Reports on Surveys with the
R/V Dr. Fridtjof Nansen

UNDP/FAO PROGRAMME GLO 001/82

CECAF COOPERATIVE SURVEY 1986

Interim Cruise Report "Dr. Fridtjof Nansen"

Surveys of the shelf between Agadir and Cape Juby
September-November 1986

Institute of Marine Research, Bergen

April 1987
1. INTRODUCTION

In accordance with the plans for the CECAF Cooperative Survey 1986 agreed at the meeting at Tenerif 7-9 April 1986 the R/V "Dr. Fridtjof Nansen" was programmed to work in September and again in November-December on the Morrocan coast from Agadir southwards.

The following coverages were made:

I 22 September-5 October; Agadir-Cape Juby. Repeated surveys.

II 6-12 November; Agadir-Cape Juby. Full survey.

The findings of each survey will be briefly described in the following and the results then discussed with reference to the total area.

2. Survey I - Agadir-Cape Juby 22 September to 5 October

In accordance with the survey plan a main acoustical coverage of the shelf from Agadir to Cape Juby was first to be made to localize the aggregations of small pelagic fish, mainly sardines. Then effort was to be concentrated on these aggregations with detailed studies on biomass estimation, target strength and fish behaviour.

Scientific staff:

From Morocco: Mostafa Idrissi Chbani Mbarek Zouiri

The vessels own scientific staff:

Tore Strømme, cruise leader
Alvaro Abella
Kjell Strømanes
Terje Haugland
Erling Molvær
The shelf between Agadir and Cape Juby was first covered to the 200 m depth contour in the period 23-27 September. The survey tracks with trawl stations are shown in Figure 1. The main biomass of small pelagic fish was found within the 60 m depth contour between Cape Juby and about latitude N 29°20'. This area was then covered twice with acoustic transects and additional trawl stations in the period 27 September to 1 October, as shown in Figure 2. Finally a course track of about 110 nm was selected from the detailed coverage and this track was sailed four times with two coverages during daylight and two during night. The selected path was sailed during the days 2-4 October with a new moon and complete darkness during night hours.

A total of 2000 nm was sailed on the shelf and 44 trawl stations were worked.

Figure 3 shows the sea temperature recorded at 4 m below surface with a thermograph. The pattern of the isolines indicate upwelling in the region from Cape Juby to about latitude 29°30' with a center where the detailed work was carried out.

Records of the fishing stations worked in this area nos. 153 through 192 are shown in Appendix I. The main species caught were Sardina pilchardus, Scomber japonicus and Trachurus trachurus. Other small pelagic and demersal fish were found only in small quantities and will not be dealt with in this report. In general the vertical distribution of the fish did not constitute a major problem for acoustic assessment of the biomass. A few times the fish was located at or close to the surface, but as this was a diurnal behaviour at some locations only, it is assumed that this undersampling can be compensated by including density figures from the repeated coverages when the fish was distributed below the surface layer.

The distributions of sardine during the main coverage and the two detailed coverages are shown in Figures 4, 5 and 6 respectively. The unit of the index is $0.1 \times m^2$ per nm$^2$. (energy reflected per unit area). The highest densities are found in the nearshore waters and the first main coverage does not sample these areas optimally.
The mackerel was mainly found together with the sardine and then usually only as small fractions of the total catch, except in an area northeast of Cape Juby where it constituted the main part of the biomass. Distribution during the main coverage is shown in Figure 7 and during the two detailed coverages combined in Figure 8.

The horse mackerel was generally found on the bottom and tended to have a more offshore distribution than the sardine and mackerel, except south of Tan Tan where it could be found in the more shallow waters, but then only in small quantities. Distributions based on the main and the detailed coverages are shown in Figures 9 and 10 respectively.

First provisional estimates of fish biomass are as follows: (thousand tonnes)

<table>
<thead>
<tr>
<th></th>
<th>Sardines</th>
<th>Mackerel</th>
<th>Horse mackerel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main coverage</td>
<td>700</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>First detailed coverage</td>
<td>870</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second detailed coverage</td>
<td>1040</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detailed coverage combined</td>
<td>960</td>
<td>70</td>
<td>20</td>
</tr>
</tbody>
</table>

As shown the estimate of sardines for the whole shelf is less than for the nearshore areas. This is due to undersampling in the dense areas during the main coverage. All coverages combined give an estimate of 1040 thousand tonnes of sardine for the shelf between Agadir and Cape Juby.

Figure 11 shows the length compositions of the pooled samples from the trawl catches.

3. Survey II, Agadir-Cape Juby 6-12 November

Scientific staff:

From Morocco: Mostafa Idrissi Chbani
The vessels own scientific staff:

I. Svellingen, cruise leader
A. Abella, FAO
O. Alvheim, chief technician
Ø. Torgersen, instrument chief
T. Mørk, instrument technician

Figure 12 shows the cruise tracks and stations between Agadir and Cape Juby. Its design was largely based on the experience of fish distribution from the September survey.

The observations of sea surface temperature Figure 13, shows effects of upwelling very similar to those found in September (see Figure 4). The main species caught were as previously Sardina pilchardus, Scomber japonicus and Trachurus trachurus with a large predominance of the sardine. Their distributions are shown in Figures 14 through 16.

The records of the fishing stations worked nos. 197 through 217 are shown in Appendix I.

The distribution of the sardine down to Cape Juby, was found to be very similar to that observed in September covering the inner part of the shelf from about latitude 29°30' southwards. Also the behaviour was similar with predominantly mid-water schools during the day and layers and looser schools during night.

The acoustic system combined with the sampling provided the following estimates of biomass: (thousand tonnes)

<table>
<thead>
<tr>
<th>Fish</th>
<th>Biomass (thousand tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sardine</td>
<td>990</td>
</tr>
<tr>
<td>Mackerel</td>
<td>160</td>
</tr>
<tr>
<td>Horse mackerel</td>
<td>80</td>
</tr>
</tbody>
</table>

These estimates are seen to be very similar to those obtained during Survey I.
Figure 1. Cruise track and fishing stations, main coverage, Survey I.

Figure 2. Cruise track and fishing stations, detailed coverages, Survey I.
Figure 3. Sea surface temperature, Survey I.

Figure 4. Distribution of sardine, main coverage, Survey I.
Figure 5. Distribution of sardine, 1st detailed coverage, Survey I.

Figure 6. Distribution of sardine, 2nd detailed coverage, Survey I.
Figure 7. Distribution of mackerel, main coverage, Survey I.

Figure 8. Distribution of mackerel, detailed coverages, Survey I.
Figure 9. Distribution of horse mackerel, main coverage, Survey I.

Figure 10. Distribution of horse mackerel, detailed coverages, Survey I.
Sardina pilchardus (pooled data)

Morocco Sep. 1986
Mean length = 17.6 cm, N = 3019
Modes : 13 cm, 11 cm
Number of subsamples : 32

Scomber japonicus (pooled data)

Morocco Sep. 1986
Mean length = 17.6 cm, N = 1456
Modes : 18 cm
Number of subsamples : 24

Trachurus trachurus (pooled data)

Morocco Sep. 1986
Mean length = 17.6 cm, N = 640
Modes : 14 cm, 17 cm
Number of subsamples : 10

Figure 11. Length composition of samples of sardine, mackerel and horse mackerel, Survey I.
Figure 12. Cruise track and fishing stations. Agadir to Cape Juby, Survey II.

Figure 13. Sea surface temperature Agadir to Cape Juby, Survey II.
Figure 14. Distribution of sardine, Agadir to Cape Juby, Survey II.

Figure 15. Distribution of mackerel Agadir to Cape Juby, Survey II.
Figure 16. Distribution of horse mackerel, Agadir to Cape Juby, Survey II.

Figure 17. Length compositions of samples of sardines, Survey II.
## Appendix I: Abbreviated records of fishing stations.

<table>
<thead>
<tr>
<th>TIME</th>
<th>STN GEAR</th>
<th>DEPTH (m)</th>
<th>POSITION</th>
<th>CATCH (kg)</th>
<th>LENGTH (cm)</th>
<th>WEIGH (kg)</th>
<th>DOMINANT SPECIES</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.09 1340 153 PT</td>
<td>105 100</td>
<td>N29 01' W010 17'</td>
<td>3,3</td>
<td>5.5</td>
<td>Trachurus trachurus</td>
<td>5,00</td>
<td>75.7</td>
<td></td>
</tr>
<tr>
<td>25.09 0425 154 PT</td>
<td>50 1</td>
<td>N29 03' W010 37'</td>
<td>19,3</td>
<td>30.6</td>
<td>Sardina pilchardus</td>
<td>28.00</td>
<td>72.5</td>
<td></td>
</tr>
<tr>
<td>25.09 0005 155 PT</td>
<td>60 15</td>
<td>N29 04' W010 42'</td>
<td>,0</td>
<td>,0</td>
<td>NO CATCH</td>
<td>,00</td>
<td>,0</td>
<td></td>
</tr>
<tr>
<td>25.09 1420 156 PT</td>
<td>53 15</td>
<td>N29 54' W010 52'</td>
<td>,0</td>
<td>,0</td>
<td>NO CATCH</td>
<td>,00</td>
<td>,0</td>
<td></td>
</tr>
<tr>
<td>25.09 2345 157 PT</td>
<td>64 1</td>
<td>N29 45' W011 14'</td>
<td>111,3</td>
<td>222.6</td>
<td>Sardina pilchardus</td>
<td>175.00</td>
<td>78.6</td>
<td></td>
</tr>
<tr>
<td>26.09 0845 158 PT</td>
<td>57 20</td>
<td>N29 34' W011 44'</td>
<td>,0</td>
<td>,0</td>
<td>NO CATCH</td>
<td>,00</td>
<td>,0</td>
<td></td>
</tr>
<tr>
<td>26.09 0945 159 BT</td>
<td>55 55</td>
<td>N29 34' W011 45'</td>
<td>476,1</td>
<td>752.2</td>
<td>Scomber japonicus</td>
<td>471.00</td>
<td>49.4</td>
<td></td>
</tr>
<tr>
<td>26.09 1430 160 PT</td>
<td>35 1</td>
<td>N29 26' W011 29'</td>
<td>1590.8</td>
<td>3817.9</td>
<td>Sardina pilchardus</td>
<td>3816.00</td>
<td>99.9</td>
<td></td>
</tr>
<tr>
<td>27.09 0635 161 PT</td>
<td>49 1</td>
<td>N29 28' W011 51'</td>
<td>,0</td>
<td>,0</td>
<td>NO CATCH</td>
<td>,00</td>
<td>,0</td>
<td></td>
</tr>
<tr>
<td>27.09 0830 162 BT</td>
<td>40 40</td>
<td>N29 19' W011 52'</td>
<td>525,3</td>
<td>1050.6</td>
<td>Scomber japonicus</td>
<td>298.20</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td>27.09 1340 163 BT</td>
<td>34 34</td>
<td>N29 10' W012 08'</td>
<td>4000.0</td>
<td>9600.0</td>
<td>Sardina pilchardus</td>
<td>8946.00</td>
<td>93.1</td>
<td></td>
</tr>
<tr>
<td>27.09 2155 164 PT</td>
<td>54 1</td>
<td>N29 10' W012 35'</td>
<td>160.7</td>
<td>321.4</td>
<td>Scomber japonicus</td>
<td>190.00</td>
<td>59.1</td>
<td></td>
</tr>
<tr>
<td>28.09 0430 165 PT</td>
<td>60 10</td>
<td>N29 12' W012 45'</td>
<td>12.0</td>
<td>24.0</td>
<td>Scomber japonicus</td>
<td>22.00</td>
<td>91.6</td>
<td></td>
</tr>
<tr>
<td>28.09 1255 166 PT</td>
<td>39 10</td>
<td>N29 01' W012 50'</td>
<td>9000.0</td>
<td>18000.0</td>
<td>Sardina pilchardus</td>
<td>17420.00</td>
<td>96.7</td>
<td></td>
</tr>
</tbody>
</table>

- **STN GEAR**: Type of fishing gear used.
- **DEPTH (m)**: Depth of water at the fishing station.
- **POSITION**: Coordinates of the fishing station.
- **CATCH (kg)**: Total weight of the catch.
- **LENGTH (cm)**: Average length of the catch.
- **WEIGHT (kg)**: Average weight of the catch.
- **DOMINANT SPECIES**: Main species caught.
- **PERCENT**: Percentage of the catch.
<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>NO.</th>
<th>START</th>
<th>TYPE</th>
<th>BOTTOM</th>
<th>LATIT.</th>
<th>LONGIT.</th>
<th>TOTAL</th>
<th>PR</th>
<th>HR</th>
<th>SPECIES</th>
<th>WEIGHT (KG)</th>
<th>PR</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.09</td>
<td>1610 167 BT</td>
<td>34</td>
<td>34</td>
<td>28° 00' W012 37'</td>
<td>3</td>
<td>3</td>
<td>Scomber japonicus</td>
<td>Sardina pilchardus</td>
<td>28.07</td>
<td>167</td>
<td>34</td>
<td>35</td>
<td>N28</td>
<td>U2</td>
</tr>
<tr>
<td>28.09</td>
<td>1940 168 BT</td>
<td>29</td>
<td>29</td>
<td>28° 05' W012 21'</td>
<td>107.7</td>
<td>215.4</td>
<td>Solea sp.</td>
<td>Merlucciops senegalensis</td>
<td>Trisopterus minutus</td>
<td>Torpedo narcomata</td>
<td>20.09</td>
<td>1940</td>
<td>168</td>
<td>169</td>
</tr>
<tr>
<td>28.09</td>
<td>2300 169 PT</td>
<td>25</td>
<td>15</td>
<td>28° 07' W012 09'</td>
<td>476.0</td>
<td>952.0</td>
<td>Sardina pilchardus</td>
<td>Pagellus acarne</td>
<td>Trachurus trachurus</td>
<td>22.40</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.09</td>
<td>0150 170 BT</td>
<td>47</td>
<td>47</td>
<td>28° 22' W012 05'</td>
<td>434.4</td>
<td>868.8</td>
<td>Trachurus trachurus</td>
<td>Pagellus acarne</td>
<td>Plectropynchus aletorz</td>
<td>Pagellus erythrinus</td>
<td>20.09</td>
<td>0150</td>
<td>170</td>
<td>100.0</td>
</tr>
<tr>
<td>28.09</td>
<td>0445 171 PT</td>
<td>34</td>
<td>10</td>
<td>28° 16' W011 54'</td>
<td>806.0</td>
<td>3244.0</td>
<td>Sardina pilchardus</td>
<td>Pagellus acarne</td>
<td>Trachurus trachurus</td>
<td>22.40</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.09</td>
<td>0805 172 BT</td>
<td>43</td>
<td>43</td>
<td>28° 23' W011 47'</td>
<td>795.8</td>
<td>1581.6</td>
<td>Scomber japonicus</td>
<td>Sardina pilchardus</td>
<td>Trachurus trachurus</td>
<td>Trachinus sp</td>
<td>20.09</td>
<td>0805</td>
<td>172</td>
<td>100.0</td>
</tr>
<tr>
<td>28.09</td>
<td>1055 173 PT</td>
<td>48</td>
<td>30</td>
<td>28° 26' W011 44'</td>
<td>1465.0</td>
<td>16860.0</td>
<td>Sardina pilchardus</td>
<td>Pagellus acarne</td>
<td>Trachurus trachurus</td>
<td>Trachinus sp</td>
<td>20.09</td>
<td>1055</td>
<td>173</td>
<td>100.0</td>
</tr>
<tr>
<td>28.09</td>
<td>1500 174 PT</td>
<td>53</td>
<td>30</td>
<td>28° 31' W011 32'</td>
<td>995.1</td>
<td>1990.2</td>
<td>Sardina pilchardus</td>
<td>Pagellus acarne</td>
<td>Trachurus trachurus</td>
<td>Trachinus sp</td>
<td>20.09</td>
<td>1500</td>
<td>174</td>
<td>100.0</td>
</tr>
<tr>
<td>28.09</td>
<td>1615 175 BT</td>
<td>41</td>
<td>41</td>
<td>28° 29' W011 28'</td>
<td>412.1</td>
<td>1648.4</td>
<td>Sardina pilchardus</td>
<td>Scomber japonicus</td>
<td>Solea sp.</td>
<td>Merlucciops senegalensis</td>
<td>20.09</td>
<td>1615</td>
<td>175</td>
<td>100.0</td>
</tr>
<tr>
<td>28.09</td>
<td>1925 176 PT</td>
<td>31</td>
<td>15</td>
<td>28° 38' W011 17'</td>
<td>96.4</td>
<td>289.2</td>
<td>Sardina pilchardus</td>
<td>Scomber japonicus</td>
<td>Octopus vulgaris</td>
<td>20.09</td>
<td>1925</td>
<td>176</td>
<td>100.0</td>
<td>N28</td>
</tr>
<tr>
<td>28.09</td>
<td>2025 177 PT</td>
<td>31</td>
<td>1</td>
<td>28° 38' W011 17'</td>
<td>51.2</td>
<td>93.6</td>
<td>Sardina pilchardus</td>
<td>Scomber japonicus</td>
<td>Scomber scombrus</td>
<td>20.09</td>
<td>2025</td>
<td>177</td>
<td>100.0</td>
<td>N28</td>
</tr>
<tr>
<td>28.09</td>
<td>2250 178 PT</td>
<td>25</td>
<td>1</td>
<td>28° 44' W011 07'</td>
<td>446.9</td>
<td>895.9</td>
<td>Sardina pilchardus</td>
<td>Diplopterus bellottii</td>
<td>20.09</td>
<td>2250</td>
<td>178</td>
<td>100.0</td>
<td>N28</td>
<td>U2</td>
</tr>
<tr>
<td>Date</td>
<td>Start No.</td>
<td>Type</td>
<td>Bottom Gear</td>
<td>Position</td>
<td>Catch (kg)</td>
<td>Dominant Species</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>------</td>
<td>-------------</td>
<td>----------</td>
<td>------------</td>
<td>-----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>0130</td>
<td>179</td>
<td>N20 51' W011 54'</td>
<td>124,4</td>
<td>248,8</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>0345</td>
<td>180</td>
<td>N20 57' W010 43'</td>
<td>53,2</td>
<td>106,4</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>1330</td>
<td>181</td>
<td>N20 05' W010 34'</td>
<td>3000,0</td>
<td>5000,0</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>1845</td>
<td>182</td>
<td>N20 47' W011 11'</td>
<td>222,1</td>
<td>444,2</td>
<td>Trachurus trachurus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>2025</td>
<td>183</td>
<td>N20 42' W011 10'</td>
<td>65,6</td>
<td>131,2</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.09</td>
<td>2310</td>
<td>184</td>
<td>N20 37' W011 22'</td>
<td>25,1</td>
<td>50,2</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>0125</td>
<td>185</td>
<td>N20 32' W011 29'</td>
<td>2000,0</td>
<td>12000,0</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>0340</td>
<td>186</td>
<td>N20 25' W011 29'</td>
<td>164,5</td>
<td>323,0</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>0650</td>
<td>187</td>
<td>N20 20' W011 40'</td>
<td>1001,4</td>
<td>4041,6</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>1130</td>
<td>188</td>
<td>N20 21' W011 58'</td>
<td>570,1</td>
<td>1140,2</td>
<td>Scomber japonicus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>1650</td>
<td>189</td>
<td>N20 21' W012 15'</td>
<td>535,5</td>
<td>1606,5</td>
<td>Scomber japonicus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01.10</td>
<td>1930</td>
<td>190</td>
<td>N20 04' W012 10'</td>
<td>790,0</td>
<td>1096,0</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02.10</td>
<td>0040</td>
<td>191</td>
<td>N20 05' W012 42'</td>
<td>52,8</td>
<td>105,6</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02.10</td>
<td>0835</td>
<td>192</td>
<td>N20 09' W012 09'</td>
<td>3000,0</td>
<td>6000,0</td>
<td>Sardina pilchardus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td>START No.</td>
<td>TYPE</td>
<td>BOTTOM</td>
<td>GEAR</td>
<td>LATIT.</td>
<td>LONGIT.</td>
<td>CATCH (KG)</td>
<td>PR HR</td>
<td>DOMINANT SPECIES</td>
<td>WEIGHT (KG)</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>------</td>
<td>--------</td>
<td>------</td>
<td>--------</td>
<td>---------</td>
<td>------------</td>
<td>-------</td>
<td>-------------------</td>
<td>-------------</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.11</td>
<td>0930</td>
<td>197</td>
<td>165</td>
<td>27</td>
<td>N29 47'</td>
<td>W010 06'</td>
<td>0</td>
<td>0</td>
<td>Scomber japonicus</td>
<td>0.00</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.11</td>
<td>1137</td>
<td>198</td>
<td>45</td>
<td>15</td>
<td>N29 44'</td>
<td>W010 02'</td>
<td>1</td>
<td>1</td>
<td>Scomber japonicus</td>
<td>100.00</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.11</td>
<td>1744</td>
<td>199</td>
<td>104</td>
<td>80</td>
<td>N29 38'</td>
<td>W010 21'</td>
<td>60.1</td>
<td>60.2</td>
<td>Scomber japonicus</td>
<td>60.00</td>
<td>99.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.11</td>
<td>2100</td>
<td>200</td>
<td>45</td>
<td>25</td>
<td>N29 27'</td>
<td>W010 14'</td>
<td>46.6</td>
<td>95.2</td>
<td>Sardina pilchardus</td>
<td>69.00</td>
<td>74.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scomber japonicus</td>
<td>13.00</td>
<td>13.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oicentracus labrax</td>
<td>9.00</td>
<td>9.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus acarne</td>
<td>120.00</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.11</td>
<td>0225</td>
<td>201</td>
<td>39</td>
<td>13</td>
<td>N29 15'</td>
<td>W010 26'</td>
<td>225.0</td>
<td>612.0</td>
<td>Sardina pilchardus</td>
<td>601.66</td>
<td>98.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scomber japonicus</td>
<td>7.61</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.11</td>
<td>1037</td>
<td>202</td>
<td>37</td>
<td>37</td>
<td>N29 57'</td>
<td>W010 42'</td>
<td>103.9</td>
<td>267.0</td>
<td>Scomber japonicus</td>
<td>162.00</td>
<td>44.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>82.00</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lepidotrigla carolae</td>
<td>32.40</td>
<td>8.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sardina pilchardus</td>
<td>25.20</td>
<td>6.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.11</td>
<td>1605</td>
<td>203</td>
<td>25</td>
<td>10</td>
<td>N29 48'</td>
<td>W011 00'</td>
<td>3000.0</td>
<td>5610.0</td>
<td>Sardina pilchardus</td>
<td>5606.26</td>
<td>99.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.11</td>
<td>0125</td>
<td>204</td>
<td>65</td>
<td>10</td>
<td>N29 44'</td>
<td>W011 14'</td>
<td>140.0</td>
<td>280.0</td>
<td>Sardina pilchardus</td>
<td>207.20</td>
<td>74.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scomber japonicus</td>
<td>72.80</td>
<td>26.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.11</td>
<td>0446</td>
<td>205</td>
<td>64</td>
<td>14</td>
<td>N29 40'</td>
<td>W011 24'</td>
<td>70.0</td>
<td>190.4</td>
<td>Sardina pilchardus</td>
<td>176.25</td>
<td>92.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scomber japonicus</td>
<td>14.14</td>
<td>7.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.11</td>
<td>0736</td>
<td>206</td>
<td>75</td>
<td>10</td>
<td>N29 44'</td>
<td>W011 39'</td>
<td>2.0</td>
<td>5.6</td>
<td>Trachinus draco</td>
<td>5.20</td>
<td>92.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sardina pilchardus</td>
<td>4.0</td>
<td>7.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.11</td>
<td>0910</td>
<td>207</td>
<td>66</td>
<td>66</td>
<td>N29 42'</td>
<td>W011 43'</td>
<td>14.2</td>
<td>426.0</td>
<td>Dentex acrophthalus</td>
<td>360.00</td>
<td>84.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus erythrinus</td>
<td>21.00</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dentex gibbosus</td>
<td>12.00</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Loligo vulgaris</td>
<td>9.00</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.11</td>
<td>0940</td>
<td>208</td>
<td>67</td>
<td>67</td>
<td>N29 42'</td>
<td>W011 42'</td>
<td>2500.0</td>
<td>5000.0</td>
<td>Scomber japonicus</td>
<td>1597.00</td>
<td>31.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>1488.60</td>
<td>29.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus acarne</td>
<td>906.40</td>
<td>18.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dentex acrophthalus</td>
<td>450.20</td>
<td>9.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scomber japonicus</td>
<td>50.06</td>
<td>48.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.11</td>
<td>2001</td>
<td>209</td>
<td>59</td>
<td>40</td>
<td>N29 35'</td>
<td>W011 51'</td>
<td>51.5</td>
<td>103.0</td>
<td>Diplodus vulgaris</td>
<td>50.06</td>
<td>48.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus bellottii</td>
<td>22.00</td>
<td>21.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sardina pilchardus</td>
<td>15.00</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Basylis sp.</td>
<td>5.60</td>
<td>5.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td>START</td>
<td>TYPE</td>
<td>BOTTOM</td>
<td>LATI.</td>
<td>LONG</td>
<td>TOTAL PR HR</td>
<td>DOMINANT SPECIES</td>
<td>WEIGHT (kg)</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>--------</td>
<td>-------</td>
<td>-------</td>
<td>-------------</td>
<td>------------------</td>
<td>-------------</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>0025</td>
<td>PT</td>
<td>44</td>
<td>10 N28 25' W011 10'</td>
<td>245,0</td>
<td>490,0</td>
<td>Sardina pilchardus</td>
<td>485,10</td>
<td>99,0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober japonicus</td>
<td>4,90</td>
<td>1,0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>1205</td>
<td>BT</td>
<td>100</td>
<td>100 N28 38' W012 05'</td>
<td>48,3</td>
<td>413,9</td>
<td>Scober japonicus</td>
<td>385,65</td>
<td>93,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>12,95</td>
<td>3,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus acarne</td>
<td>11,99</td>
<td>2,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>1505</td>
<td>PT</td>
<td>38</td>
<td>20 N29 19' W011 48'</td>
<td>313,0</td>
<td>626,0</td>
<td>Sardina pilchardus</td>
<td>500,00</td>
<td>79,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober japonicus</td>
<td>76,00</td>
<td>12,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>20,00</td>
<td>3,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus acarne</td>
<td>20,00</td>
<td>3,1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>1721</td>
<td>BT</td>
<td>19</td>
<td>19 N28 12' W011 55'</td>
<td>89,6</td>
<td>179,2</td>
<td>Diplodus bellottii</td>
<td>120,00</td>
<td>66,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>22,60</td>
<td>12,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Merluccius merluccius</td>
<td>15,00</td>
<td>8,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober scombrus</td>
<td>6,60</td>
<td>3,6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>1952</td>
<td>BT</td>
<td>48</td>
<td>40 N28 22' W012 06'</td>
<td>90,8</td>
<td>181,6</td>
<td>Pagellus acarne</td>
<td>33,90</td>
<td>18,6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dentex macrophthalus</td>
<td>27,00</td>
<td>14,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>20,40</td>
<td>11,2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sepia sp</td>
<td>19,20</td>
<td>10,5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.11</td>
<td>2120</td>
<td>PT</td>
<td>50</td>
<td>1 N28 24' W012 08'</td>
<td>261,0</td>
<td>522,0</td>
<td>Scober japonicus</td>
<td>516,60</td>
<td>98,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sardina pilchardus</td>
<td>5,40</td>
<td>1,0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.11</td>
<td>0213</td>
<td>PT</td>
<td>36</td>
<td>10 N28 06' W012 14'</td>
<td>1750,0</td>
<td>3500,0</td>
<td>Sardina pilchardus</td>
<td>3410,00</td>
<td>97,4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober japonicus</td>
<td>6,00</td>
<td>2,2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.11</td>
<td>1223</td>
<td>PT</td>
<td>34</td>
<td>10 N28 04' W012 32'</td>
<td>2506,0</td>
<td>5000,0</td>
<td>Sardina pilchardus</td>
<td>486,00</td>
<td>97,2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober japonicus</td>
<td>135,80</td>
<td>2,7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.11</td>
<td>1545</td>
<td>BT</td>
<td>46</td>
<td>46 N28 04' W012 44'</td>
<td>464,8</td>
<td>925,6</td>
<td>Sardina pilchardus</td>
<td>496,00</td>
<td>53,3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scober japonicus</td>
<td>192,00</td>
<td>20,6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pagellus acarne</td>
<td>73,60</td>
<td>7,9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trachurus trachurus</td>
<td>70,40</td>
<td>7,5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>