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SURVEY OF THE PELAGIC FISH RESOURCES AND ECOSYSTEM OFF WEST AFRICA

Gabon, Republic of Congo, and Democratic Republic of Congo

21 September - 1 October 2017



MAEPA, Gabon MAEP, Republic of Congo MPE, Democratic Republic of Congo Institute of Marine Research Bergen, Norway

The EAF-Nansen Programme

The EAF-Nansen Programme "Supporting the application of the Ecosystem Approach to Fisheries Management considering climate and pollution impacts" (GCP/GLO/690/NOR) aims to further strengthen the knowledge base and the overall institutional capacity for the implementation of the Ecosystem Approach to Fisheries (EAF) in developing countries, with additional attention to the impact of climate variability and change, pollution and other anthropogenic stressors.

The programme, that started implementation in May 2017, builds on earlier phases, and is governed by an agreement between the Food and Agriculture Organization of the United Nations (FAO), the Institute of Marine Research (IMR), Norway and the Norwegian Agency for Development Cooperation (Norad). The three pillars of the new programme are: Science, Fisheries management, and Capacity development. A new state of the art research vessel, *Dr Fridtjof Nansen* is an integral part of the programme. A science plan, covering 11 research themes, guides the programme scientific work.

The programme works in partnership with countries, regional organizations, other UN agencies as well as other partner projects and institutions.

Le Programme EAF-Nansen

Le Programme EAF-Nansen "Appuyer la mise en œuvre de l'approche écosystémique de la gestion des pêches en tenant compte des impacts du climat et de la pollution" (GCP/GLO/690/NOR), vise à renforcer la base de connaissances et les capacités institutionnelles pour la mise en œuvre de l'approche écosystémique des pêches (AEP) dans les pays en développement, en accordant une attention particulière aux effets de la variabilité et du changement climatique, de la pollution et d'autres facteurs de stress anthropiques.

Le programme, qui a débuté en mai 2017, s'appuie sur les phases précédentes et est régi par un protocole d'accord entre l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), l'Institut de recherche marine (IMR) de Norvège et l'Agence norvégienne de Coopération au développement (Norad). Les trois piliers du nouveau programme sont : la science, l'aménagement des pêches et le développement des capacités. Un navire de recherche à la pointe de la technologie, le nouveau *Dr Fridtjof Nansen*, fait partie intégrante du programme. Un plan scientifique, couvrant 11 thèmes de recherche, guide les travaux scientifiques du programme.

Le programme travaille en partenariat avec les pays, les organisations régionales, d'autres agences des Nations Unies ainsi que d'autres projets et institutions partenaires.

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by

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EXECUTIVE SUMMARY

The regional survey on the transboundary pelagic resources and ecosystems off West Africa (Gabon, Congo and Democratic Republic of Congo) had as main objective to estimate the biomass of small pelagic species by the acoustic method as well as the state of the ecosystems within the EEZ of these countries. The specific objectives of the survey were to improve knowledge and understanding of the biology, ecology and population dynamics of major pelagic species as well as the "health status" of the marine ecosystem in the EEZs of these countries. The report describes the varioous sampling operations, the methods used and preliminary results obtained.

During the survey, 68 CTDs, 18 phyto-, 34 WP2, 22 multinet, 22 manta, 12 demersal trawl and 14 pelagic trawl hauls were completed. Catches were sampled by species, weight, height, sex and stage of sexual maturity.

The results showed the presence of small pelagic eggs in the area from the mouth of the Congo River to the south of Cape Lopez and that sardinella stocks were mainly composed of small individuals. Biomass estimates of the main pelagic species were as follows:

- Round Sardinella: 4,819 tonnes
- Flat Sardinella: 37 752 tonnes
- Horse mackerel: 14 817 tonnes
- Mackerel: 28,144 tonnes
- Other clupeoid species: 7 392 tonnes
- Other carangids / scombridae: 78 354 tonnes

Biomass estimates and size composition from the catches indicate that small pelagic stocks may be at very low levels of abundance.

RÉSUMÉ EN FRANCAIS

La campagne régionale sur les ressources pélagiques et les écosystèmes transfrontaliers en Afrique de l Ouest (Gabon, Congo RDC) a eu comme objectif principale à évaluer les petits pélagiques par la méthode acoustique ainsi que l'état des écosystèmes dans les ZEE du Gabon, du Congo et de la RDC. Les objectifs spécifiques de la campagne étaient d'améliorer les connaissances et la compréhension à terme de la biologie, l'écologie et la dynamique des populations des principales espèces pélagiques ainsi que "l'état de santé" de l'écosystème marin dans les ZEE de ces pays. Le rapport décrit les différentes opérations effectuées à bord du navire et donne les résultats préliminaires obtenus lors de cette mission scientifique.

Au cours de la campagne on a pu réaliser 68 CTD, 18 phyto-, 34 WP2, 22 multinet, 22 manta, 12 coups de chalut de démersaux et 14 couts de chaluts de pélagiques. Les captures ont été échantillonnées par espèces, poids, taille, sexe et stade de maturité sexuelle.

Les résultats de la campagne ont montré que beaucoup d'œufs de petits pelagiques ont été prélevés dans la zone de l'embouchure du fleuve Congo jusqu'au sud du Cap Lopez et que les stocks de sardinelle étaient composés essentiellement d'individus de petite taille. Les estimations de biomasse pour les espèces suivantes sont :

- Sardinelle ronde: 4 819 tonnes
- Sardinelle plate: 37 752 tonnes
- Chinchard: 14 817 tonnes
- Maquereau: 28 144 tonnes
- Autres espèces de clupeoidés: 7 392 tonnes
- Autres carangidés/scombridés: 78 354 tonnes

Les estimations de biomasse et la composition en tailles indiquent que les stocks de petits pélagiques sont très faibles.

CHAPTER 1. INTRODUCTION

1.1 Survey objectives

This survey was planned as part of a synoptic coverage of West Africa's pelagic resources and ecosystems conducted from Morocco to South Africa, from May to December 2017 as part of the EAF-Nansen Programme (2017-2021).

In connection with this phase of the Programme, a Science Plan has been developed that addresses 11 different themes within three main lines of research related to resources, impacts of oil/mining activities and pollution on resources and ecosystems and climate change. Therefore, in addition to providing key information on abundance and distribution of main pelagic stocks, the survey programme was designed to also support data collection for priority research questions that will be addresses as part of specific research projects under the science plan.

Overall survey objectives and the sampling plan were agreed with the respective partner institutions and a detailed sailing order was prepared that describes these in detail.

The specific objectives include:

Hydrography:

• To map the hydrographic/environmental conditions in the survey area (temperature, salinity, oxygen, chlorophyll, nutrients and pH values-acidity).

Phytoplankton, zooplankton, ichthyoplankton and jellyfish:

• To establish as far as possible, the distribution, abundance and composition of phytoand zooplankton, and species composition of fish eggs and larvae; to collect samples of jellyfish for identification, biology and ecology.

Pelagic stocks:

- To obtain information on abundance, distribution (also by size) of *Sardinella aurita*, *Sardinella maderensis, Engraulis encrasicolus, Trachurus trecae, Scomber colias, Ethmalosa fimbriata* and *Decapterus rhonchus* using acoustic methods and a systematic grid survey strategy;
- To collect samples for genetic analysis and for morphometric studies, both for stock identification of *S. aurita, S. maderensis, E. encrasicolus, T. trecae, S. colias* and *E. fimbriata*;
- To obtain information on maturity stages, and to collect stomach samples for analysis of contents and otoliths of *S. aurita, S. maderensis, E. encrasicolus, T. trecae, S. colias* and *E. fimbriata*.

Marine debris and pollution:

• To record occurrence of marine debris in trawl gear;

- To collect samples for levels of nutrients and contaminants including microplastics;
- To map occurrence of microplastics and describe associated neuston communities.

Contaminants and nutrients in fish:

• To collect samples of fish species consumed locally for analysis of contaminant levels and nutrient values.

1.2 Participation

Institute of Marine Research, Bergen, Norway:

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National Institute of Nutrition and Seafood Research, Bergen, Norway: Per-Olav Rasmussen, Sofie Myhre Christiansen

Angola:

Filomena Vaz Velho, Miguel André Antonio, Djamila Fernanda Dos S. Pedro C Mauricio, Geraldina De Assuncao Salvador C José, António Buco, William Carlos Joao Augusto, Suzana Joao Da Conceicao S Nicolau, Sonia Cristina Pedro Da Silva, Amaro Jose S Francisco

Gabon:

Mr. Davy Angueko, Ms. Marie Francoise Nzang-Ovono Spouse Eva-ESSANGONE, Mr Jean De Dieu Lewembe, Mr. Jean-Bernard Mougoussi.

Congo:

Mr. Tite Romuald Akenze, Mr. Blaise Richard Ntse, Mr Ahmed Stanislas Belvere Nakavoua, Ms. Rychie Jucelle Léticia Ntelamanou.

Democratic Republic of Congo:

Mr Mulumba Casimir Koffi, Mr. Kambale Mangaya Jean-Marie.

1.3 Narrative

Figures 1 and 2 show the cruise track and the stations worked during the survey. The vessel departed from Point Noire, Congo, at 17h30 UTC on 21st September 2017, starting the sampling work south of Cape Lopez in Gabon on 23rd September at 01h00. The survey proceeded with an acoustic sampling grid with a transect spacing of approximately 10 NM, covering the shelf and slope until the 500-m bottom depth contour. The sampling continued southwards along parallel transects approximately perpendicular to the coast. Due to oil related activity and high density of fishing boats and other vessels some transects had to be adjusted.

The border between Gabon and Congo was reached on the 29th September at 12h00 UTC. In

several areas along the coast of Gabon waters, oil and gas activity occurs. In this area, some transects were shortened to avoid the security perimeter of rigs and vessels. A long environmental transect extending from 20 m to 2000m offshore was conducted on 29th and 30th September from Pointe Noire. Thereafter the vessel continued surveying crossing the Congo River. A north-south hydrographic section was conducted. The border to Angola at Congo River was crossed on the 1st of October. The findings from the northern part of Angola will be presented in survey report for Angola, 2017408.

Table 1 provides an overview of dates/survey days for Gabon and Congo, respectively.

| Table 1. | . Overview | of the | cruise | dates. |
|----------|------------|--------|--------|--------|
|----------|------------|--------|--------|--------|

| | Days in country | Start | Complete |
|-------|-----------------|--------------|--------------|
| Gabon | 8 | 21 September | 29 September |
| Congo | 2,5 | 29 September | 1 October |

Standard hydrographical sections were sampled along acoustic transects every 30 NM from 500 m bottom depth to between 20 and 30 m bottom depth close to the coast. Along every second hydrographic section phytoplankton, zooplankton, ichthyoplankton and micro-plastics were also sampled at each super-station.

The weather was generally favourable, and no days were lost due to bad weather or mechanical problems.

1.4 Survey effort

Altogether 26 trawl hauls were carried out to identify acoustic targets during the survey. 68 CTD casts were 68 along 9 hydrographic transects, to describe the water properties in the survey area. Plankton and manta trawl stations sampled were 22, along 6 of the 9 hydrographic transects. Tables 2 and 3 show the survey effort during the survey. Annex II provides the full details of the trawl stations.

| _ | Trawl hauls | Acoustic | Hydrographic | Plankton & hydrographic |
|-------|----------------|----------|--------------|----------------------------|
| Gabon | 23 | 19 | 7 | 4 |
| Congo | 3 | 4 | 2 | 2 |
| Total | 26 | 23 | 9 | 6 |

Table 2. Sampling effort during the survey. Table shows the number of transects.

Table 3. Number of samples per categories: CTD, Phyto - phytoplankton net, WP-2 – zooplankton net, Multinet - eggs and larvae, Manta trawl net - plastic particles in the surface, BT - bottom trawl, PT-Pelagic trawl.

| Region | CTD | Phyto | WP-2 | Multinet | Manta | BT | PT | Distance |
|--|-----|-------|------|----------|-------|-----|----|----------|
| Gabon | 49 | 12 | 20 | 13 | 13 | 10 | 13 | 1280 |
| Congo | 19 | 6 | 14 | 9 | 9 | 2 | 1 | 31,63 |
| Transit from Point Noire to Cape Lopez | | | | | | 171 | | |
| TOTAL | 68 | 18 | 34 | 22 | 22 | 12 | 14 | 159,63 |



Figure 1. Course track with plankton and hydrographic stations, Gabon and Congo. Depth contours at 20m, 50m, 100m, 200m, 500m and 1000m are shown. Z: CTD; *: super-station.



Figure 2. Course track with bottom - and pelagic trawl stations, Gabon and Congo. Depth contours at 20m, 50m, 100m, 200m, 500m and 1000m are indicated.

CHAPTER 2. METHODS

2.1 Underway sampling

2.1.1 Meteorological data recording

Meteorological data were logged continuously from the AANDERAA Smartguard meteorological station and included wind direction and speed, air pressure, relative humidity, air temperature and solar radiation. All data were logged to the Nansis tracklog system averaged every 60 sec.

2.1.2 Thermosalinograph

The SBE 21 Seacat thermosalinograph ran continuously during the survey, obtaining samples of sea surface (at 4 m depth) recording salinity and relative temperature every 10 seconds. An attached in-line C3 Turner Design Submersible Fluorometer measured turbidity and chlorophyll-a levels.

2.1.3 Current speed and direction measurements (ADCP)

Two hull-mounted Acoustic Doppler Current Profiler (VMADCP) from RD Instruments ran during the survey. The frequencis of the VM-ADCP are 75 and 150 kHz. The system was run in narrow band mode and data were averaged in 16 and 4 m vertical bins at 75 and 150 kHz respectively. The 150 kHz data was analysed during the cruise, while the 75kHz data was stored on files for post survey processing. Both the ADCPs were run continuously.

2.2 Bottom mapping echo sounder

The EM 710 multibeam echo sounder is a high to very high-resolution seabed mapping system. Data acquisition depth starts approximately 3 m below the transducers and the maximum acquisition depth is limited in practice to 1000 - 1500 m on "Dr. Fridtjof Nansen". At greater depths, the EM 302 will be used. Across track coverage (swath width) is up to 5.5 times water depth and may be limited by the operator either in angle or in swath width without reducing the number of beams. The operating frequencies are between 70 to 100 kHz. There are 128 beams with dynamic focusing employed in the near field. The transmitting fan is divided into three sectors to maximize range capability and to suppress interference from multiples of strong bottom echoes. The sectors are transmitted sequentially within each ping and use distinct frequencies or waveforms. The along track beam width is 1 degree. Ping rate is set according to depth. The receiving beam width is 2 degrees. Sound profiles were set manually in the system according to the area of operation. The data was logged to the onboard Olex plotting system.

2.3 Fixed station sampling

Standard hydrographical sections were sampled along acoustic transects every 30 NM from 500 m bottom depth to between 20 and 30 m bottom depth close to the coast (500 m, 200 m, 100 m, 75 m, 50 m, 30 m, 20 m). Along every second hydrographic section phytoplankton, zooplankton, ichthyoplankton and micro-plastics were also sampled at the super-station. (CTD with water bottles for samples of nutrients and pH phytoplankton net, WP2, multinet, manta trawl). Samples were taken at the inshore end of the acoustic transects, usually at a water depth of 30 m, 100-m isobath and at at 500 m bottom depth. In addition, CTD stations were added at 20 m, 50 m, 75 m, and 200 m at the same transect. The samples collected on every second hydrographic transects are shown in Figure 3.



Figure 3. Overview of sampling conducted at environmental transects.

2.3.1 CTD sensors – temperature, salinity, oxygen, light and fluorescence

Vertical temperature and salinity profiles were obtained by a Seabird 911 CTD, while *in situ* concentrations of dissolved oxygen were measured using a CTD-mounted SBE 43 oxygen sensor. Real time logging and plotting was performed using the Seabird Seasave software installed on a PC. Attached to the CTD was also an uncalibrated Chelsea Mk III Aquatracka fluorimeter, which measures *in situ* fluorescence on relative scale and a Photosyntetic Active radiation (PAR) sensor, measuring downwelling irradiance (in micromole photons m²).

The salinity sensor was valitated with analyses of water samples using a Portasal salinometer (mod. 8410A) onboard the vessel (Table 4). The oxygen sensor was validated with analyses of water samples using the method of Winkler titration (Grasshoff *et al.* 1983) and the results are presented in Table 5. When comparing the sensor values from the CTD, with the standard watersamples (salinity) and the Winkler titration measurements, it can be concluded that the

sensors are preforming well and the measured sensor values can be trusted and used in further analysis.

| | <i>с</i> | | | | | |
|-------------|----------------------|----------|--------------|----------|-------------------|--------|
| Station nr. | Date (dd/mm/yyyy) | P CTD | temp. CTD | S CTD | S water sample | ΔS |
| 502 | 23/09/2017 | 15,300 | 25,7980 | 34,5910 | 34,588 | -0,003 |
| 503 | 23/09/2017 | 25,900 | 25,6680 | 34,7650 | 34,764 | -0,006 |
| 504 | 23/09/2017 | 44,500 | 25,2030 | 34,9530 | 34,913 | -0,037 |
| 505 | 23/09/2017 | 90,600 | 17,1950 | 35,8010 | 35,763 | -0,037 |
| 507 | 23/09/2017 | 193,400 | 15,3780 | 35,6390 | 35,650 | 0,011 |
| 508 | 23/09/2017 | 499,300 | 7,4400 | 34,6830 | 34,688 | 0,005 |
| 509 | 23/09/2017 | 2001,700 | 3,4400 | 34,9650 | 34,963 | -0,002 |
| 509 | 23/09/2017 | 2001,700 | 3,4400 | 34,9650 | 34,962 | -0,003 |

Table 4. Comparison between the measured salinity from the CTD and the salinity obtained from water samples using the Portasal salinometer.

Table 5. Comparison between the measured oxygen from the CTD and the oxygen measured based on the Winkler titration.

| Station # | Bottle # | Depth | Oxygen (CTD) | Oxygen | Difference |
|-----------|----------|--------|--------------|-------------|------------|
| | | (m) | | (Titration) | |
| 536 | 1 | 480,98 | 2,112 | 2,012 | -0,1 |
| 536 | 2 | 400,3 | 1,767 | 1,78 | 0,013 |
| 536 | 3 | 300 | 1,368 | 1,242 | -0,126 |
| 536 | 4 | 199,7 | 2,266 | 2,16 | -0,106 |
| 536 | 5 | 99,4 | 1,825 | 1,827 | 0,002 |
| 536 | 6 | 75,2 | 3,362 | 3,195 | -0,167 |
| 536 | 7 | 50,4 | 4,839 | 4,676 | -0,163 |
| 536 | 8 | 25,3 | 4,743 | 4,708 | -0,035 |
| 536 | 9 | 5,2 | 4,793 | 4,688 | -0,105 |
| 537 | 1 | 1665 | 5,329 | 5,304 | -0,025 |
| 537 | 2 | 999,8 | 3,504 | 3,507 | 0,003 |
| 537 | 3 | 749,2 | 2,832 | 2,805 | -0,027 |
| 537 | 7 | 73,3 | 2,462 | 2,284 | -0,178 |
| 537 | 8 | 47 | 4,328 | 3,997 | -0,331 |
| 537 | 9 | 24,2 | 4,751 | 4,646 | -0,105 |
| 537 | 10 | 4,8 | 4,806 | 4,778 | -0,028 |

2.3.2 Ocean acidification parameters (pH and alkalinity)

Seawater samples collected at standard depths were used to determine chlorophyll, pH, alkalinity and for nutrient analyses (nitrate, nitrite, silicate and phosphate) as described below.

Seawater samples (250 mL) from the CTD-mounted Niskin-bottles were collected in borosilicate glass bottles using silicone tubing to reduce air exchange. Both pH and alkalinity were analysed on board the vessel. pH was determined spectrophotometrically using a diode array spectrophotometer and a pH sensitive indicator, m-cresol purple in 2 mM solution, as described by Clayton and Byrne, 1993; Chierici *et al.*, 1999. Alkalinity was measured by titration with acid (0.05M HCl) and changes in pH were measured with an electrode (potential in mV) using tiamo software. Further processing of the data will be done on land at IMR and will provide more information on the marine carbonate system and parameters for ocean acidification.

2.3.3 Nutrient samples

Seawater samples (20 mL) for nutrient analyses (nitrate, nitrite, silicate and phosphate) were taken from the Niskin water-bottles. Samples were collected from the standardized depths 5, 25, 50, 75, 100, 200, 300, 400, 500, 600, 800 and 1000 m, with bottom-depth restricting the number of samples collected from a given station. The seawater samples were stored in 20 mL polyethylene vials, conserved with 0.2 mL chloroform (1% chloroform solution), and kept cool and dark in a refrigerator (Hagebø and Rey, 1984). The analysis was made at the Institute of Marine Research (Bergen, Norway), using a modified Alpkem AutoAnalyzer C (O I Analytical, USA) and following standard procedures (Strickland and Parsons, 1972). Extra standards were added during the analysis to cover the whole measurement range. During the laboratory's quality control of the data, some outlying values that were obviously wrong were excluded. The quality control included evaluation of the ratios between the different nutrients.

2.4 Phytoplankton sampling

Chlorophyll *a* is a plant pigment, which in oceanography typically is used as an indirect measure for phytoplankton biomass. Seawater samples for analysis of chlorophyll *a* and phaeopigment concentrations were collected at predefined depths with rosette-mounted Niskin bottles attached to the CTD at the plankton stations. Seawater samples (250 mL) were collected from the standardized depths 5, 25, 50, 75, 100, 200, 300, 400, 500, 600, 800 and 1000 m, with bottom-depth restricting the number of samples collected from a given station.

The seawater samples were filtered on Munktell glass-fibre filters (GF/C, 25 mm diameter) using a custom-made filtration system. During the cruise, the filter-samples were stored at \sim - 18°C in the dark for subsequent analysis on shore in the IMR laboratory in Norway. The pigments were extracted with 90% acetone in darkness over-night, and the extracts centrifuged and analysed using a Turner Design fluorometer model 10 AU calibrated with pure chlorophyll *a* (Sigma Inc). Interference from phaeopigments was corrected for by measuring the amount of pigments once again, after having added a weak acid (10% HCl). The method of determining the amount of chlorophyll *a* and phaeopigments extracted in 90% acetone was launched in the early nineteen-sixties (Yentsch & Menzel 1963), but the method

itself and the calibration-factors have later been changed several times (e.g. Holm-Hansen et al. 1965, Jeffrey & Humphrey 1975, Welschmeyer 1994, Humphrey & Jeffrey 1997, Jeffrey & Welshmeyer 1997). The measurement of chlorophyll *a* and phaeopigments by the fluorometer was performed according to the guidelines of the producer (Turner Designs 1992), and the present version of the method was first described by Holm-Hansen & Riemann (1978).

Qualitative phytoplankton samples were collected at "super-stations" (described above). At each super-station, qualitative phytoplankton samples were collected with a net (35 cm in diameter and mesh-size of 10 μ m), hauled vertically at a speed of 0.1 ms⁻¹ from the depth of 30 m to the surface (from ca. 5 m above bottom at the 30 m stations). The samples were preserved with a solution of 2% formaldehyde in dark glass bottles. These samples are used to establish the taxonomic composition of the phytoplankton community.

2.5 Zooplankton sampling

Mesozooplankton was collected with a WP2-net along the hydrographic transects at the super-stations. The WP2-net (56 cm diameter, mesh size 180 μ m) (Fraser 1966, Anonymous 1968) was hauled vertically at a speed of $\approx 0.5 \text{ ms}^{-1}$ at each station, the net was equipped with a flowmeter to measure the sampling distance. At the shallowest and intermediately deep stations (bottom-depths of 30 m and 100 m, respectively) the sampling strata were from near-bottom to the surface (deepest sampling depths of ≈ 25 and 90 m, respectively). At the stations with bottom-depth of ≈ 500 m or greater, the sampling stratum was from the depth of 200 m to the surface.

Furthermore, a second sample with the WP2 net was collected from the upper 30 m at the stations with bottom depths of 100 m and 500 m. The purpose of these additional samples was to enable a direct comparison of the zooplankton composition and concentrations in the uppermost layer of the water-column along the bottom-depth gradient. Each zooplankton sample was divided into two equal parts using a Motoda plankton splitter (Motoda 1959). The first part of the sample was size-fractioned by using a series of sieves with the decreasing mesh-sizes of 2000 μ m, 1000 μ m and 180 μ m, and the zooplankton retained on each sieve were dried on pre-weighed and numbered aluminium trays at ~60°C for 24 h nd then frozen. These samples will be dried once more and weighed on shore at the IMR after the cruise for estimation of biomass for the different size-groups. The second part of the sample was preserved in seawater with a final solution of 4% formaldehyde for subsequent species identification and quantification, in partner countries (INIP, Angola).

2.6 Fish-eggs and larvae

Sampling for fish eggs and larvae was done at the super-stations with a Hydro-Bios Multinet with mesh-size 405 μ m. The net was towed obliquely from ~10 m above the bottom, or from a maximum depth of 100 m, to the surface with a speed of ~1.5 ms⁻¹. The counts of a manual

flowmeter attached in the lower part of the trawl opening were recorded at the start and end of each trawl.

From most of the samples fish larvae visible with "the naked eye" were removed from the total sample, photographed and transferred to sample bottles. The fish larvae were then preserved in 4% formaldehyde buffered with borax. When all visible fish larvae had been removed from the Multinet sample, the rest of the sample was splitted into a suitable part, and eggs were removed from that part and then preserved in 4% formaldehyde buffered with borax. A part equal to that which eggs were removed from was preserved for reference purposes.

2.7 Microplastics

Microplastics are normally defined as small pieces of plastic marine debris smaller than 5 mm long. Microplastics were collected along the hydrographic transects at all super-stations. At each station, the surface layer was sampled with a Manta-trawl, with a rectangular opening of 19 cm \times 61 cm (HxW), mesh-size 335 μ m and two wings to keep it balanced and at the surface during the tow. Trawls were hauled horizontally at a speed of \sim 1.5 ms⁻¹ for 15 minutes. The counts of a manual flowmeter attached in the lower part of the trawl opening were recorded at the start and end of each trawl. Trawling was performed some meters away from of the starboard side, about mid-ship, attempting to avoid the wake of the vessel.

Once the Manta-trawl was retrieved, microplastic particles were sorted from the sample under a stereo-microscope, and the sorted sample was then checked once more to reduce the risk of overlooking the smallest plastic particles. All assumed plastic items were then placed on a gridded petri dish for examination under the stereo-microscope, photographed and, to the extent possible, also measured and described (e.g. length, shape, type and colour). The sorted microplastics were dried in pre-weighed aluminium-trays in room-temperature. The trays with dried microplastic were packed in aluminium foil and stored at -20⁰C until transport to the IMR laboratory, where they will be studied in more detail. After removing the plastics, the remaining part of the samples - mainly biological material - was preserved in formalin 4% for studying the neuston at UWC, Cape Town, after the cruise.

2.8 Food safety

Whole fish, fillet and different organs from various fish that are regularly consumed in the four countries surveyed were sampled and preserved. All the samples will be analysed for a wide variety of nutrients and contaminants at IMR, Bergen, as listed below. Tissue samples from mackerel will be analysed for the parasite Kudoa. Some of the samples will also be analysed for correspondence between the microbiota and the metal content of the gut. One pelagic fish sample and two mesopelagic fish samples will be analysed for the content of microplastic particles.

2.9 Biological trawl sampling

Biological sampling of the fish was carried out using pelagic and bottom trawls. In shallow water (<30 m) or at night when pelagic fish was close to the surface, the pelagic trawl with floats or bottom trawl with floats was used for sampling. The MultPelt trawl could not be used due to winch problems, which meant that pelagic trawling was only possible with the small pelagic Åkra trawl. In several instances, especially when the acoustic target was small and isolated, this made it more difficult to obtain sufficient catches to describe identified acoustic targets. A more detailed description of instruments and fishing gear is given Annex I.

All catches were sampled for composition by weight and numbers of each species caught. Species identification was based on the FAO Species Guides. For the selected target species length (total length to the nearest cm), weight (to the nearest 0,5 g), sex, gonad maturity stage (according to Annex III), gonad weight, and stomach fullness (according Annex III) were recorded. Length and weight measurements were used to estimate the length-weight relationship and together with length frequency distributions applied in biomass calculations. In addition, the following biological samples of specific fish species were taken: otoliths (in paper envelopes), finclips (max in 96% ethanol) for genetic analysis, stomach and liver samples (frozen in plastic bags), and frozen samples for morphometric analysis (25-30 fish). Instead of attempting to remove otoliths, stomach and liver from small individuals (<10cm, and in most instances all anchovy and sardinella), whole fish were frozen, as it seemed less cumbersome and time consuming to do this on land in well equipped labs.

The target groups used for this survey were *Sardinella aurita and S. maderensis*, *Scomber japonicus*, *Trachurus trecae and T. capensis*, *and Engraulis encrasicolus*. The complete records of fishing stations and catches are shown in Annex II. A full list of biological samples per species and trawl station is given in Annex IV.

2.10 Acoustic sampling

2.10.1 Sonar data

A Simrad SH90 Sonar recorded data continuously during the survey for post processing after the survey. The sonar was set to a frequency of 26 kHz, in FM Normal mode. The sonar was operated using bow up/180 deg operation mode with the bearing of the vertical beams 90 deg, perpendicular to the vessel direction with a range of 450 m and with the horizontal beams set to 450 m with a tilt angle of 3 deg. The filters built into the sonar software to improve the school representation (i.e. AGC, RCG and ping to ping) were set to default values except for the Noise filter, which was turned off.

The settings including range and tilt was kept the same during all the surveying except during trawling operations where the sonar was at times used actively to focus in on targets.

No other sonars were used during the survey.

2.10.2 Echo sounder

Acoustic equipment

Acoustic data were recorded using a Simrad EK80 Scientific Split Beam Echo Sounder equipped with keel-mounted transducers at nominal operating frequencies of 18, 38, 70, 120, 200 and 333 kHz. The survey was started without an *a priori* calibration, although the sounders were calibrated in Bergen on the 23rd January 2017. Annex I gives the details of the acoustic settings used during the survey.

2.10.3 Allocation of acoustic energy to species group

Acoustic data were logged and post-processed on board using the latest acoustic data post-processing software, the Large-Scale Survey System (LSSS) Version 2.0.

Scatters were displayed at 38 kHz. The mean 5 nautical miles (nm) area backscattering coefficient s_A (m²/NM²) was allocated to a predefined set of species groups on the basis established echogram features and stored as mean values per 1 nautical mile (nm). Allocation of acoustic densities to species groups and respective species are listed in Table 6. Ground truthing and estimation of mean length and weight were accomplished by means of targeted pelagic and demersal trawling. In cases where the integrated echo contained more than one category of fish (see Table 6), the mean s_A -value allocated to each category was more or less in the same ratio as their contribution to the abundance in trawls in that area. Note that due to low abundance, biomass estimates could not be calculated for all the listed fish groups/species. Even though *Decapterus punctatus* was not listed as a priority species in the objectives, it often occurs with its congener *D. rhonchus* and hence the two species cannot be separated acoustically. *D. punctatus* was therefore included in the Pelagic 2 fish group.

The acoustic backscatter was scrutinized daily and allocated to the various target groups. The s_V threshold used when sardinellas occurred to filter out other species and plankton was -45 dB, or in regions where the plankton layer was extremely dense an even lower threshold had to be used. For Pelagic 1, Pelagic 2 and "other pelagic species" -50 dB was used. To identify mesopelagic layers a threshold of -60 dB was used.

Table 6. Allocation of acoustic densities to species groups. Note that for the groups sardinella, horse mackerel, big-eye grunt and pilchard all encountered species are listed, while only examples are listed for the remaining groups

| Group | Taxon | Species | Sampling |
|---------------------|--|--------------------------|---------------------------------|
| Sardinella | Sardinella sp. | S. aurita | Full biological |
| | | S. maderensis | |
| Horse mackerel | Trachurus sp. | T. trecae | Full biological |
| Mackerel | Scombridae | Scomber colias | Full biological not otoliths |
| | | | |
| Other | | Brachydeuterus auritus | Length & Weight |
| Pelagic species 1 | Clupeiformes ¹ | Ilisha africana | |
| | | | Full biological |
| | | | not otoliths |
| | | Engraulis encrasicolus | |
| Pelagic species 2 | Carangidae ² | Selene dorsalis | |
| | | Chloroscombrus | |
| | | chrysurus | |
| | | Decapterus rhonchus | |
| | | Seriola carpenteri | |
| | Scombridae | Auxis thazard | Length & Weight |
| | | Sarda sarda | |
| | Sphyraenidae | Sphyraena guachancho | |
| | Others | Trichiurus lepturus | |
| | Oulers | Lepidopus caudatus | |
| Demersal species | Sparidae ³ | Dentex angolensis | |
| | | D. macrophthalmus | Length & Weight |
| | | D. congoensis | |
| | | D. canariensis | |
| | | D. barnardi | |
| | | Pagellus bellottii | |
| | | Sparus caeruleostictus | |
| | | S. pagrus africanus | |
| | Other taxa | Saurida brasiliensis | |
| | | Arioma bondi | |
| | | Pomadasys incisus | |
| | | Galeoides decadactylus | |
| Mesopelagic species | Myctophidae ₃ | Diaphus dumerili | Total mass |
| | Other mesopelagic fish | | |
| Plankton | Calanoidae | Calanus sp. | |
| | Euphausiidae | Meganyctiphanes sp. | |
| | Other plankton | | |
| 1 other then Sandin | and on 1 ² other than Tugehum | and 3 main taxa in aroun | · |

other than Sardinops sp.;² other than Trachurus sp.;³ main taxa in group.

2.10.4 Estimation of biomass

Acoustic data were logged and post-processed on board using the latest acoustic data post-processing software, the Large-Scale Survey System (LSSS) Version 2.0.

In cases where the integrated echo contained more than one category of fish (see Table 6), the mean s_A -value allocated to each category was in the same ratio as their contribution to the abundance in trawls in that area.

The following target strength (TS) function was applied to convert s_A -values (mean integrator value for a given species or group of species in a specified area) to number of fish:

$$TS = 20 \log L - 72 dB$$

which can be converted (see Toresen *et al.* 1998 for details) to the area form (scattering cross sections of acoustic targets):

(1)

$$CF = \frac{10^{7.2}}{4\pi} \cdot \overline{L}^{-2} \tag{2}$$

where *CF* is the conversion factor from acoustic density to fish biomass and \overline{L}^2 is the mean of squared fish lengths. This target strength function was originally established for North Sea herring but has later been attributed to clupeids in general (Foote *et al.*, 1986; Foote, 1987).

No specific target strength relations presently are available for the species at hand, and equation (2) has therefore been applied consequently for all targeted species in this time series. The biomass was calculated by multiplying the number of fish by the expected length at weight, estimated by regression of the log-length (total) against total weight. Separate length-weight relationships were worked for different regions, pooling all data within each region.

The boundaries of encountered fish aggregations (post strata) were determined by means of contouring within the inner and outer zero-value limits of the transect lines. The strata contours were digitised using Nansis Maptool Version 2.01.4. Sub-stratification was used to isolate areas of similar densities, using the following pre-defined, standard categories:

1:
$$0 < s_A < 300$$
; 2: $300 \le s_A < 1000$; 3: $1000 \le s_A < 3000$; 4:
 $3000 \le s_A \le 10000$; 5: $10000 \le s_A \le \infty (m^2/NM^2)$

The basis for contouring is averages of five 1NM values along transects. At the end of transects and in connection with trawl stations the averaging may include fewer (from 1 to 4 single NM observations). This is a source of bias, but this bias is limited due to observations within strata having similar values. Other sources of bias of concern are the shallow distribution pattern (above integration limit), vessel avoidance behaviour of sardinella (Misund and Aglen, 1992) and inshore distribution (at depths smaller than 20 m). All estimates should consequently be considered as relative indices of abundance.

The overall length frequency distributions within strata were estimated by weighting the sample-distributions with the nearest valid 1 NM integrator value, or the average of two adjacent values. Target species of the same genus, i.e. *S. aurita / S. maderensis* and *T. trecae / T. capensis*, are not acoustically distinguishable, and the s_A values were therefore split according to the relative distributions of the two species in each length group. The total number of fishes in each length group was estimated as:

$$\rho_{i} = \frac{\langle s_{A} \rangle t_{i,j} \cdot u_{i}}{\sum_{i} \frac{u_{i}}{C_{Fi}}} \cdot A_{s} = \frac{10^{72} \cdot t_{i,j} \cdot u_{i} \cdot \langle s_{A} \rangle \cdot A_{s}}{4\pi \sum_{i} u_{i} \cdot (L_{i} + 0.5)^{2}}$$
(3)

where:

| ρ_i | = | estimated number of fish in length group i |
|---------------------|-----|--|
| < _{SA} > | = | mean recorded area backscattering coefficient (m^2/NM^2) |
| t _{i,j} | = | proportion of species j in length group i |
| ui | = | proportion of sampled fish in length group i |
| A _s | = | horizontal area of stratum s |
| C_{Fi} | = | conversion factor for length group i |
| Li | = | length group i (nearest full cm below total length) |
| L _i +0.5 | ; = | mean length in L _i . |
| | | |

The integrator outputs were split into the fish groups listed below using a combination of behaviour pattern as deduced from echo diagrams, the LSSS analysis and catch composition.

The above equations show that the conversion from s_A -values to number of fish is dependent on the length composition of the fish. It was therefore important to get representative length distributions from the key species groups in the whole distribution area.

When the size classes (of e.g. young fish and older fish) were well mixed, the various length distributions were pooled together with equal importance. Otherwise, when the size classes were segregated, the total distribution area was post-stratified, according to length distributions, and separate estimates were made for the strata containing fish with equal size.

For a stratum representing a distribution of a target group, the following basic data are needed for the estimation of abundance;

- 1) The average s_A -value for the region,
- 2) The surface area (usually square nautical miles, NM²), and
- 3) A representative length distribution of the fish in the region.

If the targeted fish was a mixture of more than one species, for example sardinellas, representative distributions of all the species within the stratum, as shown in the trawl catches, was used. Length distributions representing the various species for each catch was calculated and normalized to a unit number (usually 100). These were then averaged without weighting. Very small catches (normally less than about 20 fish) were not included. The total catch of each species from all the trawls in a stratum was used as a proxy for estimating the proportion of the total biomass of each species present. While it is recognised that catch is a poor indicator of relative abundance, especially for pelagic fish, no other method is accessible from the data available.

The process followed was therefore to

- a) divide the s_A-value between groups of fish and/or species,
- b) produce pooled length distributions of a target species/category for use in the above equation and
- c) calculate the biomass estimates for a region,

using the following procedure:

- The length-frequency samples of the species in the category were respectively pooled together with equal importance (normalized).
- The mean back scattering strength (ρ/s_A) of each length frequency distribution of the target group/ species was calculated and summed. This was automatically done in the Excel spread-sheet made available for acoustic abundance estimation on board RV "*Dr. Fridtjof Nansen*".
- The pooled length distribution was used, together with the mean s_A-value, to calculate the density (numbers per square NM) by length groups and species, using the above formula. The total number by length group in the area was obtained by multiplying each number by the area.
- The numbers were then converted to biomass using the estimated weight at length.

CHAPTER 3. RESULTS - OCEANOGRAPHY

3.1 Underway sampling

3.1.1 Atmospheric conditions

As expected, the incoming solar radiation show the diurnal cycle, but also pronounced interdiurnal differences with values of maximum solar radiation varying from about 400W.m⁻² to 1000 W.m⁻² (Figure 4 a). During the first few days the winds were consistently strong from the south (i.e. blowing toward north). The subsequent period from about 23^{rd} Sept. – 29^{th} Sept. was characterized by weaker and more shifting winds during the day, from upwelling winds from the south to downwelling favorable winds from the north. On the 30^{th} Sept. and the 1^{st} Oct., the wind was relatively strong and consistent from the north, before turning more easterly during $2^{nd}-3^{rd}$ Oct. (Figure 4 b).



Figure 4. The measured a) solar radiation and b) wind obtained from the meteorological instruments mounted at 25 m above sea level aboard the RV Dr. Fritjof Nansen. Note that the wind vector points in the direction that the wind is blowing. An approximate scaling factor of the order $(\ln 10)/\ln(25) = .7$ is required to reference wind to the normal 10 m height.

3.1.2 Thermosalinograph

The thermosalinograph data of near surface conditions (4m depth) show relatively saline and cold conditions in the north, off Gabon (Figure 5). Also, there is a gradient from the coast with colder and less saline water due to coastal upwelling. This is also reflected in elevated levels of fluorescence. Further south, towards the Congo River, there is a gradually increasing influence of the warm and less saline Congo River water. Corresponding to this the fluorescence and turbidity show increased values. Just south of the Congo River, the conditions are again relatively saline and cold. The transect going north to south at about 6°S indicates that the Congo River plume is slanted toward northwest.



Figure 5. Termosalinograph data at 4 m depth from the RV DR. Fritjof Nansen during the period 22 Sept. – 3 Oct. 2017 showing temperature (upper left), salinity (upper right), fluorescence (lower left) and turbidity (lower right).

3.1.3 ADCP current velocity

The continuous vertical profiles of currents measured by the ADCP 150KHz show that off Gabon, in the upper depth bin observed with the instrument (starting from 18m below surface), the flow is generally northwards of about 0.2-0.5 m.s-1 on the shelf (Figure 6). Interestingly this current decreases rapidly with increasing depth (50 m) and there is even a tendency of this flow to reverse direction toward south.

No measurements are made shallower than 18 m depth thus we cannot conclude whether there is a southward flow shallower than 18 m very close to the coast.

Southward of 4°S, on the shelf off Congo, the currents are weak and northward near the coast. Downstream of the Congo River the currents are strong toward southeast. This could in part be in accordance with entrained water into the Congo River water flowing in the opposite, i.e offshore, and direction. At 50 m, the currents are weak whereas at 214 m there is a tendency for a northward flow.

Along the entire survey along Gabon and Congo, and similarly for the subsequent survey along Angola, there is a continuous northward slope current of about 0.2 ms⁻¹ with the core over the 400-800 m isobaths that are prominent in the 214 m depth layer. Further analysis should be performed to investigate the structure of this current at larger depth using the 75 KHz ADCP which extends deeper, with further sampling also in 14 m depth bins.



Figure 6a. Stick plots of VM-ADCP current velocities from a) 18m, b) 50 m, and c) 214 m depth obtained during the period 22 Sept. -10 Oct. 2017. The arrows represent 4 m depth mean values over 5-minute sampling time. For comparison, we here also include the currents from the Angola shelf to the south. A reference arrow of 0.5 m/s is included in the plot.



Figure 6b. (cont.).



Figure 6c. (cont.).

3.2 Hydrography

The continental shelf off Gabon and Congo is typically of the order 30-40 nm defined as depth less than 250 m, before a relative steep continental slope toward a basin of 1500-2000 m. However, downstream of the Congo River there is a deep valley with depths between 500-1000 m cutting through the continental shelf. Hydrographic variables were measured in sections normal to the coastline about every 30 nm (Figure 7). The CTD sampled continuous profiles of pressure, temperature, salinity, oxygen, fluorescence, oxygen and Photosyntetic

Active Radiaation (PAR). In addition, water samples for analysis of nutrients, chlorophyll, salinity and oxygen were collected from surface to bottom at selected depths.



Figure 7. Positions of the CTD stations in waters off Gabon, Congo and Congo River. Red lines indicate hydrographic transects used to produce vertical profiles for salinity, temperature, oxygen, PAR and fluorescence. CTD stations no. 502-587, in total 86.

3.2.1 Temperature

In the upper layer covering the inner part of the shelf the temperature typically exceeds 24 $^{\circ}$ C (Figure 8). The only exception is in the Congo River section where colder water of about 20 $^{\circ}$ C intrudes the shelf. In all the sections the temperature decreases to 10 $^{\circ}$ C at depths between 300 to 400 m.

3.2.2 Salinity

The general salinity distribution constitutes a relatively fresh surface layer, then a layer between 50 m to some hundred meters with a salinity maximum, and further down a gradual decrease in salinity toward abyssal conditions. However, there are some noteworthy details on the shelf connected to the fresh surface layer. The most pronounced near coast fresh layer is in the section at 4° S off Gabon (Figure 9), whereas in the two sections closest to the Congo River low salinity layers are found, with value ranging around of the order 10.0-15.0 offshore (Figure 9). The most saline shelf water is found in the section just to the south of the Congo River.

3.2.3 Oxygen

The distribution of dissolved oxgen was generally high in the upper 50 m, and then decreasing with depth to 1-1,5 mL/L in a pronounced oxygen minimum zone (OMZ) at 250 to 400 m depth. The upper high oxygen layer is most homogenous in the northernmost section, whereas in the three sections to the south there are clear indications of onslope intrusion of lower oxygen water near the bottom.

3.2.4 Fluorescence

It is only in the upper 100m that there is a clear difference in fluorescence between the sections. In the two northernmost sections, there are relatively high values at the shelf that becomes gradually deeper offshore, typically reaching a maximum at 20-40 m. In the section to the north of Congo River relatively high fluorescence values are found in the upper 15 m, with a marked maximum about 100 km from the coast. Similar conditions, but with generally lower values are found to the south of the Congo River.


Figure 8. Cross section of temperature (° C) from north to south based on the CTD data. See Figure 1 for positions of the sections.



Figure 9. Cross section of salinity from north to south based on the CTD data. See Figure 1 for positions of the sections.



Figure 10. Cross section of oxygen from north to south based on the CTD data. See Figure 1 for positions of the sections.



Figure 11. Cross section of fluorescence, from north to south based on the CTD data. See Figure 1 for positions of the sections, note different vertical scale.

3.2.5 Horizonal distribution of fluorescence PAR

Fluorescence distributions at 5 and 50 m essentially show opposite patterns (Figure 12). At 5 m there are elevated values along-stream the Congo River water, as well as over the shelf of Congo and the coast of Gabon. In the deep water, values are low. Contrarily, at 50 m depth the values are low beneath the Congo River water, and over the shelves of Congo and Gabon, whilst outside the shelf break there are elevated values that exceeded even the maximum values at 5m. These different distributions can at least in part be explained by the changes in the measured PAR (Figure 13). In the area directly in the stream of the Congo River (st no 578 and 569, and along the coast of the Congo (st no 529) the water is dark, with high absorbance of light, and production and use of nutrient does hence only occur in the upper 10-20 m. However, for the stations offshelf along Congo and Gabon (st no 509, 523 and 537) the light penetrates much deeper and can therefore utilize the deeper nutrients, and thereby explain the high fluorescence values at 50 m.



Figure 12. The horizontal distribution of fluorescence off Gabon and Congo at left) 5 m depth and right) 50 m depth.



Figure 13. Vertical profiles from the PAR sensor mounted on the CTD for selected station during day time. Locations of the profiles are shown on the map.

3.3 Phyto and zooplankton samples

Samples containing phytoplankton and zooplankton were collected from the phytoplankton vertical haul net and the WP2 net (also vertical haul). These samples will be analysed later, and the results reported separately. Overview of the phyto- and zooplankton collected is presented in Table 7.

| | Phytoplankton | Zooplankton from | | on Zooplankton from Zooplankton from | | on from 25 m |
|---------|---------------|------------------|-------------------|--------------------------------------|-------------------|--------------|
| Country | | 100m a: | nd 200 m | | | |
| , | Formalin | Formalin | Dried and freezed | Formalin | Dried and freezed | |
| Gabon | 12 | 8 | 16 | 12 | 37 | |
| Congo | 6 | 7 | 23 | 8 | 23 | |
| Total | 18 | 15 | 39 | 20 | 60 | |

Table 7. Number of samples of phyto- and zooplankton collected.

3.4 Fish-eggs and larvae

Fish-eggs and -larvae were were sampled with Multinet; 405μ m mesh. The diameter of the fish egg, oil globule and the yolk were measured using the micrometer. It is important to emphasise that the fish eggs and fish larvae abundance was significantly lower using the Multinet than with the Manta trawl. All samples were preserved for further examination on land. An overview of the ichthyoplankton samples collected is presented in Table 8.

| Country | No. of sampling stations | No. of stations with fish larvae | Total no. of fish larvae | Total no. of samples preserved |
|---------|--------------------------|-------------------------------------|-----------------------------|--------------------------------------|
| Gabon | 13 | 7* | 95 | 27 |
| Congo | 9 | 3* | 22 | 13 |
| Total | 22 | 10 | 117 | 40 |

Table 8. Summary of Multinet sampling stations.

*6 samples were not examined for fish larvae.

3.5 Microplastics

The contents from the Manta trawl was examined onboard using a stereomicroscope before being preserved for analysis onshore. All samples analysed contained microplastics. Red and yellow paint particles, most likely originating from the sampling gear, are included in the data. All suspected plastic items were placed on a gridded petri dish and pictures were taken and saved as reference. An overview of the sampling stations is presented in Table 9.

| Country | No. of sampling stations | No. of samples with visible microplastics | Total no. of plastic objects | No. of samples preserved in formaldehyde | No. of samples preserved by freezing |
|---------|--------------------------------|---|------------------------------------|---|---|
| Gabon | 13 | 11* | 101 | 13 | 11 |
| Congo | 9 | 9 | 59 | 9 | 9 |
| Total | 22 | 20* | 160 | 22 | 20 |

Table 9. Summary of microplastics sampling stations

*2 samples were not examined for microplastics.

3.6 Food safety

Table 10 shows the number of samples for the different kind of analysis of fish for food safety. The analysis will be carried out at NIFES, Bergen, Norway.

| Species | No. of samples | Tissue | Nutr. ¹ | Cont. ² | Other | |
|-------------------------|----------------|----------------------------|--------------------|--------------------|-------|--|
| Trachurus trecae | 3 x 25 | Fillet w/skin + bone | v | v | TDADS | |
| (small) | 3 x 25 | Whole fish | Λ | Λ | ΙΔΑΚδ | |
| Sardinella | 25 | Fillet, Feces, | v | v | TRADS | |
| maderensis | 23 | Liver | Λ | Λ | IDAKS | |
| Engraulis | 3 x 25 | Fillet w/skin + bone | | v | TRADS | |
| encrasicolus | 3 x 25 | Whole fish | Λ | Λ | IDARS | |
| Scomber 3 x 25 | | Fillet w/skin + bone | v | v | TDADS | |
| colias(small) | 3 x 25 | Whole fish | Λ | Λ | IBAKS | |
| Lutjanus fulgens | 25 | Fillet, liver, gut content | Х | Х | TBARS | |
| Sphyraena guachancho | 25 | Fillet, liver, gut content | Х | Х | TBARS | |

Table 10. The sampling done for analytical work for each species.

CHAPTER 4. RESULTS - PELAGIC FISH

4.1 Biology of target species

With the expanding scope of the research to be carried out in the context of the EAF-Nansen Programme, the survey objectives and related sampling strategy have been expanded to support research on life cycles, stock identities, and trophic relationships of pelagic fish. For these facets, special effort was carried out to collect several biological parameters (otoliths, fin clips, stomachs, liver, gonad weight) and stage gonad maturity for post-survey age and growth, stock structure, population biology and trophic interaction studies. Annex V reports the numbers of samples collected. These samples will be analysed later, and the results reported separately.

The on-board analysis of several key biological parameters, notably length-weight, sex, maturity and stomach fullness are presented in the results section. Samples of fish were also collected for subsequent onshore analysis (see AnnexV).

Mesopelagics were sampled at 1 station, with 27 frozen individuals. At one station, 5 samples of jellyfish (for Mark Gibbons at UWC, Cape Town, South Africa) were also collected.

4.2 Sex-ratio and gonad development

Very few fish of the main target groups (sardinellas, horse mackerels, and mackerel) were caught in Gabon and Congo, and hence the sample sizes are small. Most biological data and samples (including otoliths, sex, gonad maturity, stomachs, and liver) were collected for *Sardinella aurita* (60 samples) and for *Sardinella maderensis* (43 samples). Since in several instances, especially for *Trachurus trecae*, the measured fish were small, it was decided to freeze these, such that otoliths and stomachs could be obtained on land. Sex ratios and proportions of gonad maturity stages (females only) by length were not possible to calculate for *T. trecae* as we almost exclusively caught immature individuals.

4.3 Distribution, size composition and biomass estimates

Overall, few distinct and well-defined acoustic recordings reminiscent of schooling pelagic fish were observed off Gabon, and when they did occur, the extent of the recordings was usually limited to a narrow depth range and short distance. Off Congo no schools of fish or distinct acoustic recordings were observed. Most of the acoustic backscatters were attributed to four groups; Sardinella, horse mackerel, mackerel and *Brachydeuterus*. These were recorded in waters shallower than 80m, except for the acoustic echos assigned to horse mackerel, which were observed at depths up to 150 m.

Of the main target species, only Pelagic 2 and *Trachurus trecae* was found over an extended area. Sardinella and Pelagic 1 (*Engraulis encrasicolus* and *Illisha africana*) were caught in very low numbers. Species more frequently caught belonged to the 'Pelagic 2' group and

'Other pelagics', and included *Sphyraena guachancho*, *Selene dorsalis, Trichurus lepturus,* and *Brachydeuterus auritus*, respectively.

4.3.1 Horse mackerel (Trachurus trecae)

The size distribution of horse mackerel varied between trawl catches. Shallow pelagic tows generally contained juvenile (4-6 cm) fish, whereas deeper pelagic and demersal trawls caught larger (> 10 cm) individuals. Consequently, the overall length distribution consisted of mainly one age cohort, with modes at 7 and 9 cm (Figure 14).



Figure 14. Length distribution of Trachurus trecae off Gabon and Congo.

The acoustic recordings showed that the horse mackerel were distributed over large areas of the Gabonese and Congolese shelf between 30-200 m (Figure 15). The fish density was however generally low in the trawl catches (average 2 kg.h⁻¹), except for in 4 catches, in which two were above 100 kg.h⁻¹ and two above 200 kg.h⁻¹. During daytime, the horse mackerel was mainly observed close to the bottom at 50-80 m depths.



Figure 15. Distribution of *Trachurus trecae* off Gabon and Congo. Depth contours as in Figure 2.

4.3.2 Mackerel (Scomber colias)

Scomber colias was caught in more than half of the fishing stations, with highly variable catch rates. Its depeth distribution was also broad, caught from 36 to 298 m depth. The mean size of the individuals is larger when compared with the horse mackerel (Figure 16).



Figure 16. Length distribution of *Scomber colias* off Gabon and Congo (catches raised according to acoustid registrations).

Both mackerel and horse mackerel showed an overlapping of their distribution area (Figure 17).



Figure 17. Distribution of *Scomber colias* off Gabon and Congo. Depth contours as in Figure 2.

4.3.3 Sardinellas

S. aurita was found in 14 out of 26 trawl hauls. The catch rates suggest that overall *S. aurita* was 55% of sardinella (in numbers). Mean length of *S. aurita* was lower than than for *S. maderensis*. In terms of biomass, *S. aurita* was 11% of the total biomass of sardinella. *S. maderensis* showed two peaks in the length distribution, indicating the presence of two age classes whereas for *S. aurita* only one peak was seen in the length distribution (Figure 18).



Sardinella maderensis

Sardinella maderensis



Figure 18. Length distribution of Sardinellas off Gabon and Congo – *Sardinella aurita* (N=517871), *Sardinella maderensis* (N=418038). The length distributions are weighted by acoustic densities.



Figure 19. Distribution of sardinella off Gabon and Congo. Depth contours as in Figure 1.

4.3.4 Pelagic I fish

Ilisha africana and *Engraulis encrasicolus*, belonging to the acoustic category 'Pelagic I', were caught both in pelagic and bottom trawls at 23-115 m depth. Average catch rates for these species were 41,2 and 2,4 kg h⁻¹, respectively, with an average of 17 kg h⁻¹. However, the number of fishes in the catches were too low to establish a reliable length frequence for biomass estimation. A pooled length distribution for the species were established and the length-weight relationship coefficients *a* and *b* were estimated to 0,0022 and 3,43, respectively and used for biomass estimate purposes. A length average of 16 cm for the pelagic 1 species was used for biomass calculations.



Figure 20. Distribution of Pelagic species I off Gabon and Congo. Depth contours as in Figure 1.

4.3.5 Pelagic 2 fish

Chloroscombrus chrysurus, Selene dorsalis, Sphyraena guachancho and *Trichiurus lepturus* were the most frequently caught species in the acoustic category 'Pelagic 2'. *Decapterus rhonchus, Auxis thazard* and *Sarda sarda* were also caught, although less frequently.

Chloroscombrus chrysurus, Selene dorsalis, Decapterus rhonchus and *Auxis thazard* were distributed from 24 m to 102 m depth whilst the remaining species extended their distribution from 24 m down to 296 m depth (Figure 21). Pelagic 2 species were caught in 16 trawls with an average catch rate of 6.9 kg h⁻¹ for all the species in the group. The average catch rates for each individual species belonging to the Pelagic 2 group varied between 0.9 kg h⁻¹ for *Sarda sarda* to 14.7 kg h⁻¹ for *Trichiurus lepturus*.



Figure 21. Distribution of Pelagic 2 species off Gabon and Congo. Depth contours as in Figure 1.

A pooled length distribution for the species included in pelagic 2 group was established and the length-weight relationship coefficients a and b were estimated to 0,00243 and 2,6691, respectively and used for biomass estimate purposes. a and b were calculated based mostly in data from *Chloroscombrus chrysurus* and *Selene dorsalis* which dominated the catches. An average length of 30 cm was used for biomass calculation purposes.

4.4 **Biomass estimates**

A summary of the biomass estimates is given in Table 11. Biomasses per strata and lengthweight relationships obtained from the biological samples and used in the biomass estimation are provided in Annex VIII.

| Country | Sardinellas | Horse mackerel | Mackerel | Pelagic fish 1 | Pelagic fish 2 |
|-------------|-------------|-------------------|----------|----------------|----------------|
| Gabon-Congo | 42 570 | 14 817 | 28 144 | 7 392 | 78 354 |

Table 11. Summary of biomass estimates of pelagic fish (tonnes).

| Table 12. Biomass estimates of the two sardinella species, based on catches (tonnes | Table | 12. | Biomass | estimates | of the two | sardinella s | species. | based of | on catches | tonnes |). |
|---|-------|-----|---------|-----------|------------|--------------|----------|----------|------------|--------|----|
|---|-------|-----|---------|-----------|------------|--------------|----------|----------|------------|--------|----|

| | S. aurita | S. maderensis |
|-------------|-----------|---------------|
| Gabon-Congo | 4 819 | 37 752 |

The main species of the pelagic community in the three countries assessed were horse mackerel (*Trachurus trecae*) and Pelagic 2, with a biomass close to 15 000 t and 71 000 t, respectively. The biomass of sardinellas was low, just over 40 000 t. *S. maderensis* had a total biomass close to 38 000 t, whilst *S. aurita* consisted of less than 5 000 t.

CHAPTER 5. CONCLUDING REMARKS

Pelagic fish were mostly present in the northern area of the survey coverage, primarily in Gabon and northern parts of Congo. Off Congo no schools of fish or distinct acoustic recordings were observed. Most of the acoustic backscatters were attributed to the four groups: aardinella, horse mackerel, mackerel and big-eye grunt. These were recorded in waters shallower than 80 m, except for the acoustic echos assigned to horse mackerel, which could be observed at depths up to 150 m.

Very few fish of the main target groups (sardinellas, horse mackerels, and mackerel) were recorded and caught in Gabon and Congo, and hence the sample sizes are small. Most biological data and samples (including otoliths, sex, gonad maturity, stomachs, and liver) were collected for *Sardinella aurita* (60 samples) and for *Sardinella maderensis* (43 samples).

The main stocks of the two pelagic species of sardinella (*S. maderensis* and *S. aurita*) are shared between Gabon, Congo and Angola, and investigations previously carried out by the EAF-Nansen project indicate that for both stocks, more than 25% of the total abundance within this region (especially juveniles and large adults) can be found off Congo-Gabon during certain periods of the year. The main part of the commercial sardinella fishery takes place in Angola, but the two species are important for the artisanal fleet in all three countries. Previous studies strongly indicate that one of the most important spawning and nursery areas for the *S. aurita* is located off Congo and Gabon south of Cape Lopez. However, the detailed distribution of larvae and retention mechanisms involved are not well known. This information is critical to avoid negative impacts on these critical habitats, as well as for understanding the possible impacts of climate change on stock abundance. In this context, it is important to be aware that this region has very high oil related industrial activities. A large-scale oil spill or accidental release of other chemicals during the recruitment/nursery period is assumed to have potentially strong detrimental impacts on these species.

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ANNEX I. DESCRIPTION OF INSTRUMENTS AND FISHING GEAR

Acoustic instruments

The Simrad EK80/18, 38, 70,120, 200 and 333 kHz scientific sounder was run during the survey. Scrutinizing was done in LSSS using the data from the 38-kHz transducer. Last standard sphere calibrations were checked on the 23.01.2017 in Sandviksflaket, Bergen, Norway using Cu64 for the 18 kHz, Cu60 for the 38 kHz, WC38.1 for the 70, 120 and 200 kHz, and the WC22 for the 333 kHz. The details of the settings for the 38-kHz echo sounder were as follows:

| Transceiver2 menu (3 | 8 kHz) |
|----------------------|-----------------------|
| Transducer depth | 5,8 m |
| Absorption coeff. | 8.3 dB/km |
| Pulse duration | medium (1,024ms) |
| Bandwidth | 2.43 kHz |
| Max power | 2000 Watt |
| 2way beam angle | 20,6dB |
| gain | 26,95 dB |
| SA correction | 0.03 dB |
| Angle sensitivity | 21.9 |
| 3 dB beamwidth | 6.22° along ship |
| | 6.28 athwart ship |
| Alongship offset | 0.10° |
| Athwardship offset | 0.06° |
| Bottom detection mer | u Minimum level 50 Db |

Fishing gear

The vessel has one small four-panel Åkrahamn pelagic trawl, one MultPelt 624 trawl (Figure 1, new in 2017) and one 'Gisund super bottom trawl'. All trawls were used during the survey. The smallest pelagic trawl has 8 to 12 m vertical opening under normal operation, whereas the MultPelt 624 trawl has 25 to 35 m opening.

The bottom trawl has a 31-m headline and a 47-m footrope fitted with a 12" rubber bobbins gear. The codend has 20 mm meshes, and has an inner net with 10 mm mesh size. The vertical opening is about 5.5 m. The distance between the wing tips is about 18 m during towing. The sweeps are 40 m long. The trawl doors are 'Thyborøen' combi, 8 m² and weigh 2000 kg. The door spreading is about 45 m when using restraining rope. Trawling was conducted for species identification only and no restraining rope was therefore used during the survey.

The SCANMAR system was used during 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 interdistance and angle, while a height sensor is fitted on the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

The all trawls are equipped with a trawl eye that provides information about the trawl opening and the distance of the footrope to the bottom. A pressure sensor is used to show the depth on the headline.



Figure 1. Schematic drawing of the MultPelt 624.



Figure 2. Schematic drawing of the small pelagic Åkratrawl.



Figure 3. Schematic drawing of the Super Gisund bottom trawl.

ANNEX II. RECORDS OF FISHING STATIONS

STATION: 1

SURVEY:2017407

R/V Dr. Fridtjof Nansen

| DATE :23/09/17 GEAR TYPE: P | T NO: 0 POSITION | :Lat S 1°43.14 | |
|--|------------------|--------------------|----|
| TIME :02:05:31 02:36:31 31.0 (min) | Purpose : | 1 | |
| LOG : 350.73 352.33 1.6 | Region : | 3300 | |
| FDEPTH: 46 44 | Gear cond.: | 0 | |
| BDEPIH: 46 44 | validity : | 0 2 E kn | |
| Sorted : 3 Total catch: 3.07 | Catch/hour: | 5.93 | |
| | | | |
| SPECIES | CATCH/HOUR | % OF TOT. C SAM | 1P |
| Sardinella maderensis | weight number | S 6 1016 1 | 1 |
| Decapterus punctatus | 1.53 4 | 5 25.77 1 | 0 |
| Decapterus punctatus | 0.87 15 | 5 14.68 | |
| Caranx rhonchus | 0.62 1 | 2 10.44 1 | 2 |
| Alloteuthis atricana Sandinella aurita | 0.39 21 | / 6.53 8 1.96 1 | 2 |
| Engraulis encrasicolus | 0.01 | 2 0.16 | |
| 0 | | | |
| Total | 5.93 | 100.00 | |
| | | | |
| R/V Dr. Fridtjof Nansen SURVEY:20 | 17407 STATI | ON: 2 | |
| DATE :23/09/17 GEAR TYPE: B | T NO: 2 POSITION | :Lat S 2°1.78 | |
| start stop duration | D | Lon E 8°54.49 | |
| 106 : 493.34 494.34 1.0 | Region : | 3300 | |
| FDEPTH: 102 95 | Gear cond.: | 0 | |
| BDEPTH: 102 95 | Validity : | 5 | |
| Towing dir: 0° Wire out : 260 | m Speed : | 3.0 kn | |
| Sorted : 26 Total catch: 141.7 | 5 Catch/hour: | 437.71 | |
| SPECIES | CATCH/HOUR | % OF TOT. C SAM | 1P |
| | weight number | s | |
| Trachurus trecae | 250.68 1436 | 9 57.27 1 | .5 |
| Arlomma Dondi Senia orbigovana | 20 04 5 | 5 1/.// 2 / 58 | |
| Pagellus bellottii | 14.95 850 | 4 3.42 1 | 6 |
| Dentex congoensis | 13.93 76 | 6 3.18 1 | .4 |
| Saurida brasiliensis | 11.55 168 | 3 2.64 | |
| Squatina oculata Cholidonichthus gebenensis | 9.20 | 3 2.10 | |
| Lagocephalus laevigatus | 7.81 3 | 4 1.78 | |
| Illex coindetii | 5.10 15 | 4 1.16 | |
| Priacanthus arenatus | 4.08 40 | 8 0.93 | _ |
| Scomber japonicus | 4.08 15 | 4 0.93 1 | .7 |
| Sardinella aurita | 2.38 12 | 0 0.54 1 | 8 |
| Citharus linguatula | 1.53 1 | 9 0.35 | |
| Dactylopterus volitans | 1.36 1 | 9 0.31 | |
| Boops boops | 0.68 3 | 4 0.16 | |
| drammopiltes gruvell | 0.00 5 | 4 0.10 | |
| Total | 437.72 | 100.00 | |
| | | | |
| R/V Dr. Fridtiof Nansen SURVEY:20 | 17407 STATT | ON: 3 | |
| DATE :23/09/17 GEAR TYPE: P | T NO: 4 POSITION | :Lat S 1°54.36 | |
| start stop duration | | Lon E 9°4.87 | |
| TIME :20:36:22 21:06:36 30.2 (min) | Purpose : | 1 | |
| EDEPTH: 15 15 | Gear cond.: | 0 | |
| BDEPTH: 48 44 | Validity : | 0 | |
| Towing dir: 0° Wire out : 120 | m Speed : | 3.0 kn | |
| Sorted : 33 Total catch: 33.00 | Catch/hour: | 65.50 | |
| SPECTES | CATCH/HOUR | % OF TOT C SAM | 1P |
| 5, 20225 | weight number | 5 | |
| Sardinella maderensis | 51.72 43 | 7 78.97 2 | 0 |
| Sardinella aurita | 3.53 3 | 4 5.39 1 | .9 |
| Sphyraena guachancho | 3.49 1 | 2 5.33 | |
| Lagocephalus laevigatus | 1.79 15 | 5 2.75 6 2.67 | |
| Scomberomorus tritor | 1.71 | 2 2.61 | |
| Selene dorsalis | 0.64 | 6 0.97 | |
| Alloteuthis africana | 0.48 27 | 8 0.73 | |
| Tlisha africana *** | 0.16 | 2 0.24 4 0.24 | |
| Saurida brasiliensis | 0.08 2 | 8 0.12 | |
| Plastic | 0.00 | 6 0.00 | |
| Total | 65 50 | 100.00 | |
| IULDI | 96.50 | 100.00 | |

| R/V Dr. Fridtjof Nansen DATE :24/09/17 start stop TIME :01:05:59 01:39:08 LOG : 580.79 582.44 FDFFH: 10 10 BDEPTH: 146 80 Towing dir: 0° Wire Sorted : 10 Total | SURVEY:2017 GEAR TYPE: PT duration 33.2 (min) 1.7 out : 150 m catch: 9.89 | 407 NO: 4 PO: Region Gear Valid: Speed Catch | STATION: SITION:Lat Lon se : 1 n : 3300 cond.: 0 ity : 0 : 3.0 kr /hour: 17.90 | 4 S 2°5.91 E 9°0.32 | |
|---|---|--|--|---------------------------|----|
| SPECTES | | CATCH/ | | | 1D |
| SFECIES | | weight | numbers | TOT. C SAP | |
| Decapterus punctatus | | 7.57 | 148 | 42.26 2 | 1 |
| Scomber japonicus | | 1.88 | 54 | 10.52 2 | 23 |
| Sphyraena guachancho | | 0.40 | 2 | 2.22 | |
| Saurida brasiliensis Ariomma bondi | | 0.29 | 45 62 | 1.62 | |
| Trachurus trecae | | 0.25 | 62 | 1.42 | |
| Alloteuthis africana | | 0.22 | 110 | 1.21 | |
| JELLYFISH Unidentified | | 0.07 | 49 | 0.40 | |
| T-+-1 | _ | 17.00 | | | |
| Iotal | | 17.90 | - | 100.00 | |
| R/V Dr. Fridtiof Nansen | SURVEY:2017 | 407 | STATION: | 5 | |
| DATE :24/09/17 | GEAR TYPE: BT | NO: 2 PO: | SITION:Lat | S 2°27.00 | |
| start stop | duration | Bunno | Lon | E 8°59.49 | |
| LOG : 644.07 645.62 | 1.6 | Regio | n : 3300 | | |
| FDEPTH: 124 136 | | Gear | cond.: 0 | | |
| BDEPIH: 124 136 Towing dir: 0° Wire | out · 320 m | Valid: Sneed | 1ty :0 ·30ki | | |
| Sorted : 60 Total | catch: 1005.24 | Catch | /hour: 1715.9 | 91 | |
| SPECTES | | CATCH/ | HOUR % OF | TOT. C SAM | ۱P |
| | | weight | numbers | | |
| Boops boops | | 674.97 | 52291 | 39.34 | |
| Dentex congoensis | | 2/5.8/ 224.60 | 221469 | 13.09 2 | 25 |
| Scomber japonicus | | 193.84 | 25652 | 11.30 2 | 4 |
| Ariomma bondi | | 192.68 | 75477 | 11.23 | |
| Priacanthus arenatus | | 12.19 | 522 | 0.71 | |
| Sepia sp. | | 9.29 | 116 | 0.54 | |
| Squatina oculata | | 4.40 | 2 | 0.26 | 16 |
| Sarda sarda | | 2.25 | 5 | 0.13 2 | 27 |
| Torpedo torpedo | | 1.84 | 3 | 0.11 | |
| Eistularia petimba | \$1\$ | 1.74 | 189 | 0.10 | |
| Raja miraletus | | 0.85 | 2 | 0.05 | |
| Illex coindetii | | 0.58 | 29 | 0.03 | |
| Total | | 1715.91 | | 100.00 | |
| R/V Dr. Fridtjof Nansen | SURVEY:2017 | 407 | STATION: | 6 | |
| DATE :24/09/17 | GEAR TYPE: PT | NO: 7 PO: | SITION:Lat | S 2°8.54 | |
| TIME :12:29:57 13:02:52 | duration 32.9 (min) | Purpo | se : 1 | E 9-20.46 | |
| LOG : 694.77 696.37 | 1.6 | Regio | n : 3300 | | |
| FDEPTH: 0 0 | | Gear | cond.: 0 | | |
| Towing dir: 0° Wire | out : 160 m | Speed | : 3.0 kr | ı | |
| Sorted : 4 Total | catch: 4.38 | Catch | /hour: 7.98 | | |
| SPECIES | | CATCH/I | HOUR % OF | TOT. C SAM | ۱P |
| Companyonus tuit | | weight | numbers | 01 70 2 | |
| Jellyfish | | 0.62 | 2 | 7.76 | .đ |
| Sepiella ornata | | 0.04 | 18 | 0.46 | |
| Total | | 7.98 | | 100.00 | |

| K/V UP. FP10T10T Nansen SURVEY:20 | 7407 | STATION: | 7 | |
|--|---|--|--|--|
| DATE : 24/09/17 GEAR TYPE: B | | STTTON | , S 2°34 | 49 |
| stant ston dunation | 110. 2 10. | Jan Lon | E 0°2 / | 4.J |
| TTME (17,22,17,18,06,12, 22,0 (min) | Dunna | co 1 | 2 5 5.4 | <i>,</i> |
| | Purpo. | SE . 1 | | |
| LUG : /45.31 /46.69 1.4 | Regio | n : 3300 | | |
| FDEPTH: 118 119 | Gear | cond.: 0 | | |
| BDEPTH: 118 119 | Valid | ity : 0 | | |
| Towing dir: 0° Wire out : 340 i | n Speed | : 2.8 | n | |
| Sorted : 37 Total catch: 81.24 | Catch, | /hour: 148.0 | 97 | |
| | | | | |
| SPECIES | CATCH/I | HOUR % OF | тот.с | SAMP |
| | weight | numbers | | |
| Spicara alta | 50.81 | 605 | 34.32 | |
| Chelidonichthys gabonensis | 25.08 | 157 | 16.94 | |
| Senia orhignvana | 14 07 | 281 | 9 50 | |
| Dentex congeonsis | 12 60 | 201 | 9 57 | 20 |
| Tilev seindetii | 6 12 | 20 | 4.14 | 25 |
| linex condecii | 5.01 | 10 | 4.14 | |
| Umbrina canariensis | 5.91 | 16 | 3.99 | |
| Ariomma bondi | 5.03 | 11 | 3.40 | |
| Boops boops | 4.08 | 222 | 2.76 | |
| Scomber japonicus | 4.08 | 11 | 2.76 | 33 |
| Small shrimps | 4.08 | 146 | 2.76 | |
| Raja straeleni | 2.99 | 2 | 2.02 | |
| Dentex angolensis | 2.41 | 18 | 1.62 | 31 |
| Pagellus bellottii | 1.97 | 26 | 1.33 | 30 |
| Raia miraletus | 1.90 | 7 | 1.28 | |
| Zeus faber | 1 75 | 4 | 1 18 | |
| Priacanthus arenatus | 1 39 | 7 | 0 9/ | |
| Scomberomorus tritor | 1 17 | 2 | 0.79 | |
| Eistulania potimba | 1.1/ | 2 | 0.75 | |
| riscularia petimba | 0.62 | 2 | 0.42 | |
| Scorpaena sp. | 0.58 | 4 | 0.39 | 22 |
| irachurus trecae | 0.44 | 11 | 0.30 | 32 |
| Sepia sp. | 0.36 | 4 | 0.25 | |
| Citharus linguatula | 0.15 | 11 | 0.10 | |
| Erythrocles monodi | 0.15 | 4 | 0.10 | |
| Trachinus sp. | 0.15 | 7 | 0.10 | |
| Saurida brasiliensis | 0.07 | 11 | 0.05 | |
| Arnoglossus imperialis | 0.04 | 11 | 0.02 | |
| Plastic | 0.00 | 4 | 0.00 | |
| | | - | | |
| Total | 148 07 | | 100 00 | |
| | | | | |
| | | | | |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FOEPTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 (| Purpo Regio Gear Valid | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k | (n | |
| TIME :21:48:28 22:18:41 30.2 (min) LGG : 787.84 789.26 1.4 FDEPTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 Sorted : 10 Total catch: 9.84 | Purpo Regio Gear Valid Speed Catch | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 | cn L | |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 | Purpo Region Gear Valid Speed Catch | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 | cn L | |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEPTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES | Purpo Regio Gear Valid N Speed Catch | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 | (n l TOT. C | SAMP |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDPTH: 15 15 BDEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES | Purpo Region Gear Valid Speed Catch CATCH/I weight | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.5 ² HOUR % OF numbers | (n l TOT. C | SAMP |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEPTH: 94 87 Towing dir: 0° Wire out : 120 n Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus | Purpo Regio Gear Valid Speed Catch CATCH/I weight 11.08 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.5 ² HOUR % OF numbers 522 | m ↓ • TOT. C 56.71 | SAMP 34 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEPTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus | Purpo Regio Gear Valid Speed Catch weight 11.08 3.38 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % OF numbers 522 441 | cn - TOT. C 56.71 17.28 | SAMP 34 36 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus | Purpo: Region Gear Valid: M Speed Catch, CATCH/I weight 11.08 3.38 2.10 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % 0f numbers 522 441 10 | rn - TOT. C 56.71 17.28 10.77 | SAMP 34 36 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEPTH: 15 15 SDEPTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus | Purpo Regio Gear Valid Speed Catch Uald Valid Catch 11.08 3.38 2.10 1.85 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % OF numbers 522 441 10 6 | TOT. C 56.71 17.28 10.77 9.45 | SAMP 34 36 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae | Purpo Regio Gear Valid Speed Catch, CATCH/I weight 11.08 3.38 2.10 1.85 0.71 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.52 HOUR % OF numbers 522 441 10 6 115 | TOT. C 56.71 17.28 10.77 9.45 3.66 | SAMP 34 36 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 DDEPTH: 94 87 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi | Purpo Regio Gear Valid speed Catch. CATCH/I weight 11.08 3.38 2.10 1.85 0.71 0.28 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % 0F numbers 522 441 10 6 115 10 | sn F TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus ***</pre> | Purpo Regio Gear Valid n Speed Catch/ weight 1 11.08 3.38 2.10 1.85 0.71 0.28 0.08 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % Of numbers 522 441 10 6 115 10 4 | rn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 n Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis</pre> | Purpoo Regio Gear Valid n Speed Catch, CATCH// weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 | se : 1 n : 3300 cond.: 0 ity : 0 /hour: 19.54 HOUR % OF numbers 522 441 10 6 115 10 4 12 | Sn 4 56.71 57.7 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 | SAMP 34 36 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita | Purpo. Regio Gear Valid Speed Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.52 HOUR % OF numbers 522 441 10 6 115 10 4 12 2 | rn 5 TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 | SAMP 34 36 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita | Purpoo Regio Gear Valid M Speed Catch, CATCH// weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % 0F numbers 522 441 10 6 115 10 4 12 2 | rn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 | SAMP 34 36 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEPTH: 15 15 SDEPTH: 94 87 Towing dir: 0° Wire out : 120 M Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita | Purpo. Regio Gear Valid n Speed Catch, United Speed Catch, Weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 ity : 0 : 2.8 k /hour: 19.54 HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 | TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total</pre> | Purpo. Regio Gear / Valid. Catch. CATCH// weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.54 HOUR % OF numbers 522 441 6 115 10 4 12 2 | 56.71 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 95 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 n Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total</pre> | Purpo. Regio Gear Valid Speed Catch. CATCH/I weight 11.08 3.38 0.71 0.28 0.08 0.08 0.08 0.02 19.54 | se : 1 n : 3300 cond.: 0 ity : 0 y : 0 y : 0 ity : | 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 f Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20</pre> | Purpo. Regio Gear - Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 | se : 1 n : 3360 cond.: 0 ity : 0 : 2.8 k / 10 : 0 : 2.8 k / 10 : 0 : 2.8 k / 10 : 10 : 52 / 10 : 10 : 52 / 10 : 10 : 10 : 10 : 10 : 10 : 10 : 10 | Solution of the second seco | SAMP 34 36 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P | Purpo. Regio Gear Valid Speed Catch. CATCH/V weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 | 5 TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 5 2°29. | SAMP 34 36 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 f Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P start stop duration</pre> | Purpo. Regio Gear. Validi Speed Catch, CATCH/ weight 11.08 3.38 2.10 1.85 6.71 6.28 0.08 0.04 0.02 19.54 | se : 1 n : 3360 cond.: 0 ity : 0 : 2.8 k /hour: 19.52 HOUR % 0f numbers 522 441 10 6 6 6 115 110 4 4 12 2 2 4 4 115 10 4 5 525 441 10 6 5 5 5 2 4 4 10 5 2 5 2 5 4 4 10 5 5 5 2 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | <pre>cn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 5 2°29. E 9°23.</pre> | SAMP 34 36 35 01 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 31:08:26 33.1 (min) | Purpo. Regio Gear / Valid Speed Catch/ weight / 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 2 | TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 S 2°29. E 9°23. | SAMP 34 36 35 01 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6</pre> | Purpo. Regio Gear · Validi Speed Catch, CATCH/ weight · 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3360 cond.: 0 ity : 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 2 5TATION: STATION: Lat Lon se : 1 n : 3360 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 5 2°29. E 9°23. | SAMP 34 36 35 35 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:72:20 91:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10</pre> | Purpo: Regio Gear , Valid Speed Catch, Unit & Speed Catch, Weight & 11.08 3.38 2.10 1.85 0.71 0.28 0.02 0.02 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 5115 110 4 12 2 2 STATION: SITION:Lat Lon se : 1 n : 3300 cond.: 0 | sn 5 TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.41 0.20 0.41 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.2 | SAMP 34 36 35 35 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P Start Stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 | Purpo. Regio Gear Valid Speed Catch. CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 i /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 9 5 2°29. E 9°23. | SAMP 34 36 35 01 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG :787.84 789.26 1.4 FDEFTH: 15 BOEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total | Purpo: Regio Gear , Valid Catch, CAtCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.52 HOUR % 0f numbers 522 441 10 6 5115 110 4 12 2 2 STATION: Lat SITION:Lat SITION:Lat SITION:Lat SITION:Lat SITION:Lat SITION:201 0 : 3300 cond.: 0 : 3300 cond.: 0 : 3310 | TOT. C 56.71 17.28 45 3.66 4.42 0.10 100.00 9 S 2°29. E 9°23. cn | SAMP 34 36 35 01 48 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 7187.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:72:0 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 EDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60</pre> | Purpo. Regio Gear Valid Speed Catch. CATCH/V weight 1 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 17407 NO: 4 PC Regio Gear v Valid a Speed Catch | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 4 12 2 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 5 2°29. E 9°23. | SAMP 34 36 35 01 48 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG :78.4 789.26 1.4 FDEPTH: 15 BOEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecce Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P Start stop duration 10 10 DG6 :814.30 815.96 1.6 DEPTH: 10 10 10 BDEPTH: 10 10 Sorted 5 | Purpo. Regio Gear . Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 19.54 17407 r NO: 4 PO: Regio Gear . Valid Speed Catch, | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.54 HOUR % 0f numbers 522 441 10 6 6 5115 10 4 12 2 2 5TATION: SITION: SITION: SITION: SITION: SITION: Cond.: 0 : 3.1k h /hour: 40.97 | <pre>cn 56.71 17.28 10.77 9.45 10.77 9.46 1.42 0.10 100.00 9 S 2°29. E 9°23. cn </pre> | SAMP 34 35 35 01 48 |
| TIME :21:48:28 22:18:41 30.2 (min) LOG :787.84 789.26 1.4 FDEFTH: 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration IUME: :00:27:20 10.6 10 BDEPTH: 10 10 BDEPTH: 46 53 Total catch: :2.60 SPECIES SPECIES | Purpo: Regio Gear, Valid Speed Catch, Unit, 08 3.38 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 17407 NO: 4 PO: Regio Gear, Valid Speed Catch, Catch, Catch | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 6 115 115 110 4 4 12 2 | <pre>sn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5 2°29. E 9°23. sn cn cn cn cn cn cn cn cn cn c</pre> | SAMP 34 36 35 35 01 48 SAMP |
| TIME :21:48:28 22:18:41 30.2 (min) LOG :78.4 789.26 1.4 FDEPTH: 15 15 BOEPTH: 94 87 Towing dir: 0° Wire out : 120 r Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE: 25/09/17 GEAR TVPE: P start stop duration IIME: 10 DIG 814.30 815.96 1.6 FDEPTH: 10 10 BDEPTH: 10 BDEPTH: 46 53 Towing dir: 0° Wire out : 150 r Sorted : 2 Total catch: 22.60 SPECIES | Purpo. Regio Gear . Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 | se : 1 n : 3360 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 6 6 115 110 4 12 2 2 5TATION: STITON:Lat Lon STATION: STITON:Lat Lon 0 : 3.1 k /hour: 40.97 HOUR % 0f NHOUR % | <pre>cn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 S 2°29. E 9°23. cn ; cn ; cn ; cn ; cn ; cn ; cn ; cn</pre> | SAMP 34 35 35 01 48 SAMP |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TDME :00:72:00 11:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decanterus punctatus</pre> | Purpo. Regio Gear, Valid Speed Catch, United 3.38 3.38 2.10 1.85 0.71 0.28 0.02 0.02 0.02 19.54 17407 NO: 4 PO: Regio Gear Valid Speed Catch, Valid Speed Catch, Valid 1.85 0.71 0.28 0.02 0.02 19.54 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 5 115 10 4 4 12 2 2 4 41 10 6 5 115 115 10 4 4 12 2 2 4 41 10 6 5 115 115 10 4 4 12 2 2 4 41 10 6 5 115 115 115 110 110 110 110 110 110 1 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5.2°29. E.9°23. cn 7 TOT. C 44.69 | SAMP 34 36 35 01 48 SAMP |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 1 Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sobycaena guachancho</pre> | Purpo. Regio Gear Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 | se : 1 n n : 3360 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 01 numbers 522 441 10 6 6 : 115 10 4 4 : 2 2 5TATION: STATION: STATION: STATION: STATION: STATION: STATION: 4 : 0 : 2 0 | <pre>cn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 S 2°29. E 9°23. cn f TOT. C 44.69 15.04</pre> | SAMP 34 36 35 01 48 SAMP |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOETH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDFTH: 10 10 BDEPTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynonus alletteratus</pre> | Purpo. Regio Gear , Valid Catch, CATCH/I weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 110 4 12 2 2 STATION: SITION:Lat Lon se : 1 n : 3300 cond.: 0 : 3.11 /hour: 40.97 HOUR % 0f numbers 2.14 /hour: 40.97 | <pre>sn 50.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5.2°29. E.9°23. sn 7 TOT. C 44.69 15.04 12.21</pre> | SAMP 34 36 35 25 81 48 SAMP |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 1 Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus chonchymets</pre> | Purpo. Regio Gear Valid Speed Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 19.54 | se : 1 n n : 3360 cond.: 0 ity : 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 2 5TATION: STATION: STATION: STATION: STATION: STATION: STATION: Cond.: 0 0 : 3.1 k /hour 40.97 HOUR % 0 n /houmbers 2144 22 4 24 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5 2°29. E 9°23. sn 7 TOT. C 44.69 15.04 12.21 | SAMP 34 36 35 01 48 SAMP |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P Start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** lallwich</pre> | Purpo: Regio Gear Valid Catch, CATCH/I weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.02 19.54 Valid NO: 4 PO: Regio Gear Valid Speed Catch, Weight 18.54 CATCH/I weight 18.31 6.16 5.00 4.97 2.25 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.52 HOUR % 0f numbers 522 441 10 6 115 110 4 12 2 2 441 12 2 5 STATION: Lat SITION:Lat SITION:Lat SITION:Lat SITION:Lat (hour: 40.95 HOUR % 0f numbers 2144 22 4 2144 214 | <pre>sn TOT. C 56.71 17.28 10.77 9.45 3.66 0.10 100.00 9 S 2°29, E 9°23. sn TOT. C 44.69 15.04 12.21 25.40</pre> | SAMP 34 35 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 1 Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 1 Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Tarchentus catching autorice Start stop</pre> | Purpoo Regio Gear Valid Speed Catch/ Weight 1 1.08 3.38 0.08 0.04 0.02 19.54 17407 NO: 4 PO: Purpoo Regio Gear Valid Speed Catch/ Valid 18.31 6.16 5.00 4.97 2.25 2.25 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 41 12 2 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. C 9°23. 5 2°29. 5 2°29 | SAMP 34 36 35 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 |
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| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 81:08:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEPTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinous ovatus Alloteuthis africana Content interimute</pre> | Purpo. Regio Gear, Valid Speed Catch, Ull,08 3.38 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 Valid NO: 4 PO Purpo. Regio Gear, Valid Speed Catch, Valid 18.31 6.16 5.00 4.97 2.25 0.91 0.73 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 115 10 4 12 2 | sn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. E 9°23. 5 2°29. 5 2°29 | SAMP 34 36 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinotus ovatus Alloteuthis africana Scomber japonicus</pre> | Purpo. Regio Gear . Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 17407 NO: 4 PO: Regio Gear . Valid Speed Catch, Valid Speed Catch, Valid 5.6 0.71 0.28 0.08 0.04 0.02 19.54 | se : 1 n n : 3360 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 6 6 6 115 110 4 12 2 2 5 5 5 5 5 110 10 4 12 2 2 5 5 5 115 10 4 12 2 2 5 5 5 115 10 4 12 2 2 5 5 115 10 8 4 12 2 2 5 5 115 10 8 4 12 2 2 5 115 10 8 4 12 2 2 5 115 10 8 4 12 2 2 5 115 10 8 4 12 2 2 5 115 10 8 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 10 8 4 12 2 2 4 11 10 10 8 4 115 115 10 8 4 115 115 10 8 4 115 115 110 10 8 4 12 2 2 4 115 115 10 8 4 12 2 2 4 115 115 115 10 8 4 12 2 2 4 115 115 10 8 4 12 2 2 4 115 115 115 115 115 115 115 115 115 1 | <pre>cn TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 S 2°29. E 9°23. cn 7 TOT. C 44.69 15.21 12.21 12.21 5.49 2.21 1.77 5.66 1.42 0.10 100.00 9 S 2°29. E 9°23. Cn 1.21 1.21 1.21 5.49 1.21 1.21 5.49 1.21 1.21 5.49 1.21 1.21 5.49 1.21 1.21 5.49 1.21 1.21 5.49 1.221 1.77 1.50</pre> | SAMP 34 35 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BDEPTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinous ovatus Alloteuthis africana Scomber japonicus Appeon sp. Texente and the second s</pre> | Purpo: Regio Gear, Valid Speed Catch, United Speed Catch, 11.08 3.38 2.10 1.85 0.71 0.28 0.02 0.02 19.54 Valid No: 4 PO: Regio Gear Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, CATCH// weight 1 1.85 0.71 0.28 0.02 0.02 0.02 0.02 0.02 0.02 0.02 | se : 1 n n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 110 4 12 2 2 441 10 4 4 12 2 2 441 110 5 SITION:Lat Lon se : 1 n : 3300 cond.: 0 : 3300 cond.: 0 : 3300 fity : 0 : 3300 fit | sn TOT. C 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 S 2°29. E 9°23. 5 TOT. C 44.69 15.04 12.12 5.49 12.12 5.49 12.12 5.49 12.12 5.49 12.12 5.64 12.21 17.77 15.06 1.50 1.50 1.50 | SAMP 34 36 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEPTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinotus ovatus Alloteuthis africana Scomber japonicus Apogon Sp. Engraulis encrasicolus</pre> | Purpo. Regio Gear Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 19.55 | se : 1 n n : 3360 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 6 6 115 110 4 12 2 2 4 4 115 10 4 4 12 2 2 4 4 115 10 4 5 115 10 4 5 115 10 4 5 115 10 4 5 115 10 6 6 6 6 6 6 7 8 7 7 8 7 8 7 8 7 8 7 8 7 | <pre>cn 56.71 17.28 10.77 9.45 3.66 1.42 0.10 100.00 9 5 2°29. E 9°23. TOT. C 44.69 15.04 12.21 12.21 25.49 2.21 1.77 1.50 1.50 1.50 1.50 1.50</pre> | SAMP 34 35 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start Stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BOEPTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinotus ovatus Alloteuthis africana Scomber japonicus Apogon sp. Engraulis encrasicolus Selene dorsalis</pre> | Purpoo Regio Gear Valid Catch, CATCH/I weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 115 10 4 12 2 2 441 12 2 3 5TATION: Lat 2 5TATION:Lat 2 5TATION:Lat 2 5TATION:Lat 2 10 f ity : 0 : 3.1k /hour: 40.97 HOUR % 0f numbers 2 14 4 /hour: 40.97 HOUR % 0f numbers 2 24 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | TOT. C 56.71 17.28 10.77 9.45 3.66 0.10 100.00 9 5.2°29 E.9°23. TOT. C 44.69 15.04 12.21 1.77 1.50 1.50 1.53 1.53 1.57 | SAMP 34 36 35 41 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 f Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TVPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEFTH: 46 53 Towing dir: 0° Wire out : 150 f Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinotus ovatus Alloteuthis africana Scomber japonicus Apogon sp. Engraulis encrasicolus Seleme dorsalis Boops boops</pre> | Purpo. Regio Gear Valid Catch, CATCH/ weight 11.08 3.38 2.10 1.85 0.71 0.28 0.04 0.02 19.54 19.55 19.5 | se : 1 n n : 3360 cond.: 0 : 2.8 k /hour: 19.5/ HOUR % 0f numbers 522 441 10 6 6 6 115 10 4 12 2 2 4 4 115 10 4 4 12 2 2 4 4 115 5 110 4 12 2 2 4 4 13 2 115 5 110 8 5 1115 10 4 4 12 2 2 5 1115 10 6 6 6 115 10 4 4 12 2 2 5 1115 10 8 4 12 2 2 11 5 115 10 8 4 12 2 10 5 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 115 5 10 6 10 6 | <pre>cn 56.71 17.28 10.77 9.45 3.66 1.42 0.41 0.20 0.10 100.00 9 5 2°29. E 9°23. TOT. C 44.69 15.04 12.21 12.12 5.49 2.21 1.77 5.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50</pre> | SAMP 34 35 35 01 48 SAMP 37 |
| <pre>TIME :21:48:28 22:18:41 30.2 (min) LOG : 787.84 789.26 1.4 FDEFTH: 15 15 BOEFTH: 94 87 Towing dir: 0° Wire out : 120 m Sorted : 10 Total catch: 9.84 SPECIES Scomber japonicus Engraulis encrasicolus Cypselurus melanurus Lagocephalus laevigatus Trachurus trecae Ariomma bondi Cypselurus cyanopterus *** Saurida brasiliensis Sardinella aurita Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :25/09/17 GEAR TYPE: P start stop duration TIME :00:27:20 01:00:26 33.1 (min) LOG : 814.30 815.96 1.6 FDEFTH: 10 10 BDEPTH: 46 53 Towing dir: 0° Wire out : 150 m Sorted : 2 Total catch: 22.60 SPECIES Decapterus punctatus Sphyraena guachancho Euthynnus alletteratus Decapterus rhonchus** Jellyfish Trachinotus ovatus Alloteuthis africana Scomber japonicus Apogon sp. Engraulis encrasicolus Selene dorsalis Boops boops Tatal</pre> | Purpo: Regio Gear Valid Catch, CATCH/I weight 11.08 3.38 2.10 1.85 0.71 0.28 0.08 0.04 0.02 19.54 Valid NO: 4 PO: Regio Gear Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, Valid Speed Catch, CATCH/I weight Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, CATCH/I Weight Speed Catch, Speed Catch, Speed Catch, CATCH/I Weight Speed Catch, CATCH/I Weight Speed Catch, CATCH/I Weight Speed Catch, CATCH/I Weight Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Catch, Speed Speed Speed Catch, Speed Spp | se : 1 n : 3300 cond.: 0 : 2.8 k /hour: 19.52 HOUR % 0f numbers 522 441 10 6 5115 100 4 115 100 4 12 2 3 STATION: Lat SITION:Lat SITION:Lat SITION:Lat SITION:Lat SITION:Lat SITION: 0 : 3.1k /hour: 40.97 HOUR % 0f 10.1k /hour: 40.97 HOUR % 0f 2.24 2 2 4 4 2 2 4 4 2 2 4 4 2 2 4 4 1 2 2 2 4 4 1 2 2 4 4 1 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 4 4 1 2 2 2 4 4 1 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 2 2 4 4 1 2 1 2 | TOT. C 56.71 17.28 10.77 9.45 3.66 0.10 100.00 9 S 2°29. E 9°23. TOT. C 44.69 15.04 12.21 1.77 1.50 1.50 1.33 1.15 0.20 1.5 | SAMP 34 35 35 01 48 SAMP 37 |

| R/V Dr. Fridtjof Nansen DATE :25/09/17 start stop | SURVEY:2017 GEAR TYPE: BT duration | 407 NO: 2 PC | STATION: SITION:Lat Lon | 10 S 2°48.8 E 9°15.3 | 31 15 |
|---|--|------------------|-------------------------------|----------------------------|-----------|
| TIME :09:53:44 10:15:22 | 21.6 (min) | Purpo | se : 1 | | |
| LOG : 881.34 882.64 EDEPTH: 111 113 | 1.3 | Regio | n : 3300 | | |
| BDEPTH: 111 113 | | Valid | lity : 0 | | |
| Towing dir: 0° Wire | out : 310 m | Speed | : 2.4 | kn | |
| Sorted : 14/ Total | catch: 639.00 | Catcr | /nour: 1//2 | .54 | |
| SPECIES | | CATCH/ | HOUR % O | F TOT. C | SAMP |
| Scomber japonicus | | weight | numbers | 64 53 | 38 |
| Trachurus trecae | | 281.00 | 38139 | 15.85 | 40 |
| Spicara alta | | 167.27 | 12696 | 9.44 | |
| Ariomma bondi | | 71.84 57.17 | 4677 4011 | 4.05 | 39 |
| Saurida brasiliensis | | 18.59 | 2571 | 1.05 | |
| Rhinobatos albomaculatu | IS | 7.99 | 3 | 0.45 | |
| Torpedo torpedo | | 4.58 | 8 | 0.26 | |
| Trigla lyra | | 4.52 | 191 | 0.26 | |
| Illex coindetii | | 2.86 | 166 | 0.24 | |
| Fistularia petimba | | 1.66 | 6 | 0.09 | |
| Sepia orbignyana | | 1.44 | 11 | 0.08 | |
| Raja miraletus | | 0.33 | 6 | 0.02 | |
| Total | | 1772.79 | - | 100.01 | |
| | | | | | |
| R/V Dr. Fridtjof Nansen DATE :25/09/17 | SURVEY:2017 GEAR TYPE: BT | 407 NO: 2 PC | STATION: SITION:Lat | 11 5 2°53.2 | 22 |
| start stop | duration | | Lon | E 9°27.0 | 90 |
| TIME :16:29:10 16:55:54 | 26.7 (min) | Purpo | se : 1 | | |
| FDEPTH: 104 106 | | Gear | cond.: 0 | | |
| BDEPTH: 104 106 | out • 200 m | Valid | ity : 0 | kn | |
| Sorted : 28 Total | catch: 119.03 | Catch | /hour: 267. | 19 | |
| SPECTES | | CATCH | HOUR % O | F TOT. C | SAMP |
| | | weight | numbers | | |
| Trachurus trecae | | 101.40 | 22310 | 37.95 | 42 |
| Lagocephalus laevigatus | | 43.77 | 105 | 16.38 | 41 |
| Fistularia petimba | | 19.66 | 49 | 7.36 | |
| Ariomma bondi Pagellus bellottii | | 16.05 | 483 117 | 6.01 2.24 | 44 |
| Dentex congoensis | | 5.11 | 227 | 1.91 | 45 |
| Chelidonichthys gaboner | sis | 4.67 | 153 | 1.75 | |
| Engraulis encrasicolus | | 3.06 | 460 | 1.15 | 46 |
| Saurida brasiliensis | | 2.33 | 438 | 0.87 | |
| Boops boops Senia sn. | | 1.90 | 132 | 0.71 | |
| Illex coindetii | | 1.31 | 74 | 0.49 | |
| Sardinella aurita | | 0.15 | 7 | 0.05 | |
| Zeus Tabel | _ | 0.15 | , | 0.05 | |
| Total | | 267.18 | | 100.00 | |
| R/V Dr. Fridtjof Nansen DATE :25/09/17 start stop | SURVEY:2017 GEAR TYPE: PT duration | 407 NO: 4 PC | STATION: SITION:Lat Lon | 12 S 2°52.9 E 9°44.4 | 95 12 |
| TIME :22:37:15 23:07:22 | 30.1 (min) | Purpo | se : 1 | | |
| FDEPTH: 15 15 | 1.0 | Gear | cond.: 0 | | |
| BDEPTH: 53 58 | | Valid | ity : 0 | L | |
| Sorted : 0 Total | catch: 5.76 | Catch | /hour: 11.4 | кп 7 | |
| SPECIES | | CATCH/ weight | HOUR % 0 numbers | F TOT. C | SAMP |
| JELLYFISH | | 4.62 | 22 | 40.28 | |
| Trachurus trecae Sphyraena guachancho | | 2.15 | 673 | 18.75 12.15 | |
| Decapterus punctatus | | 1.00 | 120 | 8.68 | |
| Engraulis encrasicolus | | 1.00 | 271 | 8.68 | |
| Saurida brasiliensis | | 0.40 | 155 | 3.47 | |
| Sardinella aurita | | 0.20 | 38 | 1.74 | |
| Scollber Japonicus | | 0.10 | • | 1.59 | |
| Total | | 11.47 | | 100.00 | |
| R/V Dr. Fridtjof Nansen DATE :26/09/17 | SURVEY:2017 GEAR TYPE: PT | 407 NO: 4 PC | STATION: SITION:Lat | 13 5 3°12.6 | 59 |
| TIME :04:44:52 05:14:57 | 30.1 (min) | Purpo | se : 1 | E 9-39.6 | 74 |
| LOG : 1072.19 1074.01 | 1.8 | Regio | n : 3300 | | |
| BDEPTH: 119 114 | | Gear Valid | lity : 0 | | |
| Towing dir: 0° Wire Sorted : 0 Total | out : 145 m catch: 0.00 | Speed Catch | : 3.6 /hour: 0.00 | kn | |
| SPECIES | | CATCH/ | HOUR % O | F TOT. C | SAMP |
| NOCATCH | | weight 0.00 | numper's Ø | 0.00 | |

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| DATE :26/09/17 GEAR TYPE: B | 7407 STATION: NO: 2 POSITION:La | 14 t S 3°3.99 p E 10°2 31 |
|---|--|--|
| TIME :11:34:05 11:57:04 23.0 (min) | Purpose : 1 | |
| FDEPTH: 41 43 | Gear cond.: 0 | 00 |
| BDEPTH: 41 43 Towing dir: 0° Wire out : 200 | Validity : 0 Speed : 3. | 2 kn |
| Sorted : 141 Total catch: 140.9 | Catch/hour: 36 | 7.91 |
| SPECIES | CATCH/HOUR % | OF TOT. C SAMP |
| Decanterus nunctatus | weight numbers 61 57 10616 | 16 73 48 |
| Lutjanus fulgens | 61.04 112 | 16.59 |
| JELLYFISH | 44.80 133 36.19 157 | 9.84 |
| Pomadasys incisus | 36.03 154 23.50 3 | 9.79 |
| JELLYFISH | 20.78 91 | 5.65 0 |
| Sardinella aurita Boops boops | 19.84 1070 16.66 144 | 5.39 47 4.53 |
| Drepane africana Pseudotolithus senegalensis | 8.62 13 | 2.34 |
| Selene dorsalis | 6.63 29 | 1.80 |
| Alloteuthis africana Sphyraena guachancho | 4.49 1441 3.55 5 | 1.22 0.97 |
| Galeoides decadactylus | 3.39 8 | 0.92 |
| Pomadasys jubelini | 2.14 3 | 0.58 |
| Chloroscombrus chrysurus Elops senegalensis | 1.80 47 1.67 3 | 0.49 0.45 |
| Dentex canariensis | 1.46 3 | 0.40 |
| Pagellus bellottii | 0.94 8 | 0.34 49 0.26 |
| Alectis alexandrinus Brachydeuterus auritus | 0.89 3 0.47 5 | 0.24 0.13 |
| | | |
| Iotal | 367.91 | 100.00 |
| P/// Dn Enidtiof Nancon SURVEY: 20 | 7407 5747700+ | 15 |
| DATE :26/09/17 GEAR TYPE: B | NO: 2 POSITION:La | t \$ 3°19.36 |
| start stop duration TIME :15:33:07 15:59:33 26.4 (min) | Lo Purpose : 1 | n E 9°44.27 |
| LOG : 1150.62 1151.97 1.4 | Region : 33 | 90 |
| BDEPTH: 132 128 | Validity : 0 | |
| Towing dir: 0° Wire out : 370 m Sorted : 64 Total catch: 4010 m | Speed : 3. | 1 kn 95 24 |
| | | |
| SPECIES | weight numbers | OF TOT. C SAMP |
| Scomber japonicus | 5250.26 175008 | 57.66 50 |
| Umbrina canariensis | 480.91 570 | 5.28 |
| Zenopsis conchifer Zeus faber | 273.19 284 239.05 427 | 3.00 |
| Boops boops | 145.13 2134 | 1.59 |
| Dentex congoensis Ariomma bondi | 91.06 854 71.15 2134 | 1.00 51 0.78 |
| Antigonia capros | 37 00 1137 | 0.41 |
| Towantaboata | 21 21 1/2 | 0.24 |
| Invertebrate Sphoeroides pachygaster | 31.31 143 28.47 143 | 0.34 0.31 |
| Invertebrate Sphoeroides pachygaster Mustelus mustelus Trachurus trecae | 31.31 143 28.47 143 18.71 7 11.37 143 | 0.34 0.31 0.21 0.12 |
| Invertebrate Sphoeroides pachygaster Mustelus mustelus Trachurus trecae Heptranchias perlo | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 | 0.34 0.31 0.21 0.12 0.07 |
| Invertebrate Sphoeroides pachygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 | 0.34 0.31 0.21 0.12 0.07 100.00 |
| Invertebrate Sphoeroides pachygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 | 0.34 0.31 0.21 0.12 0.07 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R// Dr. Fridtjof Nansen SURVEY:20 | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 STATION: | 0.34 0.31 0.21 0.12 0.07 100.00 16 |
| Invertebrate Sphoeroides packpgaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION:La NO: 4 POSITION:La | 0.34 0.31 0.21 0.12 0.07 100.00 16 t S 3°14.56 n E 10°10.36 |
| Invertebrate Sphoeroides packpgaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) IG : 1195 12 1196 80 1.7 | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 .7407 STATION:La Lo Purpose : 1 Region : 33 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t 53°14.56 h E 10°10.36 |
| Invertebrate Sphoeroides packpgaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION:La Lo Purpose : 1 Region : 33 Gear cond : 0 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t S 3°14.56 n E 10°10.36 20 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEPTH: 10 10 BDEPTH: 47 44 Towing dir: 0° Wire out : 130 d | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION:La 00 Purpose :1 Region :33 Gear cond.: 0 Validity :0 Speed :3. | 0.34 0.31 0.21 0.07 100.00 16 t S 3°14.56 n E 10°10.36 20 3 km |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEPTH: 10 10 BDEPTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION:La 0.00 Purpose 1 Region : 33 Gear cond.: 0 Validity : 0 Speed : 3. Catch/hour: 57 | 0.34 0.31 0.21 0.12 0.07 100.00 16 5.3°14.56 n E 10°10.36 20 3 km .77 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEPTH: 10 10 BDEPTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: NO: 4 POSITION:La CAUPADE 1 Region : 33 Gear cond.: 0 Validity : 0 Speed : 3. Catch/hour: 57 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t S 3°14.56 n E 10°10.36 20 3 km .77 OF TOT. C SAMP |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEPTH: 10 10 BDEPTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus | 31.31 143 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: NO: 4 POSITION:La Lo Purpose :1 Region :33 Gear cond.: 0 Validity :0 Speed :3. Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5383 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t S 3°14.56 n E 10°10.36 20 3 km .77 OF TOT. C SAMP 29.09 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 1 Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita 2.5.1.4 VET.5.4 | 31.31 143 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: La purpose 1 Region : 33 Gear cond.: 0 Validity : 0 Speed : 3. Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5383 17.91 181 7.91 181 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t \$ 3°14.56 n E 10°10.36 20 3 km .77 OF TOT. C \$AMP 29.09 19.94 15.22 20 20 20 20 20 20 20 20 20 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TVPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 u Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid. juvenile fishes | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: La purpose 1 Region : 33 Gear cond.: 0 Validity : 0 Speed : 3. Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5883 11.52 1181 7.81 18 4.64 4475 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t \$ 3°14.56 n E 10°10.36 20 3 km .77 OF TOT. C SAMP 29.09 19.94 13.52 8.02 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 m Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid. juvenile fishes Engraulis encrasicolus Ilisha africana **** | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: La Lo Purpose 1 Region : 33 Gear cond.: 0 Validity : 0 Speed : 3. Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5383 11.52 1181 7.81 18 4.64 4475 3.93 892 3.83 79 | 0.34 0.31 0.21 0.12 0.07 100.00 16 t \$3°14.56 n E 10°10.36 20 3 km .77 OF TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 \$5 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 m Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Und. juvenile fishes Engmaulis encrasicolus Ilisha africana **** Totalurus trecae | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION: La Lo Purpose 1 Region : 33 Gear cond :: 0 Validity : 0 Validity : 0 NO: 4 POSITION:La Lo Purpose 1 Region : 33 Gear cond :: 0 Validity : 0 No: 4 Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5383 11.52 1181 7.81 18 4.64 4475 3.93 892 3.83 79 2.13 704 | 0.34 0.31 0.21 0.21 0.07 100.00 16 5 3°14.56 n E 10°10.36 20 3 km .77 0F TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.69 |
| Invertebrate Sphoeroides packpaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :28:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid, juvenile fishes Engraulis encrasicolus 11isha africana *** Trachurus trecae Sphyraena guachancho Alloteuthis africana | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 7407 STATION:La Construction Purpose 1 Region : 33 Gear cond.: 0 Validity : 0 No: 4 POSITION:La Catch/hour: 57 CATCH/HOUR % weight numbers 16.80 5383 11.52 1181 7.81 18 4.64 4475 3.93 892 3.83 79 2.13 704 2.01 8 1.60 606 | 0.34 0.31 0.21 0.12 0.07 100.00 1 1 5 5 3°14.56 n E 10°10.36 20 0 5 7 7 0 F TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.48 2.77 |
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| Invertebrate Sphoeroides pachygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Undid, juvenile fishes Engraulis encrasicolus Ilisha africana *** Trachurus trecae Sphyraena guachancho Alloteuthis africana Brachydeuterus auritus Scomber omorus tritor Scomber japonicus Sardinella maderensis Sepia orbignyana Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P start stop duration TIME :22:52:32 23:11:05 18.6 (min) LOG : 1205.10 1206.13 1.0 FDEFTH: 30 31 Towing dir: 0° Wire out : 120 n Sorted : 9 Total catch: 1000.4 SPECIES | 31,31 143 28,47 143 18,71 7 11,37 143 5,99 2 9105.27 2007 STATION::a NO: 4 Purpose: 1 Region: 33.3 Gear cond: 0 Validity: 0 Speed: 3. CatcH/HOUR % % weight numbers 16. 16.80 5383 11.52 1181 7.81 18 4.64 4475 3.93 892 3.83 79 2.13 704 2.01 8 1.60 606 1.22 37 0.43 2 0.59 2 0.43 2 0.43 2 0.43 2 0.43 2 0.43 2 0.43 2 0.43 2 0.43 2 <t< td=""><td>0.34 0.31 0.21 0.27 100.00 16 15 3°14.56 n E 10°10.36 20 3 km 1.77 0F TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.69 3.48 2.77 2.12 1.64 1.02 52 0.55 100.00 17 5 3°9,75 n E 10°16.35 20 3 km 34.50 0F TOT. C SAMP 0.55 00 3 km 34.50 0F TOT. C SAMP</td></t<> | 0.34 0.31 0.21 0.27 100.00 16 15 3°14.56 n E 10°10.36 20 3 km 1.77 0F TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.69 3.48 2.77 2.12 1.64 1.02 52 0.55 100.00 17 5 3°9,75 n E 10°16.35 20 3 km 34.50 0F TOT. C SAMP 0.55 00 3 km 34.50 0F TOT. C SAMP |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid. juvenile fishes Engraulis encrasicolus Ilisha africana **** Trachurus trecae Sphyraena guachancho Alloteuthis africana Brachydeuterus auritus Scomber omorus tritor Scomber japonicus Sardinella maderensis Sepia orbignyana Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :22:52:32 23:11:05 18.6 (min) LOG : 1205.10 1206.13 1.0 FDEFTH: 3 31 Towing dir: 0° Wire out : 120 n Sorted : 9 Total catch: 1000.1 SPECIES | 31,31 143 28,47 143 18,71 7 11,37 143 28,47 143 18,71 7 9105.27 STATION::a NO: 4 POSITION:La Corr Corr Corr NO: 4 POSITION:La Catch/hour: 5.7 CATCH/HOUR % weight numbers Sas 11.52 11.52 1181 7.81 7.81 18 4.64 7.83 892 3.83 7.95 2 0.59 3 0.43 2 0.59 3 0.43 2 0.52 2 57.77 STATION::a Loo Purpose: 1 Region: 33 Gear cond:: 0 Validity :: 0 0 18 1.00 Catch/hour: 32 57.77 STATION: 20 10 2095:33 Gear cond:: 0 Validity :: 0 10 Catch/hour: 3 | 0.34 0.31 0.21 0.21 0.07 100.00 16 15 3°14.56 n E 10°10.36 20 3 km 13.52 8.02 6.79 6.62 55 3.69 3.48 2.77 2.12 1.64 1.64 1.62 52 0.75 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 10 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P Start stop duration TIME :20:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDEFTH: 10 10 BDEFTH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid, juvenile fishes Engraulis encrasicolus 11isha africana *** Trachurus trecae Sphyraena guachancho Alloteuthis africana Brachydeuterus auritus Scomber piaponicus Sardinella madrensis Sepia orbignyana Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: P start stop duration TIME :22:52:32 23:11:05 18.6 (min) LOG : 1205.10 1206.13 1.0 FDEFTH: 30 31 Towing dir: 0° Wire out : 120 n Sorted : 9 Total catch: 1000.4 SPECIES Sardinella maderensis Sardinella maderensis | 31.31 143 28.47 143 18.71 7 11.37 143 5.99 2 9105.27 NO: 4 POSITION:La Catch/hour: 57 CATCH/HOUR % Weight numbers 16.80 5383 11.52 1181 7.81 18 4.64 4475 3.93 892 3.83 79 2.13 704 2.01 8 1.60 606 1.22 37 0.59 3 0.43 2 57.77 | 0.34 0.31 0.21 0.12 0.07 100.00 16 15 3°14.56 n E 10°10.36 00 3 kn 77 0F TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.69 3.48 2.77 2.12 1.64 1.02 52 0.75 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 17 100.00 15 100.00 15 100.00 15 100.00 15 100.00 15 100.00 15 100.00 100 15 100.00 15 100.00 15 100.00 15 100.00 15 100.00 100.00 15 100.00 15 100.00 1 |
| Invertebrate Sphoeroides packygaster Mustelus mustelus Trachurus trecae Heptranchias perlo Total Total Total Solution Surveysion DATE :26/09/17 GEAR TYPE: P start stop duration TIME :26:59:19 21:29:44 30.4 (min) LOG : 1195.12 1196.80 1.7 FDETH: 10 10 BDETH: 47 44 Towing dir: 0° Wire out : 130 n Sorted : 29 Total catch: 29.29 SPECIES Decapterus punctatus Sardinella aurita J E L L Y F I S H Unid, juvenile fishes Engraulis encrasicolus Ilisha africana *** Trachurus trecae Sphyraena guachancho Alloteuthis africana Brachydeuterus auritus Scomber omborus tritor Scomber japonicus Sardinella maderensis Sepia orbignyana Total R/V Dr. Fridtjof Nansen SURVEY:20 DATE :26/09/17 GEAR TYPE: 2 SPECIES Date : 26 U U S H DATE : 25:32 23:11:05 18.6 (min) LOG : 1205.10 1206.13 1.0 FDETH: 5 5 BDETH: 30 31 Towing dir: 0° Wire out : 120 m Sorted : 9 Total catch: 1000.1 SPECIES | 31,31 143 28,47 143 18,71 7 11,37 143 18,71 7 9105.27 2 9105.27 Control 143 NO: 4 POSITION:La NO: 4 POSITION:Control 143 Gear cond.: 0 Validity: 0 Speed: :3. Catch/hour: 57 CATCH/HOUR % % weight numbers 16.80 16.80 5383 11.52 181 7.81 18 4.64 4475 3.93 892 3.83 79 2.13 764 2.01 8 4.64 4475 3.93 822 97.77 STATION: 70.95 2 6.59 3 0.43 2 57.77 STATION: 70 STATION: 10 Catch/hour: 32 CATCH/HOUR % | 0.34 0.31 0.21 0.12 0.07 100.00 16 t \$ 3°14.56 n E 10°10.36 00 3 kn .77 OF TOT. C SAMP 29.09 19.94 13.52 8.02 6.79 6.62 55 3.69 3.48 2.77 2.12 1.64 1.02 52 0.75 100.00 17 t \$ 3°9,75 n E 10°16.35 00 Skn 24.56 00 0F TOT. C SAMP 92.61 57 4.45 56 0.02 0 0 0 0 0 0 0 0 0 0 0 0 0 |

| R/V Dr. Fridtjof Nansen SURVEY:201 DATE :27/09/17 GEAR TYPE: B1 | 7407 NO: 2 POS | STATION: ITION:Lat | 18 S 3°34. | 10 |
|---|--|---|--|--|
| start stop duration | | Lon | E 9°59. | 53 |
| IIME :08:06:13 08:37:09 30.9 (min) | Purpos | e : 1 | a | |
| FDEPTH: 121 120 | Gear c | ond.: 0 | 0 | |
| BDEPTH: 121 120 | Validi | ty : 0 | | |
| Towing dir: 0° Wire out : 300 m | n Speed | : 3.0 | kn | |
| Sorted : 0 lotal catch: 104.44 | atch/ | nour: 202 | .60 | |
| SPECIES | CATCH/H | IOUR % | OF TOT. C | SAMP |
| PORTEERA (Sponges) | weight n | umbers 239 | 32.96 | |
| Scomber japonicus | 55.83 | 2099 | 27.56 | 60 |
| Dentex congoensis | 34.49 | 904 | 17.02 | 59 |
| Spicara alta | 15.83 | 846 | 7.81 | |
| Arlomma bondi Zeus faber | 13.42 | 500 | 2 22 | |
| Mustelus mustelus | 3.06 | 2 | 1.51 | |
| Squalus cf. mistukurii | 2.83 | 2 | 1.40 | |
| Illex coindetii | 2.21 | 114 | 1.09 | |
| Dentex angolensis | 1.39 | 4 | 0.79 | |
| Trachurus trecae | 0.47 | 8 | 0.23 | 61 |
| Chelidonichthys gabonensis | 0.27 | 10 | 0.13 | |
| Citharus linguatula | 0.08 | 6 | 0.04 | |
| Total | 202.60 | | 100.00 | |
| R/V Dr. Fridtjof Nansen SURVEY:201 | 7407 | STATION: | 19 | |
| DATE :27/09/17 GEAR TYPE: P1 start stop duration | NO: 4 POS | ITION:Lat Lon | S 3°44. E 10°20 | 83 .50 |
| TIME :23:31:10 23:59:55 28.8 (min) | Purpos | e : 1 | 0 | |
| EDEPTH 0 0 | Gear c | ond • 0 | 0 | |
| BDEPTH: 100 104 | Validi | ty : 0 | | |
| Towing dir: 0° Wire out : 150 m | n Speed | : 3.0 | kn | |
| Sorted : 1 Total catch: 16.93 | Catch/ | hour: 35. | 32 | |
| SPECIES | CATCH/H | IOUR % | OF TOT. C | SAMP |
| | weight n | umbers | | |
| Saurida brasiliensis | 8.60 | 3101 | 24.34 | 62 |
| Invertebrate | 5.43 | 58 | 15.36 | 05 |
| Trachurus trecae | 3.80 | 584 | 10.75 | 62 |
| Scomber japonicus | 2.75 | 104 | 7.80 | 64 |
| Fcheneis naucrates | 2.63 | 8 | 7.44 | |
| Lagocephalus laevigatus | 1.13 | 2 | 3.19 | |
| Cynselurus melanurus | 0.88 | 2 | 2.48 | |
| cypseid as meidland as | | | | |
| Priacanthus arenatus | 0.17 | 6 | 0.47 | |
| Priacanthus arenatus Ariomma bondi Sardinella aurita | 0.17 0.08 0.04 | 6 17 2 | 0.47 0.24 0.12 | |
| Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis | 0.17 0.08 0.04 0.01 | 6 17 2 6 | 0.47 0.24 0.12 0.04 | |
| Prizanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total | 0.17 0.08 0.04 0.01 35.32 | 6 17 2 6 | 0.47 0.24 0.12 0.04 100.00 | |
| Prizanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total | 0.17 0.08 0.04 0.01 35.32 | 6 17 2 6 | 0.47 0.24 0.12 0.04 | |
| R/V Dr. Fridtjof Nansen SURVEY:202 R/V Dr. Fridtjof Nansen SURVEY:202 DATE :28/09/17 GEAR TYPE: B1 | 0.17 0.08 0.04 0.01 35.32 | 6 17 2 6 | 0.47 0.24 0.12 0.04 100.00 | 02 |
| R/V Dr. Fridtjof Nansen SURVEY:201 R/V Dr. Fridtjof Nansen SURVEY:201 start stop duration | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS | 6 17 2 6 STATION: ITION:Lat Lon | 0.47 0.24 0.12 0.04 100.00 20 5 3°37.1 E 10°43 | 02 .08 |
| R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TVPE: B1 start son during R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TVPE: B1 start stop duration TIME :08:15:11 08:44:47 29.6 (min) | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Purpos | 6 17 2 6 STATION: ITION:Lat Lon e : 1 | 0.47 0.24 0.12 0.04 100.00 20 S 3°37. E 10°43 | 02 .08 |
| R/V Dr. Fridtjof Nansen SURVEY:201 R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI TIM: :851:11 08:34:47 29.6 (min) LOG :1432.89 1434.57 LOF :1432.89 1434.57 | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region Gear c | 6 17 2 6 STATION: ITION:Lat Lon e : 1 . : 330 : 300 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 | 02 .08 |
| R/V Dr. Fridtjof Nansen SURVEY:200 DATE ::28/09/17 GEAR TYPE: B1 Start ::108:15:11 08:44:47 29.6 (min) LOG :: 1432.89 1434.57 INF 38 | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi | 6 17 2 6 STATION: ITION:Lat Lon e : 1 330 ond.: 0 ty : 0 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 | 02 .08 |
| Cypical January Priacanthus arenatus Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:200 DATE 100 - 1282 Start stop duration TIME :08:15:11 08:44:47 TOG :08:15:11 08:44:47 SUPETH: 35 BDEPTH: 38 Towng dir: 100 Wire out :310 | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi | 6 17 2 6 STATION: ITION:Lat Lon e : 1 . 330 ond.: 0 ty : 0 . 3.4 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn | 02 .08 |
| Cypical J automotos Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:200 DATE :28/09/17 GEAR TYPE: BI start stop duration TIME :08:15:11 08:44:47 29.6 (min) LOG : 1422.89 1434.57 1.7 FDEPTH: 35 38 BDEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 | 0.17 0.08 0.04 0.01 35.32 7407 2 POS Region Gear c Validi Speed 2 Catch/ | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 : 3.4 hour: 365 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 | 02 .08 |
| Gypsich JB mission Comparison Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: Bistart start stop UD4E :28/09/17 GEAR TYPE: Bistart Start stop TD1: 108:15:11 08:44:47 LO6 : 1432.89 1434.57 DFDFTH: 35 B0EPTH: 35 B0EPTH: 35 Sorted : 180 Total catch: 180.42 | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi Speed Catch/H | 6 17 2 6 STATION: Lat Lon e : 1 : 330 ond.: 0 ty : 0 : 3.4 hour: 365 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C | 02 .08 SAMP |
| Gyperators Selence dorsalis Priacanthus arenatus Arionma bondi Sardinella aurita Selene dorsalis Total Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop DATE :28/09/17 GEAR TYPE: BI Start stop DIME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 FDEPTH: 35 BDEPTH: 35 Towing dir: 0° Wire out : 130 m Sorted : 180 SPECIES 15 L H VETS H | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi Speed Catch/ Weight n 200 So | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 ty : 0 : 3.4 hour: 365 IOUR % umbers 122 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C | 02 .08 SAMP |
| Gypsich Js Arianma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:200 DATE :28/09/17 GEAR TYPE: Bl start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG :1432.89 1434.57 1.7 FDEPTH: 35 38 Towing dir: 0° Wire out :130 m Sorted :180 Total catch: 180.42 | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi D Speed Catch/ weight n 209.59 56.51 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 ty : 0 : 3.4 hour: 365 OUR % umbers 142 8507 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 | 02 .08 SAMP |
| Cypical January Priacanthus arenatus Arionma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop duration TIME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDETH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi Speed Catch/ CAtCH/H weight n 209.59 56.51 23.15 | 6 17 2 6 STATION: ITION:Lat Lon e :1 : 330 ond.: 0 ty : 0 : 3.4 hour: 365 IOUR % umbers 142 8507 278 | 0.47 0.24 0.24 0.20 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 6.33 | 02 .08 SAMP 72 |
| Gypeland B metadomics Priacanthus arenatus Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop IDTE :28/09/17 GEAR TYPE: BI Th: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 DFDETH: 35 BOEPTH: 35 Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Schwingen chrysurus | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi Speed Catch/ Keight n 209.59 56.51 23.15 16.42 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 : 3.4 hour: 365 OUR % umbers 142 8507 278 414 or | 0.47 0.24 0.24 0.04 100.00 20 5 3°37. E 10°43 00 kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2 0 2 0 | 02 .08 SAMP 72 67 |
| Gypeland B Priacantbus arenatus Priacantbus arenatus Arionma bondi Sardinella aurita Selene dorsalis Total Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 TIME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 DEPTH: 35 38 DEPTH: 35 38 Towling dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyraena sphyraena Galeoide decadactylus State | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region Gear c Validi 5 Speed CATCH/H weight n 200.59 56.51 23.15 16.42 7.42 7.43 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 ty : 0 ty : 0 ty : 3 hour: 365 KOUR % 400 28507 278 414 8507 278 414 8597 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 | 02 .08 SAMP 72 67 |
| Gypeland B Sheland B Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:200 DATE :28/09/17 GEAR TYPE: B start stop duration TIME :00:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDEPTH: 35 38 TOWing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphynaena sphyraena Galeoides decadactylus Pomadasys inclisus | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi 5 Speed Catch/ weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.35 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 ond.: 0 17 : 0 17 : 0 17 : 0 17 : 0 17 : 0 19 : 10 10 10 10 10 278 414 859 7 30 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 | 02 .08 SAMP 72 67 |
| Cypical Ja Javita Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop duration TIME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDETH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphynema aghyraena Galeoides decadactylus Pomadasys incisus Sphorena mamoratus | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi Speed Catch/H weight n 209.59 56.51 16.42 7.18 6.36 6.36 4.38 | 6 17 2 6 STATION: ITION:Lat Lon e :1 0 : 330 ond.: 0 : 330 ond.: 0 : 330 0 ond.: 0 : 330 0 ond.: 0 : 1 : 330 0 ond.: 0 : 1 : 330 0 : 1 : 330 0 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 | 0.47 0.24 0.24 0.04 100.00 20 5 3°37. E 10°43 00 kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.76 | 02 .08 SAMP 72 67 |
| Gypeland B Priacanthus arenatus Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop DATE :28/09/17 GEAR TYPE: BI Start stop TIM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 TIM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 Sorted : 130 Total catch: 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphypreana sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Sardinella maderensis Sardinella maderensis | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi Speed Catch/ CATCH/H weight n 209.59 56.51 16.42 7.42 7.48 6.36 4.38 4.34 3 81 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 ond.: 0 : 330 ond.: 0 : 330 ond.: 0 : 330 ond.: 0 : 330 ond.: 0 : 1 : 330 ond.: 0 : 1 : 330 ond.: 0 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 | 0.47 0.24 0.24 0.04 100.00 20 5 3°37. E 10°43 00 Kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.19 1.04 | 02 .08 SAMP 72 67 69 69 |
| Cypical J Sector | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi D Speed C CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.41 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 ty : 0 : 3.4 hour: 365 OUR % umbers 142 8567 278 414 855 97 30 226 26 10 10 10 10 10 10 10 10 10 10 | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 Kn .71 0F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.74 1.20 1.94 0.93 | 02 .08 SAMP 72 67 69 66 |
| Gypeland B mailand B Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:200 DATE :28/09/17 GEAR TYPE: B start stop duration TIME :00:15:11 00:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDETH: 35 38 BOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphaena sphyraena Galeoides decadactylus Pomadasys inclisus Sphoeroides marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudupeneus prayensis | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi D Speed Catch// weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.35 4.38 4.38 4.34 3.41 3.28 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 ond.: 0 142 8507 278 142 8507 278 414 855 97 30 2 2 8507 278 414 85 97 30 2 2 6 93 0 2 2 6 93 0 | 0.47 0.24 0.24 0.20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 6.33 1.96 1.74 1.20 1.74 1.20 1.74 1.20 9.09 | 02 .08 SAMP 72 67 69 66 |
| Gypeland B Priacanthus arenatus Priacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop DATE :28/09/17 GEAR TYPE: BI start stop DTM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 TDM: 08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 SUPCIPH: 35 38 BOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyoraena Sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudupeneus prayensis Sepia spi Sepia spi Spie orbiti <td>0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Catch/ Validi Speed Catch/ CATCH/H weight n 20,59 56.51 16.42 7.42 7.42 7.48 6.36 4.38 4.34 3.81 3.41 3.28 2.80 2.80</td> <td>6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 0 d. : 0 142 : 330 0 d. : 0 142 : 330 0 d. : 0 142 : 330 0 d. : 0 2 : 1 278 414 8507 278 8507 2778 8507 278 278 8507 278 8507 278 278 278 2778 278 278 278 278 278 2</td> <td>0.47 0.24 0.24 0.04 100.00 20 5 3°37, E 10°43 00 kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.99 1.99 1.99 1.99 2.03 2.03 2.03 2.03 2.03 2.03 2.03 2.03</td> <td>02 08 SAMP 72 67 69 66</td> | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Catch/ Validi Speed Catch/ CATCH/H weight n 20,59 56.51 16.42 7.42 7.42 7.48 6.36 4.38 4.34 3.81 3.41 3.28 2.80 2.80 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 0 d. : 0 142 : 330 0 d. : 0 142 : 330 0 d. : 0 142 : 330 0 d. : 0 2 : 1 278 414 8507 278 8507 2778 8507 278 278 8507 278 8507 278 278 278 2778 278 278 278 278 278 2 | 0.47 0.24 0.24 0.04 100.00 20 5 3°37, E 10°43 00 kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.99 1.99 1.99 1.99 2.03 2.03 2.03 2.03 2.03 2.03 2.03 2.03 | 02 08 SAMP 72 67 69 66 |
| Cypical J aurital Prizanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOPETH: 35 38 BDEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Illisha africana *** Sphyraena sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudopenus prayensis Sepia sp. Carlarius parkii Pseudotlithus senegalensis | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region o Validi Speed Catch/ CATCH/H weight n 20.59 56.51 16.42 7.42 7.48 6.36 4.38 4.34 3.81 3.28 2.59 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 : 3,4 hour: 365 OUR % 142 8507 248 8507 266 266 266 10 30 2 266 266 266 266 266 266 266 266 266 | 0.47 0.24 0.24 0.24 0.04 0.5 0.6 5 3°37. E 10°43 0 0 Kn .71 0 0 F TOT. C 57.31 15.45 6.33 1.96 1.74 1.20 1.19 1.09 0.93 0.97 6.07 1.09 1.09 0.00 0.00 0.00 0.00 0.00 0.00 | 02 .08 SAMP 72 67 69 66 |
| Cypical J aurital Prizarthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDETH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chioroscombrus chrysurus Ilisha africana *** Sphyraena sphyraena Galeoides decadactylus Pomadasys incisus Spidersis Sardinella maderensis Elops Lacerta Pseudupeneus prayensis Sepia sp. Carlarius parkii Pseudotlithus senegalensis Auxis sp. | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi D Speed C CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.36 4.38 4.38 4.34 3.81 3.28 2.59 2.59 2.19 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 0 ty : 0 ty : 0 ty : 330 0 ty : 330 0 ty : 330 ty : 0 ty : 330 ty : 0 ty : | 0.47 0.24 0.12 0.04 100.00 20 5 3°37. E 10°43 0 kn .71 0F TOT. C 57.31 15.45 6.33 4.49 2.03 1.74 1.20 1.74 1.20 1.04 0.93 0.97 0.97 1.04 0.93 0.97 0.97 1.04 0.93 0.90 0.76 0.71 0.93 0.97 0.97 0.96 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 | 92 .08 SAMP 72 67 69 66 |
| Cypical B in claim bond Priacantbin arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: B start stop duration TIME :00:15:11 00:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FDEPTH: 35 38 TOWIng dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphoeroides marmoratus Selend orsalis Sardinella maderensis Elops lacerta Pseudopenus prayensis Sepia sp. Carlarius parkii Pseudotolithus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear c Validi 56.51 23.15 16.42 7.42 7.18 6.35 4.33 4.33 4.33 4.341 3.28 2.59 2. | 6 17 2 6 STATION: ITION:Lat ITION:Lat : 330 000.: 0 : 340 ty : 0 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 | 0.47 0.24 0.24 0.04 100.00 20 5 3°37. E 10°43 00 kn 7.71 00 T TOT. C 57.31 15.45 6.33 4.49 1.96 1.74 1.20 1.19 1.19 1.19 0.93 0.93 0.93 0.97 1.09 1.09 1.09 1.09 1.09 1.00 1.00 1.00 | 82 .08 SAMP 72 67 69 66 |
| Gypeland B Priacanthus arenatus Priacanthus arenatus Priacanthus arenatus Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop DATE :28/09/17 GEAR TYPE: BI start stop IDM: 08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 TIM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 SUPCETS: 38 BOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyoreoldes marmoratus Selene dorsalis Sadaitylus Pomadasys inclus Sphyoreoldes marmoratus Selene dorsalis Sadiella maderensis Elops lacerta Pseudupeneus prayensis Sepia sp. Carlarius peresis Carlarius parkii | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Catch/ Validi Speed Catch/ CATCH/H weight n 29.59 56.51 16.42 7.42 7.42 7.48 6.36 4.38 4.34 3.81 3.41 3.28 2.59 2.59 2.19 1.70 1.07 1.05 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 00d.: 0 142 8507 278 142 8507 278 142 8507 278 142 8507 278 144 8507 278 144 8507 278 144 8507 278 142 8507 278 144 8507 278 8507 8507 278 8507 278 8507 278 8507 278 8507 278 8507 278 8507 278 8507 278 8507 278 778 8507 778 778 778 778 778 778 778 778 778 7 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37, E 10°43 00 kn .71 00F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.99 2.03 0.97 6.33 4.49 2.03 0.96 1.74 1.20 0.93 0.93 0.93 0.93 1.96 1.74 1.24 1.96 1.96 1.96 1.96 1.96 1.96 1.96 1.96 | 02 08 SAMP 72 67 69 66 |
| Cypical James Prizarthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:20: DATE :28/09/17 GEAR TYPE: BI start stop DATE :28/09/17 GEAR TYPE: BI start stop ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOPETH: 35 BDEPTH: 35 Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana **** Sphyoraed se decadactylus Pomadasys incisus Spheeroides marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudupeneus prayensis Sepia sp. Carlarius parkii Pseudotlithus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile Panulirus regius Pagellus bellotti1 | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region o Validi 2 Catch/ CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.48 6.36 4.38 4.34 3.81 3.28 2.59 2.59 2.59 2.19 1.70 1.07 1.07 1.07 1.07 1.07 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 001.: 0 142 8507 28507 28507 28507 28507 28507 28507 28507 296 206 206 206 206 206 206 206 206 206 20 | 0.47 0.24 0.24 0.12 0.04 20 5 3°37. E 10°43 0 kn .71 0 F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.19 1.04 0.93 0.97 0.71 0.60 0.71 0.60 0.71 | 02 .08 SAMP 72 67 69 66 |
| Cypical J average of the second secon | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi 5 Speed CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.41 3.28 2.59 2.5 | 6 17 2 6 STATION: ITION:Lat Lone = 1 0 : 330 001.: 0 ty : 0 ty : 0 ty : 0 ty : 330 001.: 0 ty : 330 001.: 0 ty : 0 142 8507 278 414 855 97 278 414 855 97 206 206 206 206 206 206 206 206 | 0.47 0.24 0.12 0.04 0.12 0.04 0.06 0.06 0.07 0.07 0.07 0.07 0.07 0.03 0.00 0.07 0.03 0.03 | 92 .08 SAMP 72 67 69 66 |
| Cypical J and the second secon | 0.17 0.08 0.04 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Validi Speed Catch/H weight n 209.59 56.51 16.42 7.18 6.36 4.38 4.34 3.41 3.41 3.28 2.89 2.59 2.19 1.70 1.065 0.977 0.859 0.77 0.97 0.97 0.97 0.77 0.859 0.977 0.97 | 6 17 2 6 STATION: ITION:Lat ITION:Lat 10 10 10 10 10 10 10 10 10 10 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37. E 10°43 00 kn .71 00 T TOT. C 57.31 15.43 6.33 4.49 2.03 1.96 1.74 1.20 1.19 1.04 0.93 0.96 0.76 0.71 0.71 0.76 0.76 0.77 0.29 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27 | 82 .08 SAMP 72 67 69 66 68 |
| Cypical B and the second secon | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi Speed Catch/ CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.42 7.42 7.42 7.42 7.43 8.381 3.41 3.28 2.59 2.59 2.19 1.70 1.07 1.065 0.97 0.636 0.973 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 001.: 0 142 : 330 001.: 0 142 : 330 001.: 0 142 : 330 001.: 0 142 : 1 278 001.: 0 278 012 278 02 279 02 279 02 279 02 279 02 279 02 279 02 279 02 279 02 279 02 279 02 279 02 279 279 279 279 279 279 279 279 279 27 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37, E 10°43 00 kn .71 00 T TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.19 0.93 0.96 0.76 0.71 0.67 0.71 0.67 0.29 0.29 0.29 0.27 0.21 0.22 | 02 08 SAMP 72 67 69 66 68 |
| Cypical J aurital Prizanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOEPTH: 35 38 DOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyraena sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudopleneus prayensis Sepia sp. Carlarius parkii Pseudotlithus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile Panulirus regius Pagellus bellottii Trachurus trecae Balistes punctaus Pteroscion peli Lagocephalus laevigatus Sardinella aurita | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region of Validi 2 Catch/ CATCH/H weight n 200.59 56.51 16.42 7.42 7.43 6.36 4.38 4.34 3.81 3.28 2.59 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 001.: 0 ty : 0 ty : 0 ty : 344 hour: 365 0UR % 142 8507 278 414 8507 278 414 8507 285 02 296 26 10 30 2 296 26 10 30 2 2 9 3 371 2 2 9 3 3 371 2 2 9 3 3 3 2 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 0.47 0.24 0.24 0.12 0.04 20 5 3°37. E 10°43 0 kn .71 0 F TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.19 1.04 0.93 0.97 0.76 0.71 0.60 0.77 0.29 0.29 0.29 0.27 0.27 0.27 0.24 0.27 0.27 0.24 0.27 0.27 0.24 0.27 0.27 0.24 0.27 0.27 0.27 0.24 0.27 0.27 0.27 0.27 0.29 0.29 0.29 0.29 0.29 0.29 0.29 0.29 | 02 .08 SAMP 72 67 69 66 68 68 |
| Cyperators are and a second se | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi 55.51 23.15 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.28 2.59 2.51 2.53 2.53 2.55 2.5 | 6 17 2 6 STATION: ITION:Lat ITION:Lat e : 1 0 0 13300 0 142 8507 228 8507 208 8507 208 8507 85 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37. E 10°43 00 kn 771 00 F TOT. C 57.31 15.45 6.33 4.49 1.90 1.90 1.90 1.92 1.94 0.93 0.93 0.93 0.93 0.93 1.96 0.71 0.71 0.71 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 | 82 .08 SAMP 72 67 69 66 68 68 68 |
| <pre>Gyperator Barbard Statements Prizarthus arenatus Prizarthus arenatus Prizarthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop duration TIM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOPETH: 35 38 BOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyraena Sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Elops lacerta Pseudupeneus prayensis Sepia sp. Carlarius parkii Pseudotalthus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile Panulirus regius Pagellus bellottii Trachurus trecae Balistes punctatus Trichiurus lepturus Pteroscion peli Lagocephalus laevigatus Sardinella aurita Drepane africana Stromateus fiatola Edineobus ganeus</pre> | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Validi Speed Catch/H weight n 205.59 56.51 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.41 3.28 2.89 2.59 2.19 1.70 1.07 0.63 0.77 0.73 0.73 0.73 0.24 0.74 0.74 0.73 0.74 0.74 0.73 0.74 0.74 0.74 0.73 0.74 0.74 0.74 0.75 0.75 0.75 0.77 0.77 0.73 0.73 0.74 0.74 0.74 0.74 0.75 0.77 0.77 0.77 0.73 0.73 0.74 0.74 0.74 0.74 0.77 0.73 0.73 0.74 0.74 0.74 0.77 0.77 0.77 0.73 0.73 0.74 0.74 0.74 0.77 0.77 0.73 0.74 0.74 0.74 0.77 0.73 0.74 0.74 0.74 0.75 0.75 0.75 0.77 0.7 | 6 17 2 6 17 1110N:Lat Lon e : 1 0 : 330 001.: 0 142 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 414 8507 278 8507 8507 278 8507 8507 278 8507 278 8507 8507 278 8507 8507 8507 8507 8507 8507 8507 85 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37, E 10°43 00 kn .71 00 T TOT. C 57.31 15.45 6.33 4.49 2.03 1.96 1.74 1.20 1.19 4.09 2.03 2.03 2.03 1.96 1.74 0.93 0.76 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.71 | 82 .08 SAMP 72 67 69 66 68 68 68 |
| Cypical B Prizanthus arenatus Prizanthus arenatus Prizanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop duration ITME :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOPETH: 35 38 BDEPTH: 35 38 Dowing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyoraedse marmoratus Selene dorsalis Sardinella maderensis Elops lacerta Pseudotlithus senegalensis Auxis sp. Carlarius parkii Pseudotlithus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile Panulirus regius Pagellus bellottii Trachurus trecae Balistes punctaus Strintiurus Lepturus Pteroscion peli Lagocephalus laevigatus Sardinella aurita Drepane africana Stromateus fiatola Epinephelus aeneus Decapterus rhonchus** | 0.17 0.08 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region o Gear o Validi Speed Catch/ CATCH/H weight n 20.59 56.51 23.15 16.42 7.42 7.42 7.43 8.381 3.28 2.59 2.19 1.70 1.05 0.97 0.73 0.73 0.73 0.73 0.73 0.41 0.24 0.25 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 0 10 10 10 10 10 2 10 2 2 8 5 7 10 2 2 8 5 7 10 2 2 9 7 30 2 2 8 5 7 10 2 2 9 7 371 2 10 2 10 10 2 2 6 10 2 2 9 7 371 2 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 2 2 10 10 10 10 10 10 10 10 10 10 10 10 10 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37. E 10°43 0 Kn .71 0 F TOT. C 57.31 15.45 6.33 1.96 1.74 1.20 1.09 1.09 1.09 1.09 1.09 0.76 0.71 0.93 0.97 0.24 0.93 0.97 1.93 1.96 0.93 0.97 0.27 0.24 0.93 0.97 0.27 0.27 0.24 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 | 82 88 SAMP 72 67 69 66 68 68 68 73 |
| Cypical S and the second secon | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Purpos Region C Validi 1.5 Speed 2. Catch/ CATCH/H weight n 200.59 56.51 23.15 16.42 7.42 7.43 8.4.34 3.81 3.41 3.28 2.59 2.10 1.00 1.00 1.00 2.63 0.73 0.73 0.73 0.53 0.41 0.24 0.25 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 : 330 ond.: 0 ty : 0 ty : 0 ty : 344 hour: 365 OUR % 142 8507 278 414 857 278 414 857 296 206 206 206 206 206 206 206 20 | 0.47 0.24 0.24 0.12 0.04 20 5 3°37. E 10°43 0 xn .71 0 F TOT. C 57.31 15.45 6.33 1.96 1.74 1.9 1.04 0.93 0.76 0.71 0.77 1.19 1.04 0.93 0.93 0.93 0.93 0.93 0.93 0.76 0.71 0.29 0.29 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.27 0.24 0.29 0.29 0.29 0.29 0.27 0.24 0.29 0.29 0.29 0.29 0.29 0.29 0.29 0.29 | 92 .08 SAMP 72 69 66 68 68 65 73 |
| Cypical B average of the second secon | 0.17 0.88 0.04 0.01 35.32 7407 NO: 2 POS Region Gear C Validi 5.52 7.427 CATCH/H weight n 209.59 56.51 23.15 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.41 3.28 2.59 2.50 | 6 17 2 6 STATION: ITION:Lat e : 1 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37. E 10°43 00 kn 7.71 00 T TOT. C 57.31 15.45 6.33 4.49 1.90 1.90 1.90 1.90 1.90 0.76 0.71 0.71 0.67 1.04 0.93 0.93 0.93 0.97 1.04 0.71 0.71 0.71 0.67 0.71 0.71 0.71 0.63 0.72 0.72 0.72 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 | 82 5 AMP 72 67 69 66 68 68 65 73 |
| <pre>Gyperator Barbard Statements Prizacanthus arenatus Ariomma bondi Sardinella aurita Selene dorsalis Total R/V Dr. Fridtjof Nansen SURVEY:201 DATE :28/09/17 GEAR TYPE: BI start stop duration TIM: :08:15:11 08:44:47 29.6 (min) LOG : 1432.89 1434.57 1.7 FOPETH: 35 38 BOEPTH: 35 38 Towing dir: 0° Wire out : 130 m Sorted : 180 Total catch: 180.42 SPECIES J E L L Y F I S H Brachydeuterus auritus Chloroscombrus chrysurus Ilisha africana *** Sphyraena Sphyraena Galeoides decadactylus Pomadasys incisus Sphoeroides marmoratus Selene dorsalis Elops lacerta Pseudupeneus prayensis Sepia sp. Carlarius parkii Pseudotalthus senegalensis Auxis sp. Chloroscombrus chrysurus, juvenile Panulirus regius Pagellus bellottii Trachurus trecae Balistes punctatus Trichiurus lepturus Pteroscion peli Lagocephalus laevigatus Sardinella aurita Drepane africana Stromateus fiatola Epinephelus aeneus Decapterus rhonchus** Trachinocephalus myos Scomber japonicus Engraulis encrasicolus</pre> | 0.17 0.08 0.04 0.04 0.01 35.32 7407 NO: 2 POS Region Gear Validi 1 Speed Catch/H weight n 205.59 56.51 16.42 7.42 7.18 6.36 4.38 4.34 3.81 3.41 3.28 2.80 2.59 2.19 1.70 1.07 0.63 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.74 0.73 0.73 0.73 0.73 0.74 0.73 0.74 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.73 0.74 0.75 0.75 0.75 0.75 0.77 0.77 0.73 0.73 0.73 0.73 0.73 0.73 0.74 0.75 0 | 6 17 2 6 STATION: ITION:Lat Lon e : 1 0 : 330 001.: 0 : 3.4 hour: 365 00UR % 142 8507 27 8507 27 8507 27 28 6 10 30 2 2 26 10 30 2 2 6 10 30 2 2 6 10 14 4 4 6 2 2 3 371 2 2 6 10 14 4 4 6 2 2 2 6 10 14 4 4 6 2 2 2 6 10 10 10 10 10 10 10 10 10 10 10 10 10 | 0.47 0.24 0.24 0.24 0.04 20 5 3°37, E 10°43 00 kn .71 57.31 15.45 6.33 4.49 1.96 1.74 1.20 1.19 1.97 1.97 1.97 0.93 0.97 0.93 0.97 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 | 82 88 5AMP 72 67 69 66 68 68 68 65 73 |

| R/V Dr. Fridtjof Nansen | SURVEY:2017407 | STATION: | 21 |
|--|--|--|--|
| DATE :28/09/17 start stop d | GEAR TYPE: BT NO: uration | 2 POSITION:Lat Lon | S 3°54.78 F 10°42 89 |
| TIME :13:30:54 13:52:54 2 | 2.0 (min) | Purpose : 1 | |
| LOG : 1470.51 1471.71 | 1.2 | Region : 330 | 0 |
| RDEPTH: 70 70 | | Gear cond.: 0 Validity · 0 | |
| Towing dir: 0° Wire o | ut : 195 m | Speed : 3.3 | kn |
| Sorted : 144 Total | catch: 144.49 | Catch/hour: 394 | .06 |
| SPECIES | C | ATCH/HOUR % | OF TOT. C SAMP |
| | weig | ht numbers | |
| Trachurus trecae Dasvatis centroura | 138 | .11 19410 | 35.05 74 |
| Engraulis encrasicolus | 38 | .29 7129 | 9.72 94 |
| Dentex angolensis | 36 | .65 147 | 7.78 |
| | 19 | .31 194 | 4.90 |
| Selene dorsalis | 12 | .87 46 | 3.27 |
| Sardinella aurita | 5 | .95 55 | 1.51 75 |
| Brachydeuterus auritus Saurida brasiliensis | 5 | .35 38/ | 1.36 |
| Sepia orbignyana | 2 | .62 3 | 0.66 |
| Brotula barbata | 2 | .40 3 | 0.61 |
| Pseudupeneus prayensis | 1 | 91 22 | 0.48 0.48 |
| Carlarius parkii | e | .82 3 | 0.21 |
| Alloteuthis africana | 6 | .60 0 | 0.15 |
| Illex coindetii | 6 | .22 11 | 0.06 |
| Boops boops | e | .16 11 | 0.04 |
| Bembrops heterurus | 6 | .11 8 | 0.03 |
| Scorpaena sp. | e | .05 3 | 0.01 |
| | | | |
| Total | 394 | .10 | 100.01 |
| | | | |
| R/V Dr. Fridtjof Nansen | SURVEY: 2017407 | STATION: | 22 |
| start stop d | uration | Lon | E 10°34.39 |
| TIME :18:32:20 19:02:59 3 | 0.7 (min) | Purpose : 1 | |
| LOG : 1509.91 1511.66 | 1.7 | Region : 330 | 0 |
| BDEPTH: 292 299 | | Validity : 0 | |
| Towing dir: 0° Wire o | ut : 280 m | Speed : 3.4 | kn |
| Sorted : 21 Total | catch: 27.72 | Catch/hour: 54. | 26 |
| SPECIES | c | ATCH/HOUR % | OF TOT. C SAMP |
| Unit downstills fishes | weig | ht numbers | 62.27 |
| Invertebrate | 8 | .38 57 | 15.44 |
| Small shrimps | 3 | .18 5744 | 5.86 |
| Synagrops microlepis | 2 | .58 123 | 4.76 |
| Unidentified | 2 | .27 110 | 4.18 |
| Small squids | 1 | .24 354 | 2.28 |
| Merluccius polli | 6 | .23 2 | 0.43 |
| Parexocoetus hillianus | 6 | .03 2 | 0.06 |
| | | | |
| Total | 54 | . 27 | 100.01 |
| | | | |
| R/V Dr. Fridtjof Nansen | SURVEY: 2017407 | STATION: | 23 |
| start stop d | unation | - TOSITION.Lac | 5 4 5.47 |
| | uracion | LUII | E 10°59.95 |
| TIME :00:42:50 01:13:03 3 | 0.2 (min) | Purpose : 1 | E 10°59.95 |
| LOG : 1551.27 1552.73 | 0.2 (min) 1.5 | Purpose : 1 Region : 330 | E 10°59.95 |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 FDEPTH: 0 0 BDEPTH: 42 51 | 0.2 (min) 1.5 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 | E 10°59.95 0 |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 5 FDEPTH: 0 0 0 BDEPTH: 42 51 1 Towing dir: 0° Wire o 0 | ut 2 (min) 1.5 ut : 145 m | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 | E 10°59.95 0 |
| 11ME 100:42:50 01:13:00 3 LOG : 1551.27 1552.73 FDEPTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total Total 100 100 | ut : 145 m catch: 103.99 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 | E 10°59.95 0 kn .47 |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 FDEPTH: 0 0 BDEPTH: 42 51 Towing dr: 0° Wire o Sorted : 7 Total SPECIES | ut : 145 m catch: 103.99 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % | E 10°59.95 0 kn .47 OF TOT. C SAMP |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 FDEPTH: 42 51 Towing dr: 0° Wire o Sorted : 7 Total SPECIES Mobula co | ut : 145 m catch: 103.99 cetch: 103.99 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers | E 10°59.95 0 .47 0F TOT. C SAMP |
| IIME :00:42:50 01:13:03 3 ILOG : 1552.27 1552.73 FDEPTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus | ut : 145 m catch: 103.99 Catch: 103.99 45 36 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 | E 10°59.95 0 kn .47 0F TOT. C SAMP 24.04 17.54 |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 FDETTH: 0 0 BDETTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** | ut : 145 m catch: 103.99 (weig 45 36 36 36 36 36 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 |
| IIME :00:42:50 01:13:03 3 LOG : 1551.27 1552.73 FDEFTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scombergonus fritor | ut : 145 m catch: 103.99 (catch: 103.99 (weig 36 36 36 36 37 37 37 37 39 37 37 37 37 37 37 37 37 37 37 37 37 37 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 668 .67 42 .30 12 | E 10°59.95 0 kn .47 0F TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 |
| <pre>IIME :00:42:50 01:13:03 3 IIME :00:42:50 01:13:03 3 FDEFTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichirus lepturus</pre> | ut : 145 m catch: 103.99 catch: 103.99 veig 45 36 36 22 17 17 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 | E 10°59.95 0 kn .47 0F TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 |
| <pre>IIME :00:42:50 0F113:03 3 ILOG : 1551.27 1552.73 FDETPH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH</pre> | ut : 145 m catch: 103.99 C 22 22 22 22 22 22 22 22 22 22 22 22 2 | Purpose : 1 Region : 330 Gear cond: 0 Validity : 0 Speed : 2.9 Catch/Hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 | E 10°59.95 0 kn .47 0F TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 8.31 4.65 |
| <pre>IIME :00:42:50 0F113:03 3 IOG : 1551.27 1552.73 FDETPH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorcalis</pre> | ut : 145 m catch: 103.99 catch: 103.99 c 22 23 27 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 | Purpose : 1 Region : 330 Gear cond: 0 Validity : 0 Speed : 2.9 Catch/Hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 | E 10°59.95 Ø kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 4.65 3.40 77 1.50 |
| IIME :00:42:50 01:13:03 3 ILOG : 1551.27 1552.73 FDETTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus | ut : 145 m catch: 103.99 (weig 36 32 22 17 17 17 17 2 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers 0.64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 .90 28 | E 10°59.95 0 kn .47 0F TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 |
| IIME :00:42:50 01:13:03 3 ILOG : 1551.27 1552.73 FDETTH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH | ut : 145 m catch: 103.99 catch: 103.99 c catch: 103.79 c c c c c c c c c c c c c c c c c c c | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers 6.64 2 .21 993 .14 668 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 .90 28 .62 28 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 1.27 0 |
| <pre>IIME :00:42:50 0FI13:03 3 IIME :00:42:50 0FI13:03 3 FDEFTH: 0 0 BDEFTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus IIisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichirus lepturus JELLYFISH Sardinella maderensis Selene dorsalis ChLOroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Flons laeveta</pre> | ut : 145 m catch: 103.99 (in 103.99 (in 103.99) (in 10 | Purpose : 1 Region : 330 Gear cond: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 .90 28 .62 2 .03 6 .63 4 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 4.65 3.40 77 1.50 1.40 0.98 0.27 0 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.99 0.98 0.99 0 |
| <pre>IIME :00:42:50 0FI13:03 3 IIME :00:1252.73 FDETH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus</pre> | ut : 145 m catch: 103.99 catch: 103.99 catch: 103.99 catch: 103.99 c catch: 103.99 c c c c c c c c c c c c c c c c c c | Purpose : 1 Region : 30 Gear cond: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers c.64 2 2.21 993 .14 608 .67 42 .39 12 .61 603 .63 48 .10 91 .90 28 .62 2 .03 6 .63 4 .55 6 | E 10°59.95 Ø kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.1 14.65 3.40 77 1.50 1.40 1.27 0 9.98 0.79 0.75 |
| <pre>IIME :00:42:50 0F:13:03 3 IIME :00:42:50 0F:13:03 3 FDETPH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus fiatola Crodenard</pre> | ut : 145 m catch: 103.99 (weig 36 36 32 37 17 17 17 17 17 17 17 17 17 17 17 17 17 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers 6.64 2 2.21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .63 48 .10 91 .90 28 .62 2 .03 6 .63 4 .55 6 .91 6 | E 10°59.95 Ø kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 4.65 3.40 77 1.50 1.40 1.27 0 0.79 0.75 0.44 0.98 |
| <pre>IIME :00:42:50 01:13:03 3 ILOG : 1551.27 1552.73 FDETTH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus DELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus DELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus fiatola Sarda sarda Pteroscion peli</pre> | ut : 145 m catch: 103.99 (weig 49 36 36 36 32 37 37 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | Purpose : 1 Region : 330 Gear cond.: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers 6.64 2 .21 993 .14 608 .67 42 .39 12 .14 608 .67 42 .28 608 .28 608 .61 6 .53 6 .51 6 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 1.27 0 0.98 0.79 0.75 0.44 0.38 0.19 |
| <pre>IIME :00:42:50 0FI13:03 3 ILOG : 1551.27 1552.73 FDEFTH: 0 0 BDEFTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Iliisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichinrus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus EiOps lacerta Trachinotus ovatus Stromateus fiatola Sarda sarda Pteroscion peli Sepia hiredda**</pre> | ut : 145 m catch: 103.99 catch: 103.99 cetch: 103.99 cetch | Purpose : 1 Region : 30 Gear cond: 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 668 .67 42 .39 12 .15 91 .61 6 .63 48 .10 91 .90 28 .62 2 .03 6 .63 4 .55 6 .51 6 .91 6 .79 2 .40 10 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 0.98 0.79 0.75 0.44 0.38 0.19 0.12 |
| <pre>IIME :00:42:50 0FI13:03 3 IIME :00:42:50 0FI13:03 3 FDETPH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus fiatola Sarda sarda Pteroscion peli Sepia hieredda** Trachurus trecae Sardinella maderensis</pre> | ut : 145 m catch: 103.99 vet 45 36 36 36 36 36 36 37 7 7 7 3 3 4 36 4 36 | Purpose : 1 Region : 30 Gear cond: 2 Validity : 0 Xaltdity : 0 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 .90 28 .62 2 .03 6 .63 4 .55 6 .91 6 .9 | E 10°59.95 Ø kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 8.31 4.65 3.40 77 1.50 1.40 0.98 0.79 0.75 0.44 0.38 0.79 0.75 0.44 0.38 0.19 0.12 0.88 0.98 |
| <pre>IIME :00:42:50 0F:13:03 3 IIME :00:42:50 0F:13:03 3 FDETPH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus IIisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus fiatola Sarda sarda Pteroscion peli Sepia hieredda** Trachurus trecae Sardinella aurita Remora australis</pre> | ut : 145 m catch: 103.99 (in catch: 103.99) (in catch: 103.99 (in catch: 103.99 (in catch: 103.99) (in catch: 103.99 (in catch: 103.99) (in catch: | Purpose : 1 Region : 30 Validity : 0 Speed : 2 Catch/Hour: 206 ATCH/HOUR % ht numbers 6.64 2 2.21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .63 4 .63 4 .63 4 .55 6 .91 6 .63 4 .55 6 .91 6 .24 10 .24 10 .25 6 .16 2 .21 2 .21 993 .14 608 .67 42 .23 12 .15 91 .24 12 .25 6 .23 12 .21 12 .25 6 .23 12 .25 6 .25 6 .23 12 .25 6 .25 6 | E 10°59.95 Ø kn .47 OF TOT. C SAMP 24.04 17.54 14.60 8.42 8.31 4.65 3.40 77 1.50 1.40 1.27 0.98 0.79 0.75 0.44 0.38 0.19 0.12 0.08 0.09 0.02 0. |
| <pre>IIME :00:42:50 01:13:03 3 IIME :00:42:50 01:13:03 3 FDETFH: 0 0 BDETH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus JELLYFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus JELLYFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus fiatola Sarda sarda Pteroscion peli Sepia hieredda** Trachurus trecae Sardinella aurita Remora australis Remora nemora</pre> | ut : 145 m catch: 103.99 (weig 36 36 36 36 36 36 36 36 36 36 36 36 36 | Purpose : 1 Region : 30 Gear cond.: 0 Validity : 0 Speed : 2. Speed : 2. Speed : 2. Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 6608 .67 42 .15 668 .67 42 .16 608 .67 42 .16 608 .67 42 .16 608 .67 42 .16 608 .67 42 .16 608 .67 42 .16 608 .63 48 .10 91 .61 6 .63 48 .62 2 .03 6 .63 6 .64 2 .24 2 .25 6 .64 2 .24 2 .25 6 .64 2 .25 6 .65 6 .25 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 1.27 0 0.98 0.79 0.75 0.44 0.38 0.19 0.12 0.88 0.03 0.03 |
| <pre>IIME :00:42:50 01:13:03 3 IIME :00:125:27 IDETH: 0 0 BDEPTH: 42 51 Towing dir: 0° Wire o Sorted : 7 Total SPECIES Mobula sp. Brachydeuterus auritus Ilisha africana *** Sphyraena sphyraena Scomberomorus tritor Trichiurus lepturus IELVFISH Sardinella maderensis Selene dorsalis Chloroscombrus chrysurus IELVFISH Lagocephalus laevigatus Elops lacerta Trachinotus ovatus Stromateus flatola Sarda sarda Pteroscion peli Sepia hieredda** Trachurus trecae Sardinella aurita Remora australis Remora remora Decapterus punctatus</pre> | ut : 145 m catch: 103.99 ctch: 103.99 c catch: 103.99 c c c c c c c c c c c c c c c c c c | Purpose : 1 Region : 30 Validity : 0 Validity : 0 Speed : 2.9 Catch/hour: 206 ATCH/HOUR % ht numbers .64 2 .21 993 .14 608 .67 42 .39 12 .15 91 .61 6 .03 48 .10 91 .61 6 .03 48 .62 2 .03 6 .63 4 .55 6 .63 4 .55 6 .63 4 .55 6 .63 4 .55 6 .51 6 .51 6 .51 6 .51 6 .53 4 .22 .21 .53 4 .55 6 .53 4 .55 6 .51 6 .51 6 .53 4 .55 6 .51 6 .51 6 .53 4 .24 22 .16 4 .24 22 .16 4 .24 22 .16 4 .25 2 .26 4 .26 4 .27 | E 10°59.95 0 kn .47 OF TOT. C SAMP 24.04 17.54 14.60 80 10.98 8.42 81 8.31 4.65 3.40 77 1.50 1.40 0.98 0.40 0.98 0.40 0.98 0.75 0.44 0.38 0.19 0.12 0.08 0.03 0.03 0.02 |

| R/V Dr. Fridtjof Nansen SURVEY:2 DATE :29/09/17 GEAR TYPE: start stop duration | 017407 3T NO: 2 POS | STATION: SITION:Lat Lon | 24 S 4°6.6 E 11°11 | 7 .09 | | | | | |
|--|--|---|--|---|--|--|--|--|--|
| TIME :15:59:40 16:30:03 30.4 (min) | Purpos | e : 1 | | | | | | | |
| FDEPTH: 23 24 | Gear o | ond.: 0 | | | | | | | |
| BDEPTH: 23 24 Towing dir: 0° Wire out : 130 | w Speed | ty : 0 | kn | | | | | | |
| Sorted : 56 Total catch: 463. | 00 Catch/ | 'hour: 914.4 | 42 | | | | | | |
| SPECIES | CATCH/H | IOUR % OI | ғ тот. с | SAMP | | | | | |
| | weight r | umbers | 42.05 | | | | | | |
| Brachydeuterus auritus Ilisha africana *** | 400.94 220.35 | 31331 8970 | 43.85 24.10 | 82 | | | | | |
| Selene dorsalis | 50.22 | 1685 | 5.49 | 83 | | | | | |
| Trichiurus lepturus Sphyraena guachancho | 46.75 29.35 | 480 91 | 5.11 3.21 | | | | | | |
| Parapenaeus longirostris | 25.83 | 3223 | 2.83 | | | | | | |
| Alectis alexandrinus | 18.58 | 290 | 1.58 | 84 | | | | | |
| Callinectes pallidus | 11.18 | 34 | 1.22 | | | | | | |
| Spnyrna lewini Pseudotolithus typus | 10.74 | 51 | 1.17 | | | | | | |
| Stromateus fiatola | 10.45 | 160 | 1.14 | | | | | | |
| Pentanemus quinquarius | 7.54 | 203 | 0.83 | | | | | | |
| Galeoides decadactylus | 7.27 | 20 | 0.79 | | | | | | |
| Scomberomorus tritor | 6.91 | 8 | 0.76 | | | | | | |
| Pisodonophis semicinctus | 6.24 | 30 | 0.68 | | | | | | |
| Sepia hieredda** | 3.87 | 2 | 0.42 | 0 | | | | | |
| Rhinobatos rhinobatos Pteroscion peli | 3.12 | 2 | 0.34 | | | | | | |
| Sardinella maderensis | 2.03 | 14 | 0.22 | | | | | | |
| Panulirus regius Stromateus fiatola | 1.03 | 6 2 | 0.11 0.08 | ю | | | | | |
| Selar crumenophthalmus | 0.67 | 2 | 0.07 | 0 | | | | | |
| Carcharhinus sp. | 0.59 | 2 | 0.06 | | | | | | |
| Total | 914.71 | - | 100.03 | | | | | | |
| | | | | | | | | | |
| R/V Dr. Fridtjof Nansen SURVEY:20 | 017407 | STATION: | 25 | P1 | | | | | |
| start stop duration | PT NU: 4 PU: | Lon | E 11°8.3 | 13 | | | | | |
| TIME :00:45:23 01:15:12 29.8 (min) | Purpos | e : 1 | | | | | | | |
| FDEPTH: 0 0 | Gear d | ond.: 0 | | | | | | | |
| BDEPTH: 114 115 Towing dir: 0° Wire out : 150 | w Speed | ty : 0 | (n | | | | | | |
| Sorted : 1 Total catch: 65.0 | Fill Speed Fill Catch/ | 'hour: 130.9 | 97 | | | | | | |
| | | | | | | | | | |
| SPECTES | CATCH/H | IOUR % OI | F TOT, C | SAMP | | | | | |
| SPECIES | CATCH/H weight r | OUR % OI | F TOT. C | SAMP | | | | | |
| SPECIES Invertebrate Trichiurus lepturus | CATCH/H weight r 79.94 28.05 | HOUR % OI numbers 0 72 | F TOT. C 61.04 21.42 | SAMP | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus | CATCH/H weight r 79.94 28.05 10.38 | OUR % 01 numbers 0 72 26 | F TOT. C 61.04 21.42 7.93 | SAMP | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates | CATCH/H weight r 79.94 28.05 10.38 8.69 2.29 | HOUR % 01 numbers 0 72 26 477 4 | F TOT. C 61.04 21.42 7.93 6.64 1.75 | SAMP | | | | | |
| SPECIES Invertebrate Trichiurus Lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus | CATCH/H weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 | AUUR % 01 numbers 0 72 26 477 4 189 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 | 87 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae | CATCH/H weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 | HOUR % 01 numbers 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 | SAMP 87 86 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total | CATCH/H weight r 79,94 28.05 10.38 8.69 2.29 1.53 0.08 | NUR % 01 Numbers 0 72 26 477 4 189 18 - | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 | SAMP 87 86 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total | CATCH/F weight r 28.05 10.38 8.69 2.29 1.53 0.08 130.97 | OUR % 00 numbers 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 | SAMP 87 86 | | | | | |
| SPECIES Invertebrate Trichiurus leptruss Lagocephalus Jaevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:22 DATE :30/09/17 GEAR TYPE: J | CATCH/F weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 | HOUR % 00 numbers 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 5 4°24.6 | SAMP 87 86 29 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus Jaevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2: B/V Dr. Fridtjof Nansen SURVEY:2: DATE :30/09/17 GEAR TYPE:1 start stop duration TIME :07:33:40.60:33:13.30.41 (min) | CATCH/F weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 130.97 217407 3T NO: 2 POS | HOUR % OI numbers 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 5 4°24.6 E 11°26 | 87 86 29 .63 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2: DATE :30/09/17 GEAR TYPE: start stop duration TIME :07:33:06 08:03:13 30.1 (min) LGG : 1749.79 175.15 fo 1.8 | CATCH/F weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 130.97 217407 3T NO: 2 POS Regior | HOUR % OU numbers 0 72 26 477 4 189 18 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.6 E 11°26 | 87 86 89 .63 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2: DATE :30/09/17 GEAR TYPE: Start Stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 175.15 1.8 FOEPTH: 26 24 BNEPTH: 26 24 | CATCH/F weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 130.97 217407 3T NO: 2 POS Regior Gear c Validi | KOUR % 01 NUMBERS 0 72 26 477 4 189 18 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 5 4°24.(E 11°26. | 87 86 89 .63 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 | CATCH/+ weight 79.94 28.05 10.38 8.69 2.29 1.53 0.08 130.97 217407 3T NO: 2 POS Purpos Regior Gear of Validi m Speed | NOUR % 00 UUMBERS 0 72 26 4 477 4 189 18 189 18 5TATION: UTION:Lat Lon e: 1 0 : 33400 cond.: 0 : 33.5 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 5 4°24.(E 11°26. | 87 86 89 .63 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 Sorted : 116 Total catch: 476. | CATCH/F weight 79,94 28,05 10,38 8,69 2,29 1,53 0,08 130.97 217407 3T NO: 2 POS Region Gear c Validi m Speed 40 Catch/ | NOUR % 00 NUMBERS 0 72 26 477 4 189 18 STATION: STATION: STATION: Lat Lon 18 3400 cond: 0 13.5 hour: 949.0 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.(E 11°26 xn 20 xn 26 xn 26 xn 26 xn 26 xn 26 xn 26 xn 20 xn xn 20 xn xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn 20 xn xn xn xn xn xn xn xn xn xn | 87 86 29 .63 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDETH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 Sorted : 116 Total catch: 476. SPECIES | CATCH/F weight 79,94 28,05 10,38 8,69 2,29 1,53 0,08 130,97 217407 3T NO: 2 POS Region Gear c Validi m Speed 40 Catch/F | NOUR % 01 NUMBERS 0 72 26 477 4 189 18 STATION: STATION: STATION: Lat Lon 18 13400 cond: 0 : 3.59 (hour: 949.(NOUR % 0) NOUR % 0 NOUR % | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.(E 11°26 cn 20 5 4°27.C | 87 86 29 .63 SAMP | | | | | |
| SPECIES Invertebrate Trichiurus leptruss Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus | CATCH/F weight r 79,94 28.05 10.38 8.69 2.29 1.53 0.08 130.97 217407 3T NO: 2 POS Regior Gear c Validi m Speed 40 Catch/F weight r 314.60 | NOUR % 0 Numbers 0 72 26 4 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.(E 11°26 S 4°24.(E 11°26 C 30 F TOT. C 33.15 | SAMP 87 86 09 .63 SAMP 0 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 start stop duration TIME :07:33:160 88:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 Towing dir: 0° Wire out : 130 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Taichiuwu lontuwur | CATCH/F weight r 79,94 28.05 10.38 8.69 2.29 1.53 0.08 | NOUR % 01 NUMBERS 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.(E 11°26 S 4°24.5 E 11°26 S 4°24.2 5 11°26 S 4°24.2 S 11°26 S 4°24.2 S 11°26 S 4°24.2 S 11°26 S 1 | 87 86 89 .63 SAMP 90 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 start stop duration TIME :07:33:40 80:83:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 BOEPTH: 26 24 Towing dir: 0° Wire out : 130 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus Lepturus Lagocephalus laevigatus | CATCH/F weight r 79,94 28.05 10.38 8.69 2.29 1.53 0.08 | NOUR % 01 Numbers 0 72 26 4 77 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 5 4°24.6 E 11°26 F TOT. C 33.15 23.22 11.34 9.90 | 87 86 89 63 5AMP 0 90 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE: 1 start stop duration TIME :07:33:160 80:83:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus | CATCH/F weight r 79,94 28.05 10.38 8.69 2.29 1.53 0.08 | NOUR % 01 Numbers 0 72 26 477 4 189 18 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 100.00 26 S 4°24.6 E 11°26 xn 20 S 4°24.6 E 11°26 xn 20 S 4°24.6 E 11°26 xn 23.15 23.22 11.34 9.90 3.46 29 3.46 2.1.22 2.5 2.5 2.5 2.5 2.5 2.5 2.5 | 87 86 89 63 5AMP 0 90 88 | | | | | |
| SPECIES Invertebrate Trichiurus lepturus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FOPFTH: 26 24 Towing dir: 0° Wire out : 130 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hololepidotus Sphyraena sphyraena | CATCH/F weight r 79.94 28.05 10.38 8.69 2.29 1.53 0.08 | NOUR % 00 UUMbers 0 72 26 477 4 189 18 - STATION: UON 12 5 18 - STATION: UON 12 12 12 12 12 12 12 12 12 12 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 100.00 26 5 4°24.(E 11°26 F TOT. C 33.15 23.22 11.34 9.90 3.46 2.69 | 87 86 89 63 5AMP 0 90 88 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus Jaevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 179.79 1751.56 1.8 FDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 EDEPTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus Jaevigatus Chioroscombrus chrysurus Argyrosomus hololepidotus Sphyraena sphyraena Calarius parkii Galenides deradactylus | CATCH/+ weight 79,94 28,05 10,38 8,69 2,29 1,53 0,08 - 130.97 217407 3T NO: 2 POS Purpos Region Gear c Validi m Speed 40 Catch/ weight r 314,60 220,32 107,57 93,92 26,73 25,50 20,88 19,16 | NUR % 01 NUMBERS 0 72 26 477 4 189 18 5TATION: ITION:Lat Lon c : 3400 cond.: 0 : 3.5 hour: 949.(NUR % 01 NUMBERS 12366 1346 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 100.00 26 S 4°24.6 E 11°26 F TOT. C 33.15 23.22 11.34 9.90 3.46 2.69 2.69 2.69 2.69 2.69 2.69 2.69 2.69 | 87 86 99 63 5AMP 90 88 | | | | | |
| SPECIES Invertebrate Trichiurus leptruss Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 BDEPTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hololepidotus Sphyraena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis | CATCH/F weight 79,94 28,05 10,38 8,69 130,97 31,53 0,08 130,97 217407 3T NO: 2 POS Region Gear c Validi m Speed 40 Catch/F weight r 314,60 220,32 107,57 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 93,92 20,75 20, | KOUR % OI Numbers 0 72 26 477 4 189 18 189 18 189 18 181 STATION: STATION: 1000000000000000000000000000000000000 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 5 4°24.(E 11°26) F TOT. C 33.15 23.25 11.34 9.90 3.46 2.69 2.69 2.02 2.02 | 87 86 89 63 88 88 88 | | | | | |
| SPECIES Invertebrate Trichiurus leptrus Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hololepidotus Sphynaena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis Pteroscion peli Pseudotolithus senegallus | CATCH/F weight 79,94 28.05 10.38 8.69 130.97 130.97 217407 3T NO: 2 POS Regior Gear C Validi m Speed 40 Catch/F weight n 314.60 220.32 107.57 93.92 20.38 20.75 93.92 20.80 19.16 19.16 19.16 17.09 10.64 | NUUR % 01 NUMBERS 0 72 26 477 4 189 18 18 19 18 19 18 19 18 19 18 19 12386 1116 12386 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1116 1238 1238 1116 1238 1338 1358 1358 1358 138 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 5 4°24.6 E 11°26 F TOT. C 33.15 23.22 21.34 9.90 3.46 2.192 2.02 2.02 1.86 1.06 | 87 86 89 63 88 88 89 | | | | | |
| SPECIES Invertebrate Trichiurus leptruss Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 Start stop duration TIME :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 BDEFTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chlorosombrus chrysurus Argyrosomus hololepidotus Sphyraena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis Pteroscion peli Pseudotlithus senegallus J E L L Y F I S H | CATCH/F weight 79,94 28.05 10.38 8.69 130.97 130.97 217407 3T NO: 2 POS Region Gearco Validi m Speed 40 Catch/F weight 1314.60 220.32 107.57 93.92 28.56 20.80 19.16 19.16 17.09 10.04 9.40 2.40 2.40 2.50 2.85 2.50 2.85 2.50 2.85 2.50 2.80 2.50 2.85 2.50 2.85 2.50 2.85 2.50 2.50 2.50 2.50 2.50 2.50 2.50 2.5 | NOUR % OI 0 0 0 72 26 477 4 189 18 - STATION: - STATION: - STATION: - STATION: - STATION: - STATION: - 000000000000000000000000000000000000 | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 5 4°24.6 E 11°26 F TOT. C 33.15 23.22 11.34 9.90 3.46 2.82 2.69 2.19 2.02 2.02 1.80 1.06 0.96 | 87 86 89 63 88 88 89 | | | | | |
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SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hollepidotus Sphyraena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis Pteroscion peli Pseudotlithus senegallus J E L L Y F I S H Sphyrna lewini Rhizoprionodn actus Cynoglosus senegalensis Chaetodipterus lippei Sardinella maderensis Callinectes palldus Parapenaeus longirostris Drepane africana Panulirus regius Pentanemus quinquarius Stromateus fiatola Pisodonophis semicinctus Penaeus notialis Trachurus trecae</td><td>CATCH/F weight r 79,94 28.05 10.38 8.69 130.97 217407 3T NO: 2 POS Purpos Region Gearo Validi m Speed 40 Catch/F weight r 314.60 220.32 107.57 93.92 22.85 26.73 25.50 28.80 19.16 19.16 17.09 10.04 9.40 5.78 5.18 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.99 2.23 1.64 5.78 5.18 4.31 3.57 7.93 2.93 2.23 1.64 5.79 7.93 2.23 1.64 5.79 7.93 7.93 7.93 7.93 7.93 7.93 7.93 7</td><td>NOUR % OI Numbers % OI 0 72 26 477 4 189 18 - STATION: - 12365 12365 1116 223 668 44 104 261 528 30 4 8 22 8 8 2 207 8 4 2 <!--</td--><td>F TOT. 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SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hollepidotus Sphyraena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis Pteroscion peli Pseudotlithus senegallus J E L L Y F I S H Sphyrna lewini Rhizoprionodn actus Cynoglosus senegalensis Chaetodipterus lippei Sardinella maderensis Callinectes palldus Parapenaeus longirostris Drepane africana Panulirus regius Pentanemus quinquarius Stromateus fiatola Pisodonophis semicinctus Penaeus notialis Trachurus trecae | CATCH/F weight r 79,94 28.05 10.38 8.69 130.97 217407 3T NO: 2 POS Purpos Region Gearo Validi m Speed 40 Catch/F weight r 314.60 220.32 107.57 93.92 22.85 26.73 25.50 28.80 19.16 19.16 17.09 10.04 9.40 5.78 5.18 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.99 2.23 1.64 5.78 5.18 4.31 3.57 7.93 2.93 2.23 1.64 5.79 7.93 2.23 1.64 5.79 7.93 7.93 7.93 7.93 7.93 7.93 7.93 7 | NOUR % OI Numbers % OI 0 72 26 477 4 189 18 - STATION: - 12365 12365 1116 223 668 44 104 261 528 30 4 8 22 8 8 2 207 8 4 2 </td <td>F TOT. 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| F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 S 4°24.6 E 11°26 F TOT. C 33.15 23.21.22 1.23 2.1.24 9.90 2.1.24 9.90 2.19 2.02 2.02 2.02 0.96 0.55 0.45 0.31 0.23 0.11 0.08 0.06 | 87 86 89 63 88 89 88 89 91 | | | | | | | | |
| SPECIES Invertebrate Trichiurus leptruss Lagocephalus laevigatus Saurida brasiliensis Echeneis naucrates Engraulis encrasicolus Trachurus trecae Total R/V Dr. Fridtjof Nansen SURVEY:2 DATE :30/09/17 GEAR TYPE:1 DATE :30/09/17 GEAR TYPE:1 DATE :30/09/17 GEAR TYPE:1 DATE :07:33:06 08:03:13 30.1 (min) LOG : 1749.79 1751.56 1.8 FDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 BDEPTH: 26 24 Sorted : 116 Total catch: 476. SPECIES Brachydeuterus auritus Ilisha africana *** Trichiurus lepturus Lagocephalus laevigatus Chloroscombrus chrysurus Argyrosomus hollepidotus Sphyraena sphyraena Carlarius parkii Galeoides decadactylus Selene dorsalis Pteroscion peli Pseudotlithus senegallus J E L L Y F I S H Sphyrna lewini Rhizoprionodn actus Cynoglosus senegalensis Chaetodipterus lippei Sardinella maderensis Callinectes palldus Parapenaeus longirostris Drepane africana Panulirus regius Pentanemus quinquarius Stromateus fiatola Pisodonophis semicinctus Penaeus notialis Trachurus trecae | CATCH/F weight r 79,94 28.05 10.38 8.69 130.97 217407 3T NO: 2 POS Purpos Region Gearo Validi m Speed 40 Catch/F weight r 314.60 220.32 107.57 93.92 22.85 26.73 25.50 28.80 19.16 19.16 17.09 10.04 9.40 5.78 5.18 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.78 5.18 4.31 3.57 2.93 2.23 1.64 5.99 2.23 1.64 5.78 5.18 4.31 3.57 7.93 2.93 2.23 1.64 5.79 7.93 2.23 1.64 5.79 7.93 7.93 7.93 7.93 7.93 7.93 7.93 7 | NOUR % OI Numbers % OI 0 72 26 477 4 189 18 - STATION: - 12365 12365 1116 223 668 44 104 261 528 30 4 8 22 8 8 2 207 8 4 2 </td <td>F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 5 4°24.(E 11°26 F TOT. C 33.15 23.22 11.22 2.02 2.1.32 1.23 1.23 1.17 0.06 5 4°24.(E 11°26 3.15 23.22 1.23 1.11 1.088 1.023 1.023 1.024 1.12 1.023 1.12 1.13 1.13 1.23 1.13 1.23 1.13 1.13 1.23 1.13 1.13 1.13 1.23 1.13 1.13 1.13 1.23 1.13 1</td> <td>87 86 89 63 88 89 89 90 88 89 91</td> | F TOT. C 61.04 21.42 7.93 6.64 1.75 1.17 0.06 5 4°24.(E 11°26 F TOT. C 33.15 23.22 11.22 2.02 2.1.32 1.23 1.23 1.17 0.06 5 4°24.(E 11°26 3.15 23.22 1.23 1.11 1.088 1.023 1.023 1.024 1.12 1.023 1.12 1.13 1.13 1.23 1.13 1.23 1.13 1.13 1.23 1.13 1.13 1.13 1.23 1.13 1.13 1.13 1.23 1.13 1 | 87 86 89 63 88 89 89 90 88 89 91 | | | | | |

ANNEX III. BIOLOGY SCALES

| Stage | State | Description | | | | | | | | |
|-------|--|--|--|--|--|--|--|--|--|--|
| I | Immature | Ovary and testis about 1/3rd length of body cavity. Ovaries pinkish, translucent, testis whitish. Ova not visible to naked eye. | | | | | | | | |
| п | Maturing virgin and recovering spent | Ovary and testis about ¹ / ₂ length of body cavity. Ovary pinkish, translucent, testis whitish, symmetrical. Ova not visible to naked eye. | | | | | | | | |
| ш | Ripening | Ovary and testis is about 2/3rds length of body cavity. Ova pinkish yellow colour with granular appearance, testis whiti to creamy. No transparent or translucent ova visible. | | | | | | | | |
| IV | Ripe | Ovary and testis from 2/3rds to full length of body cavity. Ovary orange-pink in colour with conspicuous superficial blood vessels. Large transparent, ripe ova visible. Testis whitish-creamy, soft. | | | | | | | | |
| V | Spent | Ovary and testis shrunken to about ½ length of body cavity. Walls loose. Ovary may contain remnants of disintegrating opaque and ripe Ova, darkened or translucent. Testis bloodshot and flabby | | | | | | | | |

Stages for classification of maturity.

Stomach content scale

| Scale | Designation | Description |
|-------|---------------------|--|
| 0 | Empty | Stomach empty except for water. |
| 1 | Very little content | Stomach is almost empty. Only traces of small organisms can be found. |
| 2 | Some content | Stomach not completely full and not dilated. |
| 3 | Stomach full | Stomach full, but not bloated/dilated. |
| 4 | Bloated/dilated | The stomach is visibly expanded and tight. Content can be observed from the outside. |

ANNEX IV. pH, alkalinity and aragonite saturation state

Water samples were collected from the whole water column at the stations on most of the transects. These were analyzed on board for pH and alkalinity, and the nutrients will later be analyzed in on shore laboratories. Preliminary calculations are shown here, final results can only be calculated when nutrient concentrations are known. These variables will be used to characterize the inorganic carbon components of the waters, which also show the status of ocean acidification.

Deep water has low pH because of high content of CO_2 , which is produced by degradation of sinking organic material. The upwelling water along the shelf, consequently had low pH values, and pH decreased gradually with depth.

Alkalinity is more related to the salinity of the waters, and a layer was found around 50m depth, consisting of warm high saline water with lower alkalinity than the surrounding waters.

Saturation state of calcium carbonates is an indicator used for monitoring development of ocean acidification in seawater. A saturation state value below one for a calcium carbonate mineral, means the water is under-saturated for the mineral. Under-saturation predicts that over time the mineral will dissolve. Aragonite saturation state was well above one in the waters studied, but in the below 250m depth the values were rather low, as is expected in upwelling waters. For some marine organisms that construct shells of aragonite, saturation state below 2 has been shown to slow down the process of shell formation.

| FOR FUTURE ANALYSIS | |
|---------------------------|--|
| COLLECTED | |
| SIOLOGICAL SAMPLES | |
| LIST OF B | |
| ANNEX V. | |

List of biological samples collected

| timeSpeciesBiology (sec. anticity sec.Biology (sec.Biology (sec.Biology (sec.Biology (sec.Biology (sec.Biology (sec.2Scender sponteurs2929292929292929292929293Statichella antria171717171717171721722724Scender sponteus3030303030303030303030373727224Despeciasion30303030303030303030373727224Despeciasion30 </th <th>F</th> <th></th> <th>ſ</th> | F | | | | | | | | | | | | | | | | | | | | | | | | ſ |
|---|--------|---|-----------------------|------------------|-------------------|-------------------|-------------------|-----------------------|------------------|-------------------|-------------------|----------------------|-------------------|-------------------|------------------|-------------|--------------------|---------------------|------------------|--------------------|-------------------|------------------|------------------|------------------------|---|
| timeSpeciesLength Weight antivity & symplesLength Weight antivity & symplesKiver symplesStorate symplesFire disc and andFire disc and and2 </td <td></td> <td>Jellyfish formalin</td> <td></td> | | Jellyfish formalin | | | | | | | | | | | | | | | | | | | | | | | |
| Image: constraint of the section of the sectin of the section of the section of | | Jellyfish genetics | | | | | | | | | | | | | | | | | | | | | | | |
| for tionSpeciesBiology (sec. and frozenEromach samplesSomach samplesSomach samplesSomach | | Frozen individuals | | | 7 | 6 | | | 10 | | 10 | | 27 | 25 | | | | | | | | | | 10 | |
| for to to spectesSpectes | | Fin clips preserved and frozen | 15 | | | | 17 | 15 | | 15 | 15 | | | 30 | | | | | | | | | | | |
| tionSpeciesLength/Weight maturity & sonnach follness)Biology (sex. naturity & sonnach forozenLiver sonnach frozenStomach frozenStomach | | Otoliths collected | 4 | | | | 2 | 5 | | | 5 | | | | | | | | | | | | | | |
| tionSpeciesLength/Weight fullness)Biology (sex, maturity, & gamplesLiver | | Stomach weight | | | | | 17 | 30 | | 30 | 30 | | | 30 | | | | | | | | | | | |
| Image: constantBiology (ser, trive sounds)Liver soundsStomach sounds1Sardinella maderensis292929292Trachurus trecae30292929292Sardinella aurita72292929293Sardinella aurita7171717173Sardinella aurita17171717173Sardinella aurita17171717173Sardinella aurita100303030304Scomber japonicus30303030304Scomber japonicus30303030304Decapterus punctatus82303030305Trachurus trecae3303030306Trachurus trecae3303030305Scomber japonicus82303030306Trachurus trecae3303030306Trachurus trecae3303030307Dentex congolensis58Trachurus trecae330306Trachurus trecae3303030307Dentex congolensis50303030307Dentex congolensis50303030307 | | Gonad weight | | | | | 17 | 20 | | 30 | 30 | | | 30 | | | | | | | | | | | |
| ItionSpeciesLength/Weight maturity. stomachBiology (sex, maturity. stomachLiver stomach2Trachurus trecae3029292Trachurus trecae3029292Sardinella maderensis2929293Sardinella aurita1717173Sardinella aurita1717173Sardinella maderensis10030303Trachurus trecae3030304Scomber japonicus3030304Scomber japonicus3030304Decapterus punctatus8230305Stradinella aurita3030306Scomber japonicus3030307Decapterus punctatus8230308Secomber japonicus3030306Scomber japonicus530307Dentex congolensis530307Dentex congolensis530307Dentex congolensis517177Dentex angolensis510107Dentex congolensis510107Pagellus beloti7710 | | Stomach samples frozen | 29 | | | | 17 | 30 | | 30 | 30 | | | 30 | | | | | | | | | | | |
| ItionSpeciesLength/Weight maturity & stomach fulluess)1Sardinella maderensis292Trachurus trecae302Sardinella aurita73Sardinella aurita173Sardinella aurita173Sardinella aurita173Sardinella aurita173Sardinella aurita173Sardinella aurita174Secomber japonicus304Scomber japonicus305Trachurus trecae306Trachurus trecae307Decapterus punctatus828Somber japonicus306Trachurus trecae37Dentex congolensis57Dentex congolensis507Dentex angolensis507Dentex angolensis507Dentex angolensis5 | | Liver samples frozen | 29 | | | | 17 | 30 | | 30 | 30 | | | 30 | | | | | | | | | | | |
| tionSpeciesLength/Weight1Sardinella maderensis292Trachurus trecae302Sardinella maderensis292Sardinella aurita73Sardinella aurita73Sardinella maderensis1003Trachurus trecae303Trachurus trecae303Trachurus trecae304Scomber japonicus304Scomber japonicus305Scomber japonicus306Scomber japonicus307Decapterus punctatus826Scomber japonicus525Sarda sarda36Scomber japonicus537Dentex congolensis507Dentex congolensis507Pagellus belotti77Pagellus belotti7 | | Biology (sex, maturity & stomach fullness) | 29 | | | | 17 | 30 | | 30 | 30 | | | 30 | | | | | | | | | | | |
| ItionSpecies1Sardinella maderensis2Trachurus trecae2Sardinella maderensis3Sardinella aurita3Sardinella maderensis3Sardinella maderensis3Sardinella maderensis3Sardinella maderensis3Sardinella maderensis3Sardinella maderensis4Scomber japonicus4Decapterus punctatus5Sardinella aurita5Sarda sarda6Scomber japonicus7Dentex congolensis7Dentex congolensis7Dentex angolensis | | Length/Weight | 29 | 30 | 7 | 6 | 17 | 100 | | 30 | 30 | 82 | | 52 | 2 | 3 | 58 | 4 | 3 | 50 | 5 | 7 | 59 | 100 | |
| 1100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | - - | Species | Sardinella maderensis | Trachurus trecae | Sardinella aurita | Scomber japonicus | Sardinella aurita | Sardinella maderensis | Trachurus trecae | Scomber japonicus | Sardinella aurita | Decapterus punctatus | Mesopelagic sp. A | Scomber japonicus | Trachurus trecae | Sarda sarda | Dentex congolensis | Scomberomeus tritor | Trachurus trecae | Dentex congolensis | Dentex angolensis | Pagellus belotti | Trachurus trecae | Engraulis encrasicolus | |
| | | Station | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 9 | 9 | L | L | 7 | 8 | 8 | |

99

| Jellyfish formalin | | | | | | | | | 5 | 5 | | | | | | | | | | | | | |
|---|---------------------|-------------------|------------------|-------------------|------------------------|------------------|------------------|-------------------|-----------------|-----------------|----------------------|-------------------|-------------------|-----------------|-------------------|-----------------------|-------------------|------------------|------------------------|-------------------|-------------------|------------------|-----------------------|
| Jellyfish genetics | | | | | | | | | 5 | 5 | | | | | | | | | | | | | |
| Frozen individuals | | 25 | 25 | | | | 22 | 25 | | | | | | | | | 25 | | | | 20 | 25 | |
| Fin clips preserved and frozen | | | | | | | 30 | 30 | | | | | | | 15 | 15 | 30 | | | | 30 | 30 | 13 |
| Otoliths collected | | | | | | | | | | | | | | | 5 | 5 | | | | | | | 5 |
| Stomach weight | | | | | | | | | | | | | | | 30 | 30 | | | | | | | 13 |
| Gonad weight | | | | | | | | | | | | | | | 30 | 30 | | | | | | | 13 |
| Stomach samples frozen | | | | | | | | | | | | | | | 30 | 30 | | | | | | | 13 |
| Liver samples frozen | | | | | | | | | | | | | | | 30 | 30 | | | | | | | 13 |
| Biology (sex, maturity & stomach fullness) | | | | | | | | | | | | | | | 30 | 30 | | | | | | | 13 |
| Length/Weight | 12 | 168 | 193 | 100 | 34 | 45 | 50 | 100 | | | 100 | 86 | 13 | 39 | 100 | 100 | 100 | 60 | 90 | 50 | 31 | 84 | 13 |
| Species | Decapterus rhonchus | Scomber japonicus | Trachurus trecae | Scomber japonicus | Engraulis encrasicolus | Trachurus trecae | Trachurus trecae | Sardinella aurita | Jellyfish sp. A | Jellyfish sp. B | Decapterus punctatus | Scomber japonicus | Scomber japonicus | Ilisha africana | Sardinella aurita | Sardinella maderensis | Scomber japonicus | Trachurus trecae | Engraulis encrasicolus | Scomber japonicus | Sardinella aurita | Trachurus trecae | Sardinella maderensis |
| Station | 6 | 10 | 10 | 11 | 11 | 11 | 14 | 14 | 14 | 14 | 14 | 15 | 16 | 16 | 17 | 17 | 18 | 19 | 19 | 19 | 20 | 20 | 20 |

ANNEX VI. SCRUTINISATION OF ACOUSTIC BACKSCATTER FROM SARDINELLA

Scrutinisation of the acoustic backscatter is especially challenging in tropical waters, largely due to the high diversity of pelagic organisms, including plankton, masking the fish scatters. As described in the main body of this report, while not a perfect method, the s_V threshold was adjusted to filter out plankton.

Few trawl hauls taken during the day successfully sampled the targeted fish, primarily because densely shoaling pelagic fish are particularly adept at avoiding the trawl net. This was further complicated when one of the trawl winches failed, meaning that from the 2^{nd} August it was not possible to use the large pelagic trawl (Multpelt) on this leg. This was the only net that was somewhat successful at catching these fish, eventhough it could only be used in waters deeper than about 50 m due to its size. The mix of pelagic species in the night trawl hauls made scrutinisation even more difficult.

In most night-time situations, the backscatter was identified based on the trawl catch of the nearest trawl or a trawl from a similar depth on an adjacent or nearby transect. The following criteria were used during scrutinisation:

Day

As became obvious during this survey, and which seems to be the trend for sardinella surveys elsewhere, few sardinella were caught during the day. From night-time trawls in the same vicinity, combined with the experience of the on-board scientists, all dense schools encountered during the day were confidently identified as sardinella.

Night

Several trawls targeting dispersed shoals in areas where sardinella-like schools had been recorded during the day, caught a mixture of sardinella and other pelagic species.

ANNEX VII. CRITICAL PARAMETERS USED TO ESTIMATE ABUNDANCE

Sardinellas

Sardinellas: strata area and mean SA

| Stratum | Area | Mean SA |
|---------|----------|---------|
| 1 | 172.4344 | 205.833 |
| 2 | 106.9836 | 192 |
| 3 | 14.6657 | 6057 |
| 4 | 150.6452 | 154.438 |
| 5 | 12.1013 | 1257 |
| 6 | 11.7471 | 109 |
| 7 | 43.9337 | 132 |
| 8 | 20.9357 | 281 |

Sardinellas: parameters Length-Weight relationship

| | S. aurita | S. madeirensis |
|----------------|-----------|----------------|
| L-W factor a | 0.0046 | 0.0047 |
| L-W factor b | 3.1855 | 3.2095 |
| r ² | 0.9761 | 0.9767 |

Horse mackerel

Horse mackerel: strata area and mean SA

| Stratum | Area | Mean SA |
|---------|----------|---------|
| 1 | 2230.73 | 89.16 |
| 2 | 119.1994 | 108.50 |
| 3 | 331.8879 | 51.25 |
| 4 | 376.5212 | 64.00 |
| 5 | 15.9168 | 651.00 |
| 6 | 15.2111 | 489.67 |
| 7 | 10.2505 | 845.5 |
| 8 | 49.3372 | 808.33 |

Horse mackerel: parameters Length-Weight relationship

| | Trachurus trecae |
|----------------|------------------|
| L-W factor a | 0.0075 |
| L-W factor b | 3.1316 |
| r ² | 0.88 |

Mackerel

Mackerel: strata area and mean SA

| Stratum | Area | Mean SA |
|---------|----------|---------|
| 1 | 349.6226 | 84 |
| 2 | 1938.689 | 64.204 |
| 3 | 215.5307 | 66.4 |
| 4 | 79.6095 | 15 |

Mackerel: parameters Length-Weight relationship

| | Scomber colias |
|----------------|----------------|
| L-W factor a | 0.0066 |
| L-W factor b | 3.03 |
| r ² | 0.7586 |

Pelagic I fish

Pelagic I: strata area and mean SA

| Stratum | Area | Mean SA |
|---------|----------|---------|
| 1 | 137.8916 | 40 |
| 2 | 61.6121 | 17.5 |
| 3 | 272.7764 | 17.864 |
| 4 | 189.3597 | 57.35 |
| 5 | 597.3117 | 25.031 |
| 6 | 128.5497 | 86.267 |

| Pelagic I: parameters | Length-Weight relationsh | ip |
|-----------------------|--------------------------|----------|
| | 0 | F |

| | Pelagic I |
|--------------|-----------|
| L-W factor a | 0.0022 |
| L-W factor b | 3.4316 |
| r^2 | 0.9038 |

Pelagic II fish

Pelagic II: strata area and mean SA

| Stratum | Area | Mean SA |
|---------|----------|---------|
| 1 | 329.4294 | 62.727 |
| 2 | 348.0428 | 92.571 |
| 3 | 1158.117 | 87.113 |
| 4 | 2005.733 | 52.828 |

Pelagic II: parameters Length-Weight relationship

| | Pelagic II |
|--------------|------------|
| L-W factor a | 0.0243 |
| L-W factor b | 2.6691 |
| r^2 | 0.9513 |
