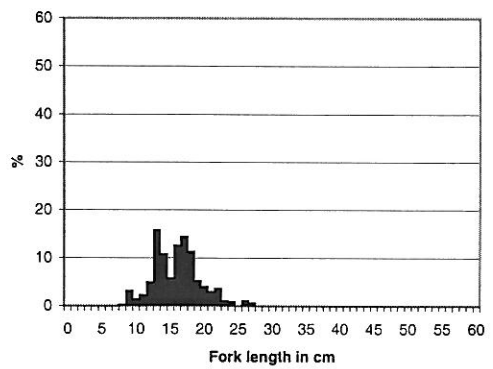
Trachurus trecae Ghana
Mean length = 14.3 cm N = 164



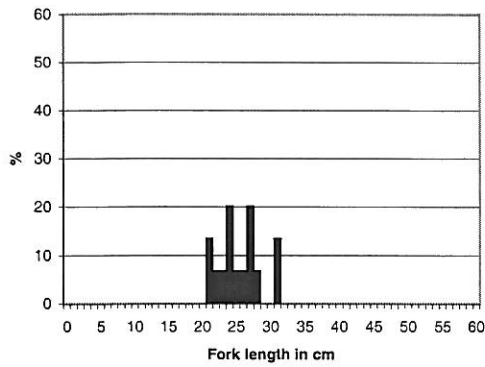
Scomber japonicus Ghana
Mean length = 26.9 cm N = 150



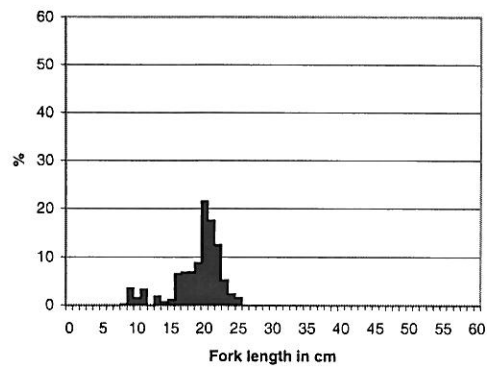
Sphyraena guachancho Ghana
Mean length = 17.2 cm N = 57



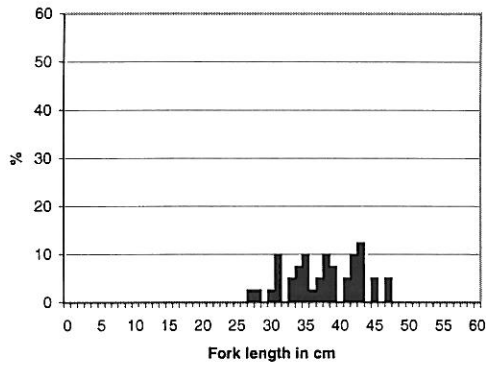
Pagellus bellottii Côte d'Ivoire
Mean length = 16.5 cm N = 225



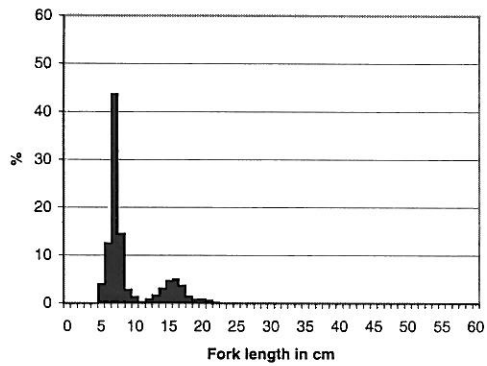
Pagrus caeruleostictus Côte d'Ivoire
Mean length = 25.9 cm N = 15



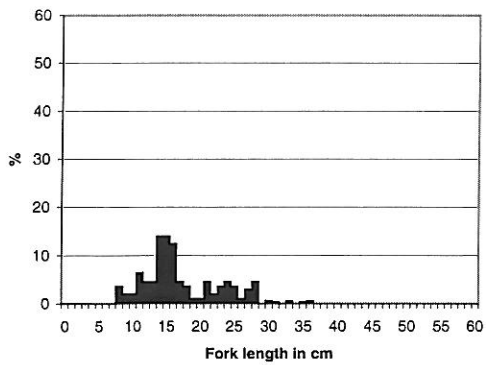
Dentex angolensis Côte d'Ivoire
Mean length = 19.5 cm N = 199



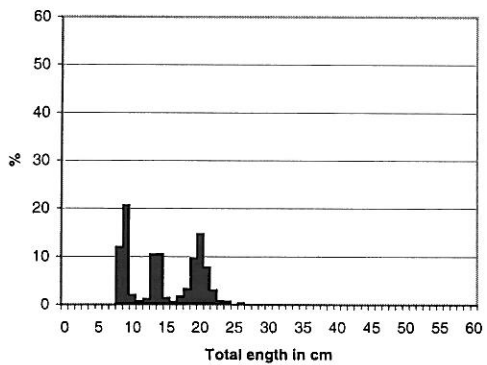
Pseudotolithus senegalensis Côte d'Ivoire
Mean length = 38.2 cm N = 35



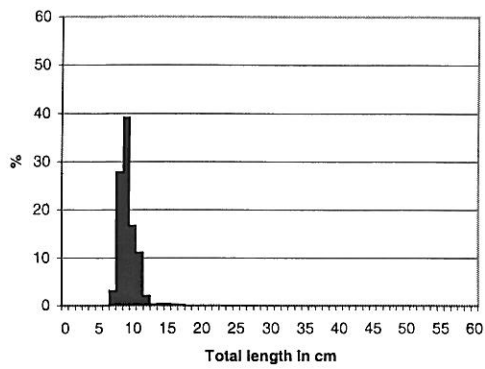
Brachydeuterus auritus Côte d'Ivoire
Mean length = 9.4 cm N = 292



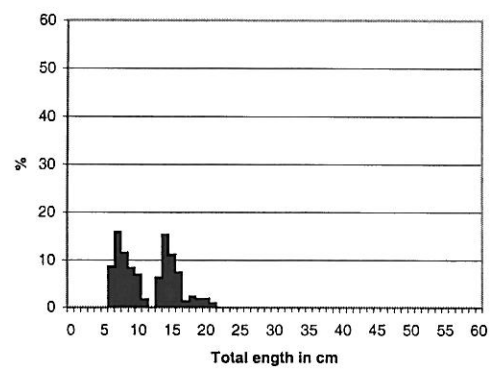
Galeoides decadactylus Côte d'Ivoire
Mean length = 17.6 cm N = 53



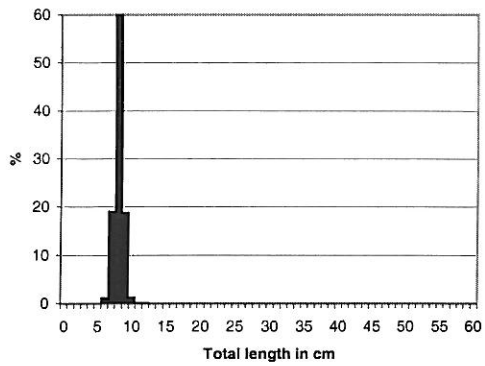
Sardinella aurita Côte d'Ivoire
Mean length = 15.0 cm N = 328



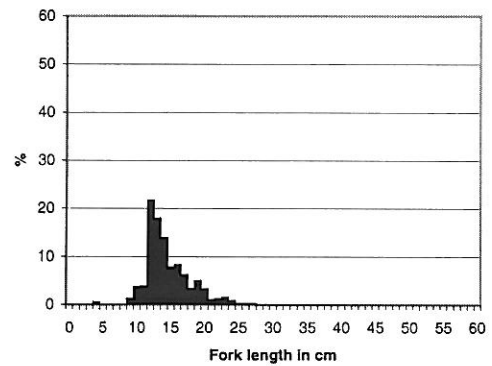
Sardinella maderensis Côte d'Ivoire
Mean length = 9.7 cm N = 711



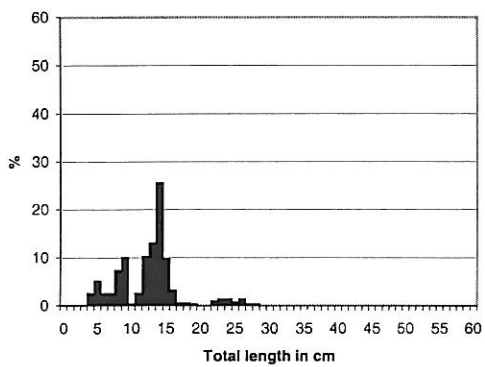
Ilisha africana Côte d'Ivoire
Mean length = 11.9 cm N = 124



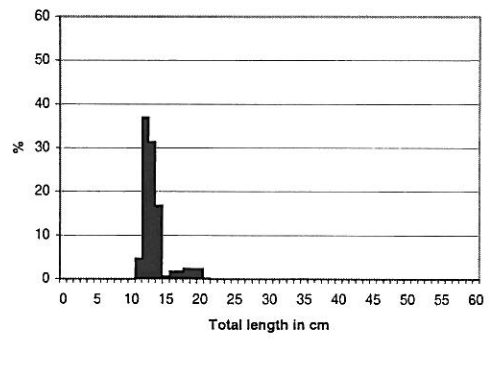
Engraulis encrasicolus Côte d'Ivoire
Mean length = 8.5 cm N = 535



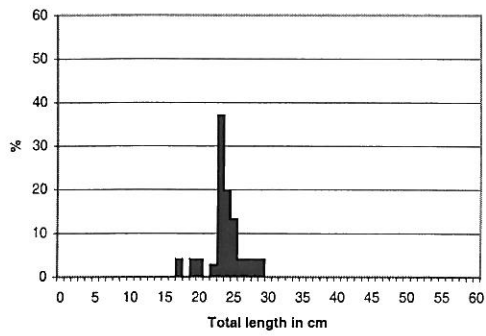
Chloroscombrus chrysurus Côte d'Ivoire
Mean length = 14.9 cm N = 225



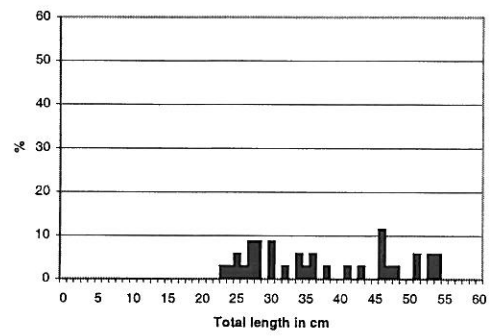
Selene dorsalis Côte d'Ivoire
Mean length = 12.9 cm N = 102



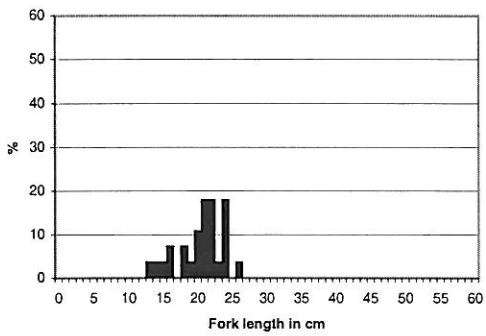
Trachurus trecae Côte d'Ivoire
Mean length = 13.7 cm N = 356



Scomber japonicus Côte d'Ivoire
 Mean length = 24.1 cm N = 32



Sphyraena guachancho Côte d'Ivoire
 Mean length = 37.7 cm N = 35



Balistes capriscus Côte d'Ivoire
 Mean length = 21.0 cm N = 28

Annex III Swept-area biomass estimates

SWEPT AREA ANALYSIS FROM STATION 25 TO STATION 36

Bénin-Togo 1999

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/rm ²	Mean densities by bottom depth strata t/rm ²			
	Lower limits, Kg/nm							- 30m	30- 50m	50-100m	100-100m
	>0	10	30	100	300 1000						
<i>Alectis alexandrinus</i>	7	1	1			75	0.68	0.10	0.45	1.48	
<i>Selene dorsalis</i>	8	2				75	0.42	0.09	1.12	0.06	
<i>Epinephelus aeneus</i>	5	1				50	0.22		0.18	0.79	
<i>Alloteuthis africana</i>	3	2				42	0.30	0.01	0.10	0.79	
<i>Pagrus caeruleostictus</i>	6	1				58	0.30		0.74	0.16	
<i>Dentex angolensis</i>	3	1				33	0.30			0.91	
<i>Galeoides decadactylus</i>	1	2				25	0.22	0.64	0.02		
<i>Pagellus bellottii</i>	6	1				58	0.20		0.05	0.54	
<i>Brachydeuterus auritus</i>	7					50	0.19	0.11	0.39	0.08	
<i>Sphyræna guachancho</i>	9	1				83	0.18	0.18	0.32	0.03	
<i>Sepia officinalis hierredda</i>	7					58	0.15		0.09	0.38	
Miscellaneous fishes	2	1				25	0.14	0.36	0.07		
<i>Pseudolithus senegalensis</i>	1	1				17	0.13	0.39			
<i>Polydactylus quadrifilis</i>	1	1				17	0.13	0.39			
<i>Scomberomorus tritor</i>	3					17	0.11	0.26	0.07		
<i>Dentex canariensis</i>	7					58	0.10	0.03	0.11	0.15	
<i>Elops lacerta</i>	2					17	0.08	0.24			
<i>Ilisha africana</i>	2					17	0.07	0.21			
<i>Psettodes belcheri</i>	3					25	0.06		0.17		
<i>Drepane africana</i>	2					17	0.06	0.17			
<i>Chloroscombrus chrysurus</i>	4					33	0.06	0.16	0.01		
<i>Pistularia petimba</i>	6					50	0.05		0.01	0.16	
<i>Penaeus notialis</i>	2					17	0.01		0.02		
<i>Penaeus kerathurus</i>	1					8		0.01			
<i>Parapenaeopsis atlantica</i>	1					8		0.01			
Other fish							0.52	0.90	0.54	0.35	
Sum all species							4.78	4.26	4.46	5.88	
Sum Snappers							0.01	0.04			
Sum Groupers							0.32		0.18	0.79	
Sum Grunts							0.22	0.22	0.39	0.08	
Sum Croakers							0.17	0.52			
Sum Seabreams							0.91	0.03	0.92	1.76	
Sum Sharks							0.01			0.04	
Sum Rays							0.04	0.06	0.02	0.06	
Sum Squids							0.46	0.01	0.20	1.18	
Sum Carangids							1.21	0.45	1.63	1.59	
Sum Barracuda							0.22	0.31	0.32	0.03	
0.02											

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

12 4 4 4

SWEPT AREA ANALYSIS FROM STATION 37 TO STATION 79

Ghana 1999

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% inci- dence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	>0	10	30	100	300 1000			- 30m	30- 50m	50-100m	100-100m
Brachydeuterus auritus	8	2	5	1	1	53	8.13	0.50	0.47	24.95	
Pagellus bellottii	19	3	2			75	0.52	0.02	0.10	1.53	
PECTINIDAE				1		3	0.50	1.59			
Sepia officinalis hierredda	17	3	1			66	0.45	0.27	0.19	0.94	
Chloroscombrus chrysurus	13	2	2			47	0.41	0.42	0.70	0.04	
Pagrus caeruleostictus	20	3				69	0.29	0.10	0.43	0.31	
Selene dorsalis	7	2	1			31	0.25	0.01	0.36	0.36	
Fistularia petimba	21	1				69	0.21		0.07	0.60	
Pomadasy jubelini	1		1			6	0.19		0.51		
Alectis alexandrinus	9		1			31	0.19	0.42	0.14	0.02	
Dentex canariensis	13	2				47	0.16	0.20	0.12	0.18	
Sphyræna guachancho	14	1				44	0.14	0.29	0.01	0.14	
Pseudupeneus prayensis	14	1				47	0.13	0.03	0.07	0.30	
Sardinella aurita	11	2				41	0.13	0.02	0.01	0.39	
Chelonia mydas			1			3	0.12	0.39			
Decapterus macarellus	20	1				66	0.12	0.05	0.04	0.28	
Alloteuthis africana	7	1				25	0.11		0.08	0.25	
Priacanthus arenatus	13	1				44	0.11	0.01	0.02	0.32	
Galeoides decadactylus	5	1				19	0.11	0.11	0.19		
Drepane africana	3		1			13	0.11	0.34			
Dactylopterus volitans	15					47	0.11	0.03	0.18	0.10	
Lagocephalus laevigatus	19					59	0.10	0.10	0.07	0.13	
Engraulis encrasicolus	7	2				28	0.09	0.14	0.10	0.01	
Epinephelus aeneus	10					31	0.08		0.11	0.12	
Dentex angolensis	5	1				19	0.07			0.21	
Selar crumenophthalmus	9					28	0.07	0.09	0.04	0.07	
Caretta caretta		1					0.06	0.20			
Scomberomorus tritor	9					28	0.06	0.06	0.11		
Sphyræna afra		1				3	0.05		0.13		
Raja miraletus	10					31	0.05		0.01	0.13	
Miscellaneous fishes	4					13	0.05	0.08	0.04	0.02	
Penaeus kerathurus	1					3					
Penaeus notialis	5					16		0.01			
Parapenaeopsis atlantica	1					3					
Other fish							0.91	0.73	0.68	1.33	
Sum all species							14.08	6.21	4.98	32.73	
Sum Snappers							0.02		0.06	0.01	
Sum Groupers							0.08		0.11	0.12	
Sum Grunts							8.37	0.51	1.09	25.00	
Sum Croakers							0.02	0.03		0.03	
Sum Seabreams							1.10	0.32	0.65	2.43	
Sum Sharks							0.06	0.02		0.16	
Sum Rays							0.09	0.02	0.04	0.19	
Sum Squids							0.59	0.27	0.32	1.23	
Sum Carangids							1.14	1.01	1.30	1.00	
Sum Barracuda							0.19	0.29	0.14	0.14	

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

32 10 12 10

SWEPT AREA ANALYSIS FROM STATION 80 TO STATION 114

Côte d'Ivoire 1999

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% inci- dence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	>0	10	30	100	300			1000	- 30m	30- 50m	50-100m
<i>Brachydeuterus auritus</i>	16	8	1	1	1	87	2.77	1.12	2.04	4.85	
<i>Engraulis encrasicolus</i>	13		1		1	48	1.81	5.20	0.82	0.02	
<i>Sardinella maderensis</i>	17		1	1		61	0.78	1.10	1.26	0.05	
<i>Chloroscombrus chrysurus</i>	14	5	2			68	0.76	1.52	0.88	0.03	
<i>Trachurus trecae</i>	9	1		1		35	0.67		0.06	1.83	
<i>Priacanthus arenatus</i>	7	1	2			32	0.49		0.01	1.37	
<i>Galeoides decadactylus</i>	13	2	1			52	0.45	0.71	0.67		
<i>Sardinella aurita</i>	19		2			68	0.34	0.03	0.08	0.86	
<i>Elops lacerta</i>	9	1	1			35	0.30	0.22	0.67		
<i>Pagellus bellottii</i>	16	3				61	0.29		0.21	0.60	
<i>Dentex angolensis</i>	8	1	1			32	0.28			0.80	
<i>Sphyraena guachancho</i>	13	1	1			45	0.27	0.44	0.35	0.06	
<i>Selene dorsalis</i>	18	2				65	0.24	0.45	0.24	0.05	
<i>Boops boops</i>	9		1			32	0.20		0.01	0.54	
<i>Dentex congoensis</i>	1	2				10	0.15			0.43	
<i>Pentheroscion mbizi</i>	5	1				19	0.14	0.02		0.37	
<i>Pomadasys jubelini</i>	9	1				32	0.10	0.19	0.13		
<i>Drepane africana</i>	6	1				23	0.10	0.25	0.08		
<i>Sphyraena sphyraena</i>	6	1				23	0.09		0.20	0.05	
<i>Sepia officinalis hierredda</i>	14					45	0.08	0.07	0.06	0.11	
<i>Dentex canariensis</i>	10					32	0.07	0.03	0.04	0.15	
<i>Epinephelus aeneus</i>	4	1				16	0.07	0.04	0.01	0.16	
<i>Pseudotolithus senegalensis</i>	7					23	0.07	0.22	0.01		
<i>Ilisha africana</i>	7					23	0.07	0.21	0.02		
<i>Lagocephalus laevigatus</i>	20					65	0.06	0.04	0.13	0.02	
<i>Lutjanus goreensis</i>	1	1				6	0.06	0.22			
<i>Trichiurus lepturus</i>	10					32	0.05	0.06	0.02	0.06	
<i>Stromateus fiatola</i>	1	1				6	0.05	0.13		0.03	
<i>Umbrina canariensis</i>	5	1				19	0.05	0.02	0.10	0.03	
<i>Penaeus kerathurus</i>	2					6					
<i>Penaeus notialis</i>	5					16		0.01			
<i>Parapenaeopsis atlantica</i>	1					3					
Other fish							0.77	0.80	0.81	0.78	
Sum all species							11.63	13.10	8.91	13.25	
Sum Snappers							0.07	0.22	0.03		
Sum Groupers							0.08	0.07	0.01	0.16	
Sum Grunts							2.98	1.40	2.41	4.85	
Sum Croakers							0.30	0.36	0.13	0.40	
Sum Seabreams							1.02	0.06	0.32	2.52	
Sum Sharks							0.04			0.11	
Sum Rays							0.05	0.03	0.04	0.09	
Sum Squids							0.13	0.09	0.11	0.20	
Sum Carangids							1.81	2.07	1.37	2.07	
Sum Barracuda							0.36	0.44	0.55	0.11	

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

31 9 11 11

Annex IV Instruments and fishing gear used

The Simrad EK-500/38kHz scientific sounder was used during the survey for fish abundance estimation. The Bergen Echo Integrator system (BEI) was used to scrutinize the acoustic records from the 38kHz echo sounder, and to allocate integrator values to fish species.

The details of the settings of the 38kHz echo sounder where as follows:

Tranceiver-1 menu (38 kHz lowering keel)

Transducer depth	5.50 m
Absorption coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducer gain	27.48 dB
TS transducer gain	27.72 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg
Alongship offset	-0.05 "
Athwardship offset	0.14 "

Display menu

Echogram	1 (38 kHz)
Bottom range	12 m
Bottom range start	10 m
Sv colour min	-67 dB

Printer- menu

Echogram	1 (38 kHz)
Range	50, 100, 250, 500 and 1000 m
Range start	0
Bottom range	12 m
Bottom range start	10 m
Sv colour min	-67 dB
TVG	20 log R

Bottom detection menu Minimum level -45 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 m², 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.