

**SURVEY OF THE PELAGIC FISH RESOURCES OFF
NORTH WEST AFRICA**

Part 1 GUINEA BISSAU

3 - 6 November 1995

Centro de Investigação Pesqueira
Bissau

Institute of Marine Research
Bergen

1 INTRODUCTION

1.1 Objectives of the cruise

A planning meeting was held in Casablanca in July 1995 with participants from Morocco, Mauritania, Senegal, Gambia, Guinea Bissau, FAO and the Institute of Marine Research, Bergen. During this meeting the objectives and schedules of the programme were established.

The defined general objectives were to estimate and map the distribution and biomass of small pelagic fish stocks off NW Africa (Morocco, Mauritania, Senegal, the Gambia and Guinea Bissau) by hydro-acoustic methods and describe the hydrographic conditions there over a period of 60 days, in November-December 1995.

For Guinea-Bissau the agreed objectives were:

To map the distribution and produce biomass estimates for the main small pelagic fish species; sardinella *Sardinella aurita*, *S. maderensis*, horse mackerel *Trachurus trecae*, false scad *Decapterus rhonchus*, anchovy *Engraulis encrasicolus* and other pelagic fish.

To occupy standard hydrographical transects for temperature, salinity and oxygen at about 10°20' N and 11°40' N.

As a second priority if time permits a bottom trawl survey of the shrimp resources off Guinea Bissau should be made.

Catch sampling would comprise weight and number by species and length frequency distributions of the principal species.

The time allocated in the work plan for the survey in Guinea Bissau was 4 days.

1.2 Participation

Members of the scientific teams were:

GUINEA BISSAU:

Duarte BUCAL

Vittorino Assau NAHADA

Abel Julio SANTOS

SENEGAL:

Birane SAMB

Abdoulaye SARRE

Ibrahima SOW

Mor SYLLA

THE GAMBIA:

Asberr N. MENDY

Maimuna NDOW-CEESAY

Lamin JAWLA

Members of the scientific staff from the Institute of Marine Research were:

Gunnar SAETERSDAL, Oddgeir ALVHEIM, Martin DAHL and Bjarte KVINGE

1.3 Narrative

Figure 1 shows the course tracks and the fishing and hydrographic stations.

After departure from Dakar on 2 November work was started near the border between Guinea Bissau and Guinea in the afternoon of 3 November with course tracks spaced about 15 nm covering the shelf. A fleet of shrimp trawlers, some using beam trawls, were found along the slope at some 300 m depth south of about 11°N and the opportunity was used of taking three sampling hauls with bottom trawl (with tickler chain) in this area. The hydrographic profile in the south was occupied on 4 November and that in the north on 6 November. The acoustic survey showed only very low densities of pelagic fish over the shelf and there was little need for trawling for sampling. Time permitted two nights of test fishing for shallow water shrimp at 15-45 m depth in the north where a fleet of shrimp trawlers were operating. The survey in Guinea Bissau was completed on 6 November

Annex I shows the records of the fishing stations with the result of the sampling to species of all catches.

Annex II describes the instruments and the fishing gear used.

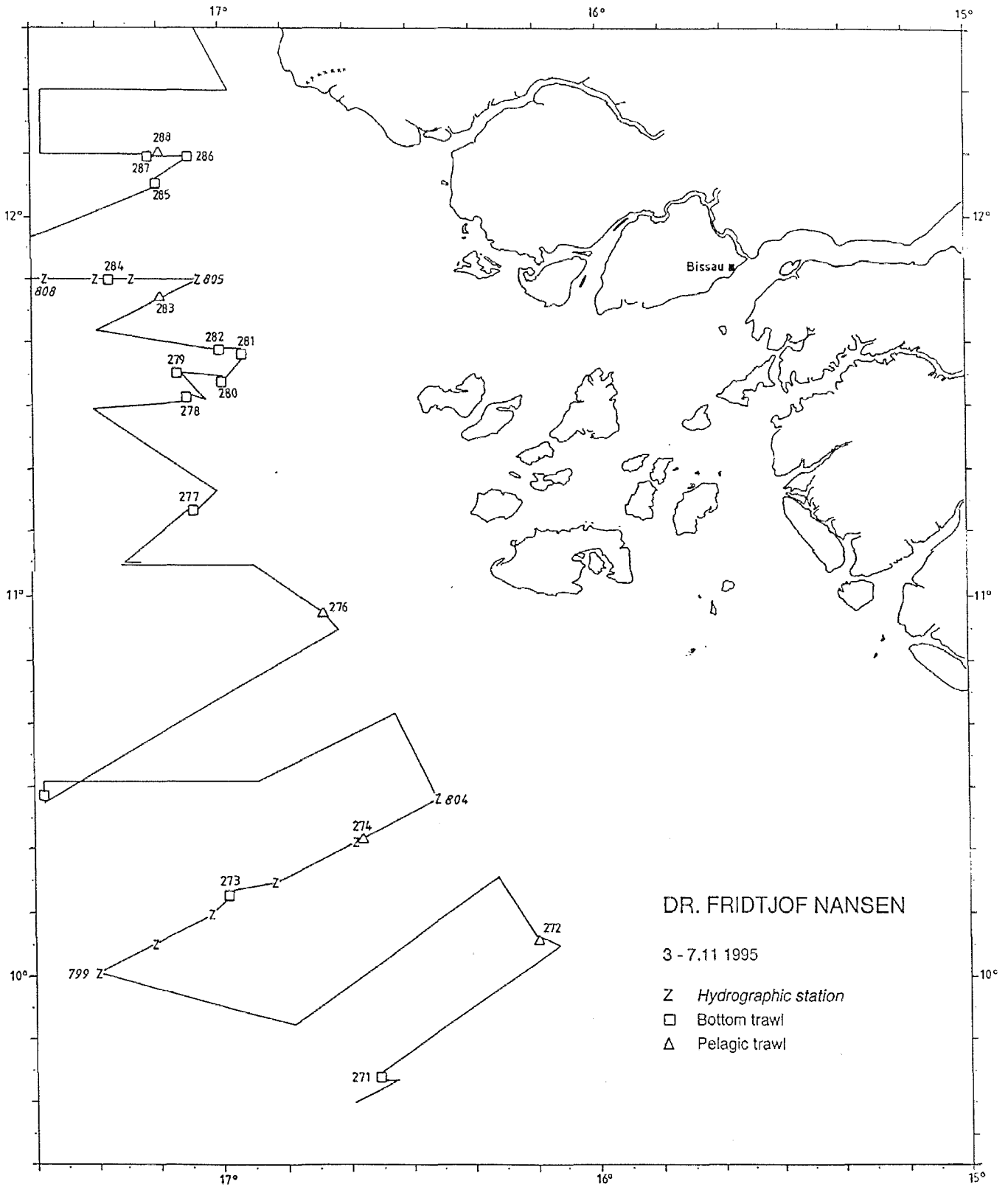


Figure 1. Course tracks and stations.

2 SURVEY RESULTS

2.1 Hydrography

Figure 2 shows the distribution of temperature, salinity and oxygen in the two profiles and Figure 3 sea surface temperature at 4 m of depth.

The oceanographical conditions found were those of the autumn season: a stable surface layer with a sharp thermocline at about 50 m with a range of about 10°C. The surface temperature was 28-29°C throughout. Dissolved oxygen content was relatively high at all depths sampled. The significance of this environment in terms of distribution of pelagic fish is its tropical character: a thin surface layer of low productivity which would not be favourable for pelagic fish except perhaps in inshore shallow waters which may have been enriched by river run-offs.

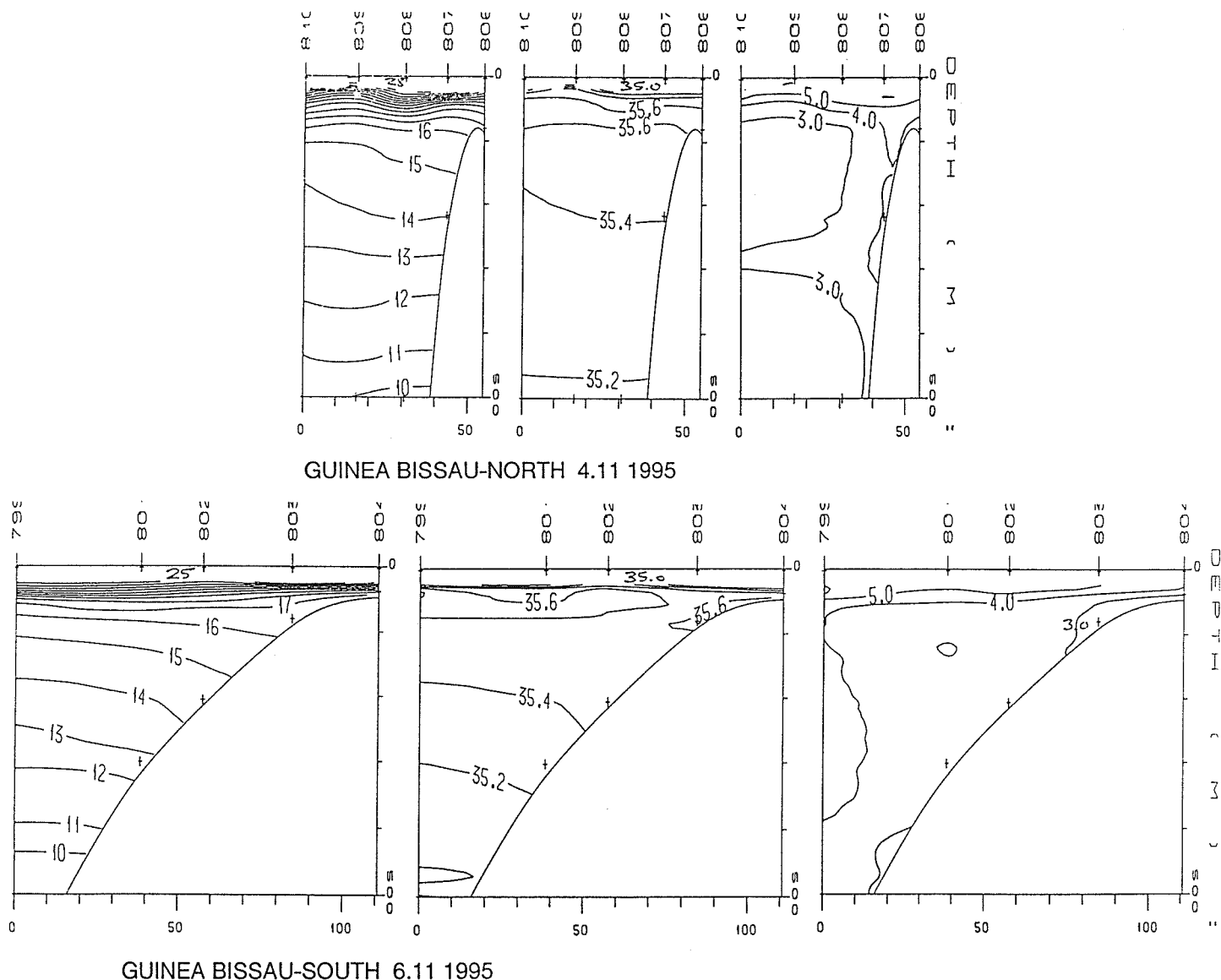


Figure 2. Hydrographic profiles with distribution of temperature, salinity and oxygen.

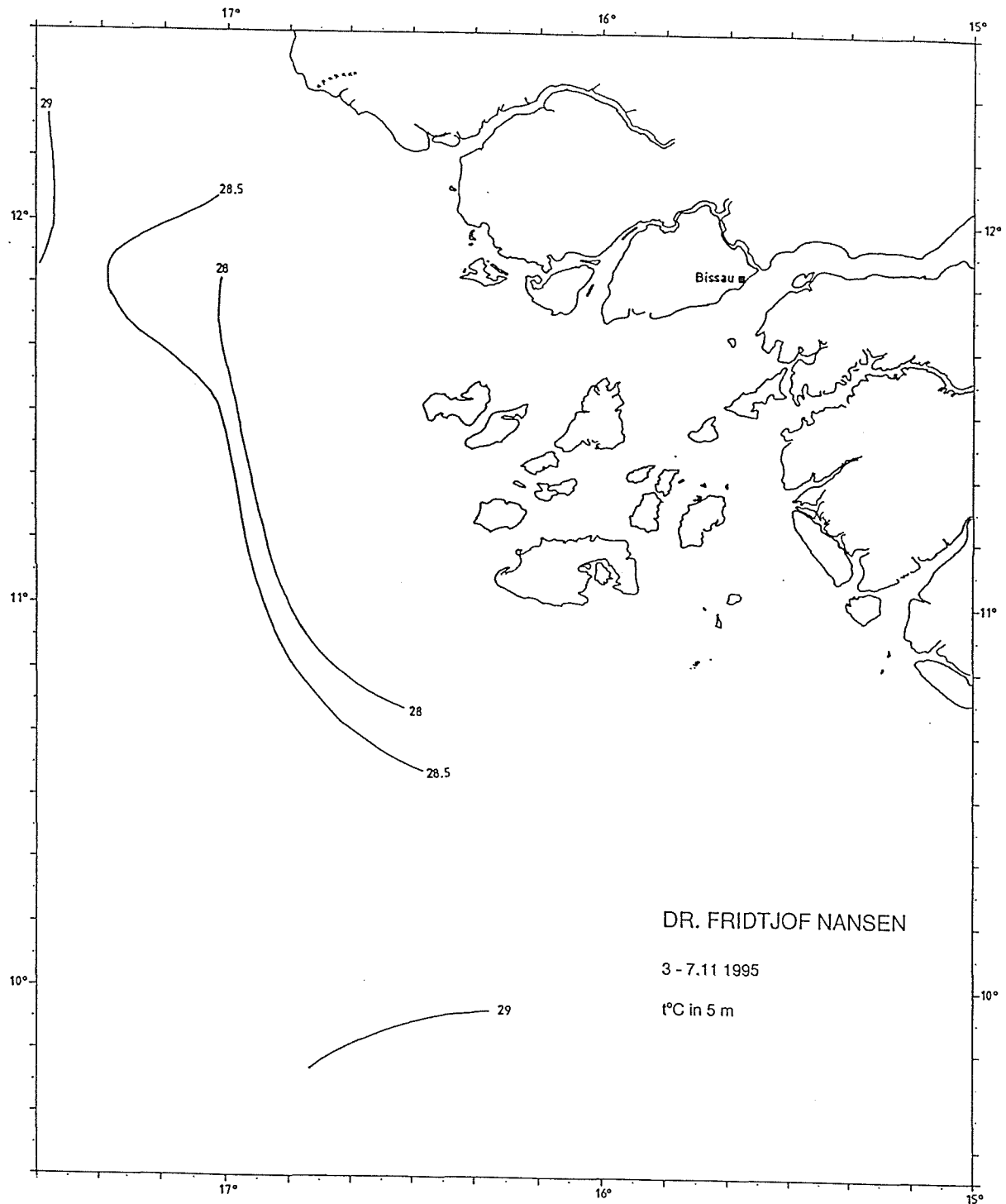


Figure 3. Sea surface temperature

2.2 Pelagic fish

Substantial densities of pelagic fish were not found in any part of the survey area. Figure 4 shows the part of the survey area within which pelagic fish were recorded, mainly limited to the shallow

inshore parts. Most of the recordings were solitary schools or small aggregations of carangids and similar species. The slightly denser spot in the north represent a limited school area of sardinella located at 15-25 m depth. Sardinella was found at this depth range in an almost continuous distribution off Casamance northwards past the Gambia into Senegal with highest density off the Saloum River estuary (see report for the Gambia-Senegal part of the survey). The school area off north Bijagos probably represented the southernmost extent of this distribution.

A biomass estimate of the small sardinella school area based on echo integration gives approximately 15 000 tonnes. The size of the sardinella (total length) was 20-25 cm.

The scattered distribution of the carangids does not provide a very reliable basis for biomass estimates, but very roughly these show about 90 000 tonnes.

Biomass estimates from previous 'Dr Fridtjof Nansen' surveys of pelagic fish on the Guinea Bissau shelf outside about 15 m depth range can be summarised as follows: (1000 tonnes)

	Mainly sardinellas	Carangids	Trigger fish
1981-82 (February-May)	20-90	20-400	350-590
1986 (September-November)	<30	100	200
1992 (March)	540	30	

The current estimates are similar to those of the 1986 September-November survey. It is seen that the estimates have varied considerably, with the highest from the late winter upwelling season. This is a reflection of the highly dynamic pelagic system in this region with seasonal movements in and out of the fish. The findings of any one survey should therefore be considered in relation to the season and to the results in adjacent neighbouring parts.

Pelagic fish in the very extensive inshore shallow waters of Guinea Bissau which could not be covered by the surveys are of course not included in the estimates.

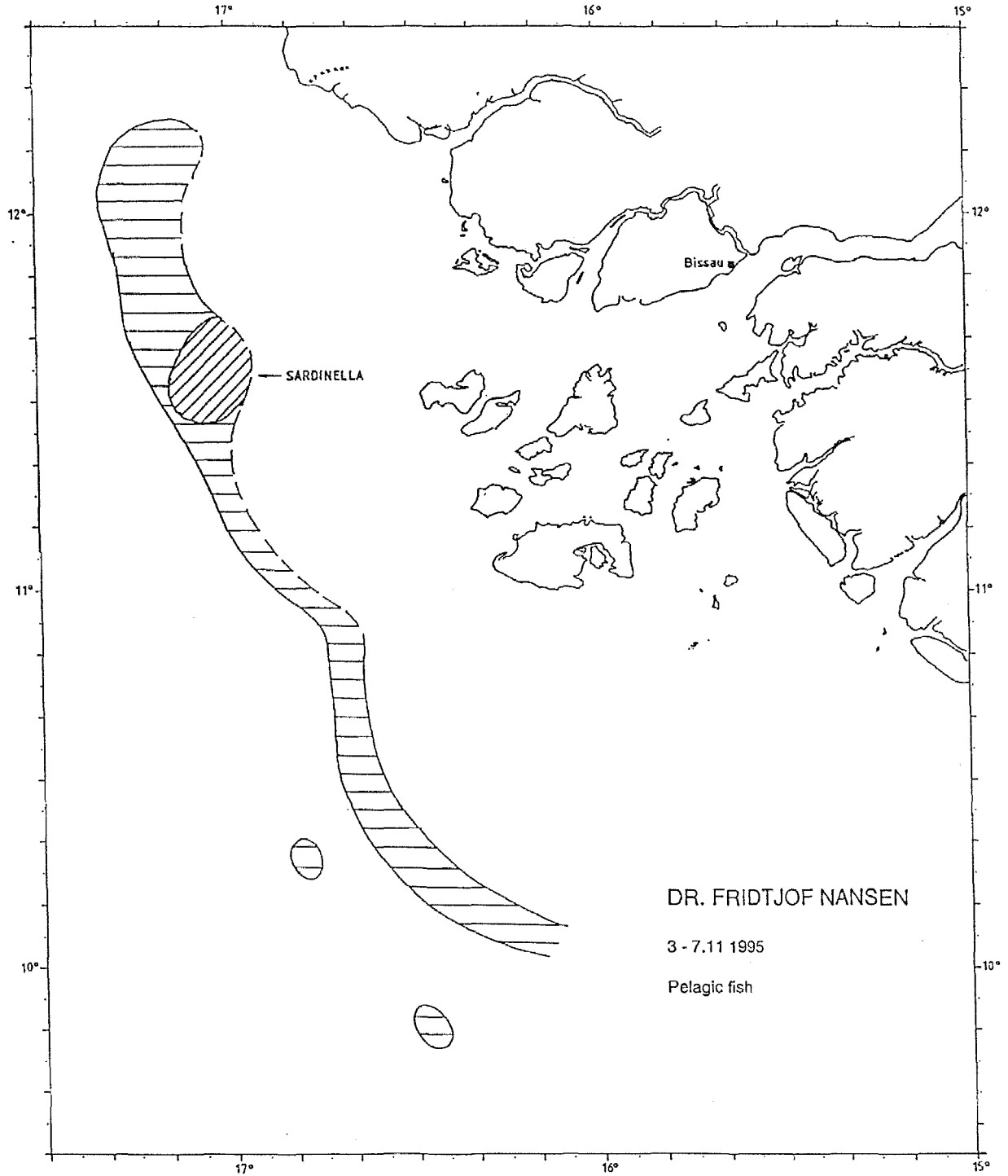


Figure 4. Areas within which pelagic fish were recorded.

2.3 Shrimp

A few test hauls were made for deep water shrimp in the wide slope region south of 11°N. Table 1 shows the catch rates (in kg/hour) of two daylight hauls at 250-300 m and a night haul at 600 m.

The principal species at the lower depths was the rose shrimp *Parapaeneus longirostris* with some golden shrimp *Plesionika martia*. At the deep station the main species was the striped red shrimp *Aristeus varidens* with a small part of scarlet shrimp *Plesiopaeneus edwardsianus*.

Table 1. Catches of deep water shrimp in a few slope hauls. Kg/hour.

ST.NO.	DEP.	Rose	Striped	Scarlet	Golden	Other
271	298	12.8				53.5
273	264	6.2			4.4	2593.9
275	629		7.0	0.4		66.3
MEAN		6.4	2.3	0.1	1.5	904.6

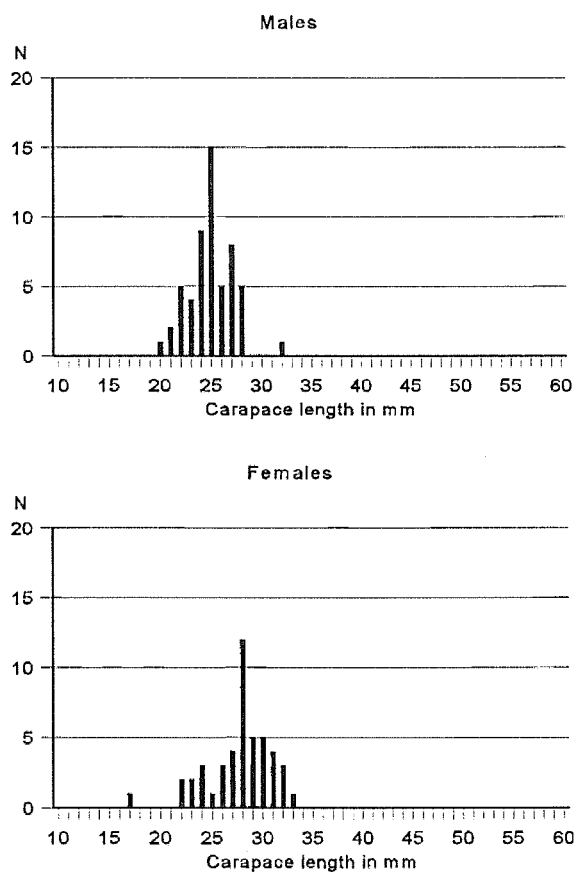


Figure 5a. Size composition of rose shrimp.

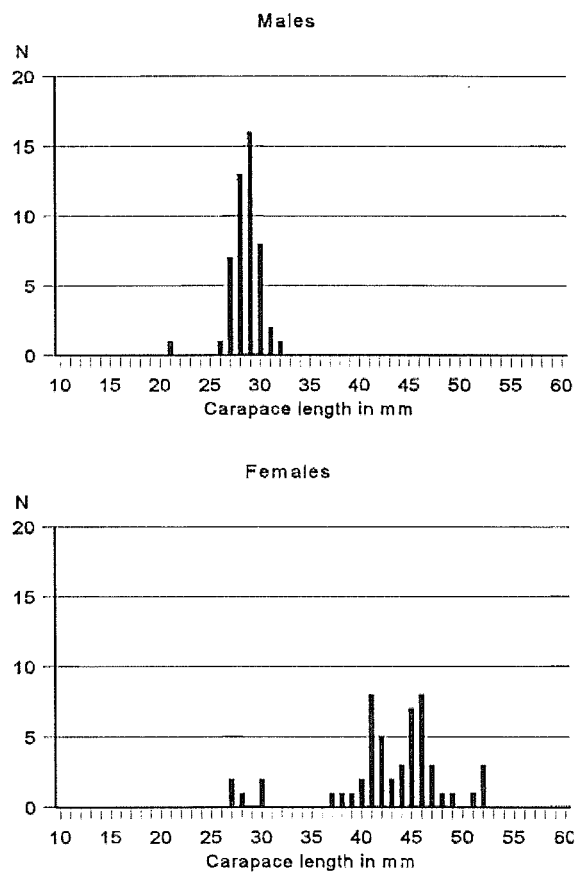


Figure 5b. Size composition of striped red shrimp.

Figure 5a and 5b show the size composition of the main species, rose and striped red shrimp. The latter was especially large sized.

The results of the test hauls made for shallow water shrimp at night time in the north are summarised in Table 2. A shrimp fleet was operating in the area. The pink shrimp *Penaeus*

notialis was the principal species with a few Caramote prawn *P. kerathurus* and some of the small sized Guinea shrimp *Parapenaeopsis atlantica*.

Table 2. Catches of shallow water shrimp in a few hauls. Kg/hour.

ST.NO.	DEP.	Pink	Caramote	Guinea	Other
278	43	0.9	0.02		2232.2
279	47	10.7	0.02	5.6	113.4
280	27	5.5	0.2	12.0	127.0
281	21			0.5	122.8
282	25	14.5			198.3
286	23	1.0		14.6	812.6
287	60	0.4		1.1	100.3
288	39				1216.6
MEAN		4.1	0.03	4.2	615.4

Figure 6 shows the size composition of the pink shrimp in the catches.

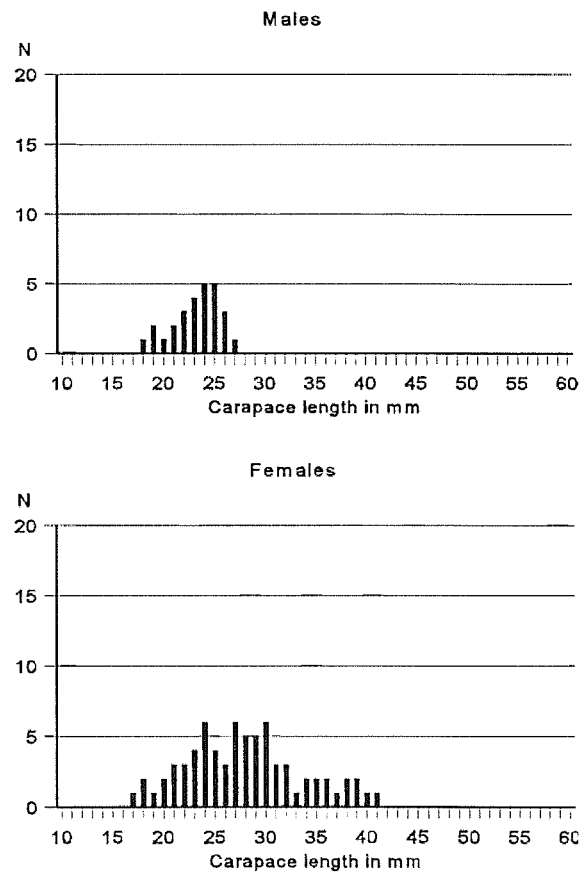


Figure 6. Size composition of pink shrimp.

Annex I Records of fishing stations

PROJECT STATION: 271
 DATE: 3/11/95 GEAR TYPE: BT No: POSITION: Lat N 944 Long W 1635
 start stop duration
 TIME :17:30:00 18:15:00 45 (min) Purpose code: 3
 LOG :5461.00 5474.70 3.70 Area code :
 FDEPTH: 293 302 GearCond.code:
 BDEPTH: 293 302 Validity code:
 Towing dir: 320° Wire out: 850 m Speed: 25 kn*10
 Sorted: 14 Kg Total catch: 49.76 CATCH/HOUR: 66.35

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	21.05	849	31.73	
Trichiurus lepturus	10.69	75	16.11	
Parapenaeus longirostris, fem.	7.89	752	11.89	486
Synagrops microlepis	6.59	285	9.93	
Parapenaeus longirostris, male	4.95	593	7.46	485
Shrimps, small, non comm.	4.07	2352	6.13	
NOHEIDAE	2.52	47	3.80	
Chascanopsetta lugubris	1.55	89	2.34	
GALATHEIDAE	1.55	112	2.34	
MYCTOPHIDAE	1.27	1.91	1.91	
Illex coindetii	0.84	136	1.27	
Solenocera africana	0.80	136	1.21	
Bembrops heterurus	3.52	24	0.78	
Lophius vullanti	0.43	5	0.65	
Symphurus sp.	0.33	28	0.50	
Helicolenus dactylopterus	0.28	15	0.42	
Peristedion cataphractum	0.28	33	0.42	
Heterocarpus ensifer	0.24	28	0.36	
Miscellaneous fishes	0.24	37	0.36	
Malacocephalus occidentalis	0.09	19	0.14	
Arionna bondi	0.09	28	0.14	
Lestrolepis intermedia	0.05	5	0.08	
Brotula barbata	0.05	9	0.08	
Total	66.37		100.05	

PROJECT STATION: 272
 DATE: 4/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 1007 Long W 1610
 start stop duration
 TIME :22:47:00 23:17:00 30 (min) Purpose code: 1
 LOG :5520.20 5522.00 1.80 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 41 40 Validity code:
 Towing dir: 140° Wire out: 150 m Speed: 38 kn*10
 Sorted: 123 Kg Total catch: 123.44 CATCH/HOUR: 246.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Euthynnus alletteratus	165.80	154	67.16	488
Axidia thezard	71.40	92	29.92	487
Trachurus, juveniles	4.00		1.62	
Scomberomorus tritor	3.12	2	1.26	
Echeneis naucrates	2.28	4	0.92	
Decapterus punctatus	0.28	2	0.11	
Total	246.80		99.99	

PROJECT STATION: 273
 DATE: 4/11/95 GEAR TYPE: BT No: POSITION: Lat N 1012 Long W 1700
 start stop duration
 TIME :10:34:00 11:19:00 45 (min) Purpose code: 3
 LOG :5634.40 5636.90 2.50 Area code :
 FDEPTH: 270 258 GearCond.code:
 BDEPTH: 270 258 Validity code:
 Towing dir: 340° Wire out: 870 m Speed: 30 kn*10
 Sorted: 32 Kg Total catch: 1553.32 CATCH/HOUR: 2604.43

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	2153.47	73925	82.68	
Synagrops microlepis	202.35	8680	7.77	
Arionna bondi	84.32	1405	3.24	
NOHEIDAE	75.23	2893	2.89	
Merluccius polli	24.80	83	0.95	
Illex coindetii	21.97	413	0.92	
MYCTOPHIDAE	15.71	3885	0.60	
Coelorinchus coelorhincus	4.96	243	0.19	
Plesionika martia	4.35	1323	0.17	
Bembrops heterurus	4.13	83	0.16	
Parapenaeus longirostris, male	3.72	516	0.14	489
Miscellaneous fishes	3.31	165	0.13	
Parapenaeus longirostris, fem.	2.48	227	0.10	490
GALATHEIDAE	1.65	207	0.06	
Dibranchius atlanticus	0.00	83		
Total	2604.45		100.00	

PROJECT STATION: 274
 DATE: 4/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 1022 Long W 1637
 start stop duration
 TIME :14:57:00 15:15:00 18 (min) Purpose code: 1
 LOG :5666.50 5667.30 0.80 Area code :
 FDEPTH: 65 70 GearCond.code: 8
 BDEPTH: 82 84 Validity code: 9
 Towing dir: 228° Wire out: 180 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 275
 DATE: 5/11/95 GEAR TYPE: BT No: POSITION: Lat N 1028 Long W 1728
 start stop duration
 TIME :01:30:00 02:00:00 60 (min) Purpose code: 3
 LOG :5761.00 5763.70 2.70 Area code :
 FDEPTH: 624 633 GearCond.code:
 BDEPTH: 624 633 Validity code:
 Towing dir: 180° Wire out: 1600 m Speed: 30 kn*10
 Sorted: 27 Kg Total catch: 73.71 CATCH/HOUR: 73.71

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Laemonema laureysi	19.25	186	25.12	
Yarella blackfordi	13.13	455	17.81	
Malacocephalus laevis	8.75	147	11.87	
Illex coindetii	6.21	39	8.42	
Lamprogrammus exutus	6.16	105	8.35	
Aristeus varidens, female	5.12	213	6.95	492
Chlorophthalmus atlanticus	4.66	105	6.32	
Shrimps, small, non comm.	2.73		3.70	
Aristeus varidens, male	1.88	200	2.55	491
ALAPOCEPHALIDAE	1.82	46	2.47	
Stereomastis sp.	1.19	84	1.61	
Neolithodes asperimus	0.60	1	0.01	
Halosaurus ovenii	0.49	11	0.66	
RAJIDAE	0.42	7	0.57	
Centroscymnus crepidater	0.39	4	0.53	
Plesiopeanaeus edwardsianus, f.	0.39	7	0.53	493
Mezumia sp.	0.14	7	0.19	
Heterocarpus ensifer	0.12	4	0.16	
Coelorinchus coelorhincus	0.11	4	0.15	
Symphurus sp.	0.07	7	0.08	
Peristedion cataphractum	0.04	4	0.05	
GALATHEIDAE	0.04	4	0.05	
Total	73.71		99.97	

PROJECT STATION: 276
 DATE: 5/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 1057 Long W 1644
 start stop duration
 TIME :08:42:00 09:12:00 30 (min) Purpose code:
 LOG :5829.80 5831.30 1.50 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 34 35 Validity code:
 Towing dir: 310° Wire out: 100 m Speed: 3 kn*10
 Sorted: 13 Kg Total catch: 12.70 CATCH/HOUR: 25.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Rachycentron canadum	23.60	2	92.91	
Remora remora	1.40	6	5.51	
Trachurus, juveniles	0.20		0.75	
Chloroscombrus juvenile	0.20		0.75	
Total	25.40		100.06	

PROJECT STATION: 277
 DATE: 5/11/95 GEAR TYPE: BT No: POSITION: Lat N 1114 Long W 1704
 start stop duration
 TIME :14:23:00 14:40:00 17 (min) Purpose code:
 LOG :5883.90 5884.00 0.90 Area code :
 FDEPTH: 39 41 GearCond.code:
 BDEPTH: 39 41 Validity code:
 Towing dir: 228° Wire out: 150 m Speed: 3 kn*10
 Sorted: 8 Kg Total catch: 7.91 CATCH/HOUR: 27.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Mustelus mustelus	9.81	4	35.14	
RAJIDAE	6.14	42	21.99	
Caranx crysos	5.61	4	20.09	
Alloteuthis africana	3.88		13.90	
Syacium micrurum	1.27	7	4.55	
Calappa rubroguttata	1.02	4	3.65	
Bothus podas africanus	0.18	4	0.64	
Total	27.91		99.96	

PROJECT STATION: 278
 DATE: 5/11/95 GEAR TYPE: BT No: POSITION: Lat N 1131 Long W 1706
 start stop duration
 TIME :19:05:00 19:35:00 30 (min) Purpose code: 3
 LOG :5931.20 5932.80 1.70 Area code :
 FDEPTH: 42 43 GearCond.code:
 BDEPTH: 42 43 Validity code:
 Towing dir: 345° Wire out: 200 m Speed: 34 kn*10
 Sorted: 93 Kg Total catch: 1116.52 CATCH/HOUR: 2233.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Albula vulpes	2163.00	7560	96.86	
Arnoglossus imperialis	17.64	112	0.79	
Mustelus mustelus	16.80		0.75	
Syacium micrurum	16.24		0.73	
Pagellus bellottii	6.16	56	0.28	
Saurida undosquamis	5.04	784	0.23	
Grammolites gruvell	2.52	364	0.11	
Scorpaena stephanica	2.24	28	0.10	
Squilla mantis	1.40	56	0.06	
Uranoscopus sp.	0.84	28	0.04	
Penaeus notialis, female	0.52	28	0.02	495
Penaeus notialis, male	0.34	28	0.02	494
OPHIDIIDAE	0.28	28	0.01	
Penaeus kerathurus, male	0.02	2		
Total	2233.04		100.00	

PROJECT STATION: 279
 DATE: 5/11/95 GEAR TYPE: BT No: POSITION:Lat N 1135 Long W 1706
 start stop duration
 TIME :21:00:00 21:30:00 30 (min) Purpose code: 3
 LOG :5944.70 5946.20 1.50 Area code :
 FDEPTH: 45 48 GearCond.code:
 BDEPTH: 45 48 Validity code:
 Towing dir: 275° Wire out: 200 m Speed: 3 kn*10
 Sorted: 29 Kg Total catch: 64.85 CATCH/HOUR: 129.70

PROJECT STATION: 282
 DATE: 6/11/95 GEAR TYPE: BT No: POSITION:Lat N 1139 Long W 1660
 start stop duration
 TIME :01:35:00 02:05:00 30 (min) Purpose code: 3
 LOG :5970.10 5971.20 1.10 Area code :
 FDEPTH: 23 26 GearCond.code:
 BDEPTH: 23 26 Validity code:
 Towing dir: 260° Wire out: 150 m Speed: 3 kn*10
 Sorted: 29 Kg Total catch: 106.38 CATCH/HOUR: 212.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	28.00		21.59	
Saurida brasiliensis	22.40		17.27	
Brachydeuterus auritus	21.10	176	16.27	
GOBIIDAE	16.80		12.95	
Sphyræna guachancho	13.00	24	10.02	
Penaeus notialis, female	8.00	542	6.17	497
Parapenaeopsis atlantica	5.60	5460	4.32	
Caranx crysos	3.98	4	3.07	
Penaeus notialis, male	2.66	258	2.05	496
Decapterus rhonchus	1.92	2	1.48	
Selene dorsalis	1.76	8	1.36	
Scomberomorus tritor	1.60	2	1.23	
Epinephelus aeneus	0.98	2	0.76	
Raja miraletus	0.74	2	0.57	
Trichiurus lepturus	0.52	2	0.40	
Pagellus bellottii	0.18	2	0.14	
Pseudupeneus prayensis	0.16	4	0.12	
Squilla mantis	0.14	4	0.11	
Scyllarides sp.	0.10	24	0.08	
Grammolites gruveli	0.04	2	0.03	
Penaeus kerathurus, female	0.02	2	0.02	
Total	129.70		100.01	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Arius parkii	59.80	230	28.11	
Galeoides decadactylus	38.70		18.19	
Pseudotolithus senegalensis	26.50	60	12.46	
Brachydeuterus auritus	24.60		11.56	
Ilisha africana	13.90	1792	6.53	
Penaeus notialis, female	12.62	490	5.93	504
Pteroscion pelli	7.70	130	3.62	
Callinectes pallidus	6.80	330	3.20	
Portunus validus	6.00	10	2.82	
Chloroscombrus chrysurus	3.50	60	1.65	
Dasyatis margarita	3.10	10	1.46	
Sphyræna guachancho	2.90	10	1.36	
Stromateus fiatola	2.40	10	1.13	
Penaeus notialis, male	1.84	156	0.86	503
Trichiurus lepturus	1.80	60	0.85	
Drepane africana	0.50	10	0.24	
Lysiosquilla hoevenii	0.10	10	0.05	
Total	212.76		100.02	

PROJECT STATION: 280
 DATE: 5/11/95 GEAR TYPE: BT No: POSITION:Lat N 1135 Long W 1659
 start stop duration
 TIME :22:51:00 23:21:00 30 (min) Purpose code: 3
 LOG :5957.90 5958.40 0.50 Area code :
 FDEPTH: 25 29 GearCond.code:
 BDEPTH: 25 29 Validity code:
 Towing dir: 234° Wire out: 150 m Speed: 3 kn*10
 Sorted: 59 Kg Total catch: 72.33 CATCH/HOUR: 144.66

PROJECT STATION: 283
 DATE: 6/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1147 Long W 1709
 start stop duration
 TIME :05:53:00 06:23:00 30 (min) Purpose code: 1
 LOG :6006.10 6007.70 1.60 Area code :
 FDEPTH: 12 12 GearCond.code:
 BDEPTH: 42 51 Validity code:
 Towing dir: 244° Wire out: m Speed: 32 kn*10
 Sorted: 129 Kg Total catch: 781.00 CATCH/HOUR: 1562.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pseudotolithus senegalensis	54.80	40	37.88	
Brachydeuterus auritus	21.10	1206	14.59	
Parapenaeopsis atlantica	12.00		8.30	
Chloroscombrus chrysurus	10.68	174	7.38	
Galeoides decadactylus	9.54	2982	6.59	
Arius parkii	8.52	16	5.89	
Ilisha africana	6.30	294	4.36	
Penaeus notialis, female	4.28	192	2.96	499
Sardinella maderensis	2.64	30	1.82	502
Torpedo torpedo	2.10	8	1.45	
Dactylopterus volitans	1.78	2	1.23	
Syacium micrurum	1.56	2	1.08	
Stromateus fiatola	1.38	2	0.95	
Penaeus notialis, male	1.22	118	0.84	498
Cynoglossus senegalensis	1.04	8	0.72	
Ephippion guttifer	1.00	2	0.69	
Trichiurus lepturus	1.00	4	0.69	
Sepia officinalis hierredda	0.92	2	0.64	
Galeoides decadactylus	0.92	6	0.64	
Sphyræna guachancho	0.90	4	0.62	
Calappa rubroguttata	0.40	2	0.28	
Epinephelus aeneus	0.20	2	0.14	
Epinephelus goreensis	0.20	2	0.14	
Penaeus kerathurus, female	0.12	4	0.08	501
Penaeus kerathurus, male	0.06	2	0.04	500
Total	144.66		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	632.00	3398	40.46	
Brachydeuterus auritus	486.00	632	31.11	
Sphyræna guachancho	174.00	54	11.14	
Mustelus mustelus	116.00	34	7.43	
Scomberomorus tritor	50.00	52	3.20	
Stromateus fiatola	46.00	52	2.94	
Uraspis secunda	34.00	294	2.18	
Caranx senegalensis	24.00	28	1.54	
Total	1562.00		100.00	

PROJECT STATION: 281
 DATE: 6/11/95 GEAR TYPE: BT No: POSITION:Lat N 1137 Long W 1656
 start stop duration
 TIME :00:25:00 00:55:00 30 (min) Purpose code: 3
 LOG :5966.50 5968.20 1.70 Area code :
 FDEPTH: 19 22 GearCond.code:
 BDEPTH: 19 22 Validity code:
 Towing dir: 43° Wire out: 140 m Speed: 3 kn*10
 Sorted: 24 Kg Total catch: 61.65 CATCH/HOUR: 123.30

PROJECT STATION: 284
 DATE: 6/11/95 GEAR TYPE: BT No: POSITION:Lat N 1150 Long W 1718
 start stop duration
 TIME :09:29:00 09:49:00 20 (min) Purpose code: 1
 LOG :6032.60 6033.70 1.10 Area code :
 FDEPTH: 106 104 GearCond.code:
 BDEPTH: 106 104 Validity code:
 Towing dir: 90° Wire out: 350 m Speed: 35 kn*10
 Sorted: 26 Kg Total catch: 77.04 CATCH/HOUR: 231.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	50.70	552	41.12	
Arius parkii	32.10	84	26.03	
Pseudotolithus senegalensis	11.10	8	9.00	
Pisodonopis semicinctus	7.50	18	6.08	
Epinephelus aeneus	6.12	6	4.96	
Callinectes pallidus	3.54	156	2.87	
Brachydeuterus auritus	3.54	78	2.87	
Dasyatis margarita	1.98	12	1.61	
Sepia officinalis hierredda	1.68	12	1.36	
Sphyræna guachancho	1.62	6	1.31	
Ilisha africana	1.02	144	0.83	
Rypticus saponaceus	0.66	2	0.54	
Cynoglossus senegalensis	0.66	12	0.54	
Parapenaeopsis atlantica	0.48		0.39	
Syacium micrurum	0.30	12	0.24	
Drepane africana	0.12	6	0.10	
Selene dorsalis	0.12	36	0.10	
Trachinus draco	0.06	6	0.05	
Total	123.30		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	75.33	3312	32.59	505
Mustelus mustelus	63.45	9	27.45	
Dentex angolensis	46.44	873	20.09	
Ariomma bondi	13.95	288	6.04	
Lepidotrigla cadmani	12.24	261	5.30	
Pontinus kuhlii	9.27	126	4.01	
Chelidonichthys lucerna	2.88	18	1.25	
Illex coindetii	2.61	45	1.13	
Penaeus notialis	1.44	18	0.62	
Boops boops	1.26	45	0.55	
Pagellus bellottii	0.90	27	0.39	
Zeus faber	0.81	9	0.35	
Scorpaena scrofa	0.54	18	0.23	
Total	231.12		100.00	

PROJECT STATION: 285
 DATE: 6/11/95 GEAR TYPE: BT No: POSITION:Lat N 1205 Long W 1710
 start stop duration
 TIME :22:10:00 22:40:00 30 (min) Purpose code:
 LOG :6131.20 6132.90 1.70 Area code :
 FDEPTH: 47 38 GearCond.code:
 BDEPTH: 47 38 Validity code:
 Towing dir: 55° Wire out: 175 m Speed: 34 kn*10
 Sorted: 58 Kg Total catch: 291.45 CATCH/HOUR: 582.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	321.50	120466	55.16	
Mustelus mustelus	238.80	48	40.97	
Penaeus notialis, female	11.50	770	1.97	507
Sphyrna couardi	8.70	2	1.49	
Penaeus notialis, male	2.00	240	0.34	506
Symphurus sp.	0.40	60	0.07	
Total	582.90		100.00	

DATE: 6/11/95 GEAR TYPE: BT No: PROJECT STATION: 286
 POSITION: Lat N 1209
 Long W 1705
 TIME :23:40:00 00:10:00 30 (min) Purpose code: 3
 LOG :6140.70 6142.10 1.40 Area code :
 FDEPTH: 18 27 GearCond.code:
 BDEPTH: 18 27 Validity code:
 Towing dir: 270° Wire out: 100 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 414.06 CATCH/HOUR: 828.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Arius parkii	229.04	756	27.66	
Galeoides decadactylus	160.72	336	19.41	
Drepane africana	123.76	84	14.94	
Pteroscion pelli	92.12	1260	11.12	
Pseudotolithus senegalensis	74.48	196	8.99	
Shrimps, small, ncn comm.	28.00		3.38	
Trichiurus lepturus	22.12	1176	2.67	
Ilisha africana	16.52	364	1.99	
Pentapenaeus quinquecarinus	15.12	196	1.83	
Pomadourus peroteti	14.84	56	1.79	
Albula vulpes	14.56	28	1.76	
Parapenaeopsis atlantica	14.56	3640	1.76	
Brachydeuterus auritus	13.72	224	1.66	
Arius heudeloti	6.72	28	0.81	
Cynoglossus canariensis	0.56	28	0.07	
Penaeus notialis, female	0.50	14	0.06	509
Penaeus notialis, male	0.50	42	0.06	508
Syacium micrurum	0.28	28	0.03	
Total	828.12		99.99	

DATE: 7/11/95 GEAR TYPE: BT No: PROJECT STATION: 287
 POSITION: Lat N 1209
 Long W 1711
 TIME :01:00:00 01:30:00 30 (min) Purpose code: 3
 LOG :6145.50 6147.10 1.60 Area code :
 FDEPTH: 59 60 GearCond.code:
 BDEPTH: 59 60 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: 25 Kg Total catch: 50.91 CATCH/HOUR: 101.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Arius parkii	35.40	78	34.77	
Brachydeuterus auritus Juv.	21.24		20.86	
Rhizoprionodon acutus	15.00	6	14.73	
Selene dorsalis	9.54	42	9.37	
Mustelus mustelus	7.80	4	7.66	
Pomadourus peroteti	4.38	6	4.30	
Brachydeuterus auritus	3.72	168	3.65	
CONGRIDAE	1.92	6	1.89	
Parapenaeopsis atlantica	1.14	372	1.12	
Protula barbata	0.84	38	0.82	
Penaeus notialis, female	0.34	22	0.33	511
Trichiurus lepturus	0.18	24	0.18	
Pagellus bellottii	0.12	6	0.12	
Pseudupeneus prayensis	0.12	6	0.12	
Penaeus notialis, male	0.08	8	0.08	510
Total	101.82		100.00	

DATE: 7/11/95 GEAR TYPE: BT No: PROJECT STATION: 288
 POSITION: Lat N 1209
 Long W 1709
 TIME :02:20:00 02:50:00 30 (min) Purpose code: 3
 LOG :6152.50 6154.10 1.60 Area code :
 FDEPTH: 39 39 GearCond.code:
 BDEPTH: 39 39 Validity code:
 Towing dir: * Wire out: 150 m Speed: 30 kn*10
 Sorted: 104 Kg Total catch: 608.28 CATCH/HOUR: 1216.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Rhizoprionodon acutus	740.00	296	60.83	
Selene dorsalis	313.20	1126	25.74	513
Scomberomorus tritor	55.20	52	4.54	512
Lutjanus agennes	40.00	6	3.29	
Carcharhinus limbatus	22.00	4	1.81	
Alectis alexandrinus	17.04	36	1.40	
Caranx senegalus	9.72	12	0.80	
Trachinotus maxillosus	8.00	2	0.66	
Sphyrna mokarran	8.00	6	0.66	
Sphyrna guachancho	3.40	4	0.28	
Total	1216.56		100.01	

Annex II Instruments and fishing gear used

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

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

Tranceiver-1 menu (38 kHz lowering keel)

Transducer depth	0.00 m
Absorbtion coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducer gain	28.1 dB
TS transducer gain	28.0 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg
Alongship offset	0.00 "
Athwardship offset	0.04 "

Display menu

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

Printer- menu

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

Bottom detection menu Minimum level -50 dB

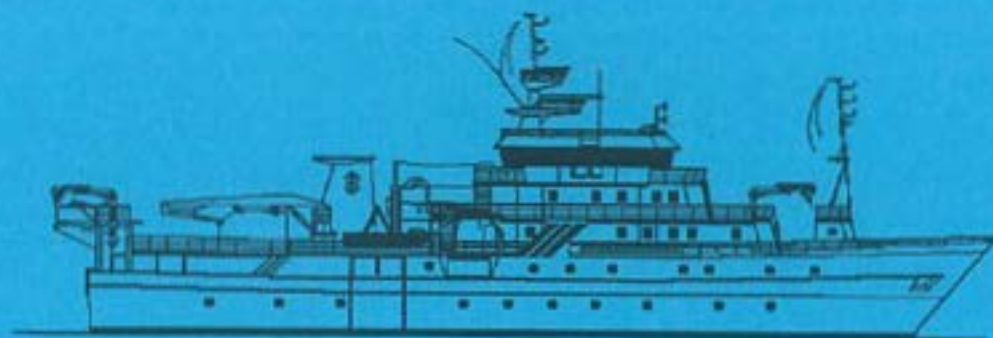
Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl". Both the bottom trawl and the smallest pelagic trawl were used during the survey.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernett of 10 mm meshsize. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m², 1670 kg, their distance while trawling about 46 m in average. A tickler chain was used when trawling for shrimp.

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

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



**SURVEY OF THE PELAGIC FISH RESOURCES OFF
NORTH WEST AFRICA**

Part 2

SENEGAL - THE GAMBIA

7 - 16 November 1995

Centre de Recherches Océanographiques de Dakar
Thiaroye, Sénégal
Department of Fisheries, The Gambia

Institute of Marine Research
Bergen, Norway

CRUISE REPORT 'DR FRIDTJOF NANSEN'

**SURVEY OF THE PELAGIC FISH RESOURCES OFF
NORTH WEST AFRICA**

Part 2

SENEGAL - THE GAMBIA

7 - 16 November 1995

by

G. Sætersdal

Institute of Marine Research

P.O.Box 1870 Nordnes

N-5024 Bergen, Norway

Institute of Marine Research

Bergen, 1995

TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	1
1.1	Objectives of the cruise	1
1.2	Participation	1
1.3	Narrative	2
1.4	Methods	3
CHAPTER 2	SURVEY RESULTS	6
2.1	Hydrography	6
2.2	The Casamance shelf	8
2.3	The Gambia shelf	11
2.4	The Gambia border - Cap Vert	13
2.5	Cap Vert - St. Louis	14
CHAPTER 3	OVERVIEW AND SUMMARY OF RESULTS	15
Annex I	The Gambia. Estimated densities from swept area hauls	
Annex II	Pooled length distributions by species and regions	
Annex III	Stock length distributions by numbers and weight	
Annex IV	Records of fishing stations	
Annex V	Description of instruments and fishing gear used	

CHAPTER 1 INTRODUCTION

1.1 Objectives of the cruise

A planning meeting was held in Casablanca in July 1995 with participants from Morocco, Mauritania, Senegal, The Gambia, Guinea Bissau, FAO and the Institute of Marine Research, Bergen. During this meeting the objectives and schedules of the programme were established.

The defined general objectives were to estimate and map the distribution and biomass of small pelagic fish stocks off NW Africa (Morocco, Mauritania, Senegal, the The Gambia and Guinea Bissau) by hydro-acoustic methods and describe the hydrographic conditions there over a period of 60 days, in November-December 1995. For Senegal and The Gambia the agreed objectives were:

To map the distribution and produce biomass estimates for the main small pelagic fish species; sardinella *Sardinella aurita*, *S. maderensis*, horse mackerel *Trachurus trecae*, false scad *Decapterus rhonchus*, anchovy *Engraulis encrasicolus* and other pelagic fish.

To occupy standard hydrographical transects for temperature, salinity and oxygen at about 13°35' N and 14°50' N.

To carry out bottom trawl survey off The Gambia, if time available.

Catch sampling would comprise weight and number by species and length frequency distributions of the principal species.

The time allocated in the work plan for this part of the survey, off Senegal and The Gambia, was 10 days.

1.2 Participation

Members of the scientific teams were:

SENEGAL: Birane SAMB (2-23/11), Abdoulaye SARRE (2-23/11), Ibrahim SOW (2-23/11)
Mor SYLLA (2-23/11)

THE GAMBIA: Asberr N. MENDY (2-13/11), Maimuna NDOW-CEESAY (2-13/11), Lamin JAWLA (2-13/11)

GUINEA BISSAU: Duarte BUCAL (2-13/11), Vittorino Assau NAHADA (2-13/11), Abel Julio SANTOS (2-13/11)

MAURITANIA (from 12/11): Mohamed MAHFOUDH OULD TALEB SIDI, Diallo IBRA, Ball Abou CIRE

NORWAY: Gunnar SAETERSDAL, Oddgeir ALVHEIM, Guillermo BURGOS (from 13/11), Martin DAHL and Bjarte KVINGE

1.3 Narrative

The course tracks with the fishing and hydrographical stations are shown in Figure 1.

After completion of the survey off Guinea Bissau on 6 November work started off Casamance on 7 November with main course tracks spaced about 10 nm apart. Since it appeared that the distribution of pelagic fish was mainly limited to the inner shelf, inside about 30 m depth, the survey intensity was increased in this shelf part. A swept area trawl survey was made off The Gambia with 17 prelocated stations spaced over the shelf at about 5 nm distance.

A school area of sardinellas with high densities was found inshore, off the estuaries of The Gambia and Saloum rivers. By extending the survey grid into 10 m depth the shoreward limits of the distribution of this school area was established. The outer limit was similarly confirmed by a grid net along 25-35 m depth. The bottom trawl with floats was used for sampling the pelagic fish in these shallow waters. Another sardinella school area was found south of Dakar on 9-10 November in slightly deeper waters and its distribution determined. The shelf northwards to Cayar was then covered before a call was made on Dakar on 13 November to disembark the participants from Guinea Bissau and The Gambia and embark participants from Mauritania.

The shelf from Cayar to St Louis was surveyed on 14 - 16 November.

The hydrographic profile off The Gambia was occupied on 9 and that off Cap Vert on 12 November.

1.4 Methods

All catches were sampled for composition by weight and numbers of each species. The length frequency distributions of the target species was almost always taken. Total fish length was measured. The complete records of fishing stations are shown in Annex IV.

The surface temperature was logged automatically and recorded with position and bottom depth every nautical mile sailed.

Hydrographical profiles were collected with a CTD sonde with logging of records of temperature, salinity, and depth. From these data series records were selected from standard depths and presented in figures.

The acoustic biomass estimates are based on the integration technique. The Bergen Integrator (BEI) was used for analysis and allocation of S_A values. This system does not underestimate dense schools close to the bottom as some times may have happened with the EK500 used in the 1992 surveys.

The North Sea herring target strength was used for all pelagic fish:

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

The biomass density in numbers/nm² of a length group i is calculated from the formula:

$$\rho_i = \frac{1}{4\pi} * S_a \frac{n_i}{\sum_{i=1}^{\max} n_i k_i} \quad k_i = 10^{21 \log l_i - 7.2}$$

where s_a = Mean total integrator value from a species distribution area in m²/nm²

n_i = frequency count of length group i in pooled representative sample from distribution area.

l_i = total length of fish in length group i .

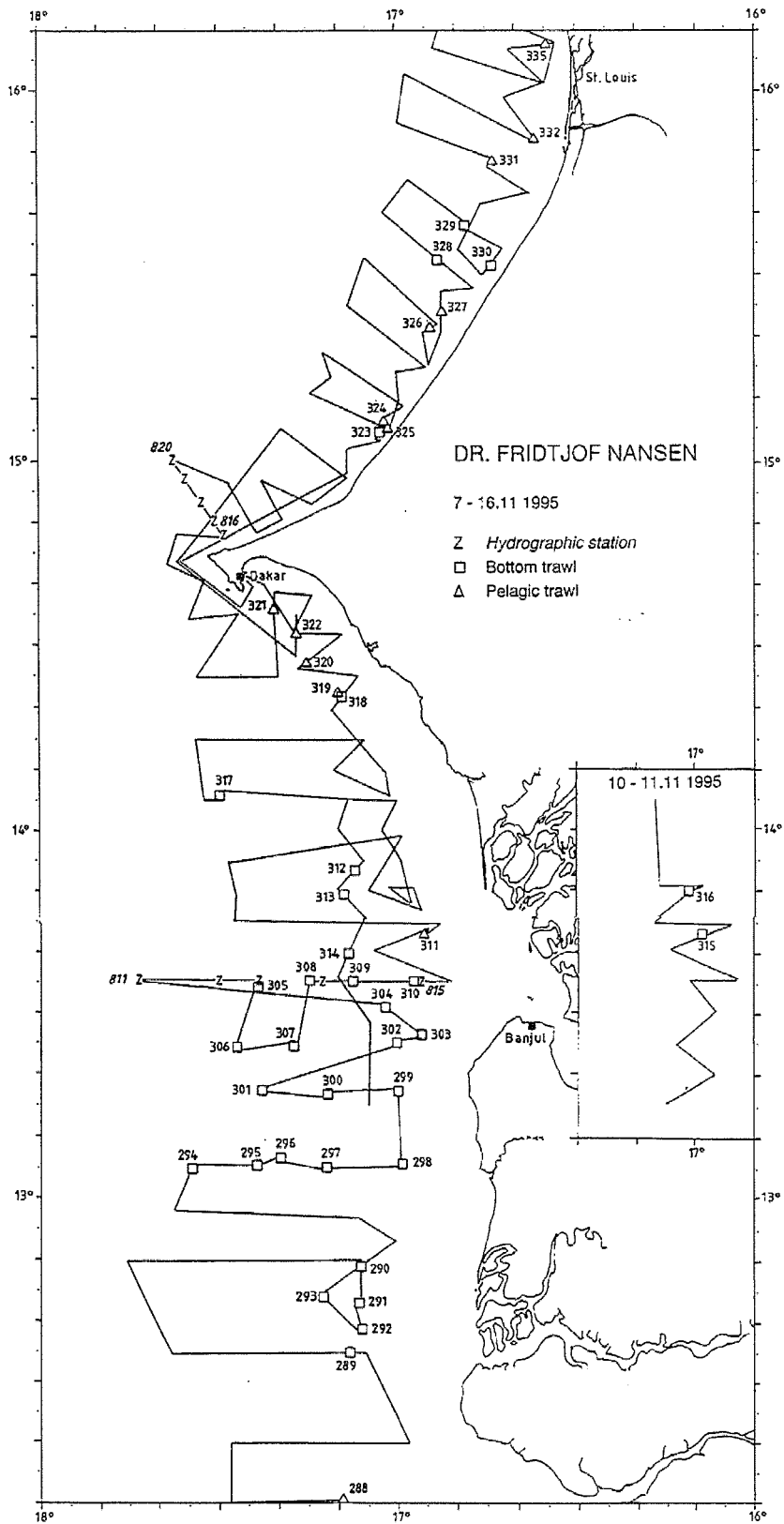


Figure 1 Course tracks with fishing and hydrographical stations

These densities are then converted from numbers to weight by applying the condition factor for the species. Absolute biomasses are obtained by multiplying the densities with the size of the distribution area, usually obtained with a digital planimeter.

The integrator outputs were split into fish groups using a combination of behaviour pattern as deduced from echo diagrams, the BEI analysis and catch composition. The following groups were used for Senegal: sardinellas, carangids and associated species which include chub mackerel, hairtails and barracudas. Catch compositions formed the basis for a further separation of biomass by species.

In the swept area trawl survey in The Gambia 30 min hauls were made at predetermined positions along the cruise track covering the various depths between about 10 m and the shelf edge at 100-200 m. For conversion of catch rates to fish densities the distance between the wings is assumed to be the width of the effective fishing area i.e. q is equal to 1. Catch rates are converted to kg per hours towing.

Annex V gives a description of the instruments and the fishing gear used.

All data of fishing stations and length sampling were made available to the participants on diskettes.

CHAPTER 2 SURVEY RESULTS

2.1 Hydrography

Figure 2 shows the distribution of temperature, salinity and oxygen in the two profiles and Figure 3 the sea surface temperature at 5 m of depth.

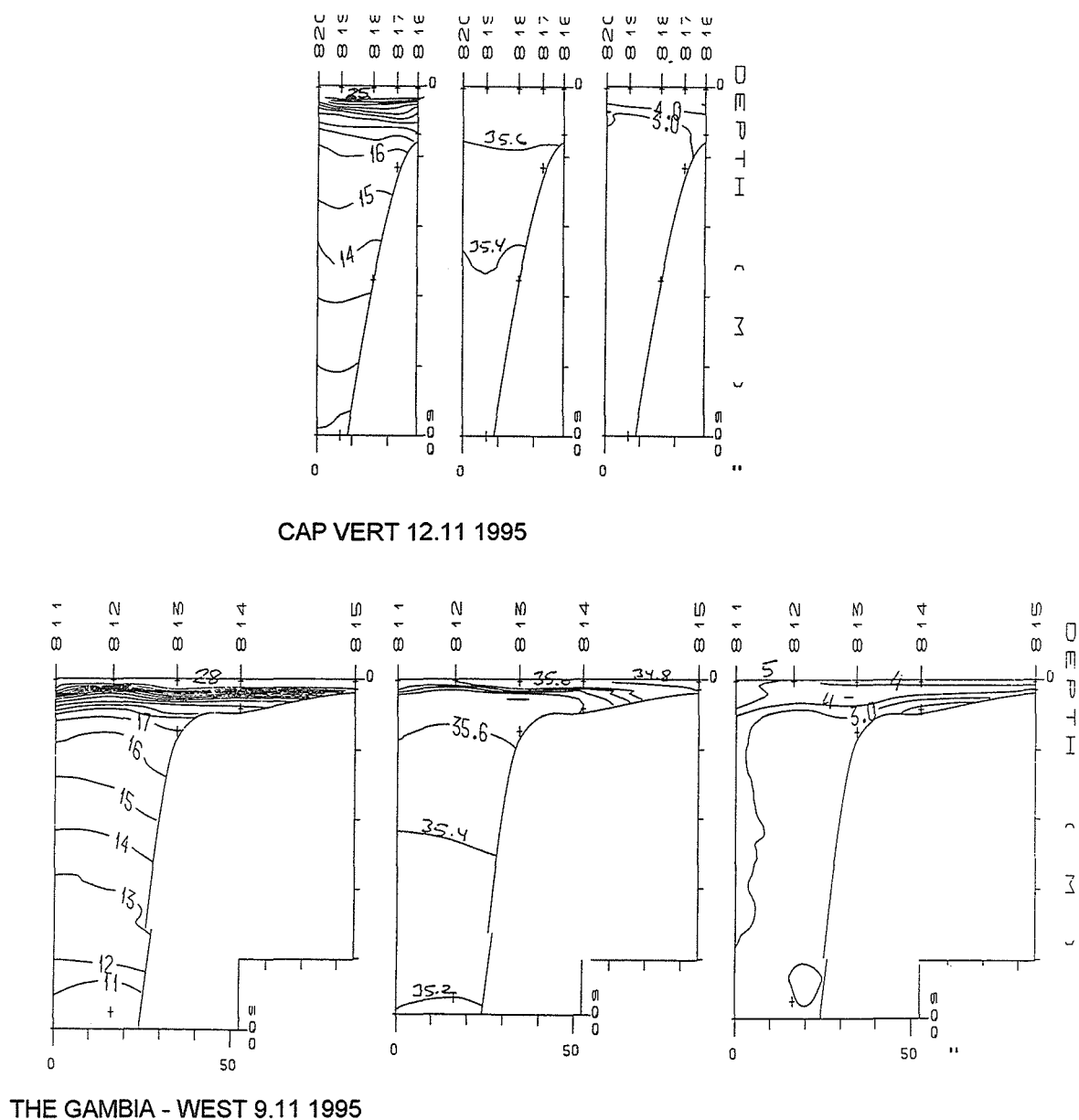


Figure 2 Hydrographic profiles with distribution of temperature, salinity and oxygen

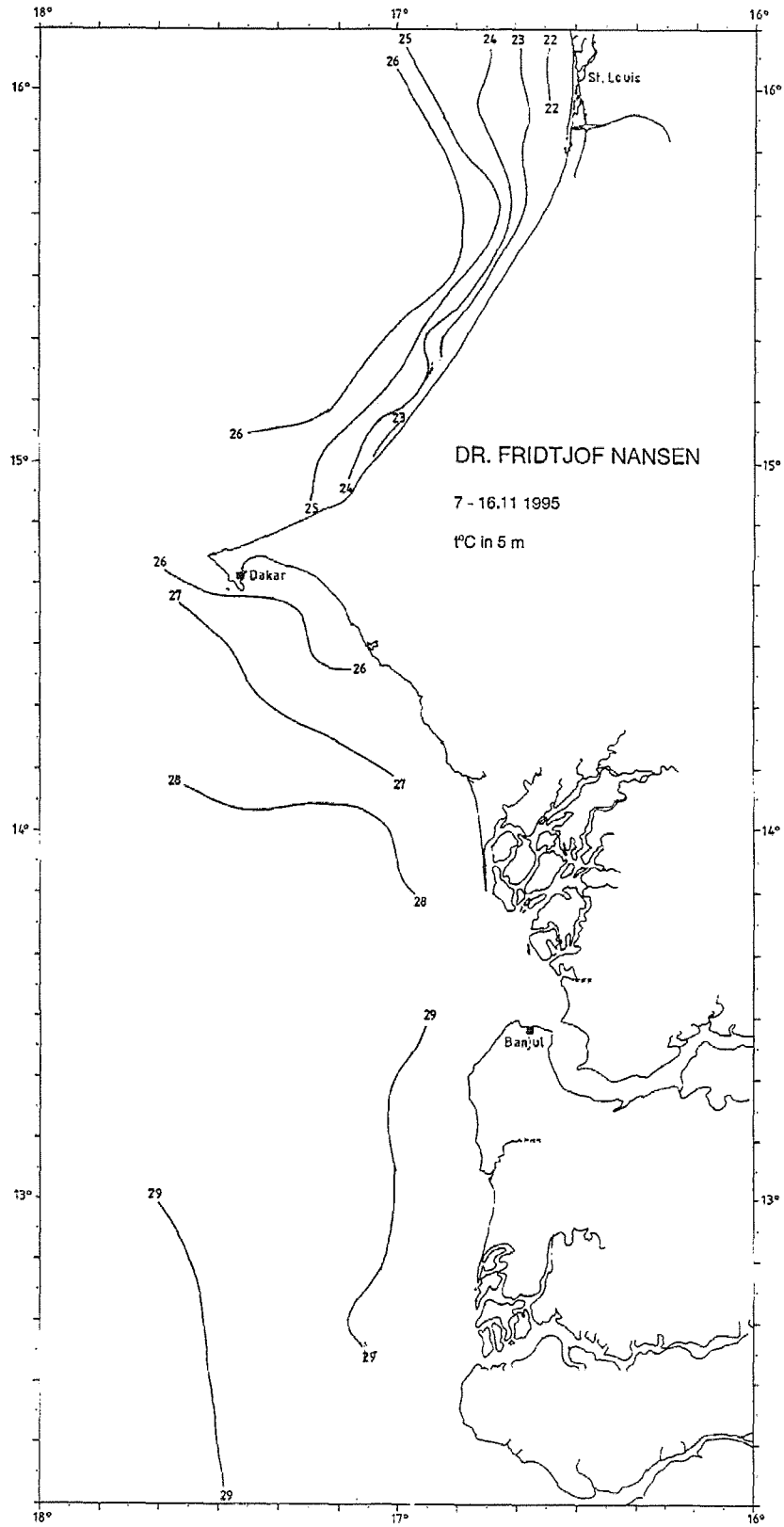


Figure 3 Sea surface temperature

The distribution of surface temperature and the profile The Gambia-West shows that there was a stable surface layer with increasing temperature, from 28°C to 29°C towards the shore over the whole shelf south of 13°50' N. Over the shelf immediately south of Dakar the surface temperature decreased towards the coast with 26°C in the surface inshore. North of Cap Vert this trend of decreasing temperature shorewards was more pronounced with a relatively sharp decline from 26°C over the outer and mid shelf to 23°C close to the shore. Near St. Louis the isolines of the cooler inshore water turned seawards indicating the approach of the front between the temperate northern waters and the tropical waters in the south. The distribution of the pelagic fish in the Dakar region and north of Cap Vert seemed in a general way to be related to the cooler inshore waters.

2.2 The Casamance shelf

Figures 4 and 5 show the distribution of the main groups of pelagic fish by contoured acoustic densities for the whole shelf of Senegal and The Gambia. (One should note that the unit used is m^2/nm^2 which is 10 times that used in previous Nansen reports. The density levels used remain the same).

Off the Casamance coast there was a school area of sardinella of medium density in shallow water, mostly inside the 20 m depth line, see Figure 4. The samples from this distribution were only *Sardinella maderensis*. The modal size was 26 cm (total length). The size composition is shown in Annex II and the stock length compositions by numbers and weight in Annex III. The biomass was estimated at 31 000 tonnes (Table 1).

Other pelagic fish was found in low densities, but over a wider area than the sardinellas, see Figure 5. The trawl samples indicated that these consisted of bumper, lookdown, barracudas and hairtails in largely equal proportions and had an estimated total biomass of 37 000 tonnes.

Table 1 Casamance. Biomass estimates of pelagic fish, 1000 tonnes.	
Flat sardinella	Carangids etc.
31	37

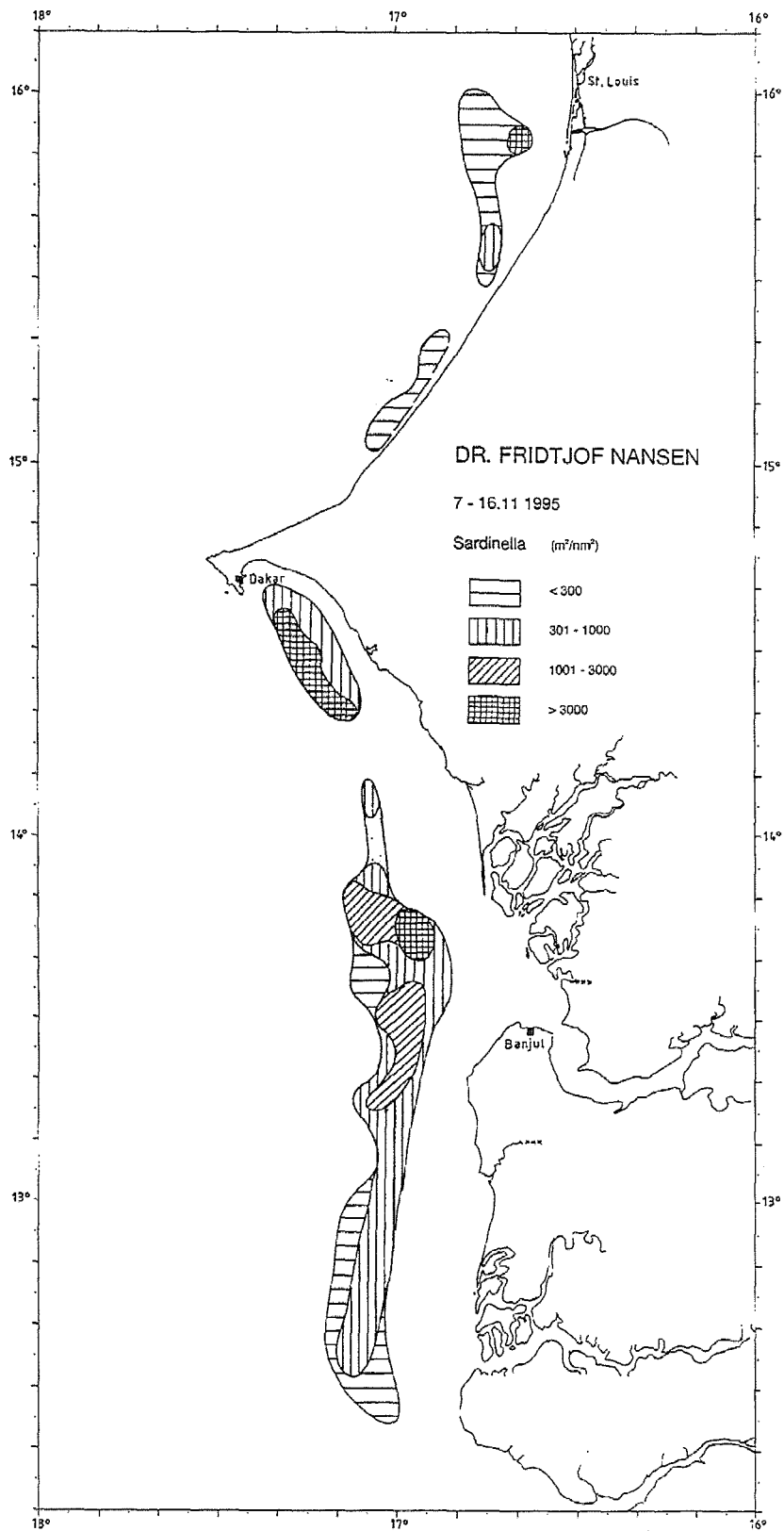


Figure 4 Distribution of sardinellas

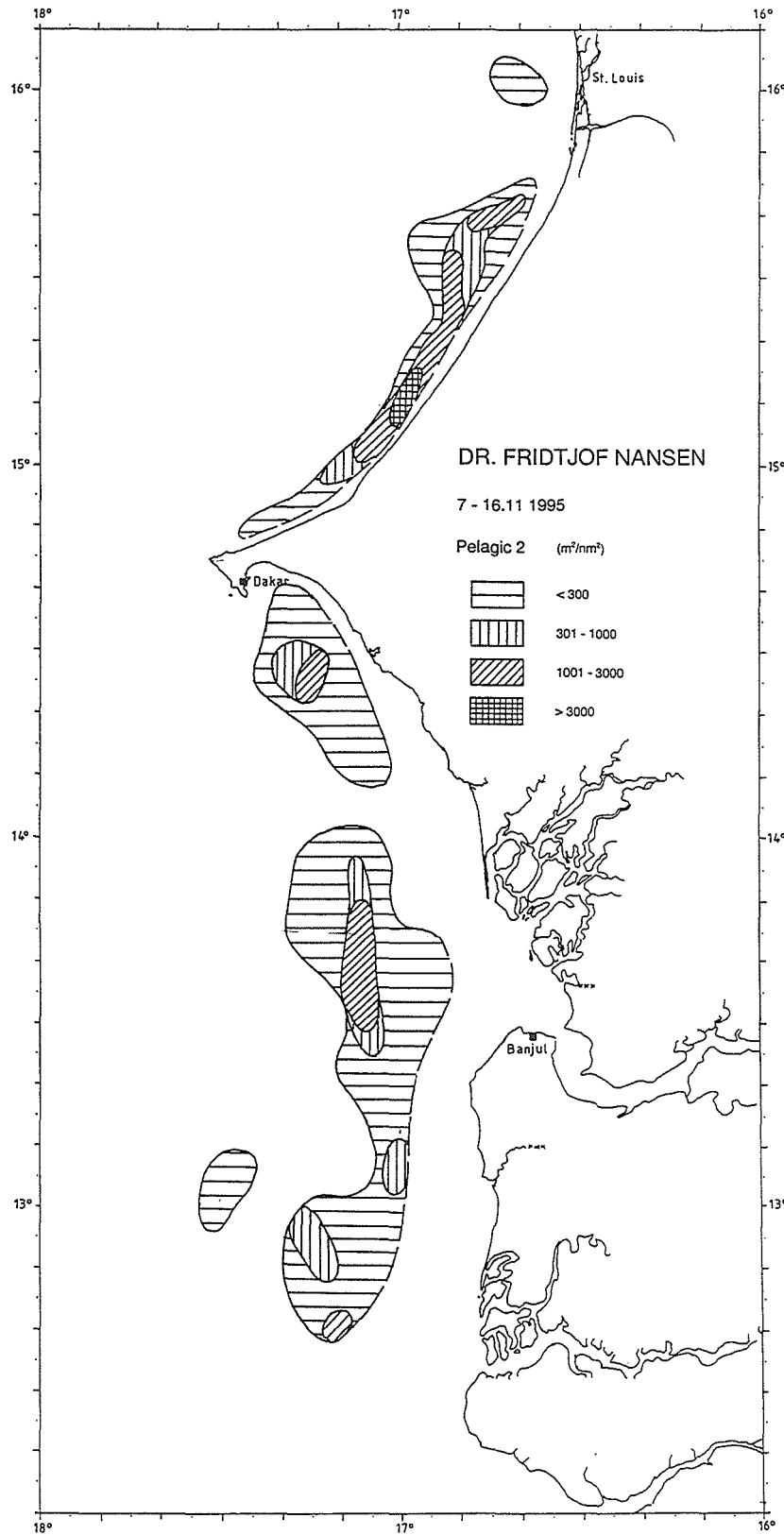


Figure 5 Distribution of carangids and associated species

2.3 The Gambia shelf

Pelagic fish

The school area of sardinella found inshore off Casamance continued northwards off The Gambia with increasing density off the Gambia River estuary and with the main part inside the 20 m depth line, see Figure 4. The samples showed a dominance of flat sardinella (*Sardinella maderensis*) with a small proportion of round sardinella (*S. aurita*). The pooled length composition of the flat sardinella had a mode of 24 cm with some juveniles, see Annex II. The stock length compositions by numbers and weight (not including the juveniles) are shown in Annex III.

Table 2 shows that the biomass estimates of the pelagic fish included 116 000 tonnes of sardinellas of which 6 000 tonnes were round sardinella mostly from the offshore parts of the school area.

Carangids and associated species were found mainly outside the sardinella school area, see Figure 5.

Catches of this group consisted mainly of false scad, bumper and lookdown with small amounts of barracudas and hairtails. The biomass was estimated at 40 000 tonnes.

Table 2 The Gambia. Biomass estimates of pelagic fish, 1000 tonnes.		
Flat sardinella	Round sardinella	Carangids etc.
110	6	40

Demersal fish

The data comprised 17 swept area hauls. Annex 1 shows the densities by species and depth ranges. Large eye grunt showed high abundance in shallow water (< 20 m). The seabreams had their highest abundance on the deeper shelf and were represented by a number of species. The squids were found over the whole shelf.

Table 3 shows the catches by main groups of commercial interest. The bogue *Boops boop* and the bigeye grunt *Brachydeuterus auritus* were common representatives

of their respective families, but are perhaps of less commercial interest than the other seabreams and grunts. Their catch rates are shown separately in Table 4.

Table 3 The Gambia Catches by main groups.

ST.NO.	DEP.	Seabreams	Grunts	Croakers	Cephalopod	Shrimp	Other
294	103	2414.0		50.0	4.6		889.6
295	55	43.8			7.8		12.2
296	49	64.2	18.6		6.6		30.2
297	36	12.3	116.1		3.2		54.5
298	17	1.3	482.7	28.4	4.7		753.8
299	17	9.0	329.8	25.9		0.7	293.2
300	40	48.5	53.2		3.4		103.5
301	66	118.8	2.8		14.0		119.9
302	20	4.8	330.3	6.2	31.7	10.6	487.4
303	18		516.8	27.2		17.5	4059.2
304	21	2.9	284.8			9.2	678.1
305	89	181.8			37.2		113.6
306	94	290.6	10.2	6.4	48.0		35.1
307	60	40.4			7.6		26.7
308	54	213.5	91.9		3.3		82.9
309	36	189.3	69.2				3012.3
310	18	1.6	377.4	5.4	10.2	0.5	115.7
MEAN		213.9	157.9	8.8	10.7	2.3	639.3

Table 4 The Gambia. Catches of Bogue and big eye grunt.

ST.NO.	DEP.	Bogue	Big eye grunt	Other
294	103	646.0		2712.2
295	55			63.9
296	49	6.2		113.4
297	36		58.9	127.1
298	17		403.7	867.1
299	17			658.6
300	40	3.4		205.2
301	66			255.5
302	20		257.6	613.4
303	18		497.6	4123.1
304	21		284.8	690.2
305	89	15.7		316.7
306	94			390.3
307	60			74.7
308	54	117.6		274.0
309	36			3270.8
310	18		377.4	133.4
MEAN		46.4	110.6	875.9

The Congo dentex *Dentex congoensis* and the red pandora *Pagellus bellottii* were the most common seabreams while the sompat grunt *Pomadasys jubelini* and the bastard grunt *Pomadasys incisus* were most abundant of this group. The cephalopods included common octopus *Octopus vulgaris* and the common cuttlefish *Sepia officinalis*. The shrimp catches most of which were from night hauls consisted of pink shrimp *Penaeus notialis* and caramote prawn *Penaeus kerathurus*.

Estimates of the standing biomass of the fish caught in the swept area hauls were as follows:

Total fish biomass	22 000 t
Of which:	
Grunts	8 700 t
Croakers	400 t
Seabreams	6 400 t
Cephalopods	400 t

Of the grunt biomass about 6 000 tonnes were bigeye grunt

A largely similar composition and amount of demersal fish was found in the 'Dr Fridtjof Nansen' survey of March 1992. A total biomass of 30 000 tonnes was then estimated, which, however, at that season included about 5 000 tonnes of *Cunene* horse mackerel.

2.4 The Gambia border - Cap Vert.

Two school areas of sardinella were found on this shelf, see Figure 4. The southernmost area formed a continuation of the inshore distribution of sardinella found off Casamance and The Gambia. By far the highest densities in this school area were found off the Saloum River estuary at depths of less than 20 m. A second school area was found south of Dakar with the highest densities between 25 and 40 m depth. Table 5 shows the biomass estimates for the two areas by species. Flat sardinella dominated in the Saloum area, round sardinella south of Dakar. The sardinella biomass was 580 000 tonnes.

Pooled length compositions of samples showed that the adults parts of the flat sardinella had a modal length of 24 cm and the round sardinella 26 cm, see Annex II. Stock size compositions by numbers and weight (not including the juveniles) are shown in Annex III.

Also the carangids and associated pelagic fish appeared to have two distributional areas, that in the south mainly outside the sardinella area, but still within about 50 m depth, see Figure 5. No pelagic fish was found on the outer shelf, where this group is often found in abundance. False scad was caught in most of the trawl samples, bumper appeared with some high catch rates and barracuda was also common. It is notable that hardly any horse mackerel *Trachurus trecae* was

caught south of Dakar. The biomass of the carangids and associated pelagic fish was estimated at about 80 000 tonnes (Table 5).

Table 5 The Gambia border to Cap Vert. Biomass estimates of pelagic fish, 1 000 tonnes			
	Flat sardinella	Round sardinella	Carangids etc.
Saloum estuary	312	76	47
S. of Dakar	19	174	32
Total	331	250	79

2.5 Cap Vert - St. Louis

On this part of the shelf sardinellas were found in an inshore patch north of Cayar and in an area towards and outside St. Louis see Figure 4. The more offshore distribution off St. Louis coincides with the offshore turn of the 23°C surface isoline. The samples showed mainly flat sardinella with two modal groups, at about 15 and 30 cm, see Annex II. The biomass of the sardinellas was estimated at 35 000 tonnes (Table 6).

Carangids and associated pelagic fish were found on the inner part of the shelf from Cayar to St. Louis see Figure 5. The catches consisted of roughly equal parts of Cunene horse mackerel, bumper and hairtails with some barracudas and a little false scad and mackerel *Scomber japonicus*. The biomass estimate was 61 000 tonnes.

Table 6 Cap Vert to St. Louis. Biomass estimates of pelagic fish, 1 000 tonnes.		
Flat sardinella	Round sardinella	Carangids etc.
32	3	61

CHAPTER 3 OVERVIEW AND SUMMARY OF RESULTS

The survey was conducted successfully in the period 7 to 16 November with a course track of about 1 900 nm and 47 fishing stations of which 17 for the swept area programme off The Gambia.

The limits of the school areas found are thought to have been well determined and the areas adequately sampled.

The hydrographical data showed a stable surface layer for the whole shelf in the south, but with declining surface temperatures towards the coast from about Dakar northwards.

Pelagic fish

Sardinellas were found in several school areas along the inshore shelf, see Figure 4. One area extended from Casamance northwards past The Gambia and into the shallow waters off the Saloum River estuary where by far the highest densities were found. This was mainly flat sardinella. A second sardinella area consisting mainly of round sardinella was located south of Dakar in slightly deeper waters. Two smaller areas with mainly flat sardinella were found inshore between Cayar and St. Louis.

The distribution of carangids and associated species formed a band along the coast mostly outside the sardinella areas, but still on the inner shelf, mainly inside about the 50 m depth line, see Figure 5. Hardly any pelagic fish were found on the outer shelf. South of Cap Vert the catches of this group consisted of false scad, bumper, barracudas and a little hairtails. Horse mackerel was hardly present. The catches north of Cap Vert were a mixture of horse mackerel, bumper and hairtails with some barracuda and a few false scad and mackerel.

An overview of the estimates of biomass of the main groups of pelagic fish based on the echo integration data is shown in Table 7. The total biomass of sardinellas was thus 760 000 tonnes and of carangids and associated species about 220 000 tonnes.

Table 7 Summary of biomass estimates of pelagic fish, Senegal and The Gambia. 1 000 tonnes.			
	Flat sardinella	Round sardinella	Carangids etc.
St. Louis-Cap Vert	32	3	61
Cap Vert-Gambia	331	250	79
Gambia	110	6	40
Casamance	31	0	37
Total	504	259	217

Table 8 lists biomass estimates of sardinellas and carangids and associated species from previous 'Dr Fridtjof Nansen' surveys of this shelf region. Large-scale lateral movements of pelagic fish between West Sahara and Guinea Bissau is well known and November is still within the season of northern distribution. Compared with the Sept/81 and NovDec/86 surveys the estimate of 760 000 tonnes of sardinellas from the current survey is high. The carangid estimate of 220 000 tonnes is roughly at the same level as that from NovDec/86.

Table 8 Biomass estimates from previous 'Dr Fridtjof Nansen' surveys of the Senegal-The Gambia shelf. 1 000 tonnes		
Survey:	Sardinellas	Carangids etc.
AprMay/81	210	570
Sept/81	360	*
FebMar/82	40	90
NovDec/86	330	170
FebMar/92	1 530	690

* Not available

Annex I The Gambia. Estimated densities from swept area hauls

SWEPT AREA ANALYSIS FROM STATION 294 TO STATION 310

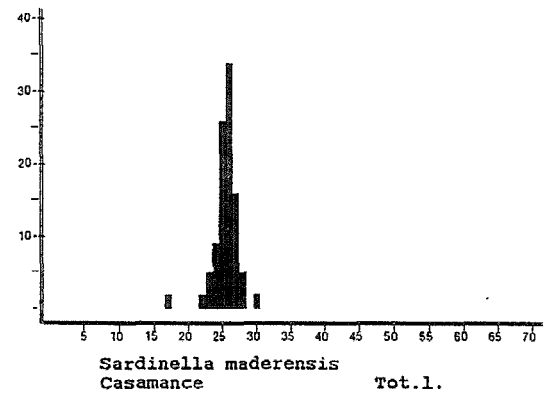
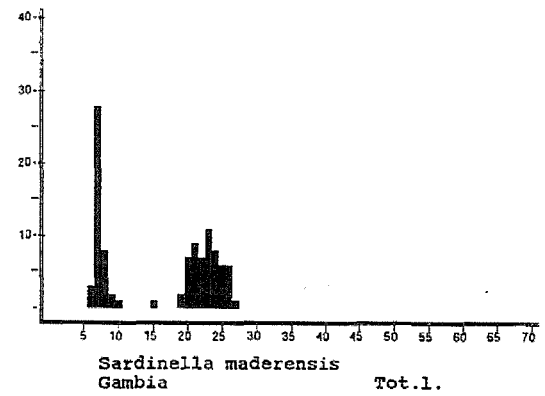
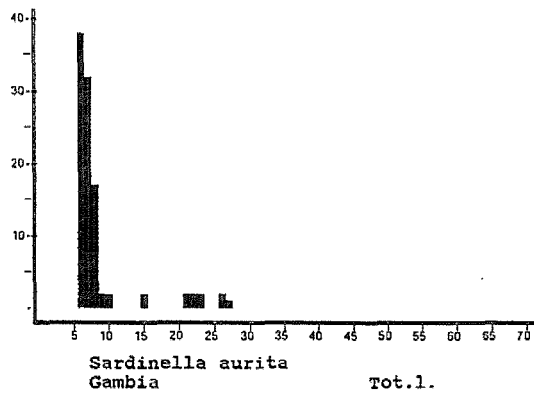
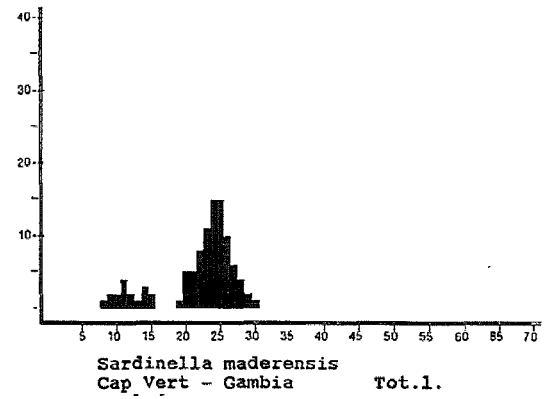
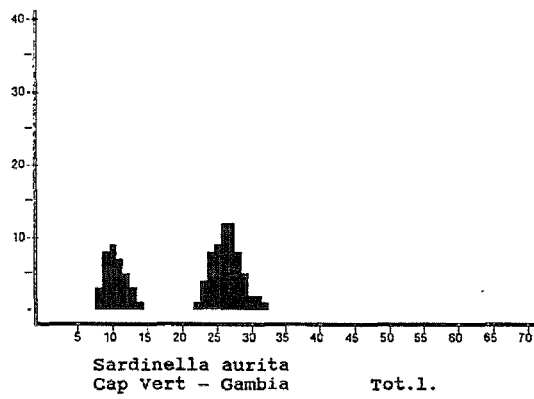
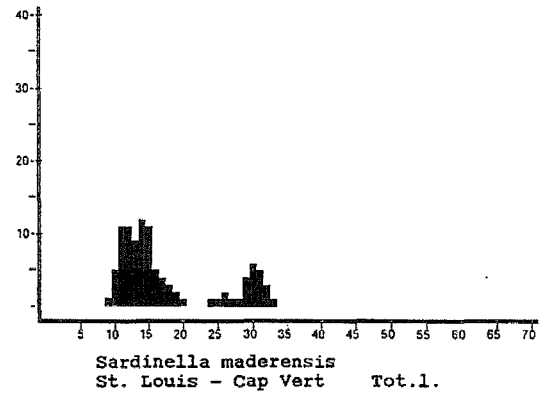
Gambia 1995 by depth ranges

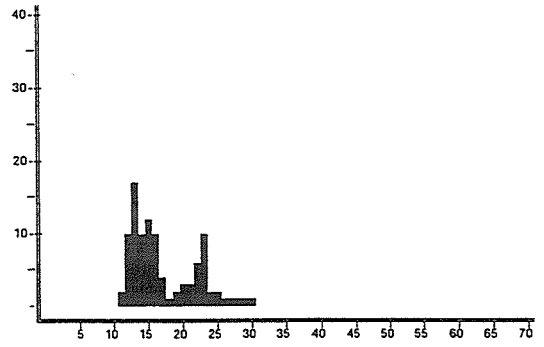
SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% inci- dence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	>0	10	30	100	300 1000			5- 20m	20- 50m	50-105m	105-105m
Dentex congouensis	1	1	1		1	24	3.97			9.65	
Brachydeuterus auritus		1	2	3		35	3.33	9.17	2.14		
Boops boops	3		1	1		29	1.54		0.06	3.70	
Spicara alta				1		6	1.33			3.24	
Galeoides decadactylus		4	2			35	0.92	2.59	0.52		
Pagellus bellottii	6	3	2			65	0.89	0.02	1.38	1.16	
Pomadasys jubelini			1			6	0.56	1.89			
Pomadasys incisus	5	3				47	0.49	0.08	1.00	0.43	
Pseudupeneus prayensis	8	1	1			59	0.39	0.02	0.98	0.23	
JUVENILE FISHES	1	1	1			18	0.33	0.35	0.78		
Pomadasys peroteti	2	2				24	0.28	0.71	0.26		
Ariomma bondi	2		1			18	0.24			0.57	
Sparus caeruleostictus *	7					41	0.22	0.06	0.39	0.23	
Sepia officinalis hierredda	8	1				53	0.20	0.10	0.04	0.39	
Sparus pagrus africanus *		2				12	0.19			0.47	
Sphyræna guachancho	3	1				24	0.18	0.60			
Eucinostomus melanopterus	3	1				24	0.16	0.09	0.09	0.26	
Priacanthus arenatus	6					35	0.14		0.32	0.12	
Umbrina canariensis	1	1				12	0.11			0.27	
Pseudolithus senegalensis	5					24	0.11	0.37			
Arius parkii	2	1				18	0.11	0.36	0.01		
Scorpaena scrofa		1				6	0.10			0.25	
Pomadasys rogeri	1	1				12	0.10	0.34			
Sparus auriga *	4					24	0.09		0.14	0.13	
Raja miraletus	2	1				18	0.09			0.22	
Octopus vulgaris	5					24	0.08	0.19		0.06	
Chelidonichthys lucerna		1				6	0.07			0.16	
Dicologlossa cuneata	7					41	0.07	0.02	0.03	0.13	
Dasyatis margarita	4					18	0.06	0.14	0.05		
Fistularia petimba	7					41	0.06		0.04	0.11	
Chelidonichthys gabonensis	5					29	0.05		0.01	0.12	
Sphoeroides spengleri	7					41	0.05		0.11	0.04	
Pteroscion peli	2					12	0.05	0.16			
Penaeus notialis, female	4					24	0.03	0.06	0.03		
Penaeus notialis, male	4					24	0.03	0.09	0.02		
Penaeus kerathurus, female	2					12		0.01			
Penaeus kerathurus, male	3					18		0.01	0.01		
Penaeus notialis	1					6					
Other fish							0.56	0.43	0.65	0.60	
Sum all species							17.18	17.86	9.06	22.54	
Sum Snappers											
Sum Groupers							0.01		0.06		
Sum Grunts							4.81	12.24	3.45	0.49	
Sum Croakers							0.28	0.56		0.27	
Sum Seabreams							6.97	0.11	2.08	15.41	
Sum Sharks									0.01		
Sum Rays							0.17	0.17	0.08	0.22	
Sum Squids							0.34	0.29	0.09	0.53	
Sum											
Sum commercial shrimps							0.06	0.17	0.06		

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

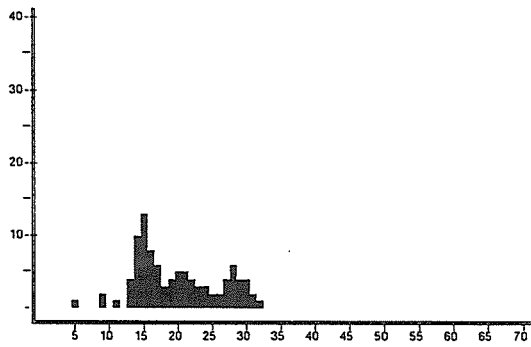
17 5 5 7

Annex II Pooled length distributions by species and regions.

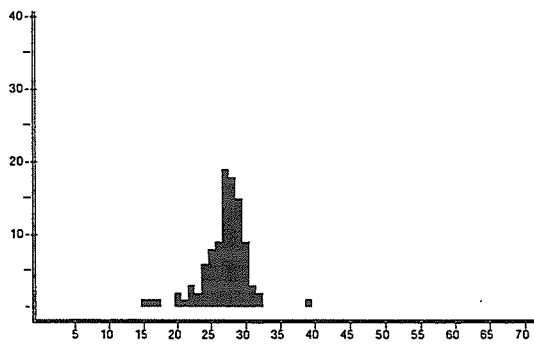




Trachurus trecae
St. Louis - Cap Vert Tot.1.



Decapterus rhonchus
Cap Vert - Gambia Tot.1.



Decapterus rhonchus
Gambia Tot.1.

Annex III Stock length distributions by numbers and weight

Sardinella aurita

Length	Numbers in millions				Weight in 1 000 tonnes			
	Cap Vert	Saloum R	Gambia	Casa- mance	Cap Vert	Saloum R	Gambia	Casa- mance
	-	-			-	-		
	Saloum R	Gambia			Saloum R	Gambia		
10								
11								
12								
13								
14								
15							0.2	
16								
17								
18								
19	5.8				0.4			
20								
21			12.9				1.0	
22	22.9	5.6	8.6		2.2	0.5	0.8	
23	51.7	36.0	8.6		5.7	3.9	0.9	
24	126.6	70.9			15.7	8.8		
25	195.7	51.8			26.9	7.1		
26	149.8	112.6	12.9		23.0	17.3	2.0	
27	207.3	76.8	4.3		36.6	13.5	0.8	
28	161.1	42.9			31.8	8.5		
29	63.3	33.9			14.2	7.6		
30	11.6	19.2			2.8	4.6		
31	22.9	13.6			6.2	3.7		
32	28.7	1.1			8.6	0.3		
Total	1047.5	464.3	47.3		174.0	75.9	5.8	

Sardinella maderensis

Length	Numbers in millions				Weight in 1 000 tonnes			
	Cap Vert	Saloum R	Gambia	Casa- mance	Cap Vert	Saloum R	Gambia	Casa- mance
	-	-			-	-		
	Saloum R	Gambia			Saloum R	Gambia		
10								
11								
12								
13								
14		25.2				0.7		
15		4.7	14.9			0.1	0.4	
16								
17		4.7		3.5		0.2		0.2
18			3.8				0.2	
19		32.9	40.8			2.0	2.5	
20		128.6	126.1			9.2	9.0	
21		186.8	159.4			14.5	12.3	
22		379.8	126.1	3.5		35.0	11.6	0.3
23		566.7	200.3	10.6		60.3	21.3	1.1
24	2.6	742.5	144.6	17.7	0.3	90.2	17.6	2.2
25	21.5	515.0	107.5	53.2	2.9	68.7	14.3	7.1
26	33.5	150.8	103.9	70.9	5.1	23.1	15.9	10.8
27	21.5	42.3	22.2	31.9	3.9	7.6	4.0	5.7
28	18.0			10.6	3.6			2.1
29	8.6				2.0			
30	4.3			3.5	1.1			0.9
31	1.7				0.4			
32								
Total	111.7	2780.0	1049.7	205.7	19.3	311.6	109.3	30.5

Annex IV Records of fishing stations

PROJECT STATION: 289
 DATE: 7/11/95 GEAR TYPE: BT No: POSITION: Lat N 1235 Long W 1709
 start stop duration
 TIME :10:51:00 11:21:00 30 (min) Purpose code: 3
 LOG :6236.00 6237.60 1.60 Area code :
 FDEPTH: 16 16 GearCond.code:
 BDEPTH: 16 16 Validity code:
 Towing dir: 90° Wire out: 100 m Speed: 32 kn*10

Sorted: 37 Kg Total catch: 138.47 CATCH/HOUR: 276.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	55.36	776	19.99	517
Sphyraena guachancho	44.20	136	15.96	
Galeoides decadactylus	34.30	300	12.39	
Brachydeuterus auritus	30.88	2088	11.15	
Ilisha africana	26.64	2682	9.62	
Trichiurus lepturus	18.36	118	6.63	
Pseudolithus senegalensis	15.20	46	5.49	
Sardinella maderensis	14.70	114	5.31	514
Arius parkii	8.20	28	2.96	
Cynoglossus canariensis	7.56	18	2.73	
Pomadasys peroteti	7.56	18	2.73	
Synaptura cadenati	4.14	36	1.49	
Pteroscion peli	3.78	586	1.36	
Selene dorsalis	2.34	36	0.84	
Penaeus notialis, female	1.18	62	0.43	516
Eucinostomus melanopterus	1.08	18	0.39	
Penaeus notialis, male	0.72	56	0.26	515
Sepia sp.	0.28	72	0.10	
Alectis alexandrinus	0.18	18	0.06	
Trachurus trecae	0.10	18	0.04	
Echeneis naucrates	0.10	10	0.04	
Total	276.86		99.97	

PROJECT STATION: 292
 DATE: 7/11/95 GEAR TYPE: BT No: POSITION: Lat N 1239 Long W 1707
 start stop duration
 TIME :21:35:00 22:05:00 30 (min) Purpose code: 3
 LOG :6334.90 6336.50 1.60 Area code :
 FDEPTH: 17 16 GearCond.code:
 BDEPTH: 17 16 Validity code:
 Towing dir: 180° Wire out: 120 m Speed: 32 kn*10

Sorted: 52 Kg Total catch: 291.77 CATCH/HOUR: 583.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	153.00	2176	26.22	
Ilisha africana	144.26	31500	24.72	
Galeoides decadactylus	122.26	19500	20.95	
Arius parkii	58.76	22	10.07	
Sphyraena guachancho	48.50	100	8.31	
Chloroscombrus chrysurus	28.76	3550	4.93	
Pseudolithus senegalensis	13.50	176	2.31	
Trichiurus lepturus	3.50	350	0.60	
Penaeus notialis	2.38		0.41	
Dasyatis margarita	2.00	26	0.34	
Pteroscion peli	2.00	550	0.34	
Lophius sp.	1.76	26	0.30	
Cynoglossus senegalensis	1.26	100	0.22	
Selene dorsalis	0.76	176	0.13	
Dicologlossa sp.	0.76	26	0.13	
Penaeus kerathurus	0.08	4	0.01	
Total	583.54		99.99	

PROJECT STATION: 290
 DATE: 7/11/95 GEAR TYPE: BT No: POSITION: Lat N 1249 Long W 1707
 start stop duration
 TIME :19:30:00 19:50:00 20 (min) Purpose code: 3
 LOG :6323.60 6324.70 1.10 Area code :
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 20 20 Validity code:
 Towing dir: 180° Wire out: 100 m Speed: 3 kn*10

Sorted: 26 Kg Total catch: 286.95 CATCH/HOUR: 860.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	361.50	28710	41.99	
Galeoides decadactylus	186.90	6600	21.71	
Eucinostomus melanopterus	81.90	1056	9.51	
Ilisha africana	45.60	9900	5.30	
Pomadasys peroteti	32.10	66	3.73	
Carcharhinus limbatus	31.80	33	3.69	
Pseudolithus senegalensis	19.20	66	2.23	
Sphyraena guachancho	16.20	66	1.88	
Chloroscombrus chrysurus	14.70	330	1.71	
Synaptura cadenati	14.19	198	1.65	
Dasyatis margarita	13.20	66	1.53	
Trichiurus lepturus	13.20	1056	1.53	
Arius parkii	11.70	66	1.36	
Sepia sp.	10.23	1056	1.19	
Decapterus rhonchus	8.10	33	0.94	
Penaeus kerathurus	0.33	15	0.04	
Total	860.85		99.99	

PROJECT STATION: 293
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1245 Long W 1713
 start stop duration
 TIME :23:35:00 00:05:00 30 (min) Purpose code: 3
 LOG :6347.50 6349.10 1.60 Area code :
 FDEPTH: 23 24 GearCond.code:
 BDEPTH: 23 24 Validity code:
 Towing dir: 30° Wire out: 150 m Speed: 3 kn*10

Sorted: 106 Kg Total catch: 716.25 CATCH/HOUR: 1432.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Arius parkii	367.40	880	25.65	
Pomadasys peroteti	275.00	660	19.20	
Brachydeuterus auritus	260.70	4726	18.20	
Galeoides decadactylus	217.80	3476	15.20	
JUVENILE FISHES	65.12		4.55	
Arius heudeloti	55.20	18	3.85	
Arius laticutatus	24.40	16	1.70	
Drepane africana	23.76	88	1.66	
Dasyatis margarita	22.00	44	1.54	
Trichiurus lepturus	18.04	66	1.26	
Pseudupeneus prayensis	16.28	308	1.14	
Lagocephalus laevigatus	15.62	22	1.09	
BATRACHOIDIDAE	11.44	44	0.80	
Epinephelus alexandrinus *	10.56	110	0.74	
Chloroscombrus chrysurus	5.94	88	0.41	
Aluterus punctata	5.50	22	0.38	
Pseudolithus senegalensis	5.20	2	0.36	
Sardinella maderensis	4.62	66	0.32	
Arius parkii	4.20	2	0.29	
Pteroscion peli	4.18	22	0.29	
Synaptura lusitanica	3.52	22	0.25	
Ilisha africana	3.52	418	0.25	
Eucinostomus melanopterus	2.64	22	0.18	
Serranus cabrilla	1.98	110	0.14	
Torpedo torpedo	1.98	22	0.14	
Rhizoprionodon acutus	1.94	2	0.14	
Scorpaena sp.	1.76	44	0.12	
Penaeus notialis	0.88	44	0.06	
Syacium micrurum	0.66	44	0.05	
Sphyraena sp.	0.44	22	0.03	
Penaeus kerathurus	0.22	22	0.02	
Total	1432.50		100.01	

PROJECT STATION: 291
 DATE: 7/11/95 GEAR TYPE: BT No: POSITION: Lat N 1230 Long W 1707
 start stop duration
 TIME :20:30:00 21:00:00 30 (min) Purpose code: 3
 LOG :6329.30 6331.80 2.50 Area code :
 FDEPTH: 20 19 GearCond.code:
 BDEPTH: 20 19 Validity code:
 Towing dir: 220° Wire out: 100 m Speed: 32 kn*10

Sorted: 36 Kg Total catch: 222.29 CATCH/HOUR: 444.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	117.92	9100	26.52	
Brachydeuterus auritus	84.50	9490	19.01	
Arius parkii	62.36	40	14.03	
Ilisha africana	52.04	15860	11.93	
Torpedo torpedo	36.28	40	8.16	
Pseudolithus senegalensis	20.16	78	4.53	
Dasyatis margarita	12.88	52	2.90	
Eucinostomus melanopterus	12.10	144	2.72	
Sphyraena guachancho	9.62	40	2.16	
Penaeus notialis, female	9.10	436	2.05	519
Penaeus notialis, male	8.50	668	1.91	518
Scomberomorus tritor	6.90	26	1.55	
Synaptura cadenati	3.00	26	0.67	
Chloroscombrus chrysurus	1.96	598	0.44	
Penaeus kerathurus, female	1.70	150	0.38	521
Selene dorsalis	1.56	234	0.35	
Lophius sp.	1.30	26	0.29	
Penaeus kerathurus, male	1.04	124	0.23	520
Pteroscion peli	0.66	52	0.15	
Total	444.58		99.98	

PROJECT STATION: 294
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1304 Long W 1735
 start stop duration
 TIME :07:15:00 07:45:00 30 (min) Purpose code: 3
 LOG :6410.80 6412.30 1.50 Area code :
 FDEPTH: 105 100 GearCond.code:
 BDEPTH: 105 100 Validity code:
 Towing dir: 33° Wire out: 350 m Speed: 3 kn*10

Sorted: 85 Kg Total catch: 1679.10 CATCH/HOUR: 3358.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congongensis	1732.00	13460	51.58	522
Spicara alta	680.00	8574	20.25	
Boops boops	646.00	11106	19.24	
Ariomma bondi	100.00	2080	2.98	
Scorpaena scrofa	52.00	120	1.55	
Umbrina canariensis	50.00	120	1.49	
Sparus pagrus africanus *	36.00	240	1.07	
Raja miraletus	32.00	40	0.95	
Priacanthus arenatus	24.00	80	0.71	
Sepia officinalis hierredda	4.60	2	0.14	
Trachurus trecae	1.60	40	0.05	
Total	3358.20		100.01	

PROJECT STATION: 295
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1305
 start stop duration Long W 1724
 TIME :09:04:00 09:12:00 8 (min) Purpose code: 3
 LOG :6422.50 6422.90 0.40 Area code :
 FDEPTH: 55 55 GearCond.code:
 RDEPTH: 55 55 Validity code:
 Towing dir: 60° Wire out: 200 m Speed: 3 kn*10
 Sorted: 9 Kg Total catch: 8.51 CATCH/HOUR: 63.83

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	43.80	593	68.62	
Chelidonichthys gabonensis	3.60	60	5.64	
Sphoeroides spengleri	3.30	75	5.17	
Loligo vulgaris	3.08	15	4.83	
Alloteuthis africana	3.00	2370	4.70	
Bothus podas africanus	2.33	53	3.65	
Fistularia petimba	1.80	15	2.82	
Octopus vulgaris	1.50	8	2.35	
Trachinus draco	0.68	8	1.07	
Pseudupeneus prayensis	0.30	8	0.47	
Illex coindetii	0.23	8	0.36	
Dicologlossa hexophthalma	0.23	8	0.36	
Total	63.85		100.04	

PROJECT STATION: 298
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1306
 start stop duration Long W 1659
 TIME :13:45:00 14:15:00 30 (min) Purpose code: 3
 LOG :6454.30 6456.20 1.70 Area code :
 FDEPTH: 17 17 GearCond.code:
 RDEPTH: 17 17 Validity code:
 Towing dir: 355° Wire out: 100 m Speed: 3 kn*10
 Sorted: 89 Kg Total catch: 635.41 CATCH/HOUR: 1270.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	449.90	8998	35.40	534
Brachydeuterus auritus	403.70	3192	31.77	
Galeoides decadactylus	88.00	1320	6.92	
Pomadasys peroteti	73.92	242	5.82	535
Sphyaena guachancho	58.00	150	4.55	533
Pseudotolithus senegalensis	28.38	132	2.23	
Sardinella maderensis	25.52	1980	2.01	537
Alectis alexandrinus	24.20	198	1.90	
Arius parkii	23.10	154	1.82	
Dasyatis margarita	22.00	132	1.73	
JUVENILE FISHES	20.46		1.61	
Decapterus rhonchus	12.98	440	1.02	
Trichiurus lepturus	6.60	22	0.52	
Ilisha africana	5.50	748	0.43	
Drepane africana	5.06	22	0.40	
Pomadasys incisus	5.06	22	0.40	
Sepia officinalis hierredda	4.68	6	0.37	
Scomberomorus tritor	3.72	4	0.29	
Sardinella aurita	3.08	198	0.24	536
Echeneis naucrates	1.54	22	0.12	
Rachycentron canadum	1.46	2	0.11	
Pagellus bellottii	1.32	44	0.10	
Selene dorsalis	1.10	44	0.09	
Scorpaena sp.	0.88	22	0.07	
Trachinocephalus myops	0.66	22	0.05	
Total	1270.82		99.98	

PROJECT STATION: 296
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1308
 start stop duration Long W 1719
 TIME :10:07:00 10:37:00 30 (min) Purpose code: 3
 LOG :6429.30 6431.00 1.70 Area code :
 FDEPTH: 49 48 GearCond.code:
 RDEPTH: 49 48 Validity code:
 Towing dir: 210° Wire out: 150 m Speed: 34 kn*10
 Sorted: 31 Kg Total catch: 59.80 CATCH/HOUR: 119.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	42.00	256	35.12	527
Pomadasys incisus	18.64	100	15.59	525
Pseudupeneus prayensis	12.24	108	10.23	526
Sparus caeruleostictus *	8.76	24	7.32	523
Dentex gibbosus	7.16	16	5.99	524
Alloteuthis africana	6.56	6614	5.48	
Boops boops	6.24	556	5.22	
Fistularia petimba	5.44	40	4.55	
Priacanthus arenatus	3.60	8	3.01	
Caranx crysos	3.36	2	2.81	
Alectis alexandrinus	2.48	2	2.07	
Dactylopterus volitans	1.36	4	1.14	
Chaetodon boefferi	0.64	4	0.54	
Decapterus punctatus	0.40	20	0.33	
Bothus podas africanus	0.32	4	0.27	
Sphoeroides spengleri	0.28	4	0.23	
Sardinella aurita	0.12	4	0.10	
Total	119.60		100.00	

PROJECT STATION: 299
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1316
 start stop duration Long W 1700
 TIME :15:22:00 15:52:00 30 (min) Purpose code: 3
 LOG :6465.90 6467.50 1.60 Area code :
 FDEPTH: 17 17 GearCond.code:
 RDEPTH: 17 17 Validity code:
 Towing dir: * Wire out: 110 m Speed: 30 Kn*10
 Sorted: 98 Kg Total catch: 329.32 CATCH/HOUR: 658.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasys jubelini	301.94	4754	45.84	
Chloroscombrus chrysurus	62.26	2086	9.45	542
Galeoides decadactylus	52.82	1774	8.02	
JUVENILE FISHES	36.02	10	5.47	
Arius parkii	35.00	130	5.31	
Pomadasys peroteti	27.10	118	4.11	539
Decapterus rhonchus	20.62	336	3.13	
Arius heudeloti	12.00	8	1.82	
Pseudotolithus senegalensis	11.30	8	1.72	
Sphyaena guachancho	10.70	24	1.62	538
Trichiurus lepturus	10.46	18	1.59	
Sparus caeruleostictus *	8.96	18	1.35	
Pseudotolithus senegalensis	8.86	28	1.35	
Bucipostomus melanopterus	7.94	74	1.21	
Arius latiscutatus	7.90	6	1.20	
Torpedo marmorata	5.42	10	0.82	
Alectis alexandrinus	5.04	46	0.77	
Sardinella maderensis	4.30	720	0.65	541
Argyrosomus regius	4.20	10	0.64	
Albula vulpes	4.10	10	0.62	
Pseudupeneus prayensis	2.80	28	0.43	
Ilisha africana	2.70	46	0.41	540
Dicologlossa cuneata	2.62	10	0.40	
Selene dorsalis	2.52	28	0.38	
Dasyatis margarita	1.96	10	0.30	
Dactylopterus volitans	1.96	10	0.30	
Ilisha africana	1.78	158	0.27	
Mugil cephalus	1.58	10	0.24	
Pteroscion peli	1.58	10	0.24	
Pomadasys rogeri	0.80	2	0.12	
Scorpaena sp.	0.66	18	0.10	
Penaeus notialis, female	0.46	18	0.07	
Penaeus notialis, male	0.18	18	0.02	
Penaeus kerathurus, male	0.10	10	0.02	
Total	658.64		100.01	

PROJECT STATION: 297
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION: Lat N 1305
 start stop duration Long W 1713
 TIME :11:44:00 12:17:00 33 (min) Purpose code: 3
 LOG :6439.20 6441.00 1.80 Area code :
 FDEPTH: 37 35 GearCond.code:
 RDEPTH: 37 35 Validity code:
 Towing dir: 90° Wire out: 150 m Speed: 3 kn*10
 Sorted: 74 Kg Total catch: 102.33 CATCH/HOUR: 186.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	58.91	1411	31.66	
Pomadasys peroteti	41.91	71	22.53	528
Pomadasys incisus	14.09	73	7.57	532
Alectis alexandrinus	11.36	5	6.12	
Sparus caeruleostictus *	10.36	33	5.57	531
Scomberomorus tritor	10.09	11	5.42	
Pseudupeneus prayensis	7.27	49	3.91	529
Sardinella aurita	5.45	713	2.93	
Sepia officinalis hierredda	3.18	4	1.71	
Sphoeroides spengleri	2.91	65	1.56	
Priacanthus arenatus	2.45	9	1.32	
CONGRIDAE	2.27	7	1.22	
Pagellus bellottii	1.91	15	1.03	530
Rhinobatos rhinobatos	1.73	2	0.93	
Arius parkii	1.45	4	0.78	
Syacium micrurum	1.36	9	0.73	
Epinephelus aeneus	1.27	2	0.68	
Parapristipoma octolineatum	1.18	5	0.63	
Trachinocephalus myops	1.18	11	0.63	
Rhizoprionodon acutus	1.09	2	0.59	
Trachurus, Juveniles	0.73	189	0.39	
Fistularia petimba	0.73	7	0.39	
Torpedo torpedo	0.73	2	0.39	
Dicologlossa cuneata	0.73	2	0.39	
Trachinus draco	0.64	7	0.34	
Chaetodon boefferi	0.55	4	0.30	
Decapterus punctatus	0.36	29	0.19	
Trichiurus lepturus	0.15	7	0.08	
Total	186.04		99.98	

PROJECT STATION: 300
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION:Lat N 1317 Long W 1711
 start stop duration
 TIME :17:10:00 17:40:00 30 (min) Purpose code: 3
 LOG :6480.20 6481.60 1.40 Area code :
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 40 40 Validity code:
 Towing dir: 270° Wire out: 150 m Speed: 30 kn*10
 Sorted: 59 Kg Total catch: 104.30 CATCH/HOUR: 208.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasys incisus	47.96	78	22.99	547
Pseudupeneus prayensis	27.20	394	13.04	543
Priacanthus arenatus	26.26	130	12.59	
Pagellus bellottii	22.12	120	10.60	545
Decapterus rhonchus	19.68	150	9.43	544
Sparus caeruleostictus *	12.14	32	5.82	546
Sphoeroides spengleri	7.70	238	3.69	
Dentex canariensis	6.02	52	2.89	548
Plectorhinchus mediterraneus	5.26	10	2.52	
Sparus auriga *	4.80	8	2.30	
Boops boops	3.44	276	1.65	
Zanobatus shoeneleini	3.36	4	1.61	
Chloroscombrus chrysurus	3.00	24	1.44	
Sepia officinalis hierredda	2.40	4	1.15	
Ballistes punctatus	2.36	4	1.13	
Chaetodon hoefleri	1.82	18	0.87	
Decapterus punctatus	1.78	98	0.85	
Alectis alexandrinus	1.78	4	0.85	
Sardinella maderensis	1.52	8	0.73	
Zeus faber	1.28	8	0.61	
Alloteuthis africana	1.00	0.48	0.48	
Serranus scriba	0.92	8	0.44	
Acanthurus monroviae	0.92	4	0.44	
Chelidonichthys gabonensis	0.84	10	0.40	
Syacium micrurum	0.74	14	0.35	
Epinephelus goreensis	0.74	8	0.35	
Fistularia petimba	0.64	10	0.31	
Bothus podas africanus	0.52	18	0.25	
Trachinocephalus myops	0.40	4	0.19	
Total	208.60		99.97	

PROJECT STATION: 301
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION:Lat N 1844 Long W 1722
 start stop duration
 TIME :18:44:00 19:14:00 30 (min) Purpose code: 3
 LOG :6491.50 6493.10 1.60 Area code :
 FDEPTH: 62 69 GearCond.code:
 BDEPTH: 62 69 Validity code:
 Towing dir: 270° Wire out: 200 m Speed: 32 kn*10
 Sorted: 31 Kg Total catch: 127.76 CATCH/HOUR: 255.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	118.80		46.49	519
Dicologlossa cuneata	25.52	360	9.99	
Ariomma bondi	21.12	288	8.27	
Fistularia petimba	12.24	32	4.79	
Chelidonichthys gabonensis	10.64	440	4.16	
Dactylopterus volitans	7.76	32	3.04	
Chlorophthalmus atlanticus	7.12	1136	2.79	
Decapterus rhonchus	6.08	112	2.38	
Sphoeroides spengleri	5.92	152	2.32	
Raja miraletus	5.44	8	2.13	
Bothus podas africanus	5.28	8	2.07	
Alloteuthis africana	5.12	2400	2.00	
Sepia officinalis hierredda	4.24	104	1.66	
Syacium micrurum	3.60	176	1.41	
Octopus vulgaris	3.28	8	1.28	
Pomadasys incisus	2.80	16	1.10	
Arnoglossus imperialis	2.24	280	0.88	
Priacanthus arenatus	1.92	8	0.75	
Pseudupeneus prayensis	1.84	24	0.72	
Scorpaena stephanica	1.44	24	0.56	
Illex coindetii	1.36	16	0.53	
Trachinus draco	1.36	48	0.53	
Microchirus boscanion	0.24	16	0.09	
Sardinella maderensis	0.16	8	0.06	
Total	255.52		100.00	

PROJECT STATION: 302
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION:Lat N 1324 Long W 1701
 start stop duration
 TIME :21:42:00 22:12:00 30 (min) Purpose code: 3
 LOG :6517.40 6519.10 1.70 Area code :
 FDEPTH: 22 18 GearCond.code:
 BDEPTH: 22 18 Validity code:
 Towing dir: 80° Wire out: 100 m Speed: 34 kn*10
 Sorted: 33 Kg Total catch: 435.48 CATCH/HOUR: 870.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	276.80	4192	31.78	521
Brachydeuterus auritus	257.60	17280	29.58	
Galeoides decadactylus	132.16	2880	15.17	526
Pomadasys rogeri	57.36	192	6.59	
Decapterus rhonchus	35.52	800	4.08	
Octopus vulgaris	31.68	608	3.64	
Sphyræna guachancho	11.52	32	1.32	
Sardinella aurita	9.60	1024	1.10	520
Plectorhinchus mediterraneus	7.68	32	0.88	
Pomadasys incisus	7.68	32	0.88	
Eucinostomus melanopterus	7.36	96	0.85	
Chloroscombrus chrysurus	7.04	352	0.81	
Pseudotolithus senegalensis	6.24	32	0.72	
Dentex canariensis	4.80	32	0.55	
Penaeus notialis, female	4.20	184	0.48	523
Penaeus notialis, male	4.04	296	0.46	522
BATRACHODIDAE	3.84	32	0.44	
Selene dorsalis	2.88	64	0.33	
Penaeus kerathurus, female	1.60	108	0.18	525
Penaeus kerathurus, male	0.80	80	0.09	524
Ilisha africana	0.64	32	0.07	
Total	871.04		100.00	

PROJECT STATION: 303
 DATE: 8/11/95 GEAR TYPE: BT No: POSITION:Lat N 1326 Long W 1655
 start stop duration
 TIME :23:07:00 23:22:00 15 (min) Purpose code: 3
 LOG :6524.70 6525.60 0.90 Area code :
 FDEPTH: 16 19 GearCond.code:
 BDEPTH: 16 19 Validity code:
 Towing dir: 300° Wire out: 100 m Speed: 36 kn*10
 Sorted: 33 Kg Total catch: 1155.17 CATCH/HOUR: 4620.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	3824.00	36084	82.76	528
Brachydeuterus auritus	497.60	77484	10.77	
Sardinella aurita	112.00	800	2.42	527
Galeoides decadactylus	108.80	3200	2.35	
Pteroscion peli	27.20	320	0.59	
Pomadasys peroteti	19.20	160	0.42	
Ilisha africana	14.40	2560	0.31	
Penaeus notialis, male	10.92	1436	0.24	529
Penaeus notialis, female	6.56	780	0.14	530
Total	4620.68		100.00	

PROJECT STATION: 304
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION:Lat N 1330 Long W 1702
 start stop duration
 TIME :00:32:00 01:02:00 30 (min) Purpose code: 3
 LOG :6532.20 6533.80 1.60 Area code :
 FDEPTH: 21 21 GearCond.code:
 BDEPTH: 21 21 Validity code:
 Towing dir: 277° Wire out: 120 m Speed: 30 kn*10
 Sorted: 35 Kg Total catch: 487.50 CATCH/HOUR: 975.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	353.60	3552	36.27	532
Brachydeuterus auritus	284.80	4914	29.21	
JUVENILE FISHES	124.80		12.80	
Galeoides decadactylus	83.20	1856	8.53	
Chloroscombrus chrysurus	36.80	640	3.77	
Synaptura lusitanica	15.04	64	1.54	
Eucinostomus melanopterus	14.40	224	1.48	
Trichurus lepturus	10.88	32	1.12	
Sardinella aurita	10.24	64	1.05	531
Dasyatis margarita	7.68	32	0.79	
Conger conger	6.72	64	0.69	
Pseudupeneus prayensis	6.72	192	0.69	
Penaeus notialis, female	4.16	226	0.43	534
Dicologlossa cuneata	3.84	64	0.39	
Penaeus notialis, male	3.62	344	0.37	533
Syacium micrurum	3.20	64	0.33	
Sparus auriga *	2.88	160	0.30	
Epinephelus goreensis	0.96	32	0.10	
Penaeus kerathurus, male	0.84	98	0.09	535
Penaeus kerathurus, female	0.62	76	0.06	536
Total	975.00		100.01	

PROJECT STATION: 305
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION:Lat N 1335 Long W 1733
 start stop duration
 TIME :08:31:00 08:49:00 18 (min) Purpose code: 3
 LOG :6599.00 6600.00 1.00 Area code :
 FDEPTH: 89 88 GearCond.code:
 BDEPTH: 89 88 Validity code:
 Towing dir: 200° Wire out: 300 m Speed: 3 kn*10
 Sorted: 35 Kg Total catch: 99.76 CATCH/HOUR: 332.53

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sparus pagrus africanus *	70.00	10	21.05	
Dentex congoensis	64.67	1903	19.45	
Eucinostomus melanopterus	60.30	10267	18.13	
Chelidonichthys lucerna	37.33	103	11.23	
Sepia officinalis hierredda	31.83	83	9.57	
Pagellus bellottii	31.47	643	9.46	537
Boops boops	15.67	1400	4.71	
Sardinella maderensis	9.07	83	2.73	
Octopus vulgaris	4.20	10	1.26	
Arnoglossus sp.	3.27	93	0.98	
Trachurus trecae	1.40	10	0.42	
Illex coindetii	1.13	20	0.34	
Dicologlossa cuneata	0.83	10	0.25	
Zeus faber	0.60	10	0.18	
Sphoeroides spengleri	0.40	10	0.12	
Arnoglossus imperialis	0.37	27	0.11	
Total	332.54		99.99	

PROJECT STATION: 306
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION:Lat N 1325 Long W 1727
 start stop duration
 TIME :10:12:00 10:42:00 30 (min) Purpose code: 3
 LOG :6610.60 6612.30 1.70 Area code :
 FDEPTH: 94 93 GearCond.code:
 BDEPTH: 94 93 Validity code:
 Towing dir: 170° Wire out: 300 m Speed: 34 kn*10
 Sorted: 48 Kg Total catch: 195.15 CATCH/HOUR: 390.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	257.20	5994	65.90	538
Sepia officinalis hierredda	44.80	22	11.48	
Sparus caeruleostictus *	33.40	80	8.56	539
Lepidotrigla cadmani	12.90	200	3.31	
Parapristipoma octolineatum	10.20	14	2.61	
Raja miraletus	10.00	14	2.56	
Lepidotrigla carolae	7.50	348	1.92	
Umbra canariensis	6.40	14	1.64	
Todaropsis eblanae	3.20	68	0.82	
Dicologlossa cuneata	1.50	26	0.38	
Syacium micrurum	1.40	14	0.36	
Zeus faber	1.10	14	0.28	
Ariomma bondi	0.70	14	0.18	
Total	390.30		100.00	

PROJECT STATION: 307
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION: Lat N 1325 Long W 1718
 start stop duration
 TIME :12:00:00 12:30:00 30 (min) Purpose code: 3
 LOG :6623.00 6624.90 1.90 Area code :
 FDEPTH: 60 59 GearCond.code:
 BDEPTH: 60 59 Validity code:
 Towing dir: 165° Wire out: 200 m Speed: 3 kn*10
 Sorted: 37 Kg Total catch: 37.37 CATCH/HOUR: 74.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	39.80	778	53.25	540
Sepia officinalis hierredda	7.34	50	9.82	
Chelidonichthys gabonensis	6.46	112	8.64	
Fistularia petimba	5.16	30	6.90	
Alectis alexandrinus	5.10	2	6.82	
Miscellaneous fishes	2.20	52	2.94	
Syacium micrurum	2.18	74	2.92	
Pseudupeneus prayensis	1.34	34	1.79	
Dactylopterus volitans	1.18	4	1.58	
Scorpaena stephanica	1.06	16	1.42	
Dicologlossa cuneata	0.68	10	0.91	
Dentex gibbosus	0.62	12	0.83	541
Dasyatis margarita	0.52	2	0.70	
Arnoglossus imperialis	0.40	64	0.54	
Ilex coindetii	0.24	52	0.32	
Grammelites gruvelli	0.20	6	0.27	
Zeus faber	0.16	2	0.21	
Trachurus trecae	0.10	2	0.13	
Total	74.74		99.99	

PROJECT STATION: 310
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION: Lat N 1335 Long W 1658
 start stop duration
 TIME :17:03:00 17:33:00 30 (min) Purpose code: 3
 LOG :6657.10 6658.60 1.50 Area code :
 FDEPTH: 17 18 GearCond.code:
 BDEPTH: 17 18 Validity code:
 Towing dir: 90° Wire out: 120 m Speed: 3 kn*10
 Sorted: 42 Kg Total catch: 255.41 CATCH/HOUR: 510.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	377.40	113220	73.88	
Galeoides decadactylus	54.40	5172	10.65	
Ilisha africana	23.12	2424	4.53	
Sphyraena guachancho	18.10	46	3.54	554
Sepia officinalis hierredda	10.20	18	2.00	
Chloroscombrus chrysurus	5.44	52	1.06	
Pseudotolithus senegalensis	5.40	12	1.06	
Synaptura lusitanica	4.30	18	0.84	
Sardinella aurita	4.26	1258	0.83	555
Decapterus rhonchus	1.60	4	0.31	
Decapterus rhonchus	1.54	86	0.30	
Caranx crysos	1.20	2	0.23	
Selene dorsalis	1.02	18	0.20	
Pagellus bellottii	1.02	120	0.20	
Sardinella maderensis	0.70	120	0.14	556
Iithognathus mormyrus	0.60	2	0.12	
Penaeus notialis	0.52	68	0.10	
Total	510.82		99.99	

PROJECT STATION: 311
 DATE: 9/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 1343 Long W 1656
 start stop duration
 TIME :21:17:00 21:23:00 5 (min) Purpose code: 1
 LOG :6692.10 6692.50 0.30 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 19 19 Validity code:
 Towing dir: 251° Wire out: 120 m Speed: 30 kn*10
 Sorted: 60 Kg Total catch: 1804.20 CATCH/HOUR: 21650.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	19440.00	168480	89.79	558
Sardinella aurita	1029.60	6120	4.76	557
Brachydeuterus auritus	885.60	18408	4.09	
Decapterus rhonchus	169.20	1080	0.78	
Sphyraena guachancho	126.00	360	0.58	
Total	21650.40		100.00	

PROJECT STATION: 308
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION: Lat N 1334 Long W 1715
 start stop duration
 TIME :13:50:00 14:20:00 30 (min) Purpose code: 3
 LOG :6636.60 6638.10 1.50 Area code :
 FDEPTH: 54 54 GearCond.code:
 BDEPTH: 54 54 Validity code:
 Towing dir: 15° Wire out: 180 m Speed: 3 kn*10
 Sorted: 56 Kg Total catch: 195.79 CATCH/HOUR: 391.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Boops boops	127.60	10622	30.03	
Pomadasys incisus	87.50	546	22.35	542
Pseudupeneus prayensis	46.00	680	11.75	543
Pagellus bellottii	28.36	280	7.24	547
Sparus auriga *	26.68	56	6.81	548
Sparus caeruleostictus *	18.00	50	4.60	544
Chaetodon hoefleri	9.50	54	2.43	
Dentex congensis	9.24	154	2.36	546
Sarpa salpa	8.34	42	2.13	
Chelidonichthys gabonensis	6.66	64	1.70	
Fistularia petimba	6.00	28	1.53	
Dentex canariensis	5.32	28	1.36	545
Decapterus rhonchus	4.70	28	1.20	
Parapristipoma octolineatum	4.40	22	1.12	
Zeus faber	4.34	28	1.11	
Octopus vulgaris	3.28	8	0.84	
Chromis sp.	1.90	22	0.49	
Scorpaena stephanica	1.34	22	0.34	
Trachinocephalus myops	1.20	8	0.31	
Dicologlossa hexophthalma	1.06	14	0.27	
Decapterus punctatus	0.16	8	0.04	
Total	391.58		100.01	

PROJECT STATION: 312
 DATE: 10/11/95 GEAR TYPE: BT No: POSITION: Lat N 1352 Long W 1708
 start stop duration
 TIME :13:24:00 13:58:00 34 (min) Purpose code: 3
 LOG :6852.00 6857.70 5.70 Area code :
 FDEPTH: 35 33 GearCond.code:
 BDEPTH: 35 33 Validity code:
 Towing dir: 40° Wire out: 120 m Speed: 3 kn*10
 Sorted: 54 Kg Total catch: 54.41 CATCH/HOUR: 96.02

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasys incisus	43.76	274	45.57	
Dentex barnardi	16.50	109	17.18	
Pagellus bellottii	11.66	101	12.14	
Pseudupeneus prayensis	10.16	139	10.58	
Sepia officinalis hierredda	1.92	7	2.00	
Sphoeroides spengleri	1.89	58	1.97	
Decapterus rhonchus	1.43	19	1.49	
Syacium micrurum	1.32	9	1.37	
Plectozhinchus mediterraneus	1.25	7	1.30	
Alectis alexandrinus	1.01	4	1.05	
Fistularia tabacaria	0.86	2	0.90	
Fistularia petimba	0.78	7	0.81	
Pegusa lascaris	0.72	2	0.75	
Brachydeuterus auritus	0.67	11	0.70	
Chaetodon hoefleri	0.62	5	0.65	
Chloroscombrus chrysurus	0.42	4	0.44	
Priacanthus arenatus	0.39	2	0.41	
Dactylopterus volitans	0.35	2	0.36	
Rypticus saponaceus	0.23	4	0.24	
Selene dorsalis	0.16	2	0.17	
Total	96.10		100.08	

PROJECT STATION: 309
 DATE: 9/11/95 GEAR TYPE: BT No: POSITION: Lat N 1336 Long W 1708
 start stop duration
 TIME :15:28:00 15:58:00 30 (min) Purpose code: 3
 LOG :6646.00 6647.50 1.50 Area code :
 FDEPTH: 37 35 GearCond.code:
 BDEPTH: 37 35 Validity code:
 Towing dir: 90° Wire out: 120 m Speed: 3 kn*10
 Sorted: 94 Kg Total catch: 1635.40 CATCH/HOUR: 3270.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	2714.40	14700	82.99	549
Chloroscombrus chrysurus	151.80	1248	4.64	553
Pagellus bellottii	144.20	970	4.41	550
Pseudupeneus prayensis	93.60	1144	2.86	552
Pomadasys incisus	69.20	382	2.12	551
Sparus caeruleostictus *	28.20	70	0.86	
Priacanthus arenatus	13.80	70	0.42	
Sparus auriga *	13.10	34	0.40	
Sardinella maderensis	9.40	70	0.29	
Sardinella aurita	7.90	34	0.24	
Syacium micrurum	6.50	34	0.20	
Serranus scriba	5.20	34	0.16	
Chaetodon hoefleri	4.80	34	0.15	
Sphoeroides spengleri	4.80	104	0.15	
Dentex gibbosus	3.80	34	0.12	
Total	3270.80		100.01	

PROJECT STATION: 313
 DATE: 10/11/95 GEAR TYPE: BT No: POSITION: Lat N 1349 Long W 1708
 start stop duration
 TIME :15:15:00 15:45:00 30 (min) Purpose code: 3
 LOG :6867.90 6869.50 1.60 Area code :
 FDEPTH: 36 37 GearCond.code:
 BDEPTH: 36 37 Validity code:
 Towing dir: 320° Wire out: 120 m Speed: 3 kn*10
 Sorted: 84 Kg Total catch: 154.21 CATCH/HOUR: 308.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	116.00	672	37.61	560
Chloroscombrus chrysurus	79.00	656	25.61	561
Decapterus rhonchus	65.00	344	21.08	559
Pomadasys incisus	18.20	100	5.90	562
Sparus caeruleostictus *	8.38	6	1.42	
Sepia officinalis hierredda	4.90	12	0.94	
Sphyraena guachancho	2.40	6	0.78	
Fistularia tabacaria	2.40	10	0.71	
Priacanthus arenatus	1.80	20	0.58	
Dentex canariensis	1.80	20	0.58	
Pistularia petimba	1.40	10	0.45	
Dactylopterus volitans	1.40	10	0.45	
Octopus vulgaris	1.22	2	0.40	
Trachinocephalus myops	1.20	10	0.39	
Aluterus sp.	0.90	6	0.29	
Sphoeroides spengleri	0.60	16	0.19	
Zeus faber	0.60	6	0.19	
Trachinus draco	0.40	10	0.13	
Decapterus punctatus	0.40	10	0.13	
Chaetodon hoefleri	0.30	6	0.10	
Bothus podas africanus	0.12	6	0.04	
Total	308.42		99.98	

PROJECT STATION: 314
 DATE:10/11/95 GEAR TYPE: BT No: POSITION:Lat N 1339 Long W 1708
 start stop duration
 TIME :17:20:00 17:40:00 20 (min) Purpose code: 3
 LOG :6886.00 6886.00 1.00 Area code :
 FDEPTH: 35 30 GearCond.code:
 BDEPTH: 35 30 Validity code:
 Towing dir: 20° Wire out: 120 m Speed: 3 kn*10

Sorted: 117 Kg Total catch: 4091.50 CATCH/HOUR: 12274.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	6552.00	80736	53.38	563
Brachydeuterus auritus	2992.50	36792	24.38	564
Sardinella aurita	2163.00	14175	17.62	565
Decapterus rhonchus	235.20	2100	1.92	567
Pagellus bellottii	207.90		1.69	
Selene dorsalis	69.30	735	0.56	
Sardinella maderensis	35.70	420	0.29	566
Sepia officinalis hierredda	10.50	105	0.09	
Chelidonicichthys gabonensis	8.40	105	0.07	
Total	12274.50		100.00	

PROJECT STATION: 318
 DATE:11/11/95 GEAR TYPE: BT No: POSITION:Lat N 1422 Long W 1710
 start stop duration
 TIME :19:10:00 19:22:00 12 (min) Purpose code: 1
 LOG :7144.90 7145.60 0.70 Area code :
 FDEPTH: 25 26 GearCond.code:
 BDEPTH: 25 26 Validity code:
 Towing dir: 205° Wire out: 150 m Speed: 30 kn*10

Sorted: 27 Kg Total catch: 81.21 CATCH/HOUR: 406.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	101.55	1245	25.01	580
Pomadasys incisus	78.30	720	19.28	581
Pseudupeneus prayensis	60.75		14.96	
Brachydeuterus auritus	54.90	780	13.52	
Dactylopterus volitans	23.70	30	5.84	
Decapterus rhonchus	23.55	615	5.80	579
Plectorhynchus mediterraneus	15.00	270	3.69	
Dicologlossa cuneata	6.60	60	1.63	
Syacium micrurum	6.45	195	1.59	
Scorpaena angolensis	5.55	120	1.37	
Penaeus notialis, female	5.25	165	1.29	583
Sarpa salpa	4.35	15	1.07	
Sepia sp.	3.90	75	0.96	
Bothus podas africanus	3.45	180	0.85	
Trachinus draco	3.15	45	0.78	
Penaeus notialis, male	2.55	135	0.63	582
Sparus caeruleostictus *	2.55	15	0.63	
Dicologlossa hexophthalma	1.05	15	0.26	
Parapristipoma octolineatum	0.90	15	0.22	
Trachinocephalus myops	0.75	120	0.18	
Sphoeroides spengleri	0.60	15	0.15	
Grammolites gruvelli	0.60	45	0.15	
Synodus saurus	0.45	60	0.11	
Decapterus punctatus	0.15	15	0.04	
Total	406.05		100.01	

PROJECT STATION: 315
 DATE:11/11/95 GEAR TYPE: BT No: POSITION:Lat N 1343 Long W 1659
 start stop duration
 TIME :02:40:00 02:55:00 15 (min) Purpose code: 3
 LOG :6980.80 6981.60 0.80 Area code :
 FDEPTH: 19 19 GearCond.code:
 BDEPTH: 19 19 Validity code:
 Towing dir: 66° Wire out: 120 m Speed: 3 kn*10

Sorted: 46 Kg Total catch: 543.69 CATCH/HOUR: 2174.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	905.40	8076	41.63	569
Galeoides decadactylus	598.32	12112	27.51	
Sardinella maderensis	283.68	1548	13.04	568
Brachydeuterus auritus	108.00	4176	4.97	
Decapterus rhonchus	103.68	2592	4.77	570
Sphyræna guachancho	54.00	72	2.48	
Pomadasys peroteti	30.96	72	1.42	
Sepia officinalis hierredda	30.24	504	1.39	
Lithognathus mormyrus	26.40	72	1.21	
Penaeus kerathurus	9.36	648	0.43	
Batrachoides liberiensis	8.64	432	0.40	
Pseudupeneus prayensis	6.48	360	0.30	
Dactylopterus volitans	3.60	144	0.17	
Pegusa lascaris	2.88	216	0.13	
Penaeus notialis	1.44	144	0.07	
Dentex canariensis	0.72	648	0.03	
Dentex canariensis	0.72	448	0.03	
Parapenaeopsis atlantica	0.72	144	0.03	
Total	2175.24		100.01	

PROJECT STATION: 319
 DATE:11/11/95 GEAR TYPE: BT No:7 POSITION:Lat N 1421 Long W 1710
 start stop duration
 TIME :19:46:00 20:17:00 31 (min) Purpose code: 1
 LOG :7146.80 7148.40 1.90 Area code :
 FDEPTH: 8 8 GearCond.code:
 BDEPTH: 8 8 Validity code:
 Towing dir: 50° Wire out: 120 m Speed: 38 kn*10

Sorted: 65 Kg Total catch: 623.83 CATCH/HOUR: 1207.41

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pomadasys jubelini	1030.65	15557	85.36	
Sardinella maderensis	67.74	354	5.61	585
Decapterus rhonchus	58.06	1161	4.81	590
Pseudupeneus prayensis	23.71	1113	1.96	
Decapterus punctatus	10.65	726	0.88	
Galeoides decadactylus	4.35	48	0.36	
Sardinella aurita	4.24	21	0.35	584
Penaeus notialis, male	2.50	124	0.21	586
Penaeus notialis, female	1.99	56	0.16	587
Alectis alexandrinus	1.74	2	0.14	
Plectorhynchus mediterraneus	1.06	2	0.09	
Penaeus kerathurus, male	0.46	17	0.04	588
Penaeus kerathurus, female	0.25	2	0.02	589
Total	1207.40		99.99	

PROJECT STATION: 316
 DATE:11/11/95 GEAR TYPE: BT No: POSITION:Lat N 1349 Long W 1701
 start stop duration
 TIME :05:25:00 05:44:00 19 (min) Purpose code: 1
 LOG :7008.00 7009.00 1.00 Area code :
 FDEPTH: 22 20 GearCond.code:
 BDEPTH: 22 20 Validity code:
 Towing dir: 56° Wire out: 120 m Speed: 3 kn*10

Sorted: 97 Kg Total catch: 848.05 CATCH/HOUR: 2678.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	1259.05	13295	47.01	576
Pomadasys peroteti	716.21	824	26.74	577
Sardinella aurita	203.21	1165	7.59	575
Sparus caeruleostictus *	99.76	398	3.73	
Sepia officinalis hierredda	54.28	227	2.03	
Decapterus rhonchus	48.60	654	1.81	578
Brachydeuterus auritus	38.65	711	1.44	
Chloroscombrus chrysurus	36.09	483	1.35	
Pseudupeneus prayensis	32.97	881	1.23	
Sphyræna guachancho	31.83	85	1.19	
Plectorhynchus mediterraneus	31.55	369	1.18	
Dentex canariensis	25.01	426	0.93	
Dasyatis margarita	23.02	85	0.86	
Eucinostomus melanopterus	16.20	171	0.60	
Galeoides decadactylus	14.21	199	0.53	
Pomadasys incisus	13.64	142	0.51	
Pagellus bellottii	6.82	57	0.25	
Serranus scriba	6.25	57	0.23	
SOLEIDAE	4.83	199	0.18	
Penaeus notialis, female	4.42	193	0.17	572
Diplodus bellottii	3.69	28	0.14	
Penaeus notialis, male	3.63	313	0.14	571
Scorpaena stephanica	2.56	85	0.10	
Penaeus kerathurus, female	0.98	54	0.04	574
Penaeus kerathurus, male	0.57	41	0.02	573
Total	2678.03		100.00	

PROJECT STATION: 320
 DATE:11/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1427 Long W 1716
 start stop duration
 TIME :22:15:00 22:30:00 15 (min) Purpose code: 1
 LOG :7164.40 7165.40 1.00 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 41 40 Validity code:
 Towing dir: 55° Wire out: 120 m Speed: 3 kn*10

Sorted: 57 Kg Total catch: 568.90 CATCH/HOUR: 2275.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	1310.00	12400	57.57	591
Chloroscombrus chrysurus	748.00	7004	32.87	592
Trachurus trachurus	76.40	1080	3.36	593
Sphyræna guachancho	31.60	240	1.39	
Decapterus punctatus	24.80	1120	1.09	
Scomber japonicus	24.40	200	1.07	
Decapterus rhonchus	24.00	480	1.05	594
Pomadasys incisus	18.00	160	0.79	
Sardinella maderensis	17.60	120	0.77	
Penaeus notialis	0.80	24	0.04	
Total	2275.60		100.00	

PROJECT STATION: 317
 DATE:11/11/95 GEAR TYPE: BT No: POSITION:Lat N 1407 Long W 1730
 start stop duration
 TIME :10:44:00 11:07:00 23 (min) Purpose code: 1
 LOG :7060.00 7061.30 1.30 Area code :
 FDEPTH: 109 110 GearCond.code:
 BDEPTH: 109 110 Validity code:
 Towing dir: 180° Wire out: 350 m Speed: 3 kn*10

Sorted: 25 Kg Total catch: 199.68 CATCH/HOUR: 520.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Boops boops	454.96	7158	87.34	
Trachinocephalus myops	16.49	271	3.17	
Lepidotrigla carolae	13.36	605	2.56	
Pagellus bellottii	9.60	250	1.84	
Illex coindetii	5.43	83	1.04	
Antigonia capros	4.80	417	0.92	
Loligo vulgaris	4.38	21	0.84	
Syacium micrurum	3.13	104	0.60	
Dactylopterus volitans	2.92	21	0.56	
Zeus faber	2.09	21	0.40	
Decapterus rhonchus	2.09	21	0.40	
Ariomma bondi	1.25	21	0.24	
BLENNIIDAE	0.21	21	0.04	
Arnooglossus imperialis	0.21	21	0.04	
Total	520.92		99.99	

PROJECT STATION: 321
 DATE:11/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1437 Long W 1721
 start stop duration
 TIME :02:00:00 03:00:00 60 (min) Purpose code: 1
 LOG :7196.60 7199.60 3.00 Area code :
 FDEPTH: 32 39 GearCond.code:
 BDEPTH: 32 39 Validity code:
 Towing dir: 177° Wire out: 150 m Speed: 3 kn*10

Sorted: 32 Kg Total catch: 94.65 CATCH/HOUR: 94.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Caranx crysos	57.30	1364	60.54	
Chloroscombrus chrysurus	19.35	138	20.44	
Sardinella aurita	5.91	516	6.24	595
Brachydeuterus auritus	5.82	66	6.15	
Sardinella maderensis	3.81	216	4.03	596
Scomber japonicus	1.02	6	1.08	
Pistularia petimba	0.78	3	0.82	
Sphyræna guachancho	0.27	3	0.29	
Pagellus bellottii	0.21	3	0.22	
Solea senegalensis	0.12	3	0.13	
Boops boops	0.06	3	0.06	
Total	94.65		100.00	

PROJECT STATION: 322
 DATE:13/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1430 Long W 1717
 start stop duration
 TIME :02:10:00 03:02:00 52 (min) Purpose code: 1
 LOG :7422.70 7425.50 2.80 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 41 36 Validity code:
 Towing dir: * Wire out: 150 m Speed: 30 kn*10
 Sorted: 43 Kg Total catch: 43.15 CATCH/HOUR: 49.79

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	36.42	220	77.16	597
Sardinella maderensis	6.81	55	13.68	598
Decapterus rhonchus	2.12	30	4.26	600
Pomadasys incisus	0.87	7	1.75	
Sphyræna guanchancho	0.54	5	1.08	
Decapterus punctatus	0.45	20	0.90	
Sardinella aurita	0.30	36	0.60	599
Brachydeuterus auritus	0.27	5	0.54	
Pseudupeneus prayensis	0.01	1	0.02	
Total	49.79		99.99	

PROJECT STATION: 326
 DATE:15/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1521 Long W 1655
 start stop duration
 TIME :03:55:00 04:25:00 30 (min) Purpose code: 1
 LOG :7637.00 7638.50 1.50 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 53 45 Validity code:
 Towing dir: 75° Wire out: 140 m Speed: 30 kn*10
 Sorted: 110 Kg Total catch: 445.76 CATCH/HOUR: 891.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	377.30	2856	42.32	610
Selene dorsalis	99.12	2114	11.12	
Rhizoprionodon acutus	79.54	64	8.92	612
Sardinella maderensis	57.26	2408	6.42	608
Trachinotus ovatus	52.22	224	5.86	609
Trichiurus lepturus	49.98	308	5.61	
Sphyræna guanchancho	49.14	322	5.51	
Chloroscombrus chrysurus	40.60	1414	4.55	
Sphyrna zygaena	27.60	6	3.10	
Decapterus rhonchus	26.04	112	2.92	
Pomadasys peroteti	16.38	28	1.84	
Campogramma glaycos	7.14	14	0.80	
Sardinella aurita	6.86	448	0.77	611
Selar crumenophthalmus	1.26	14	0.14	
Echeneis naucrates	1.12	14	0.13	
Total	891.52		100.01	

PROJECT STATION: 323
 DATE:14/11/95 GEAR TYPE: BT No: POSITION:Lat N 1503 Long W 1704
 start stop duration
 TIME :15:05:00 15:35:00 30 (min) Purpose code: 1
 LOG :7516.40 7517.70 1.30 Area code :
 FDEPTH: 48 41 GearCond.code:
 BDEPTH: 48 41 Validity code:
 Towing dir: 200° Wire out: 150 m Speed: 30 kn*10
 Sorted: 58 Kg Total catch: 2495.29 CATCH/HOUR: 4990.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	2841.44	33024	56.94	601
Brachydeuterus auritus	812.70	6364	16.28	
Pomadasys incisus	511.70	2924	10.25	
Pagellus bellottii	472.14	6020	9.46	
Boops boops	166.84	4128	3.34	
Trichiurus lepturus	56.76	1204	1.14	
Loligo vulgaris	41.28	344	0.83	
Pomadasys peroteti	25.80	86	0.52	
Chelidonicthys gabonensis	22.36	344	0.45	
Pseudupeneus prayensis	21.50	430	0.43	
Bothus podas africanus	6.02	86	0.12	
Sphoeroides spengleri	5.16	86	0.10	
Sphyræna guanchancho	4.30	86	0.09	
Citharus linguatula	2.58	86	0.05	
Total	4990.58		100.00	

PROJECT STATION: 327
 DATE:15/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1525 Long W 1652
 start stop duration
 TIME :06:41:00 07:11:00 30 (min) Purpose code: 1
 LOG :7660.50 7662.10 1.60 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 44 41 Validity code:
 Towing dir: 185° Wire out: 140 m Speed: 32 kn*10
 Sorted: 90 Kg Total catch: 366.66 CATCH/HOUR: 733.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	535.20	4546	72.98	614
Selene dorsalis	43.92	924	5.99	613
Sphyrna zygaena	38.40	4	5.24	
Brachydeuterus auritus	26.40	240	3.60	
Carcharinus limbatus	23.20	8	3.16	
Trichiurus lepturus	18.00	300	2.45	
Trachinotus ovatus	10.44	48	1.42	
Sphyræna guanchancho	9.60	48	1.31	
Campogramma glaycos	7.20	12	0.98	
Stromateus fiatola	6.72	12	0.92	
Pomadasys peroteti	5.64	12	0.77	
Rhizoprionodon acutus	4.20	2	0.57	
Sphyrna couardi	3.20	2	0.44	
Ilisha africana	2.40	24	0.33	
Total	734.52		100.16	

PROJECT STATION: 324
 DATE:14/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1507 Long W 1702
 start stop duration
 TIME :19:44:00 20:29:00 45 (min) Purpose code: 1
 LOG :7562.50 7564.70 2.20 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 52 45 Validity code:
 Towing dir: 225° Wire out: 120 m Speed: 30 kn*10
 Sorted: 61 Kg Total catch: 910.20 CATCH/HOUR: 1213.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	650.00	5495	53.56	
Trachurus trecae	176.00	4793	14.50	602
Trichiurus lepturus	140.00	2000	11.54	
Sardinella maderensis	90.00	6055	7.42	603
Sphyræna guanchancho	86.00	520	7.09	
Chloroscombrus chrysurus	33.40	1660	2.75	604
Selene dorsalis	31.20	580	2.57	
Alloteuthis africana	2.40	1000	0.20	
Scomber japonicus	2.40	20	0.20	
Sardinella aurita	2.20	20	0.18	
Total	1213.60		100.01	

PROJECT STATION: 328
 DATE:15/11/95 GEAR TYPE: BT No:1 POSITION:Lat N 1531 Long W 1652
 start stop duration
 TIME :09:22:00 09:52:00 30 (min) Purpose code: 1
 LOG :7682.80 7684.60 1.80 Area code :
 FDEPTH: 68 58 GearCond.code:
 BDEPTH: 68 58 Validity code:
 Towing dir: 131° Wire out: 210 m Speed: 36 kn*10
 Sorted: 32 Kg Total catch: 163.48 CATCH/HOUR: 326.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	90.60	1296	27.71	
Trachurus trecae	51.60	1910	15.78	615
Dentex angolensis	42.00	516	12.85	
Boops boops	32.52	2364	9.95	
Lepidotrigla cadmani	18.48	252	5.65	
Brachydeuterus auritus	12.96	84	3.96	
Loligo vulgaris	12.24	96	3.74	
Pseudupeneus prayensis	8.88	84	2.72	
Saurida brasiliensis	8.76	1572	2.68	
Alectis alexandrinus	8.10	4	2.48	
Citharus linguatula	6.00	228	1.84	
Dentex canariensis	5.64	24	1.72	
Decapterus rhonchus	4.80	12	1.47	
Alloteuthis africana	4.32	12	1.32	
Brotula barbata	4.20	12	1.28	
Serranus cabrilla	3.48	72	1.06	
Scorpaena stephanica	2.40	36	0.73	
Trachurus trecae	2.20	10	0.67	616
Zeus faber	2.02	2	0.62	
Sphyræna guanchancho	1.80	24	0.55	
Ilex coindetii	1.20	12	0.37	
Fistularia petimba	0.84	12	0.26	
Sphoeroides spengleri	0.60	60	0.18	
Parapaneus longirostris	0.48	96	0.15	
GOBIIDAE	0.36	48	0.11	
Sepia sp.	0.24	36	0.07	
Arnoglossus blachei *	0.24	36	0.07	
Total	326.96		99.99	

PROJECT STATION: 325
 DATE:14/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1505 Long W 1702
 start stop duration
 TIME :21:17:00 21:37:00 20 (min) Purpose code: 1
 LOG :7569.20 7570.10 0.90 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 40 39 Validity code:
 Towing dir: 213° Wire out: 120 m Speed: 27 kn*10
 Sorted: 56 Kg Total catch: 330.00 CATCH/HOUR: 990.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	456.00	4113	46.06	
Chloroscombrus chrysurus	295.50	12096	29.85	607
Sphyræna guanchancho	90.00	300	9.09	
Trachurus trecae	76.50	681	7.73	605
Trichiurus lepturus	45.00	300	4.55	
Pomadasys peroteti	11.40	30	1.15	
Sardinella maderensis	9.30	600	0.94	606
Loligo vulgaris	6.30	30	0.64	
Total	990.00		100.01	

PROJECT STATION: 329
 DATE: 15/11/95 GEAR TYPE: BT No: POSITION: Lat N 1538 Long W 1649
 start stop duration
 TIME : 13:24:00 13:54:00 30 (min) Purpose code: 1
 LOG : 7720.90 7722.50 1.60 Area code :
 FDEPTH: 49 46 GearCond.code:
 BDEPTH: 49 46 Validity code:
 Towing dir: 37° Wire out: 150 m Speed: 30 kn*10
 Sorted: 54 Kg Total catch: 456.20 CATCH/HOUR: 912.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	436.90	6206	47.88	
Brachydeuterus auritus	256.70	2584	28.13	617
Alectis alexandrinus	70.56	52	7.73	
Selene dorsalis	51.68	374	5.66	
Pagellus bellottii	39.62	256	4.34	618
Boops boops	18.36	1360	2.01	
Pseudolithus senegalensis	12.92	18	1.42	
Trachurus trecae	8.00	426	0.88	
Citharus linguatula	6.30	204	0.69	
Pseudupeneus prayensis	4.60	86	0.50	
Loligo vulgaris	3.92	18	0.43	
Chloroscombrus chrysurus	2.90	18	0.32	
Total	912.46		99.99	

PROJECT STATION: 330
 DATE: 15/11/95 GEAR TYPE: BT No: POSITION: Lat N 1531 Long W 1645
 start stop duration
 TIME : 15:14:00 15:41:00 27 (min) Purpose code: 1
 LOG : 7734.60 7736.10 1.50 Area code :
 FDEPTH: 20 19 GearCond.code:
 BDEPTH: 20 19 Validity code:
 Towing dir: 35° Wire out: 120 m Speed: 30 kn*10
 Sorted: 63 Kg Total catch: 1522.55 CATCH/HOUR: 3383.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	1020.44	3544	30.16	
Pteroscion pelli	684.44	12467	20.23	
Pseudolithus senegalensis	536.56	11244	15.86	
Pomadasys peroteti	399.56	1589	11.81	
Pomadasys jubelini	256.67	733	7.59	
Drepane africana	176.00	733	5.20	
Brachydeuterus auritus	138.11	1100	4.08	
Trichiurus lepturus	58.67	122	1.73	
Chloroscombrus chrysurus	38.78	227	1.15	621
Polynemus sextarius	33.00	611	0.98	
Selene dorsalis	15.67	53	0.46	619
Stromateus fiatola	8.71	11	0.26	
Sardinella maderensis	8.47	33	0.25	622
Ilisha africana	3.29	76	0.10	620
Campogramma glaycos	1.89	4	0.06	
Pomatomus saltatrix	1.53	2	0.05	
Caranx senegallus	1.44	4	0.04	
Total	3383.23		100.01	

PROJECT STATION: 331
 DATE: 15/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 1548 Long W 1645
 start stop duration
 TIME : 19:09:00 19:32:00 23 (min) Purpose code: 1
 LOG : 7771.60 7773.00 1.40 Area code :
 FDEPTH: 23 23 GearCond.code:
 BDEPTH: 48 47 Validity code:
 Towing dir: 28° Wire out: 100 m Speed: 36 kn*10
 Sorted: 111 Kg Total catch: 2229.00 CATCH/HOUR: 5814.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	5086.96	55657	87.48	
Trachurus trecae	370.43	2400	6.37	624
Decapterus rhonchus	142.96	365	2.46	623
Pomadasys peroteti	50.09	104	0.86	
Trichiurus lepturus	34.43	1148	0.59	
Loligo vulgaris	26.09	157	0.45	
Sepia officinalis hierredda	24.00	52	0.41	
Boops boops	23.48	209	0.40	
Sardinella maderensis	21.91	626	0.38	625
Pemaeus notialis	18.78	1617	0.32	
Pagellus bellottii	10.43	52	0.18	
Sphyraena quachancho	3.65	104	0.06	
Pseudupeneus prayensis	1.57	52	0.03	
Total	5814.78		99.99	

PROJECT STATION: 332
 DATE: 16/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 1551 Long W 1637
 start stop duration
 TIME : 00:58:00 01:25:00 27 (min) Purpose code: 1
 LOG : 7826.30 7827.90 1.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 25 30 Validity code:
 Towing dir: 305° Wire out: 140 m Speed: 30 kn*10
 Sorted: 59 Kg Total catch: 356.46 CATCH/HOUR: 792.13

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	465.33	3480	58.74	626
Brachydeuterus auritus	86.40	667	10.91	
Galeoides decadactylus	76.67	227	9.68	
Sardinella aurita	36.13	173	4.56	627
Pteroscion pelli	28.93	187	3.65	
Trichiurus lepturus	26.53	400	3.35	
Drepane africana	19.07	40	2.41	
Selene dorsalis	12.80	280	1.62	629
Ilisha africana	10.93	253	1.38	630
Stromateus fiatola	9.47	13	1.20	
Pomadasys zosteri	6.00	13	0.76	
Sphyraena quachancho	4.80	80	0.61	
Pomadasys peroteti	4.27	13	0.54	
Chloroscombrus chrysurus	4.27	93	0.54	628
Polydactylus quadrifilis	0.53	13	0.07	
Total	792.13		100.02	

Annex V Instruments and fishing gear used

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

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

Tranceiver-1 menu (38 kHz lowering keel)

Transducer depth	0.00 m
Absorbtion coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducer gain	28.1 dB
TS transducer gain	28.0 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg
Alongship offset	0.00 "
Athwardship offset	0.04 "

Display menu

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

Printer- menu

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

Bottom detection menu Minimum level -50 dB

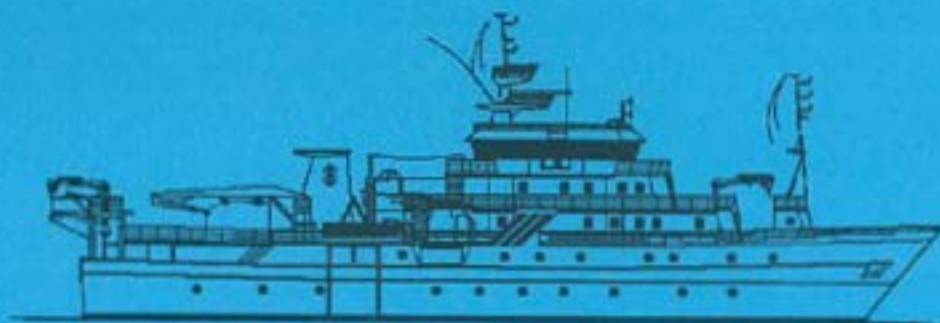
Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl". Both the bottom trawl and the smallest pelagic trawl were used during the survey.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernett of 10 mm meshsize. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m², 1670 kg, their distance while trawling about 46 m in average. A tickler chain was used when trawling for shrimp.

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

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



**SURVEY OF THE PELAGIC FISH RESOURCES
OFF NORTH WEST AFRICA**

Part 3

MAURITANIA
17 - 23 November 1995

Centre National Recherches Oceanographie et Peche,
Nouadhibou,
Mauritania

Institute of Marine Research,
Bergen,
Norway

CRUISE REPORT "DR FRIDTJOF NANSEN"

**SURVEY OF THE PELAGIC FISH RESOURCES
OFF NORTH WEST AFRICA**

Part 3

MAURITANIA
17 - 23 November 1995

by

G. Sætersdal

Institute of Marine Research
P.O.Box 1870 Nordnes
N-5024 Bergen, Norway

Institute of Marine Research
Bergen, 1995

TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	1
1.1	Objectives of the cruise	1
1.2	Participation	1
1.3	Narrative	2
1.4	Methods	2
CHAPTER 2	SURVEY RESULTS	6
2.1	Hydrography	6
2.2	Pelagic fish on the shelf from St Louise to Cap Timeris	6
2.3	Pelagic fish on the shelf from Cap Timeris to Cap Blanc	12
CHAPTER 3	OVERVIEW AND SUMMARY OF RESULTS	13
ANNEX I	Pooled length distributions by main species	
ANNEX II	Biomass and number by length	
ANNEX III	Records of fishing stations	
ANNEX IV	Instruments and fishing gear used	

CHAPTER 1 INTRODUCTION

1.1 Objectives of the cruise

A planning meeting was held in Casablanca in July 1995 with participants from Morocco, Mauritania, Senegal, Gambia, Guinea Bissau, FAO and the Institute of Marine Research, Bergen. During this meeting the objectives and schedules of the programme were established.

The defined general objectives were to estimate and map the distribution and biomass of small pelagic fish stocks off NW Africa (Morocco, Mauritania, Senegal, the Gambia and Guinea Bissau) by hydro-acoustic methods and describe the hydrographic conditions there over a period of 60 days, in November-December 1995.

For Mauritania the agreed objectives were:

To map the distribution and produce biomass estimates for the main small pelagic fish species; sardine *Sardina pilchardus*, sardinella *Sardinella aurita*, *S. maderensis*, horse mackerel *Trachurus trecae* and *T. trachurus*, false scad *Decapterus rhonchus*, anchovy *Engraulis encrasicolus* and other pelagic fish.

To occupy standard hydrographical transects for temperature, salinity and oxygen at about 17°20' N, off Cap Timeris and off Cap Blanc.

Catch sampling would comprise weight and number by species and length frequency distributions of the principal species.

The time allocated in the work plan for this part of the survey was 7 days.

1.2 Participation

Members of the scientific teams were:

MAURITANIA:

Mohamed MAHFOUDH OULD TALEB SIDI

Diallo IBRA

Ball Abou CIRE

SENEGAL:

Birane SAMB

Abdoulaye SARRE

Ibrahima SOW

Mor SYLLA

Members of the scientific staff from the Institute of Marine Research were:

Gunnar SAETERSDAL, Oddgeir ALVHEIM, Guillermo BURGOS, Martin DAHL and Bjarte KVINDE

1.3 Narrative

After having embarked the Mauritanian scientific team in Dakar on 13 November and surveyed the Senegal shelf from Cayar to St Louis, the survey of the Mauritanien shelf started at the border with Senegal on 17 November. Figure 1 shows the survey tracks and the fishing and hydrographical stations. As sardinella was found in abundance over the mid and inner shelf in a nearly continuous belt northward to Cap Timeris, a denser survey grid was adopted over the inner part. The sardinella school areas are thought to have been well covered and sampled. A high survey intensity was also adopted over the broad shelf south of Cap Blanc. From Cap Timeris northward where horse mackerel was expected to be found on the outer shelf the survey was in several places extended outside the shelf edge to see whether horse mackerel occurred over the deep slope.

The hydrographic profile at 17°20' N was occupied on 18, off Cap Timeris on 19 and off Cap Blanc on 23 November.

The survey was terminated in Nouadhibou on 23 November.

1.4 Methods

All catches were sampled for composition by weight and numbers of each species. The length frequency distributions of the target species was almost always taken. Total fish length was measured. The complete records of fishing stations are shown in Annex IV.

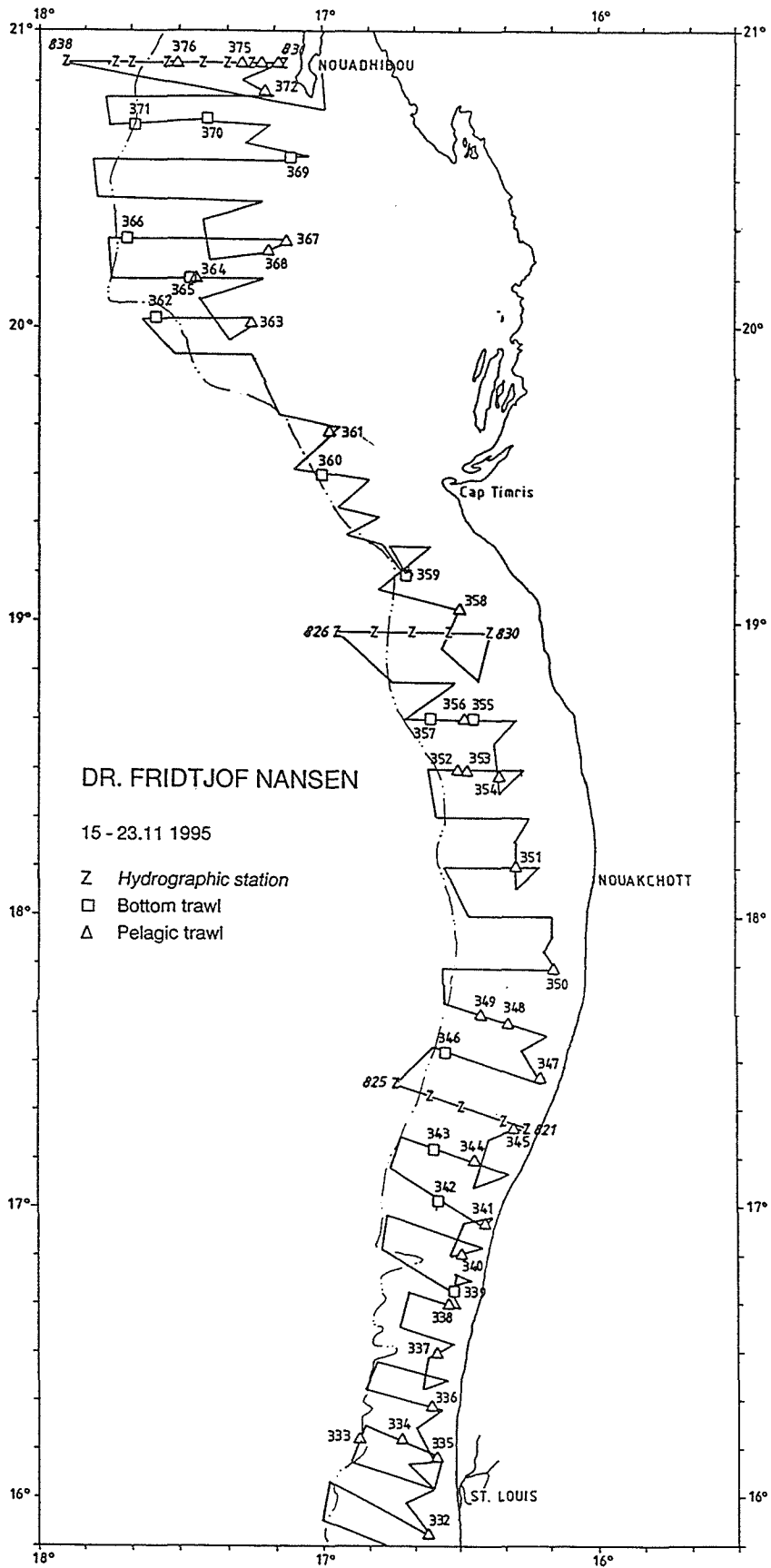


Figure 1 Course track and fishing and hydrographic stations

The surface temperature was logged automatically and recorded with position and bottom depth every nautical mile sailed.

Hydrographical profiles were collected with a CTD sonde with logging of records of temperature, salinity, oxygen and depth. From these data series records were selected from standard depths and presented in figures.

The acoustic biomass estimates are based on the integration technique. The Bergen Integrator (BEI) was used for analysis and allocation of S_A values. This system does not underestimate dense schools close to the bottom as some times may have happened with the EK500 used in the 1992 surveys.

The North Sea herring target strength was used for all pelagic fish:

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

The biomass density in numbers/nm² of a length group i is calculated from the formula:

$$\rho_i = \frac{1}{4\pi} * s_a \frac{n_i}{\sum_{i=1}^{\max} n_i k_i} \quad k_i = 10^{21 \log l_i - 7.2}$$

where s_a = mean total integrator value from a species distribution area in m²/nm²

n_i = frequency count of length group i in pooled representative sample from distribution area.

l_i = total length of fish in length group i .

These densities are then converted from numbers to weight by applying the condition factor for the species. Absolute biomasses are obtained by multiplying the densities with the size of the distribution area, usually obtained with a digital planimeter.

The integrator outputs were split on fish groups using a combination of behaviour pattern as deduced from echo diagrams, the BEI analysis and catch composition. Two groups were used for Mauritania: the sardinellas as one group and carangids and associated species as the other. The

latter included chub mackerel, hairtails and barracudas. Catch compositions formed the basis for a further separation of biomass by species.

Annex V gives a description of the instruments and the fishing gear used.

All data of fishing stations and length sampling were made available to the participants on diskettes.

CHAPTER 2 SURVEY RESULTS

2.1 Hydrography

Figure 2 shows the distribution of temperature, salinity and oxygen in the two profiles and Figure 3 the sea surface temperature at 5 m of depth.

The distribution of surface temperature showed that over the shelf from St Louis to Cap Timeris there was a decrease from 25°C offshore to 22-23 C near the coast. In two areas at about 17°20' N and north of Nouakchott water of about 22°C covered most of the shelf. In these areas sardinellas were found farthest offshore.

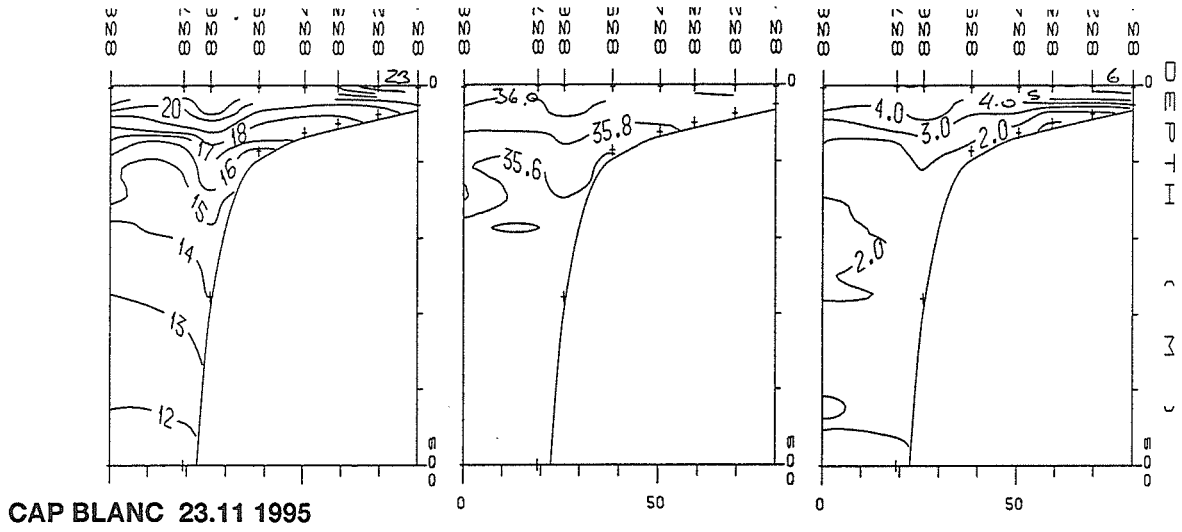
The surface temperature was higher, 25°C - 26°C over the narrow shelf between 20 m and 200 m from Cap Timeris to the start of the Cap Blanc shelf at about 20° N. South of Cap Blanc the surface temperature dropped from 25° to 21°C over a distance of 20-30 nm marking the position of a distinct front.

The two southernmost hydrographic profiles showed a sharp thermocline, but upward sloping isotherms above 50 m depth inshore. The profile off Cap Blanc appeared affected by the front with a partly disrupted thermocline and higher surface temperatures inshore.

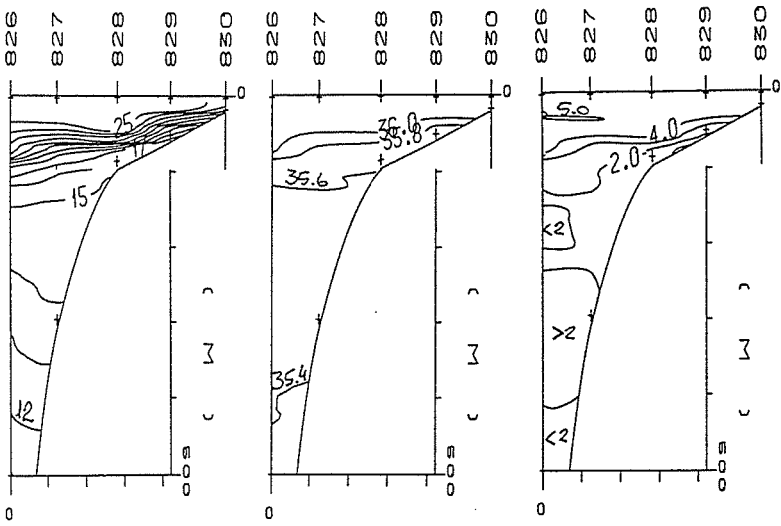
2.2 Pelagic fish on the shelf from St Louis to Cap Timeris

Figures 4 and 5 shows the distribution of the main groups of pelagic fish by contoured acoustic densities for the whole shelf of Mauritania. (One should note that the unit used is m^2/nm^2 which is 10 times that used in previous Nansen reports. The density levels used remain the same).

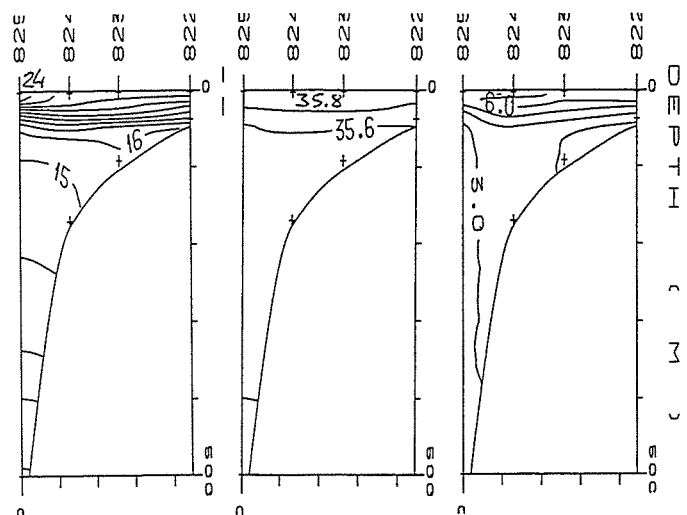
Sardinellas were found over the inner - and mid shelf in a nearly continuous belt along the entire coast from St Louis to Cap Timeris, see Figure 4. Particularly dense school areas were located at about 16°30' to 16° 45' N and at about 17°10' N where pockets of cooler water occurred, see Figure 3. Also the aggregation of sardinella at about 18°30' N coincided with a cool water pocket.



CAP BLANC 23.11 1995



19°00' N 19.11 1995



17°20' N 17.11 1995

Figure 2. Hydrographic profiles with distribution of temperature, salinity and oxygen.

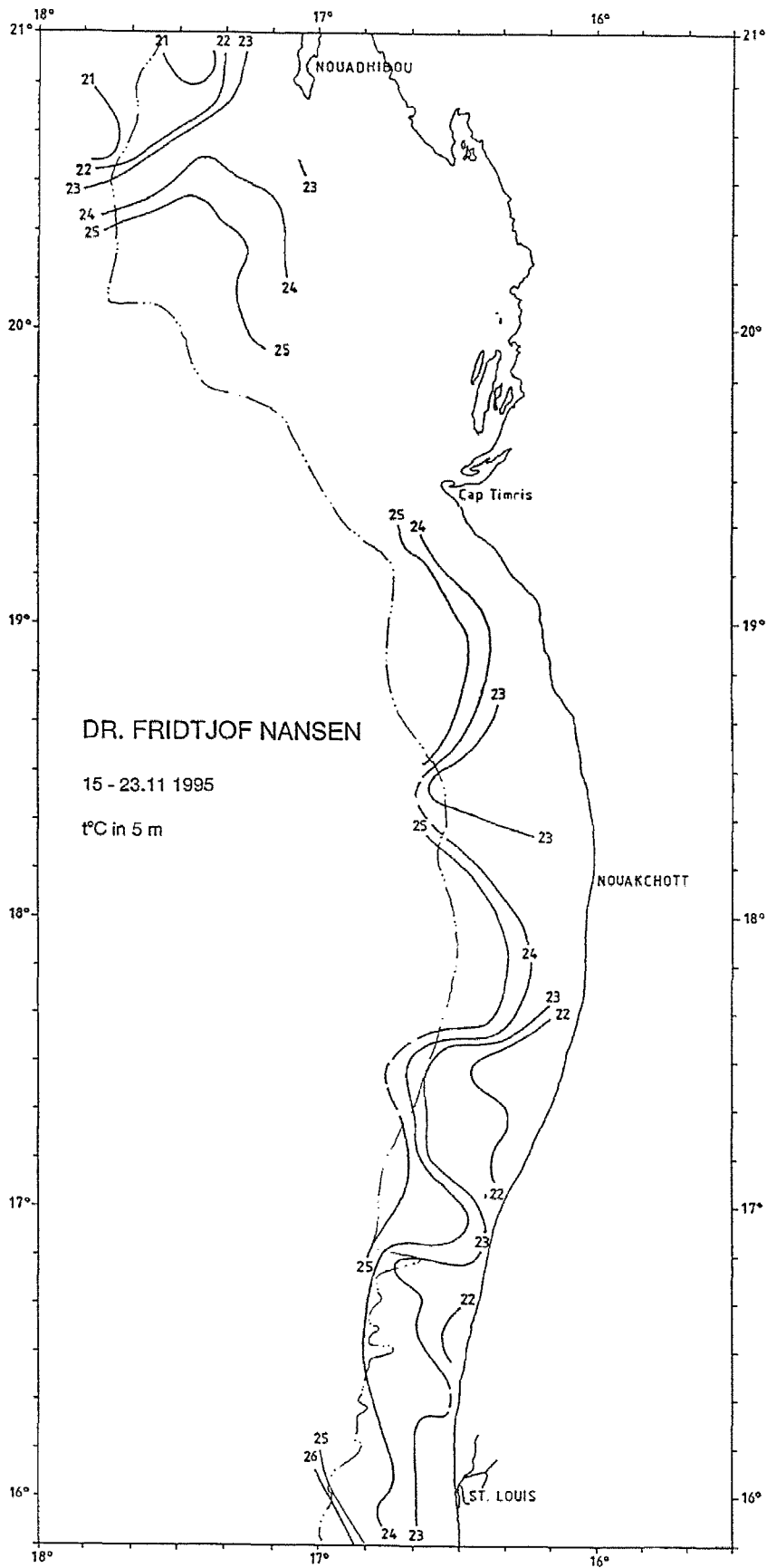


Figure 3 Sea surface temperature

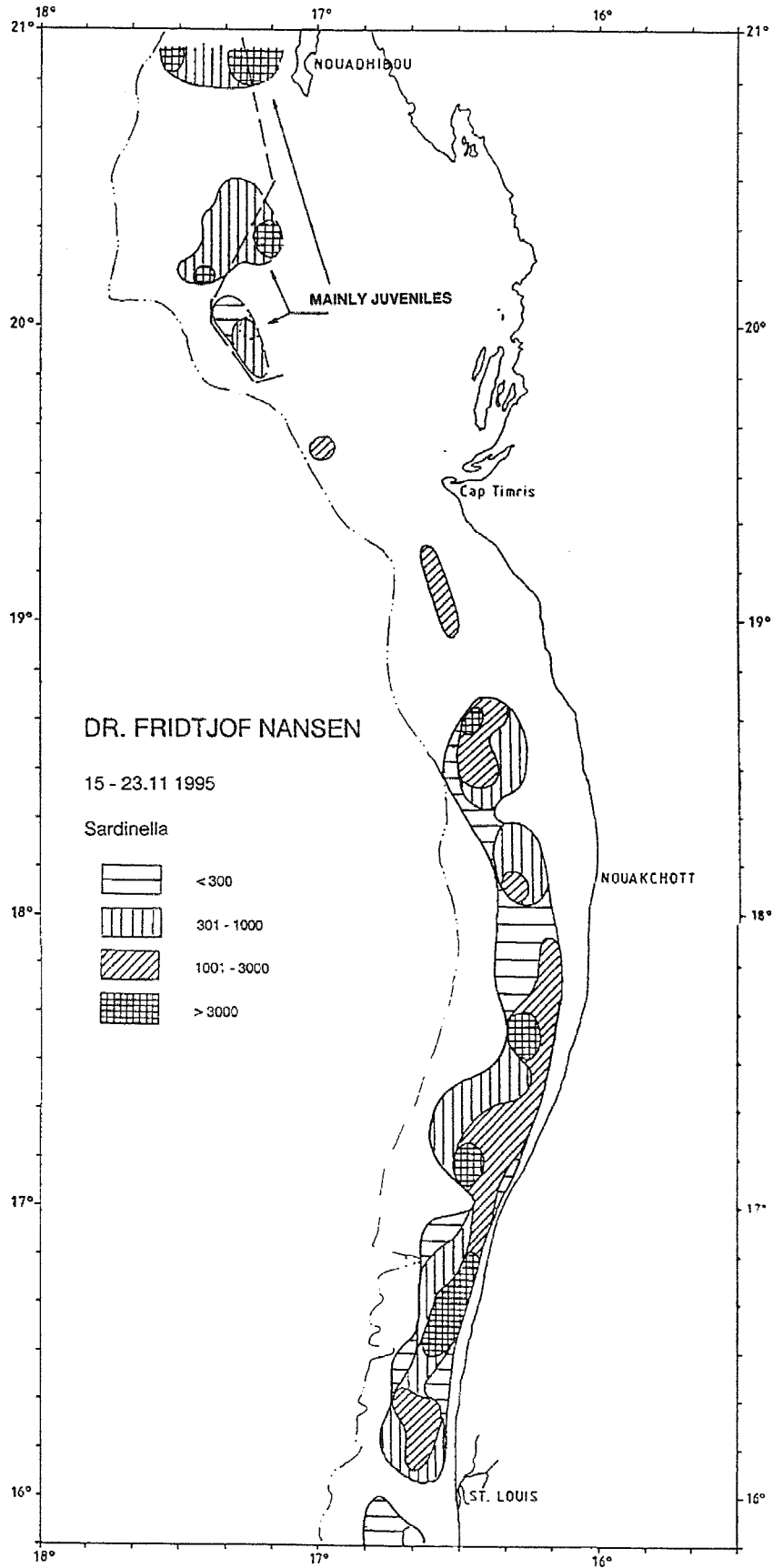


Figure 4 Distribution of sardinellas

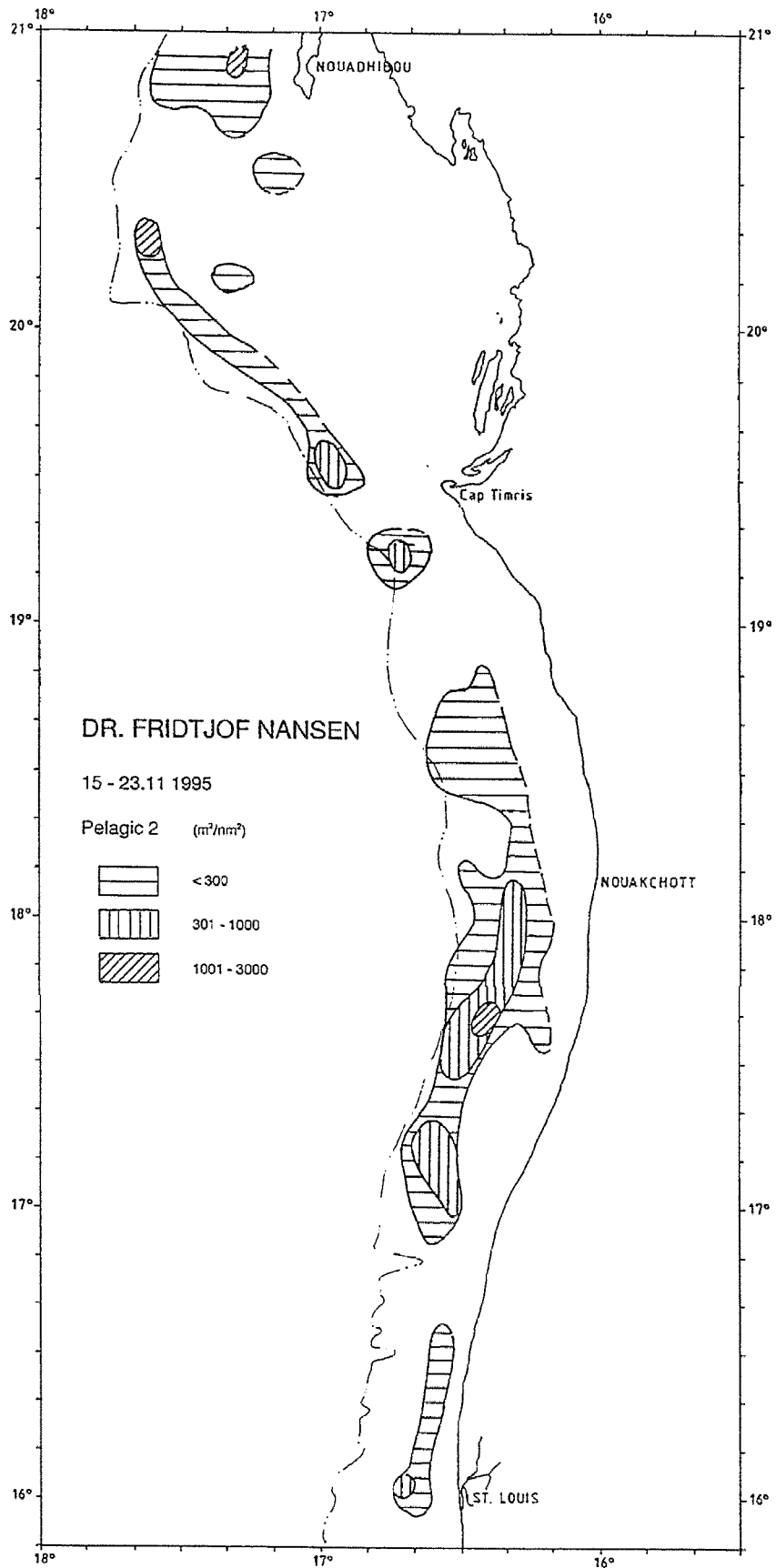


Figure 5 Distribution of carangids and associated species

Flat sardinella dominated the catches from the inner parts of the distribution, round sardinella those from the outer deeper parts. The samples showed consistent large sizes of both sardinella species with modes of 33-34 cm for round sardinella and 31-32 cm for flat sardinella, see Annex 1. The stock length compositions by numbers and weight are shown in Annex II.

Table 1 gives the biomass estimates of sardinellas for this shelf based on weighting of the two species and their size composition by acoustic densities in the area of sampling. The total estimate was 1.5 million tonnes of which 59% was flat- and 41% round sardinella.

Attempts were made also to identify horse mackerel in the acoustic analysis, but this proved difficult since this species did not appear in any abundance in separate aggregations in the survey area. Most often it occurred in low densities mixed with other carangids and associated species, and the horse mackerels were therefore included in this group.

Figure 5 shows that the distribution of the mixed group took the form of low density patches along the coast, mostly found on the outer shelf. The total biomass was estimated at 130 000 tonnes. The samples from the distributional areas consisted of horse mackerels, scad, hairtails and small amounts of mackerel, *Scomber japonicus*. By weighting the relative proportions in the samples by the density in the sampling area the composition obtained was as follows:

Horse mackerel	38%
Scad	7%
Hairtails	51%
Mackerel	5%

The main part of the horse mackerels was *Trachurus trecae*. *T. trachurus* only occurred in two samples close to Cap Timeris.

Table 1 St Louis to Cap Timeris. Biomass estimates of pelagic fish, 1000 tonnes.		
Flat sardinella	Round sardinella	Carangids etc.
890	620	130

2.3 Pelagic fish on the shelf from Cap Timeris to Cap Blanc

There was only minor aggregations of sardinella off Cap Timeris and northwards along the narrow shelf outside the Banc D'Arguin. A school area of low and medium densities was found on the southern part of the broad shelf outside Cap Blanc.

In the shallow part inside this school area, a patch of high density of small sardinella 10-12 cm was found. A dense patch of juvenile sardinella was also found close inshore west of Cap Blanc. The aggregations of juvenile sardinella and carangids were not included in the biomass estimates of the respective groups. This is because their main distributional areas are thought to lie in shallow inshore waters which could not be covered by the survey. The patches which were surveyed would only represent incidental unknown parts of the total abundance of the juvenile stocks.

The total sardinella biomass was 260 000 tonnes with 63% flat sardinella, Table 2.

Another school area of sardinella was found north of the temperature front west of Cap Blanc. It seems likely that this extended northwards into West Sahara.

Limited patches of anchovy were recorded and identified in a few locations mostly in shallow water inshore and often mixed with juvenile sardinellas and carangids.

The carangids and associated species were only found in a few patches of low density over this part of the shelf, see Figure 5. No records of horse mackerel were made in the slope or over deep water on any of the survey tracks which were extended 5 to 10 nm off the shelf edge.

The catches of this group consisted of horse mackerels and scad with some hairtails, mackerel and Spanish mackerel *Scomberomorus tritor*. The biomass of the group was estimated at 60 000 tonnes.

Table 2 Cape Timeris to Cap Blanc. Biomass estimates of pelagic fish, 1 000 tonnes.		
Flat sardinella	Round sardinella	Carangids etc.
165	95	60

CHAPTER 3 OVERVIEW AND SUMMARY OF RESULTS

The survey was conducted successfully in the period 17 to 23 November with a course track of 1 500 nm and 42 fishing stations (Figure 1). The limits of the school areas of adult fish found are thought to have been well determined and the main areas adequately sampled..

The hydrographical data showed lowered surface temperatures inshore between St Louis and Cap Timeris with upward slanting isotherms shorewards from about 50 m depth. A distinct front was found west of Cap Blanc (Figures 2 and 3).

Sardinellas were found in high density between St Louis and Cap Timeris and in a few smaller school areas near Cap Blanc (Figure 4). Carangids and associated species only occurred in scattered distributions (Figure 5). No separate aggregations of horse mackerels of significant densities were located.

The total biomass of sardinellas was estimated at 1 780 000 tonnes with 60% flat and 40% round sardinella, that of the carangids and associated species 190 000 tonnes, see Table 3. Of this horse mackerels may roughly be assessed at 80 000 tonnes.

	Flat sardinella	Round sardinella	Carangids etc.
St. Louis-Cap Timeris	890	620	130
Cap Timeris-Cap Blanc	170	100	60
Total	1060	720	190

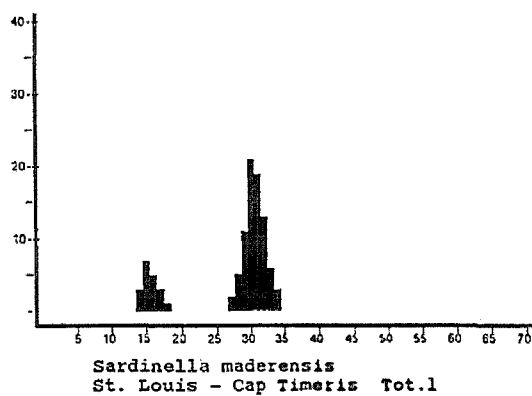
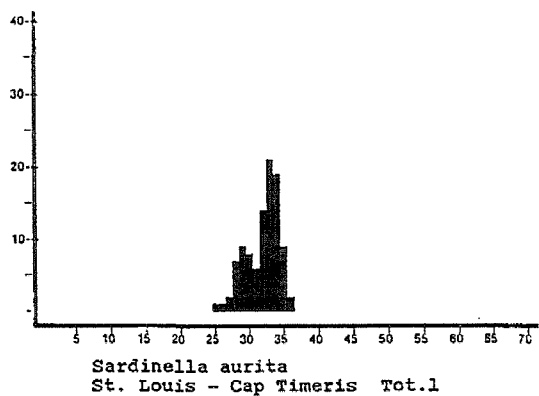
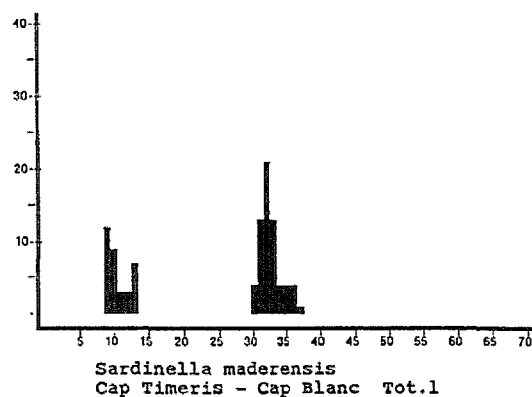
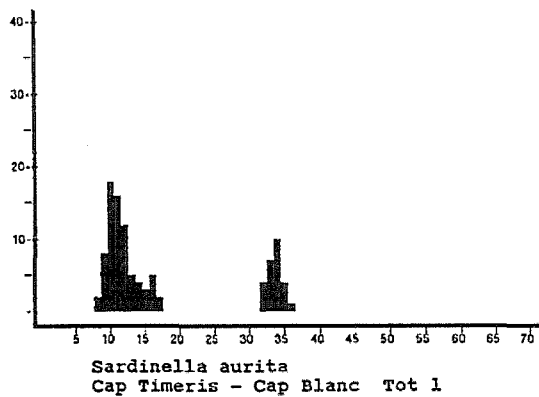
Table 4 lists biomass estimates of sardinellas and carangids and associated species from previous 'Dr Fridtjof Nansen' surveys of this shelf region. Compared with the surveys from the same season: Sept/81 and NovDec/86 the estimate of 1 780 000 tonnes of sardinellas from the current survey is high and close to that of the spring 1992 survey. The carangid estimate of 190 000 tonnes is similar to that from FebMar/92, but very much lower than the corresponding estimates

from the 1981, 1982 and 1986 surveys. Over the whole period there is a tendency for the carangid stocks to have been high when the sardinellas were low and vice versa.

Table 4 Biomass estimates from previous 'Dr Fridtjof Nansen' surveys of the Mauritanian shelf. 1 000 tonnes		
Survey:	Sardinellas	Carangids etc.
AprMay/81	20	370
Sept/81	75	*
FebMar/82	50	470
NovDec/86	300	540
FebMar/92	1 970	190

* Not available

Annex I Pooled length distributions by main species



Annex II Biomass and number by length

Sardinella aurita

Length cm	C. Blanc- C. Timeris		South of Cap Timeris		Total	
	Tonnes	Millions	Tonnes	Millions	Tonnes	Millions
13			1	0.1		
14						
15						
16						
17						
18						
19						
20				0.1		
21			6	0.1		
22			6	0.1		
23			274	2.4		
24			33	0.2		
25			653	4.1		
26			813	4.8		
27			2452	12.8		
28			9577	43.0		
29			13262	55.9		
30			24954	90.2		
31			23678	74.2		
32			88633	263.4		
33			185520	500.9		
34			166935	406.2		
35			89923	212.8		
36			11506	26.3		
37			921	2.0		
Sum	95000	230	619143	1699.6	715000	1930

Sardinella maderensis

Length cm	C. Blanc- C. Timeris		South of Cap Timeris		Total	
	Tonnes	Millions	Tonnes	Millions	Tonnes	Millions
13			13	0.6		
14			154	5.6		
15			393	12.4		
16			368	9.8		
17			204	4.6		
18			71	1.4		
19			26	0.4		
20			20	0.3		
21						
22						
23			24	0.2		
24			48	0.4		
25			90	0.6		
26			2848	16.3		
27			15903	78.0		
28			63895	298.8		
29			93040	384.4		
30			187097	722.7		
31			232047	806.4		
32			174072	538.2		
33			83006	235.6		
34			24459	64.5		
35			5775	14.3		
36			334	0.8		
37			2375	4.8		
Sum	165000	490	886263	3201.3	1050000	3690

Annex III Records of fishing stations

PROJECT STATION: 333
 DATE:16/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1612
 start stop duration Long W 1652
 TIME :05:30:00 05:50:00 20 (min) Purpose code: 1
 LOG :7871.00 7872.00 1.00 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 411 280 Validity code:
 Towing dir: 196° Wire out: 150 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 390.00 CATCH/HOUR: 1170.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
MYCTOPHIDAE	900.00		76.92	
Trichiurus lepturus	270.00	693	23.08	
Total	1170.00		100.00	

PROJECT STATION: 337
 DATE:16/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1630
 start stop duration Long W 1634
 TIME :19:43:00 19:50:00 7 (min) Purpose code: 1
 LOG :7999.30 7999.70 0.40 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 30 30 Validity code:
 Towing dir: 243° Wire out: 140 m Speed: 30 kn*10
 Sorted: 73 Kg Total catch: 299.70 CATCH/HOUR: 2568.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	865.71	2314	33.70	
Brachydeuterus auritus	694.29	11323	27.03	
Pomadasy peroteti	171.43	600	6.67	
Sardinella maderensis	154.29	549	6.01	639
Decapterus rhonchus	151.71	566	5.91	640
Pagellus bellottii	144.00	857	5.61	
Pteroscion pelli	64.29	514	2.50	
Sardinella aurita	60.00	189	2.34	638
Loligo vulgaris	47.14	343	1.84	
Pseudotolithus senegalensis	42.00	86	1.63	
Trachurus trecae	41.40	369	1.61	641
Galeoides decadactylus	36.00	171	1.40	
Pomadasy incisus	36.00	171	1.40	
Argyrosomus regius	24.00	86	0.93	
Sardinella aurita (Juvenile)	22.29	8571	0.87	
Sphyræna guachancho	13.71	86	0.53	
Penæus notialis	0.60	9	0.02	
Total	2568.86		100.00	

PROJECT STATION: 334
 DATE:16/11/95 GEAR TYPE: PT No:1 POSITION:Lat N 1612
 start stop duration Long W 1642
 TIME :07:39:00 08:00:00 21 (min) Purpose code: 1
 LOG :7887.00 7888.00 1.20 Area code :
 FDEPTH: 25 30 GearCond.code:
 BDEPTH: 70 78 Validity code:
 Towing dir: 285° Wire out: 90 m Speed: 36 kn*10
 Sorted: 58 Kg Total catch: 846.17 CATCH/HOUR: 2417.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	1532.14	6386	63.37	631
Brachydeuterus auritus	642.86	5209	26.59	
Selene dorsalis	163.29	814	6.75	
Sardinella maderensis	50.57	300	2.09	632
Decapterus rhonchus	12.43	43	0.51	
Trichiurus lepturus	6.43	129	0.27	
Trachurus trecae	5.57	43	0.23	
Brama brama	4.34	3	0.18	
Total	2417.63		99.99	

PROJECT STATION: 338
 DATE:16/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1632
 start stop duration Long W 1632
 TIME :23:23:00 23:36:00 13 (min) Purpose code: 1
 LOG :8034.30 8035.00 0.70 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 25 28 Validity code:
 Towing dir: 288° Wire out: 140 m Speed: 35 kn*10
 Sorted: 56 Kg Total catch: 477.50 CATCH/HOUR: 2203.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	984.92	3886	44.69	644
Sardinella aurita	977.08	2866	44.34	643
Brachydeuterus auritus	181.85	1883	8.25	
Decapterus rhonchus	56.31	1098	2.56	642
Pagellus bellottii	3.69	198	0.17	
Total	2203.85		100.01	

PROJECT STATION: 335
 DATE:16/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1608
 start stop duration Long W 1634
 TIME :11:35:00 12:00:00 25 (min) Purpose code: 1
 LOG :7923.90 7925.30 1.40 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 23 30 Validity code:
 Towing dir: 268° Wire out: 140 m Speed: 30 kn*10
 Sorted: 55 Kg Total catch: 136.62 CATCH/HOUR: 327.89

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	183.60	3233	55.99	633
Brachydeuterus auritus	70.20	768	21.41	
Pomadasy peroteti	41.69	151	12.71	
Trichiurus lepturus	7.37	84	2.25	
Chloroscombrus chrysurus	6.24	79	1.90	634
Sphyræna guachancho	5.76	31	1.76	
Lagocephalus laevigatus	2.57	7	0.78	
Decapterus rhonchus	2.28	19	0.70	
Sardinella aurita	2.04	31	0.62	635
Camponogramma glycos	1.92	7	0.59	
Loligo vulgaris	1.85	12	0.56	
Selene dorsalis	0.89	43	0.27	
Balistes caprisicus	0.84	7	0.26	
Pteroscion pelli	0.29	19	0.09	
Galeoides decadactylus	0.17	7	0.05	
Alectis alexandrinus	0.12	7	0.04	
Total	327.83		99.98	

PROJECT STATION: 339
 DATE:17/11/95 GEAR TYPE: BT No: POSITION:Lat N 1643
 start stop duration Long W 1631
 TIME :02:20:00 02:40:00 20 (min) Purpose code: 1
 LOG :8061.00 8062.00 1.00 Area code :
 FDEPTH: 22 23 GearCond.code:
 BDEPTH: 22 23 Validity code:
 Towing dir: * Wire out: 140 m Speed: 30 kn*10
 Sorted: 57 Kg Total catch: 200.65 CATCH/HOUR: 601.95

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	154.50	642	25.67	646
Pagellus bellottii	105.60	1323	17.54	
Galeoides decadactylus	81.90	1806	13.61	
Brachydeuterus auritus	77.10	651	12.81	
Decapterus rhonchus	26.40	168	4.39	645
Pomadasy incisus	25.50	138	4.24	
Zanobatus shoeneleini	25.20	42	4.19	
Arius heudeloti	18.90	96	3.14	
Gymnura altavela	18.60	12	3.09	
Loligo vulgaris	13.80	63	2.29	
Pomadasy peroteti	7.50	21	1.25	
Sparus caeruleostictus *	7.20	21	1.20	
Sardinella aurita	7.20	21	1.20	647
Chelidonicichthys gabonensis	7.20	54	1.20	
Pomadasy rogeri	6.90	12	1.15	
Solea senegalensis	6.30	12	1.05	
Pseudupeneus prayvensis	4.20	84	0.70	
Umbrina canariensis	3.30	12	0.55	
Penæus kerathurus, female	1.20	105	0.20	651
Penæus kerathurus, male	1.20	147	0.20	650
Dactylopterus volitans	1.20	12	0.20	
Penæus notialis, female	0.84	63	0.14	649
Penæus notialis, male	0.21	33	0.03	648
Total	601.95		100.04	

PROJECT STATION: 336
 DATE:16/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1618
 start stop duration Long W 1637
 TIME :14:03:00 14:28:00 25 (min) Purpose code: 1
 LOG :7944.80 7946.20 1.40 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 39 34 Validity code:
 Towing dir: * Wire out: 140 m Speed: 30 kn*10
 Sorted: 38 Kg Total catch: 7000.00 CATCH/HOUR: 16800.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	16407.50	57070	97.66	636
Sardinella maderensis	191.76	890	1.14	637
Pomadasy peroteti	169.44	446	1.01	
Brachydeuterus auritus	31.20	446	0.19	
Total	16800.00		100.00	

PROJECT STATION: 340
 DATE:17/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1650
 start stop duration Long W 1630
 TIME :07:49:00 08:22:00 33 (min) Purpose code: 1
 LOG :8115.70 8117.70 2.00 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 24 21 Validity code:
 Towing dir: 80° Wire out: 120 m Speed: 38 kn*10

Sorted: 14 Kg Total catch: 13.98 CATCH/HOUR: 25.42

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Chloroscombrus chrysurus	14.64	73	57.59
Acanthurus monroviae	4.95	7	19.47
Zanobatus schoenleinii	2.44	4	9.60
Sardinella maderensis	1.95	7	7.67
Pomadasys incisus	0.71	4	2.79
Decapterus rhonchus	0.51	2	2.01
Brachydeuterus auritus	0.22	2	0.87
Pennax kerathurus	0.02	2	0.08
Total	25.44	100.08	

PROJECT STATION: 341
 DATE:17/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1657
 start stop duration Long W 1624
 TIME :10:25:00 10:45:00 20 (min) Purpose code: 1
 LOG :8136.50 8137.60 1.10 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 19 18 Validity code:
 Towing dir: 250° Wire out: 120 m Speed: 30 kn*10

Sorted: 83 Kg Total catch: 83.35 CATCH/HOUR: 250.05

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
sardinella maderensis	194.70	732	77.86
sardinella aurita	55.35	177	22.14
Total	250.05	100.00	

PROJECT STATION: 342
 DATE:17/11/95 GEAR TYPE: BT No: POSITION:Lat N 1701
 start stop duration Long W 1635
 TIME :12:12:00 12:32:00 20 (min) Purpose code: 1
 LOG :8150.00 8151.00 1.10 Area code :
 FDEPTH: 86 81 GearCond.code:
 BDEPTH: 86 81 Validity code:
 Towing dir: 299° Wire out: 270 m Speed: 30 kn*10

Sorted: 57 Kg Total catch: 113.60 CATCH/HOUR: 340.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	144.60	948	42.43
Trichiurus lepturus	92.70	552	27.20
Illex coindetii	36.06	3828	10.58
Dentex congolensis	31.80	810	9.33
Loligo vulgaris	13.92	150	4.08
Zeus faber	7.02	12	2.06
Boops boops	6.06	366	1.78
Torpedo torpedo	3.78	6	1.11
Decapterus rhonchus	1.80	6	0.53
Scomber japonicus	1.56	6	0.46
Pagellus bellottii	0.90	6	0.26
Merluccius polli	0.42	6	0.12
Lepidotrigla caduani	0.18	6	0.05
Total	340.80	99.99	

PROJECT STATION: 343
 DATE:17/11/95 GEAR TYPE: BT No: POSITION:Lat N 1712
 start stop duration Long W 1635
 TIME :15:38:00 15:58:00 20 (min) Purpose code: 1
 LOG :8181.70 8182.70 1.00 Area code :
 FDEPTH: 106 112 GearCond.code:
 BDEPTH: 106 112 Validity code:
 Towing dir: 287° Wire out: 300 m Speed: 30 kn*10

Sorted: 14 Kg Total catch: 14.42 CATCH/HOUR: 43.25

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	17.43	54	40.29
Trichiurus lepturus	15.03	45	34.74
Brotula barbata	4.83	3	11.17
Zeus faber	3.42	3	7.91
Illex coindetii	1.50	240	3.47
Loligo vulgaris	0.36	3	0.83
Cepola pauciradiatus	0.30	3	0.69
Dentex congolensis	0.18	9	0.42
Merluccius polli	0.15	3	0.35
Solea senegalensis	0.03	3	0.07
Boops boops	0.03	3	0.07
Total	43.26	100.01	

PROJECT STATION: 344
 DATE:17/11/95 GEAR TYPE: PT No:6 POSITION:Lat N 1710
 start stop duration Long W 1627
 TIME :17:30:00 18:00:00 30 (min) Purpose code: 1
 LOG :8195.40 8196.70 1.30 Area code :
 FDEPTH: C 0 GearCond.code:
 BDEPTH: 67 73 Validity code:
 Towing dir: 285° Wire out: 100 m Speed: 260 kn*10

Sorted: 57 Kg Total catch: 198.05 CATCH/HOUR: 396.10

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
sardinella aurita	352.40	846	88.97
sardinella maderensis	29.40	104	7.42
Selene dorsalis	9.74	28	2.46
Caranx senegalensis	2.48	8	0.63
Trichiurus lepturus	2.08	8	0.53
Total	396.10	100.01	

PROJECT STATION: 345
 DATE:17/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 1716
 start stop duration Long W 1618
 TIME :21:27:00 21:42:00 15 (min) Purpose code: 1
 LOG :8229.90 8230.80 0.90 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 35 36 Validity code:
 Towing dir: 10° Wire out: 140 m Speed: 36 kn*10

Sorted: 86 Kg Total catch: 774.63 CATCH/HOUR: 3098.52

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sardinella maderensis	1497.60	5436	48.33
Chloroscombrus chrysurus	417.60	2916	13.48
Brachydeuterus auritus	352.80	2808	11.39
Sardinella aurita	316.80	864	10.22
Decapterus rhonchus	144.00	684	4.65
Trichiurus lepturus	129.60	252	4.18
Trachurus trecae	86.40	2556	2.79
Alectis alexandrinus	28.08	36	0.91
Loligo vulgaris	27.72	252	0.89
Pagellus bellottii	18.00	72	0.58
Selene dorsalis	18.00	72	0.58
Sepia bertheloti	17.28	144	0.56
Pomadasys incisus	15.48	72	0.50
Sparus caeruleostictus *	14.40	36	0.46
Pomadasys peroteti	11.52	36	0.37
Sardinella aurita (Juvenile)	3.24	540	0.10
Total	3098.52	99.99	

PROJECT STATION: 346
 DATE:18/11/95 GEAR TYPE: BT No: POSITION:Lat N 1731
 start stop duration Long W 1632
 TIME :03:45:00 04:08:00 23 (min) Purpose code: 1
 LOG :8279.33 8280.50 1.17 Area code :
 FDEPTH: 158 176 GearCond.code:
 BDEPTH: 158 176 Validity code:
 Towing dir: 287° Wire out: 450 m Speed: 30 kn*10

Sorted: 92 Kg Total catch: 407.91 CATCH/HOUR: 1064.11

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Chlorophthalmus atlanticus	414.78	30741	38.98
Merluccius polli	175.30	4070	16.47
Trachurus trecae	163.30	339	15.35
Synagrops microlepis	91.72	6449	8.62
Melicolenus dactylopterus	58.85	626	5.53
Scorpaena angolensis	51.97	3725	4.88
Pontinus kuhlii	29.74	125	2.79
Torpedo torpedo	22.85	31	2.15
GOBIDAE	19.10	3256	1.79
Parapenaeus longirostris, fem.	11.90	2504	1.12
Citharus linguatula	8.14	157	0.76
Parapenaeus longirostris, male	6.57	1534	0.62
Serrivomer sp.	3.13	63	0.29
Zenopsis conchifer	2.50	31	0.23
OPHIDIIDAE	1.57	31	0.15
MYCTOPHIDAE	1.57	438	0.15
Sardinella aurita	1.12	3	0.11
Total	1064.11	99.99	

PROJECT STATION: 347
 DATE:18/11/95 GEAR TYPE: PT No:7 POSITION:Lat N 1726
 start stop duration Long W 1612
 TIME :06:45:00 07:00:00 15 (min) Purpose code: 1
 LOG :8304.30 8305.20 0.90 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 25 26 Validity code:
 Towing dir: 12° Wire out: 140 m Speed: 36 kn*10

Sorted: 93 Kg Total catch: 277.50 CATCH/HOUR: 1110.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sardinella maderensis	655.20	2508	59.03
Sardinella aurita	291.60	804	26.27
Decapterus rhonchus	94.32	528	8.50
Brachydeuterus auritus	28.20	216	2.54
Trichiurus lepturus	16.92	36	1.52
Alectis alexandrinus	9.36	24	0.84
Selene dorsalis	7.58	36	0.69
Trachurus trecae	3.48	36	0.31
Pomadasys incisus	3.24	12	0.29
Total	1110.00	99.99	

PROJECT STATION: 348
 DATE:18/11/95 GEAR TYPE: PT No:1 POSITION:Lat N 1738
 start stop duration Long W 1620
 TIME :09:40:00 10:15:00 35 (min) Purpose code: 1
 LOG :8330.30 8333.00 2.70 Area code :
 FDEPTH: 30 30 GearCond.code:
 BDEPTH: 75 63 Validity code:
 Towing dir: 98° Wire out: 100 m Speed: 40 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 349
 DATE:18/11/95 GEAR TYPE: PT No:1 POSITION:Lat N 1739
 start stop duration Long W 1620
 TIME :11:41:00 11:50:00 9 (min) Purpose code: 1
 LOG :8343.30 8343.90 0.60 Area code :
 FDEPTH: 60 60 GearCond.code:
 BDEPTH: 102 107 Validity code:
 Towing dir: 102° Wire out: 140 m Speed: 35 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 350
 DATE:18/11/95 GEAR TYPE: FT No:7 POSITION:Lat N 1749 Long W 1608
 start stop duration
 TIME :15:48:00 16:18:00 30 (min) Purpose code: 1
 LOG :8384.40 8386.00 1.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 21 27 Validity code:
 Towing dir: 270° Wire out: 100 m Speed: 30 kn*10
 Sorted: 23 Kg Total catch: 23.20 CATCH/HOUR: 46.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	28.80	102	62.07	673
Sardinella aurita	14.42	42	31.08	674
Pomatomus saltatrix	1.78	2	3.84	
Pomadasy s rogeri	1.40	2	3.02	
Total	46.40		100.01	

PROJECT STATION: 351
 DATE:18/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1810 Long W 1617
 start stop duration
 TIME :21:50:00 22:05:00 15 (min) Purpose code: 1
 LOG :8442.40 8443.30 0.90 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 41 44 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 36 kn*10
 Sorted: 116 Kg Total catch: 116.24 CATCH/HOUR: 464.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	202.40	532	43.53	675
Sardinella maderensis	192.40	572	41.38	676
Trachurus trecae	34.32	312	7.38	674
Camopgramma glaycos	18.12	32	3.47	
Trichiurus lepturus	6.56	12	1.41	
Boops boops	5.40	208	1.16	
Scomber japonicus	3.24	8	0.70	
Pagellus bellottii	2.28	8	0.49	
Decapterus rhonchus	1.44	4	0.31	
Loligo vulgaris	0.80	24	0.17	
Total	464.96		100.00	

PROJECT STATION: 352
 DATE:19/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1836 Long W 1629
 start stop duration
 TIME :04:50:00 05:15:00 25 (min) Purpose code: 1
 LOG :8514.10 8515.20 1.10 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 88 87 Validity code:
 Towing dir: 180° Wire out: 140 m Speed: 30 kn*10
 Sorted: 21 Kg Total catch: 21.44 CATCH/HOUR: 51.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	28.92	187	56.20	
Sardinella maderensis	9.14	26	17.76	677
Sardinella aurita	4.61	14	8.96	678
Trachurus trecae	3.26	12	6.34	679
Camopgramma glaycos	2.59	2	5.03	
Saurida brasiliensis	1.63	343	3.17	
Scomber japonicus	1.10	2	2.14	
Illex coindetii	0.19	48	0.37	
Total	51.44		99.97	

PROJECT STATION: 353
 DATE:19/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1829 Long W 1627
 start stop duration
 TIME :05:56:00 06:26:00 30 (min) Purpose code: 1
 LOG :8518.90 8520.50 1.60 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 68 81 Validity code:
 Towing dir: 265° Wire out: 140 m Speed: 30 kn*10
 Sorted: 64 Kg Total catch: 277.70 CATCH/HOUR: 555.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	434.00	1270	78.14	681
Sardinella aurita	50.00	130	9.00	680
Trichiurus lepturus	40.00	70	7.20	
Scomber japonicus	17.60	30	3.17	682
Decapterus rhonchus	8.00	20	1.44	
Sarda sarda	3.80	2	0.68	
Trachurus trecae	2.00	10	0.36	
Total	555.40		99.99	

PROJECT STATION: 354
 DATE:19/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1829 Long W 1621
 start stop duration
 TIME :09:10:00 09:30:00 20 (min) Purpose code: 1
 LOG :8545.50 8546.70 1.20 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 44 43 Validity code:
 Towing dir: 354° Wire out: 140 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Total	0.00			

PROJECT STATION: 355
 DATE:19/11/95 GEAR TYPE: BT No: POSITION:Lat N 1840 Long W 1627
 start stop duration
 TIME :12:10:00 12:35:00 25 (min) Purpose code: 1
 LOG :8571.30 8572.80 1.50 Area code :
 FDEPTH: 73 67 GearCond.code:
 BDEPTH: 73 67 Validity code:
 Towing dir: 270° Wire out: 240 m Speed: 30 kn*10
 Sorted: 67 Kg Total catch: 66.64 CATCH/HOUR: 159.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	56.88	115	35.56	
Trachurus trecae	32.28	403	20.18	684
Sphoeroides spengleri	16.68	326	10.43	
Allosethis africana	14.42	1963	9.02	
Pagellus bellottii	11.62	53	7.27	
Decapterus rhonchus	8.88	10	5.55	683
Loligo vulgaris	5.33	125	3.33	
Solea senegalensis	3.98	542	2.49	
Uranoscopus albesca	3.12	5	1.95	
Dentex maroccanus	2.59	326	1.62	
Illex coindetii	2.40	74	1.50	
Sparus pagrus africanus *	0.70	2	0.44	
Boops boops	0.58	26	0.36	
Zeus faber	0.17	2	0.11	
Penaeus notialis	0.12	5	0.08	
Pseudupeneus prayensis	0.12	7	0.08	
Saurida brasiliensis	0.07	38	0.04	
Total	159.94		100.01	

PROJECT STATION: 356
 DATE:19/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1839 Long W 1628
 start stop duration
 TIME :13:18:00 13:48:00 30 (min) Purpose code: 1
 LOG :8577.00 8578.60 1.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 79 71 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10
 Sorted: 51 Kg Total catch: 205.80 CATCH/HOUR: 411.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	113.60	744	76.19	686
Sardinella maderensis	53.20	240	12.93	685
Trachinotus ovatus	44.80	88	10.88	687
Total	411.60		100.00	

PROJECT STATION: 357
 DATE:19/11/95 GEAR TYPE: BT No: POSITION:Lat N 1841 Long W 1636
 start stop duration
 TIME :15:12:00 15:27:00 15 (min) Purpose code: 1
 LOG :8589.50 8590.30 0.80 Area code :
 FDEPTH: 154 156 GearCond.code:
 BDEPTH: 154 156 Validity code:
 Towing dir: 180° Wire out: 450 m Speed: 30 kn*10
 Sorted: 46 Kg Total catch: 116.33 CATCH/HOUR: 465.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	285.60	752	61.38	
Trachurus trachurus	59.16	404	11.42	688
Chlorophthalmus atlanticus	43.88	4244	9.39	
Trachurus trecae	39.67	44	4.21	689
Synagrops microlepis	17.24	1820	3.70	
Merluccius polli	15.11	168	3.25	
Dentex macropthalmus	14.04	112	3.19	
Zeus faber	14.72	112	3.16	
Pontinus kuhlii	7.41	28	0.30	
Total	465.32		100.00	

PROJECT STATION: 358
 DATE:20/11/95 GEAR TYPE: FT No:2 POSITION:Lat N 1962 Long W 1629
 start stop duration
 TIME :02:55:00 03:10:00 15 (min) Purpose code: 1
 LOG :8701.00 8701.80 0.80 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 34 37 Validity code:
 Towing dir: 208° Wire out: 140 m Speed: 30 kn*10
 Sorted: 55 Kg Total catch: 95.45 CATCH/HOUR: 381.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	159.24	504	41.71	692
Decapterus rhonchus	58.96	868	15.44	691
Sardinella aurita	56.72	276	14.86	693
Diplodus sargus *	46.56	56	12.19	
Camopgramma glaycos	17.00	28	4.45	
Pomadasy incisus	16.32	84	4.27	
Trachurus trecae	7.56	160	1.98	690
Trichiurus lepturus	5.80	8	1.52	
Todaropsis eblanae	3.92	140	1.03	
Trachinotus ovatus	3.52	8	0.92	
Pagellus bellottii	3.36	20	0.88	
Auxis thazard	2.32	8	0.61	
Chelidonichthys obscurus	0.56	8	0.15	
Total	381.84		100.01	

PROJECT STATION: 359
DATE: 20/11/95 GEAR TYPE: BT No: POSITION: Lat N 1909 Long W 1641
start stop duration
TIME : 10:49:00 11:11:00 22 (min) Purpose code: 1
LOG : 8764.70 8766.00 1.30 Area code :
FDEPTH: 127 281 GearCond.code:
BDEPTH: 127 281 Validity code:
Towing dir: 5° Wire out: 450 m Speed: 30 kn*10

Sorted: 42 Kg Total catch: 1193.20 CATCH/HOUR: 3254.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macropthalmus	2901.82	18436	89.17	
Dentex angolensis	171.27	436	5.26	
Merluccius senegalensis	50.18	109	1.54	
Trachurus lepturus	31.64	436	0.97	
Trachurus trachurus	28.06	63	0.84	694
SCRSC18	19.64	109	0.60	
Zeus faber	16.36	109	0.50	
Merluccius merluccius	12.00	109	0.37	
Helicolenus dactylopterus	9.82	218	0.30	
Trachurus trachurus	6.68	19	0.21	695
Chlorophthalmus atlanticus	6.55	2727	0.20	
Pagellus acarne	1.64	3	0.05	
Total	3255.66		100.02	

PROJECT STATION: 360
DATE: 20/11/95 GEAR TYPE: BT No: POSITION: Lat N 1930 Long W 1700
start stop duration
TIME : 16:32:00 17:02:00 30 (min) Purpose code: 1
LOG : 8921.30 8922.90 1.50 Area code :
FDEPTH: 103 100 GearCond.code:
BDEPTH: 103 100 Validity code:
Towing dir: 100° Wire out: 300 m Speed: 30 kn*10

Sorted: 12 Kg Total catch: 1080.00 CATCH/HOUR: 2160.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus lepturus	2160.00	53888	100.00	
Total	2160.00		100.00	

PROJECT STATION: 361
DATE: 20/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 1938 Long W 1658
start stop duration
TIME : 19:16:00 19:36:00 20 (min) Purpose code: 1
LOG : 8942.90 8944.10 1.20 Area code :
FDEPTH: 40 40 GearCond.code:
BDEPTH: 70 73 Validity code:
Towing dir: 330° Wire out: 100 m Speed: 30 kn*10

Sorted: 56 Kg Total catch: 167.00 CATCH/HOUR: 501.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	337.05	946	67.28	696
Trachurus lepturus	103.95		20.75	
Sardinella maderensis	26.28	63	5.25	698
Trachurus trachurus	18.63	36	3.72	699
Sepia sp.	9.90	1511	1.98	
Scomber japonicus	5.13	9	1.02	697
Sepiella ornata	0.09	9	0.02	
Total	501.03		100.02	

PROJECT STATION: 362
DATE: 21/11/95 GEAR TYPE: BT No: POSITION: Lat N 2002 Long W 1736
start stop duration
TIME : 02:15:00 02:40:00 25 (min) Purpose code: 1
LOG : 8907.30 8908.50 1.20 Area code :
FDEPTH: 115 150 GearCond.code:
BDEPTH: 115 150 Validity code:
Towing dir: 89° Wire out: 300 m Speed: 30 kn*10

Sorted: 85 Kg Total catch: 176.11 CATCH/HOUR: 422.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	197.04	1440	46.62	
Umbria canariensis	67.68	163	16.01	
Trachurus trachurus	49.56	130	11.73	701
Scomber japonicus	30.36	55	7.18	700
Capros aper	27.96	780	6.62	
Pagellus acarne	24.48	84	5.79	
Zeus faber	12.48	12	2.95	
MYCTOPHIDAE	3.36	1020	0.79	
Helicolenus dactylopterus	3.00	24	0.71	
Octopus vulgaris	2.64	12	0.62	
Seranus cabrilla	1.44	12	0.34	
Trachurus trachurus	1.10	2	0.26	
Nezumia aequalis	0.72	24	0.17	
Chelidonichthys gabonensis	0.48	12	0.11	
Argyrosomus imperialis	0.24	24	0.06	
Spherooides spengleri	0.12	12	0.03	
Total	422.66		99.99	

PROJECT STATION: 363
DATE: 21/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2002 Long W 1714
start stop duration
TIME : 05:17:00 05:42:00 25 (min) Purpose code: 1
LOG : 8930.90 8932.30 1.40 Area code :
FDEPTH: 5 5 GearCond.code:
BDEPTH: 26 27 Validity code:
Towing dir: 180° Wire out: 120 m Speed: 30 kn*10

Sorted: 34 Kg Total catch: 957.90 CATCH/HOUR: 2298.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	1908.00	387562	82.59	702
Sardinella aurita (Juvenile)	253.44	29107	11.02	703
Decapterus rhonchus	66.96	180	2.91	705
Echeneis naucrates	28.08	36	1.22	
Pomadasys incisus	18.00	72	0.78	
Camogramma glaycos	10.08	36	0.44	
Trachurus juvenilis	7.20	792	0.31	
Sardinella maderensis (Juv.)	7.20	936	0.31	704
Total	2298.96		99.98	

PROJECT STATION: 364
DATE: 21/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2011 Long W 1727
start stop duration
TIME : 10:54:00 11:36:00 42 (min) Purpose code: 1
LOG : 8979.90 8981.90 2.00 Area code :
FDEPTH: 10 10 GearCond.code:
BDEPTH: 42 43 Validity code:
Towing dir: 180° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 365
DATE: 21/11/95 GEAR TYPE: BT No: POSITION: Lat N 2009 Long W 1727
start stop duration
TIME : 12:15:00 12:45:00 30 (min) Purpose code: 1
LOG : 8984.60 8986.20 1.60 Area code :
FDEPTH: 42 41 GearCond.code:
BDEPTH: 42 41 Validity code:
Towing dir: 50° Wire out: 150 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 279.18 CATCH/HOUR: 558.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	477.00	3366	85.43	707
Uranoscopus albesca	19.80	18	3.55	
Trachurus trachurus	14.94	1062	2.68	706
Lagocephalus laevisgatus	14.76	36	2.64	
Lagocephalus laevisgatus	13.68	126	2.45	
Arius parkii	12.24	18	2.19	
Decapterus rhonchus	5.04	18	0.90	
Citharus linguatula	0.90	18	0.16	
Total	558.36		100.00	

PROJECT STATION: 366
DATE: 21/11/95 GEAR TYPE: BT No: POSITION: Lat N 2019 Long W 1740
start stop duration
TIME : 16:05:00 16:20:00 15 (min) Purpose code: 1
LOG : 9018.80 9019.50 0.70 Area code :
FDEPTH: 239 232 GearCond.code:
BDEPTH: 239 232 Validity code:
Towing dir: 160° Wire out: 600 m Speed: 30 kn*10

Sorted: 58 Kg Total catch: 527.36 CATCH/HOUR: 2109.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Helicolenus dactylopterus	1785.00	29760	84.62	
Scorpaena sp.	99.00	300	4.69	
Dentex angolensis	67.20	240	3.19	
Trachurus trachurus	52.00	144	2.47	710
Merluccius senegalensis	45.60	120	2.15	
Trachurus trachurus	33.08	84	1.57	709
Umbria canariensis	12.60	60	0.60	
Scomber japonicus	12.56	24	0.60	708
Capros aper	2.40	120	0.11	
Total	2109.44		100.01	

PROJECT STATION: 367
DATE: 21/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2018 Long W 1700
start stop duration
TIME : 19:46:00 20:16:00 30 (min) Purpose code: 1
LOG : 9050.70 9052.30 1.60 Area code :
FDEPTH: 5 5 GearCond.code: 3
BDEPTH: 21 20 Validity code: 9
Towing dir: 180° Wire out: 130 m Speed: 32 kn*10

Sorted: 26 Kg Total catch: 266.50 CATCH/HOUR: 513.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	382.00	44862	74.45	716
Sardinella aurita	41.00	180	7.29	711
Sphyracna guachancho	40.40	320	7.89	
Sardinella aurita (Juvenile)	27.00	1980	5.25	713
Sardinella maderensis	13.00	40	2.53	712
Sardinella maderensis (Juv.)	3.80	200	3.74	714
Engraulis encrasicolus	2.40	440	0.47	715
Pagellus bellottii	1.20	60	0.23	
Scomber japonicus	0.80	20	0.16	
Coligo vulgaris	0.60	80	0.12	
Spherooides spengleri	0.40	20	0.08	
Sepiella ornata	0.20	20	0.04	
Penaeus notialis	0.20	20	0.04	
Total	513.00		100.00	

PROJECT STATION: 368
DATE: 21/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2016 Long W 1712
start stop duration
TIME : 21:11:00 21:26:00 15 (min) Purpose code: 1
LOG : 9058.10 9058.90 0.80 Area code :
FDEPTH: 5 5 GearCond.code:
BDEPTH: 20 20 Validity code:
Towing dir: 355° Wire out: 130 m Speed: 32 kn*10

Sorted: 31 Kg Total catch: 3107.00 CATCH/HOUR: 12428.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita (Juvenile)	12040.00	855016	96.09	717
Sardinella aurita	184.00	400	1.48	
Decapterus rhonchus	120.00	15600	0.97	
Engraulis encrasicolus	84.00	13600	0.69	718
Total	12428.00		100.01	

PROJECT STATION: 369
 DATE:22/11/95 GEAR TYPE: ET No: POSITION:Lat N 2034 Long W 1706
 start stop duration
 TIME :10:03:00 10:27:00 24 (min) Purpose code: 1
 LOG :9178.30 9179.70 1.40 Area code :
 FDEPTH: 28 29 GearCond.code:
 BDEPTH: 28 29 Validity code:
 Towing dir: 285° Wire out: 150 m Speed: 32 kn*10

Sorted: 30 Kg Total catch: 898.50 CATCH/HOUR: 2246.25

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	1875.00	240670	83.47	721
Sardinella aurita	295.50	10200	13.16	719
Loligo vulgaris	31.50	1725	1.40	
Pagellus bellottii	24.00	900	1.07	
Diplodus sargus *	13.50	1275	0.60	
Sardina pilchardus	5.25	600	0.23	720
Boops boops	1.50	75	0.07	
Total	2246.25		100.00	

PROJECT STATION: 370
 DATE:22/11/95 GEAR TYPE: ET No: POSITION:Lat N 2042 Long W 1724
 start stop duration
 TIME :14:35:00 15:05:00 30 (min) Purpose code: 1
 LOG :9217.60 9219.10 1.50 Area code :
 FDEPTH: 55 55 GearCond.code:
 BDEPTH: 55 55 Validity code:
 Towing dir: 16° Wire out: 180 m Speed: 30 kn*10

Sorted: 4 Kg Total catch: 3.75 CATCH/HOUR: 7.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Loligo vulgaris	7.50	114	100.00	
Total	7.50		100.00	

PROJECT STATION: 371
 DATE:22/11/95 GEAR TYPE: ET No: POSITION:Lat N 2041 Long W 17391
 start stop duration
 TIME :17:00:00 17:09:00 9 (min) Purpose code: 1
 LOG :9237.10 9237.60 0.50 Area code :
 FDEPTH: 199 208 GearCond.code:
 BDEPTH: 199 208 Validity code:
 Towing dir: 190° Wire out: 550 m Speed: 30 kn*10

Sorted: 28 Kg Total catch: 2482.20 CATCH/HOUR: 16548.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Helicolenus dactylopterus	10020.00	162000	60.55	
Capros aper	5742.00	280800	34.70	
Merluccius polli	390.00	1200	2.36	
Trachurus trachurus	270.00	600	1.63	
Pontinus accraensis	78.00	600	0.47	
Nezumia aequalis	48.00	1200	0.29	
Total	16548.00		100.00	

PROJECT STATION: 372
 DATE:22/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 2048 Long W 1712
 start stop duration
 TIME :22:02:00 22:29:00 27 (min) Purpose code: 1
 LOG :9285.10 9286.50 1.40 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 38 43 Validity code:
 Towing dir: 298° Wire out: 1403 m Speed: 30 kn*10

Sorted: 5 Kg Total catch: 451.20 CATCH/HOUR: 1002.67

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	777.78		77.57	
Euthynnus alletteratus	111.11		11.08	
Engraulis encrasicolus	87.78	7882	8.75	723
Loligo vulgaris	14.22	378	1.42	
Trachurus trecae	7.78	1622	0.78	722
Decapterus rhonchus	4.89	89	0.49	724
Sepia sp.	0.67	22	0.07	
Boops boops	0.67	67	0.07	
Total	1004.90		100.23	

PROJECT STATION: 373
 DATE:23/11/95 GEAR TYPE: ET No:7 POSITION:Lat N 2054 Long W 17086
 start stop duration
 TIME :00:30:00 00:37:00 7 (min) Purpose code: 1
 LOG :9301.10 9301.70 0.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 10 10 Validity code:
 Towing dir: 180° Wire out: 140 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 3002.42 CATCH/HOUR: 25735.03

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	22554.00	1752857	87.64	726
Engraulis encrasicolus	1682.57	291429	6.54	725
Decapterus rhonchus	718.29	3214	2.79	
Camopgramma glaycos	439.71	1071	1.71	
Trachurus trecae	278.57	21429	1.08	727
Pomatomus saltatrix	61.97	43	0.24	
Total	25735.11		100.00	

PROJECT STATION: 374
 DATE:23/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 2054 Long W 17116
 start stop duration
 TIME :01:50:00 02:20:00 30 (min) Purpose code: 1
 LOG :9307.30 9308.80 1.50 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 42 41 Validity code:
 Towing dir: 180° Wire out: 140 m Speed: 30 kn*10

Sorted: 21 Kg Total catch: 1518.48 CATCH/HOUR: 3036.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	2635.20	272880	86.77	728
Trachurus trecae	295.20	19584	9.72	729
Decapterus rhonchus	60.48	288	1.99	
Loligo vulgaris	46.08	1152	1.52	
Total	3036.96		100.00	

PROJECT STATION: 375
 DATE:23/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 2054 Long W 17159
 start stop duration
 TIME :03:38:00 03:43:00 5 (min) Purpose code: 1
 LOG :9314.90 9315.10 0.20 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 43 43 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10

Sorted: 40 Kg Total catch: 39.94 CATCH/HOUR: 479.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	217.20	720	45.32	730
Trichiurus lepturus	133.20	168	27.79	
Scomber japonicus	75.60	204	15.77	734
Decapterus rhonchus	19.20	48	4.01	733
Sardinella maderensis	18.72	48	3.91	732
Auxis thazard	8.40	12	1.75	
Sardinella aurita	4.56	12	0.95	731
Pomadasys incisus	2.40	12	0.50	
Total	479.28		100.00	

PROJECT STATION: 376
 DATE:23/11/95 GEAR TYPE: PT No:2 POSITION:Lat N 2054 Long W 17305
 start stop duration
 TIME :05:57:00 06:20:00 23 (min) Purpose code: 1
 LOG :9331.50 9332.70 1.20 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 85 79 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10

Sorted: 51 Kg Total catch: 50.92 CATCH/HOUR: 132.83

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	89.74	154	67.56	
Sardinella maderensis	27.65	83	20.82	736
Trachurus trecae	11.53	34	8.68	737
Sardinella aurita	2.61	8	1.96	735
Scomber japonicus	1.10	5	0.83	
Illex coindetii	0.21	5	0.16	
Total	132.84		100.01	

Annex IV Instruments and fishing gear used

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

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

Tranceiver-1 menu (38 kHz lowering keel)

Transducer depth	0.00 m
Absorbtion coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducer gain	28.1 dB
TS transducer gain	28.0 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg
Alongship offset	0.00 "
Athwardship offset	0.04 "

Display menu

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

Printer- menu

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

Bottom detection menu Minimum level -50 dB

Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl". Both the bottom trawl and the smallest pelagic trawl were used during the survey.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernet of 10 mm meshsize. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m², 1670 kg, their distance while trawling about 46 m in average. A tickler chain was used when trawling for shrimp.

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

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

NORAD/FAO/UNDP
GLO 92/013

CRUISE REPORT "DR FRIDTJOF NANSEN"



**SURVEY OF THE PELAGIC FISH RESOURCES
OFF NORTH WEST AFRICA**

Part 4 Morocco

24 November- 21 December 1995

**Institut Scientifique
des Pêches Maritimes,
Casablanca, Morocco**

**Institute of Marine Research,
Bergen,
Norway**

CRUISE REPORTS 'DR. FRIDTJOF NANSEN'

**SURVEY OF THE PELAGIC FISH RESOURCES
OFF NORTH WEST AFRICA**

**Part 4 Morocco
24 November- 21 December 1995**

by

T. Strømme

Institute of Marine Research
P. O. Box 1870 Nordnes
N-5024 Bergen, Norway

and

M. Chbani Idrissi

Institut Scientifique,
des Pêches Maritimes,
Casablanca, Morocco

**Institute of Marine Research
Bergen, 1995**

TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION	1
1.1	Survey Objectives	1
1.2	Participation	1
1.3	Narrative	2
1.4	Methods	5
CHAPTER 2	SURVEY RESULTS	8
2.1	Hydrography and weather conditions	8
2.2	Pelagic fish on the shelf from Cap Blanc to Cap Juby	12
2.3	Pelagic fish on the shelf from Cap Juby to Cap Jorf Lasfar	20
CHAPTER 3	CONCLUDING REMAKS	24
ANNEX I	Biomass and number by length	
ANNEX II	Records of fishing stations	
ANNEX II	Instruments and fishing gear used	

CHAPTER 1 INTRODUCTION

1.1 Survey objectives

A planning meeting was held in Casablanca in July 1995 with participants from Morocco, Mauritania, Senegal, Gambia, Guinea Bissau, FAO and the Institute of Marine Research, Bergen. During this meeting, the objectives and schedules of the programme were established.

The defined general objectives were to estimate the biomass and map the distribution of small pelagic fish stocks off NW Africa (Morocco, Mauritania, Senegal, the Gambia and Guinea Bissau) by hydro-acoustic methods and describe the hydrographic conditions over a period of 60 days, in November-December 1995.

The agreed objectives were:

To map the distribution and produce biomass estimates for the main small pelagic fish species: sardine *Sardina pilchardus*, sardinellas *Sardinella aurita*, *S. maderensis*, chub mackerel *Scomber japonicus*, horse mackerel *Trachurus trecae* and *T. trachurus*, false scad *Decapterus rhonchus*, anchovy *Engraulis encrasicolus* and other pelagic fish.

To sample standard hydrographical transects for temperature, salinity and oxygen off Dakhla, Cap Bojador, Cap Juby and Cap Ghir.

To sample the catches by recording length, weight and number by species.

The time allocated for this part of the survey was 26 days.

1.2 Participation

Members of the scientific team were:

CHBANI IDRISSE Mostafa, ABOUABDELLAH Lahcen, MESFIOUI Abdel-Hakim, CHFIRI Hamid and KADA Omar (from the Institut Scientifique de Pêches Maritimes, Casablanca, Morocco);

Tore STRØMME, Oddgeir ALVHEIM, Guillermo BURGOS, Martin DAHL and Bjarte KVINGE (from the Institute of Marine Research, Bergen, Norway)

1.3 Narrative

After embarking the Moroccan scientific team in Nouadhibou on 23 November, the survey started from Cape Blanc northwards. The general plan was to cover the shelf with acoustic transects 10 nm apart. Figure 1 (a-b) shows the survey tracks and the fishing and hydrographic stations. When approaching the Dakhla area the sardine was surfacing, probably due calm wind conditions. It was therefore necessary to return and sample again the near shore areas with sardine concentrations when the normal north-east wind resumed. The opportunity was taken to sample part of this track with a day and a night coverage, to assess day/ night differences under normal wind conditions. On 5 December the vessel called on Las Palmas for refuelling and loading equipment shipped from Norway. The acoustic survey track was resumed at Cape Bojador on the evening of 6 December. Between Cape Juby and Cap Dra the survey track on the outer shelf was opened to 20 nm due to poor fish recordings and to make up for the time spent on sampling the Dakhla area.

The vessel reached the planned northern limit of the survey area on 14 December and as fish concentrations were found, and as time permitted it, it was decided to extend the survey until Cap Jorf Lasfar. However, stormy weather was encountered and it was necessary to suspend work for about 24 hours off Safi.

The vessel called on Agadir on the 18 December for crew exchange, disembarkment of three Moroccan scientists and to allow a visit by the Moroccan authorities. The vessel left next day steaming to Las Palmas, while completing the cruise report. The vessel arrived at Las Palmas on the 20. December, with two Moroccan scientists and the Norwegian scientific team disembarking on the 21.

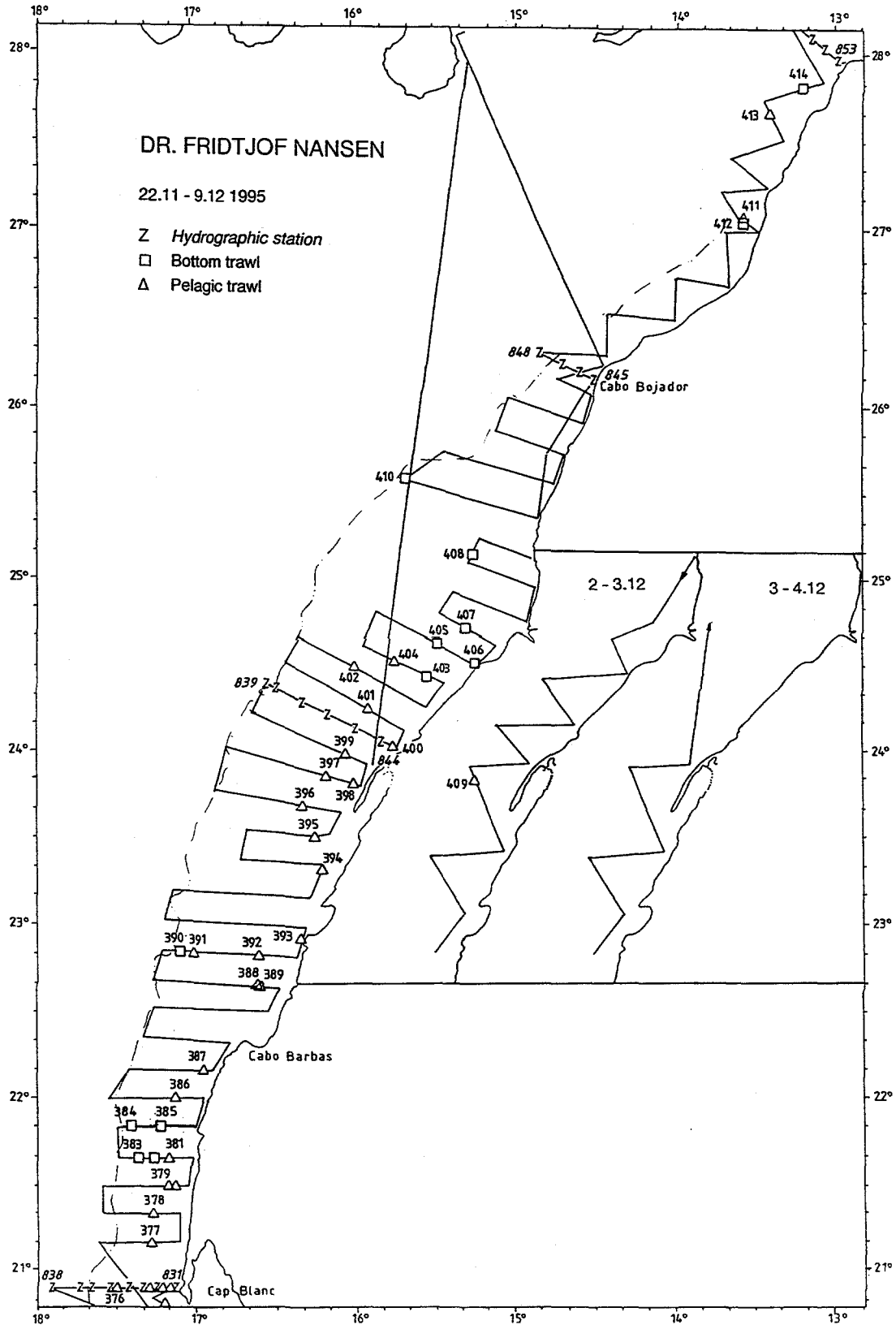


Figure 1a Course track and fishing and hydrographic stations

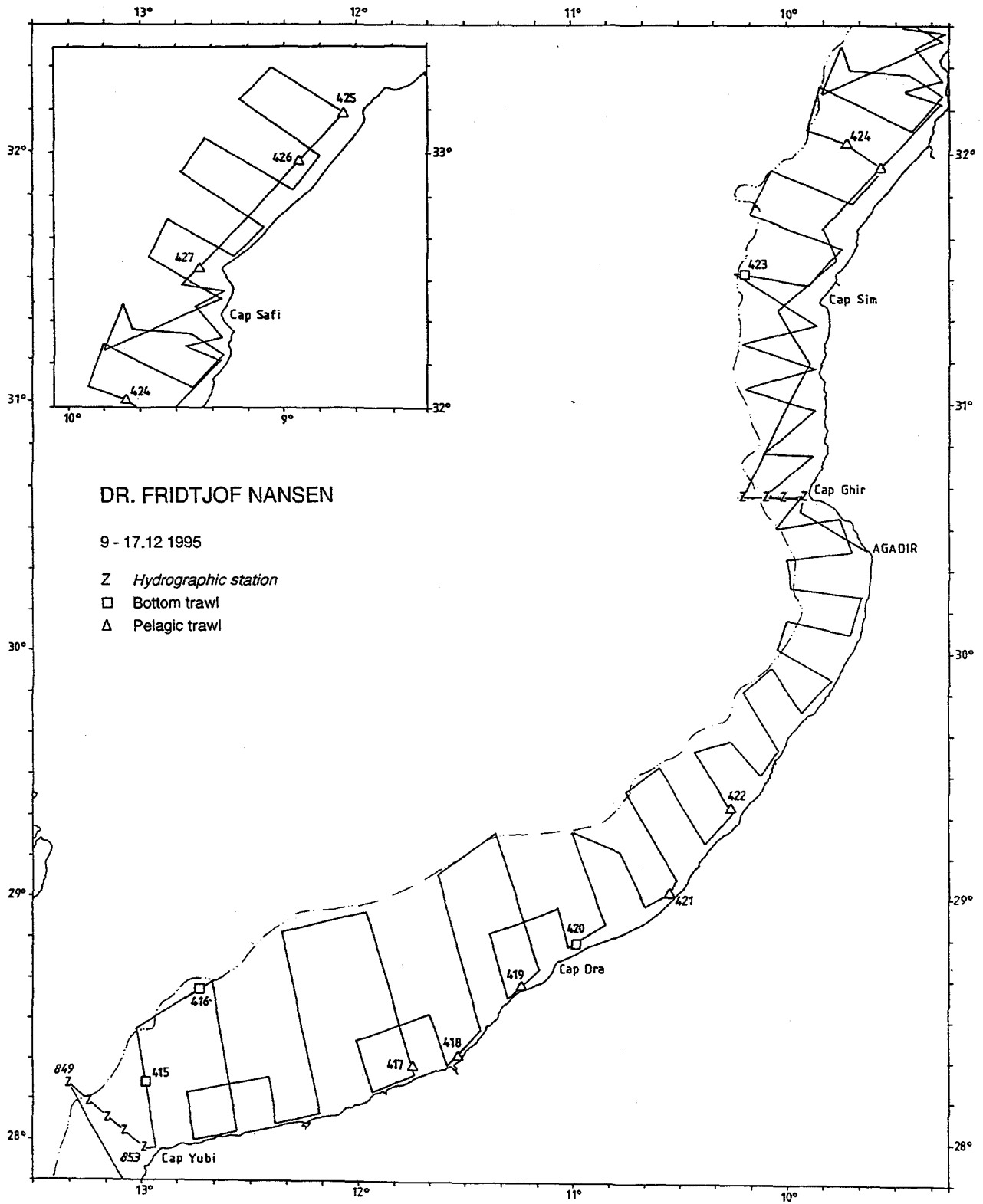


Figure 1b Course track and fishing and hydrographic stations

1.4 Methods

All catches were sampled for weight and numbers of each species. Length measurements (total length) were taken for target species. The complete records of fishing stations are shown in Annex II.

Surface and air temperature, wind speed, wind direction and solar radiation was logged automatically and recorded with position and bottom depth every nautical mile sailed.

Values for temperature, salinity and oxygen by depth were collected using a CTD sonde. These values were used to draw vertical profiles.

Simrad SA950 sonar was used for school counting and measurements of school areas by five nautical miles sailed. The sonar was set to monitor the surface waters between 25 and 300-metre distance from the starboard side of the ship. A computer program developed at IMR was used to automatically detect, count and measure fish schools.

The acoustic biomass estimates are based on the integration technique. The Bergen Integrator (BEI) was used for analysis and allocation of S_A values by species based on the composition in the trawl catches and on the characteristics of the acoustic traces. The BEI system allows better discrimination between bottom signals and dense schools close to the bottom than the previous EK500 system used during the 1992 surveys. This source of bias is thus much reduced with the present system.

The integrator values are plotted out in a working map and aggregations of fish are contoured, the mean integrator value of each aggregation is calculated and the areas are measured by a calibrated planimeter.

As for previous surveys, the North Sea herring target strength equation was used for all pelagic fish:

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

The biomass density in numbers/nm² of a length group i is calculated from the formula:

$$\rho_i = \frac{1}{4\pi} * \bar{s}_a \frac{n_i}{\sum_{i=1}^{\max} n_i k_i} \quad k_i = 10^{2 \log l_i - 7.2}$$

The formula can be further developed into:

$$\rho_i = 1261217 * \bar{s}_a \frac{n_i}{\sum_{i=1}^{\max} n_i l_i^2}$$

where s_a = mean total integrator value from a species distribution area in m^2/nm^2

n_i = frequency count of length group i in pooled representative sample from the distribution area.

l_i = total length of fish in length group i .

These densities are then converted from numbers to weight by applying a condition factor for the species, obtained from the samples. Abundance in number and weight is obtained by multiplying the densities with the area of the aggregations.

The above equation shows that conversion from Sa-value into number of fish is much dependant on the size composition of the fish. A representative pooled length distribution to use in the above equation and the biomass estimate are obtained through the following procedure:

- a. Each trawl station is given an integrator value, as a density index for the location.
- b. The length distribution of each fish aggregation (area in the map) is obtained from the samples believed to be representative for that aggregation.
- c. Each length sample is associated with a mean back scattering strength representative for the size distribution.
- d. The selected length distributions are then pooled using the ratio between the allocated Sa value and the mean back scattering strength for the size distribution as weighting factor.
- e. The pooled length distribution is used in the above formula to calculate the biomass density by length group, for each area in the map.
- f. Biomass is calculated as the product of the density and the area of the aggregation.
- g. The area-related biomass values from a map or a region are summed together.

The calculations in d.-e. are done automatically in NAN-SIS software after the scientist has completed steps a.-c.

The two sardinellas were treated as one species during the scrutinizing process and the mean Sa values were later separated by species (*S. aurita* and *S. maderensis*) according to the catch rates and the length distributions of the two species. The same method applies to the two horse mackerel species.

Annex III gives a description of the instruments and the fishing gear used.

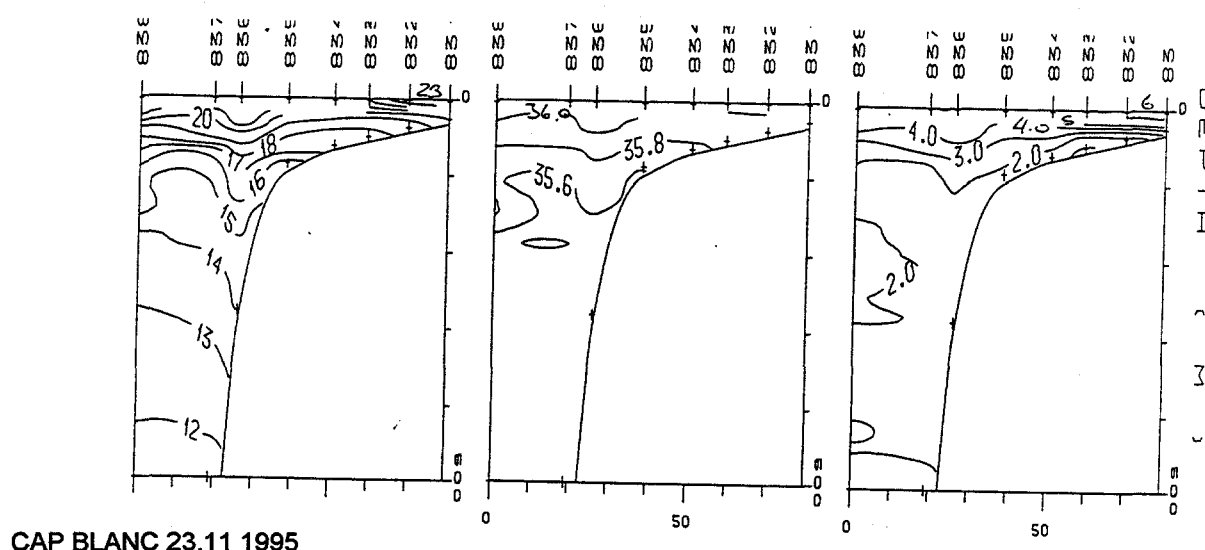
Upon completion of the survey the following data/documents were made available to the scientific team from Morocco: the present report; all data from fishing stations and length sampling (NAN-SIS format); bathymetric data of the cruise track with position and 1- nm resolution (ASCII format); working maps (A1 size) of: Sa values, bottom depths and wind conditions during the survey.

CHAPTER 2 SURVEY RESULTS

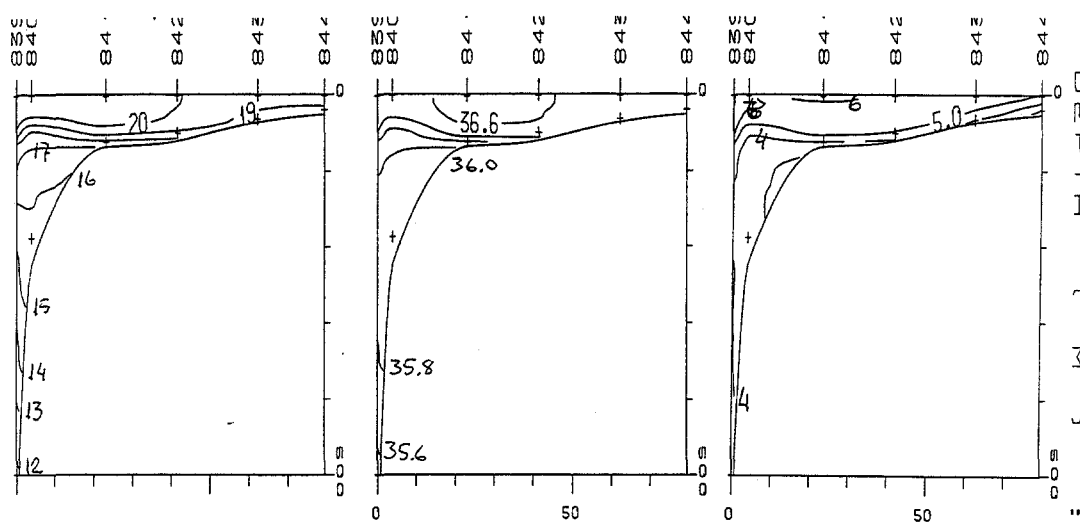
2.1 Hydrography and weather conditions

Figure 2 shows the distribution of temperature, salinity and oxygen in the five profiles and Figure 3 (a-b) the sea surface temperature at 5 m depth.

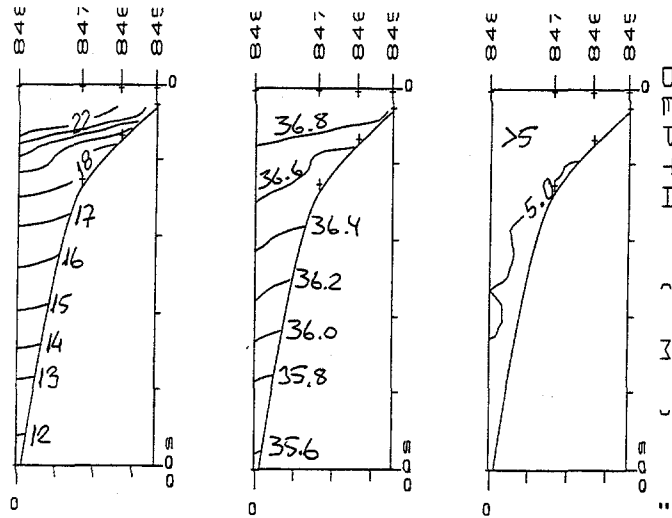
The distribution of surface temperature showed well developed coastal upwelling in the whole survey area with surface temperatures below 19°C near the coast south of Cape Bojador and decreasing to below 17°C in the north. The same pattern is pictured in the transects. There are no signs of oxygen depletion in the water over the shelf.



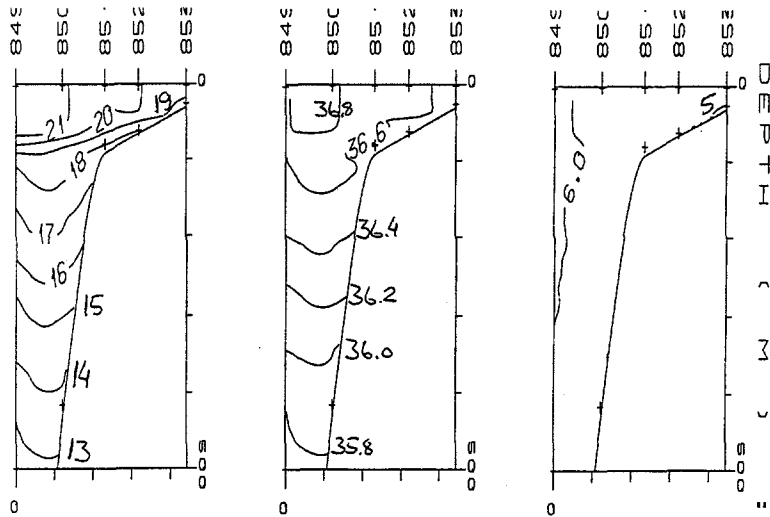
CAP BLANC 23.11 1995



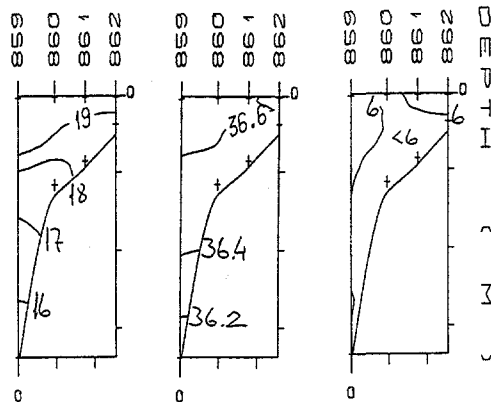
DAKHLA 30.11 1995



CAP BOJADOR 7.12 1995



CAP JUBY 9.12 1995



CAP GHIR 17.12 1995

Figure 2 Hydrographic profiles with distribution of temperature, salinity and oxygen

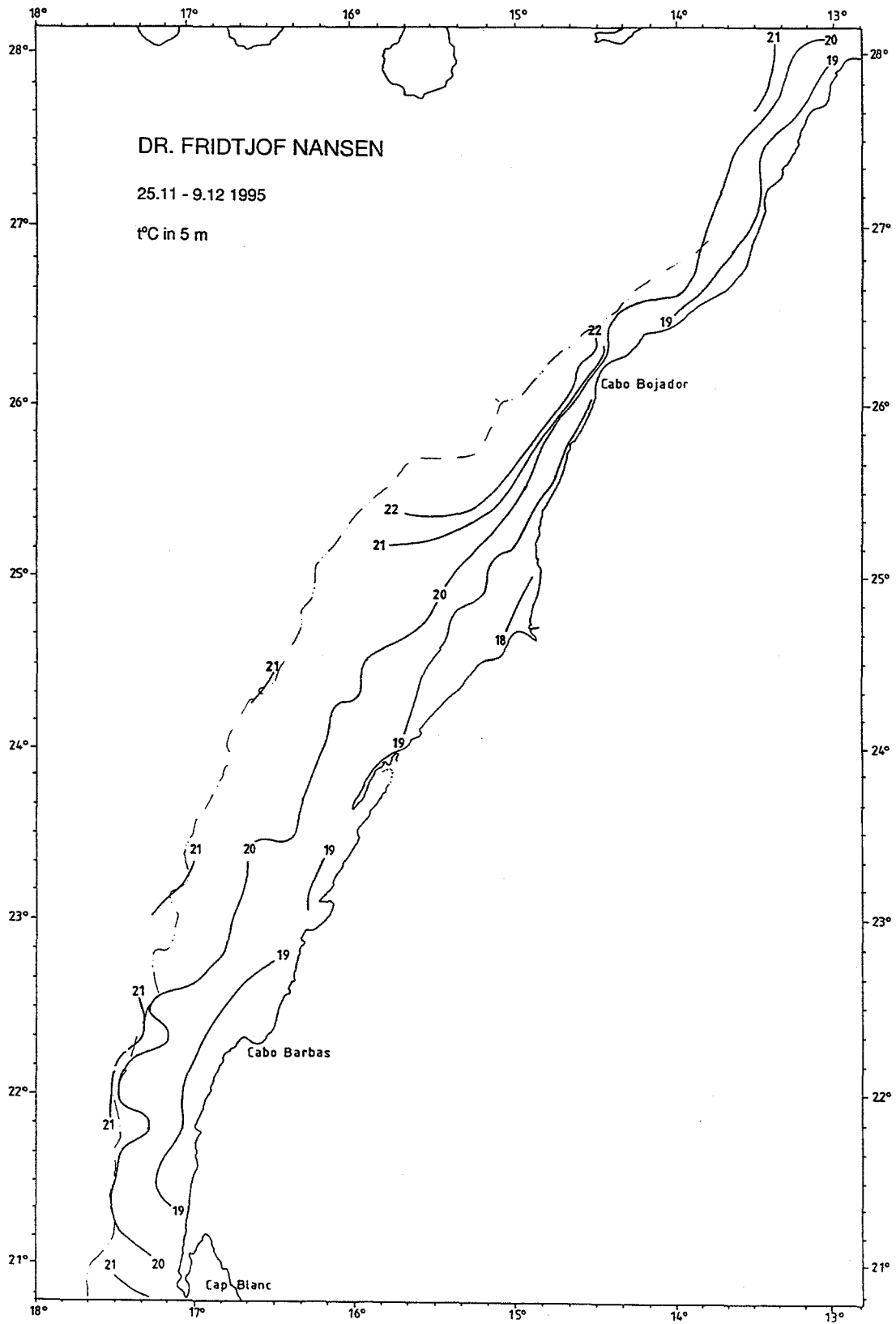


Figure 3a Sea surface temperature

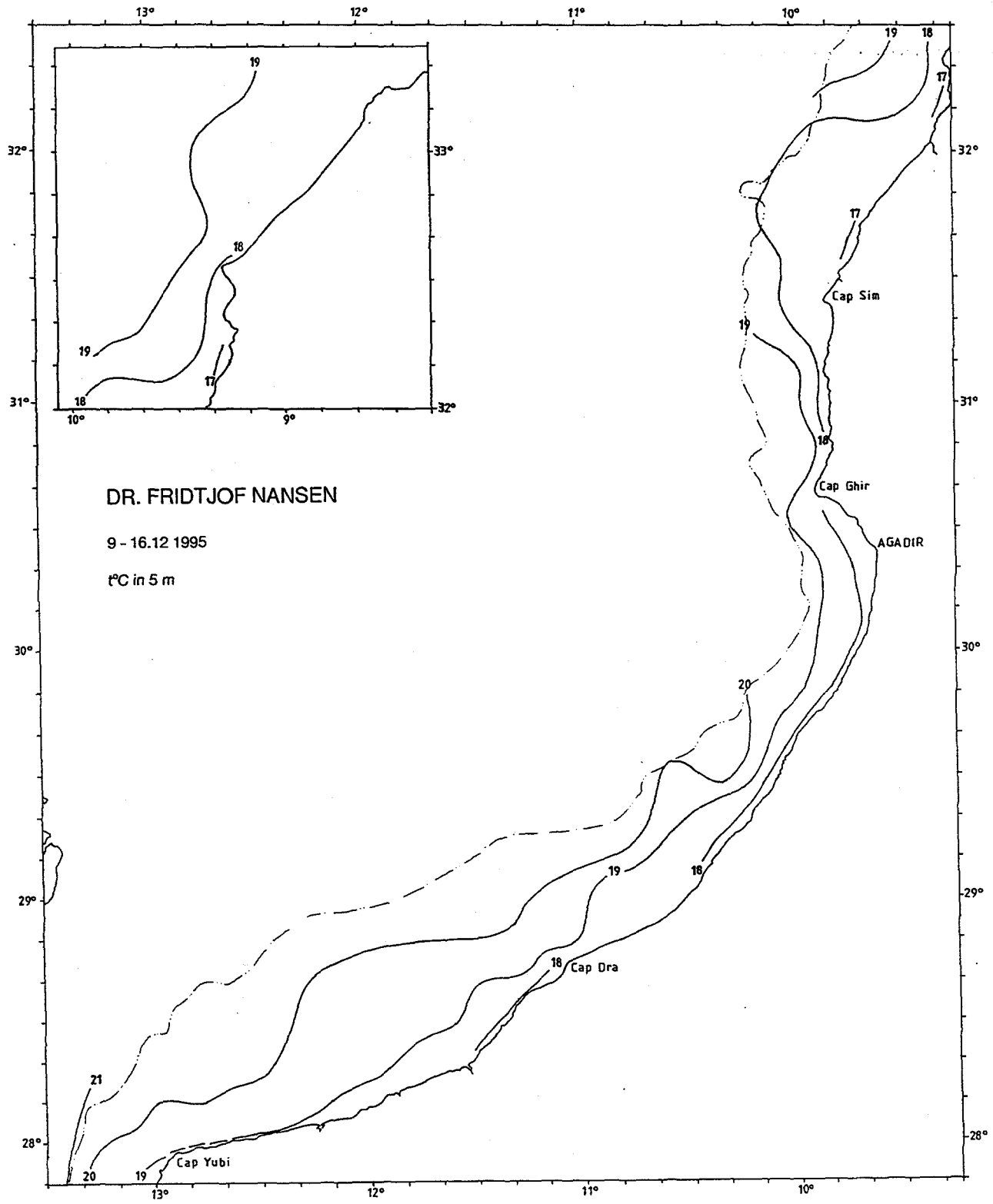


Figure 3b Sea surface temperature

The wind conditions along the survey track are shown in Figure 4 (a-b). Winds of varying strength from north-east characterised the survey between Cape Blanc and Cape Juby, interrupted by calm weather conditions for two days when operating at 23-24°N. Between Cape Juby and Safi the wind direction was more varying, and stormy weather from south-west was encountered for one day in the far north of the survey area. The weather conditions were favourable for acoustic work except during the calm weather and during the storm. The calm weather gave problems with surfacing schools.

2.2 Pelagic fish on the shelf from Cap Blanc to Cap Juby

Figures 5 to 8 show the distribution of the four main species groups of pelagic fish by contoured acoustic densities (it should be noted that the unit used is m^2/nm^2 which is 10 times that used in previous Nansen reports. The density levels used in the hatchings are consistent with previous reports).

Sardine (fig. 5) was found in a major aggregation between Cape Barbas and northwards to 25°N. As during previous surveys the highest densities were found close to the shore and the centre of the distribution is around Dakhla or 24°N. Small pockets of sardine were found further north and one small aggregation was recorded in the south at 22°N.

Sardinellas (fig. 6), were found in patches as far north as 25°N. The aggregation found from Cap Blanc and northwards is a continuation of the sardinella distribution found in Mauritania. In previous 'Dr. Fridtjof Nansen' surveys in this region (Sept. 1986, Sept. 1989, Jan.1992), sardinellas were first recorded in small amounts in 1992. The present distribution, with the sardinellas occupying and dominating the outer shelf at the centre of the sardine population has not been observed before. These concentrations represent the continuation of the population in Mauritania and Senegal, which in later years has increased several times from its level in the 80ies.

Horse mackerel (fig. 7) was found at most locations between Cap Blanc to a little north of Cap Barbas. Further north, only spurious occurrences were encountered.

Chub mackerel (fig. 8), was found in an aggregation at 25°N and a few weak spots south of Cabo Barbas.

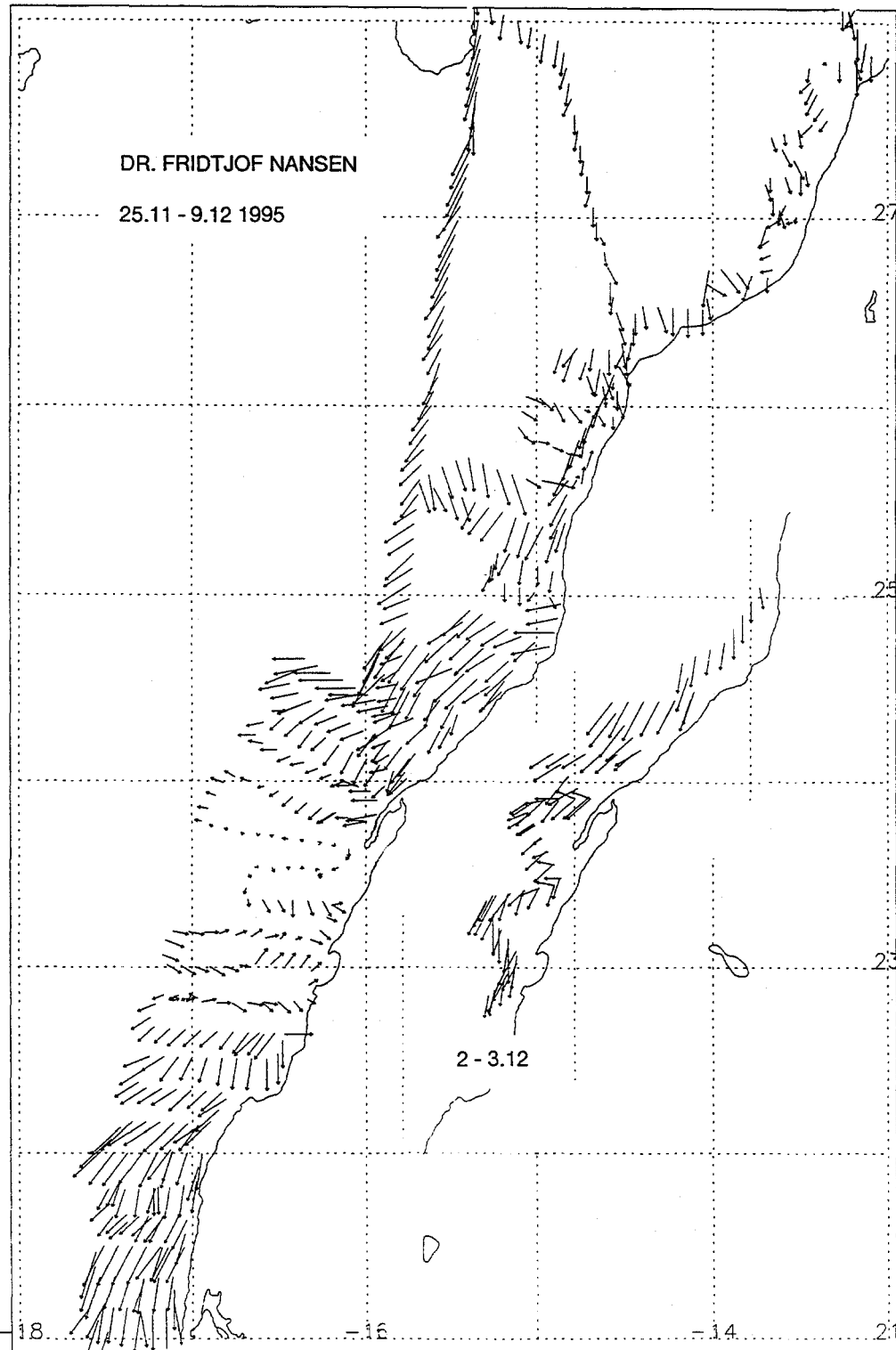


Figure 4a Wind conditions along the cruise track

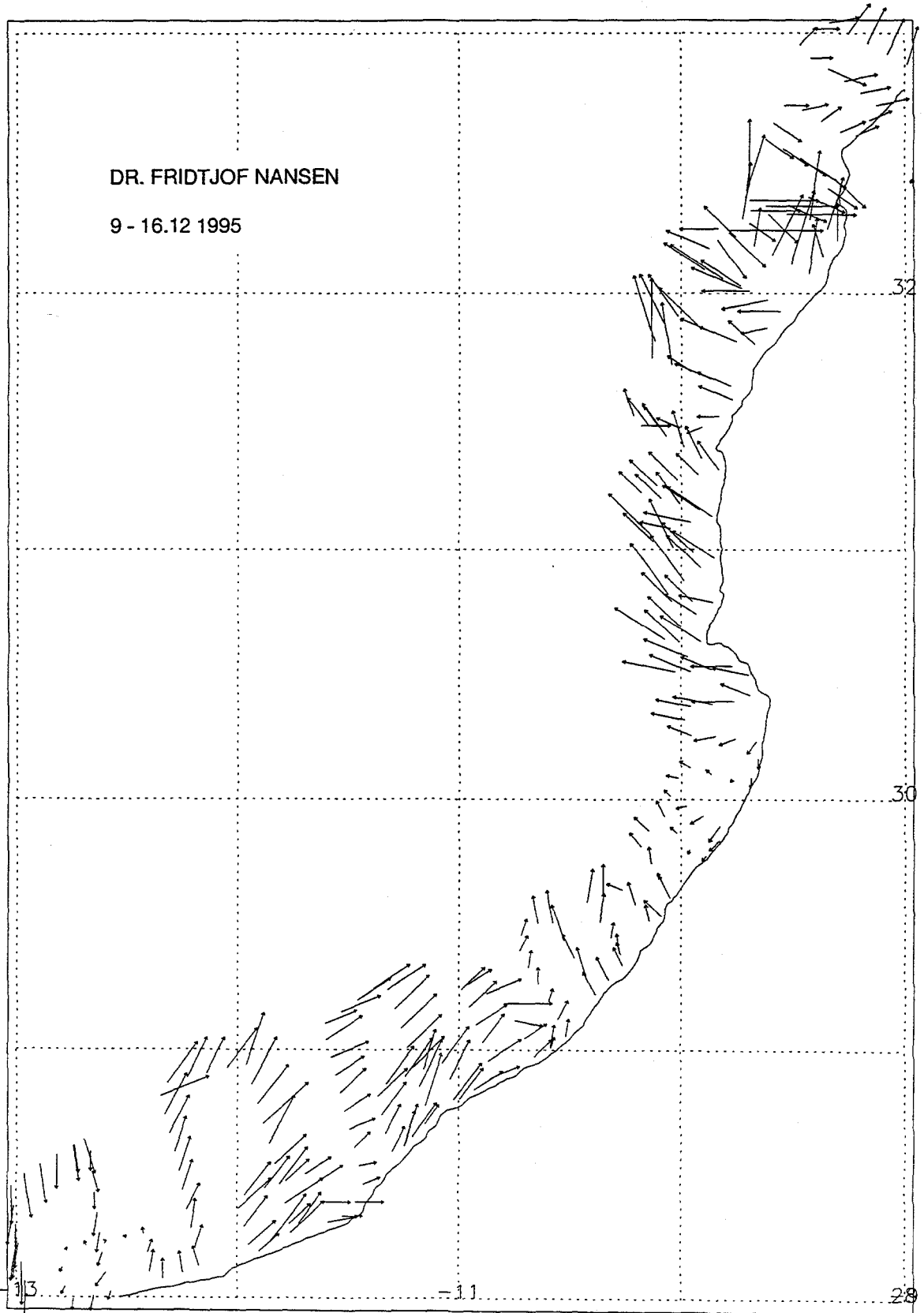


Figure 4b Wind conditions along the cruise track

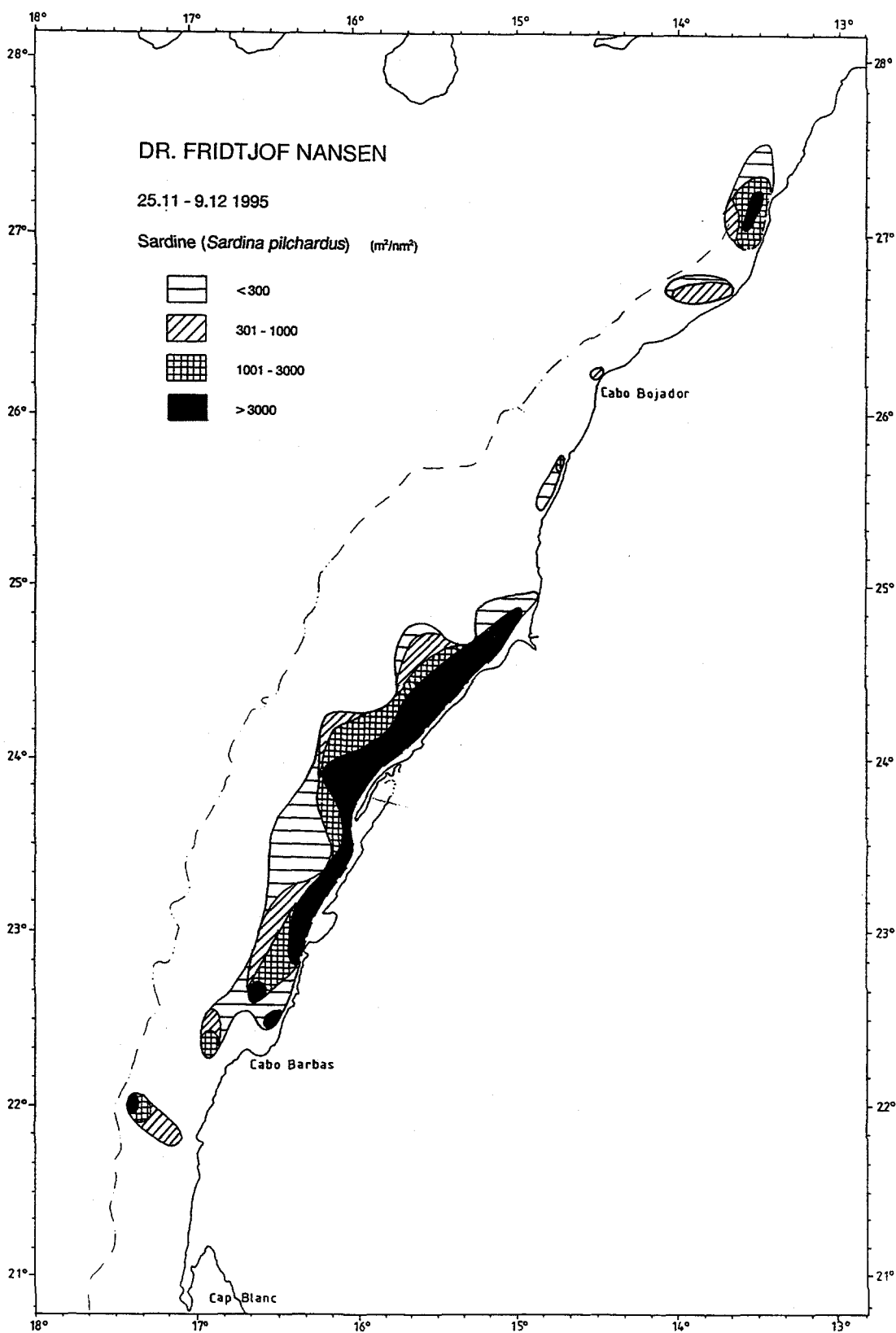


Figure 5 Distribution of sardine, Cap Blanc to Cap July

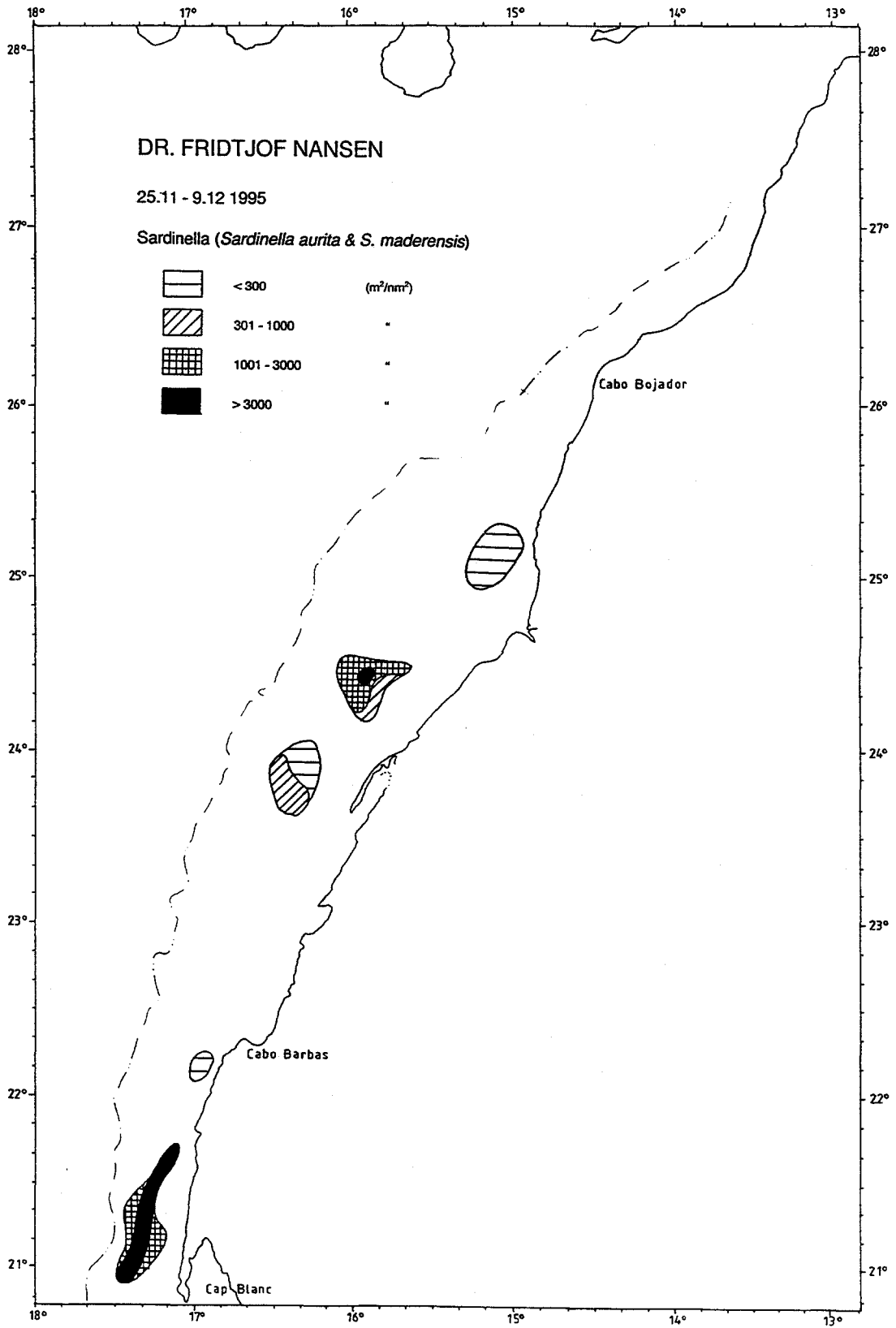


Figure 6 Distribution of sardinella, Cap Blanc to Cap Juby

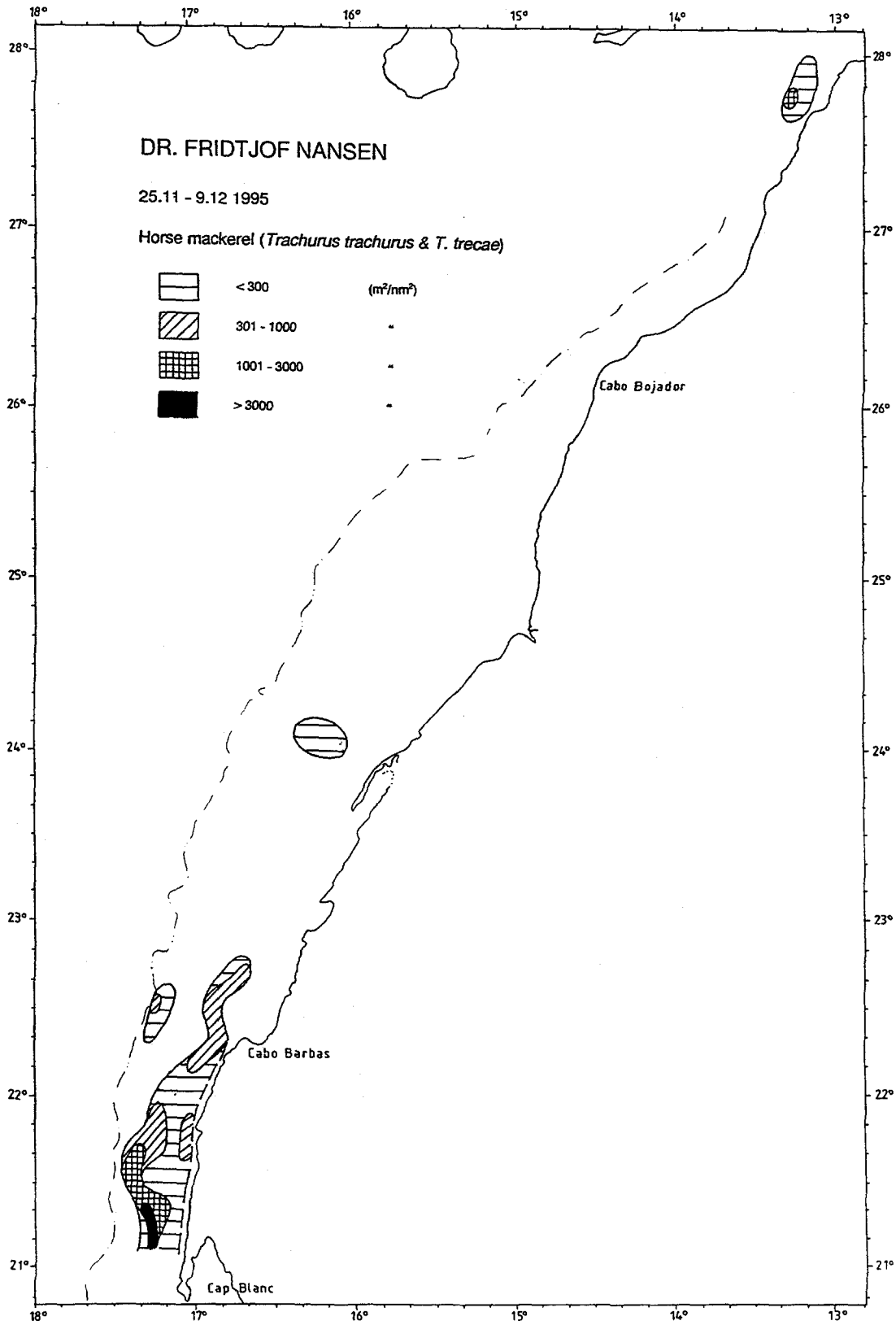


Figure 7 Distribution of horse mackerel, Cap Blanc to Cap Juby

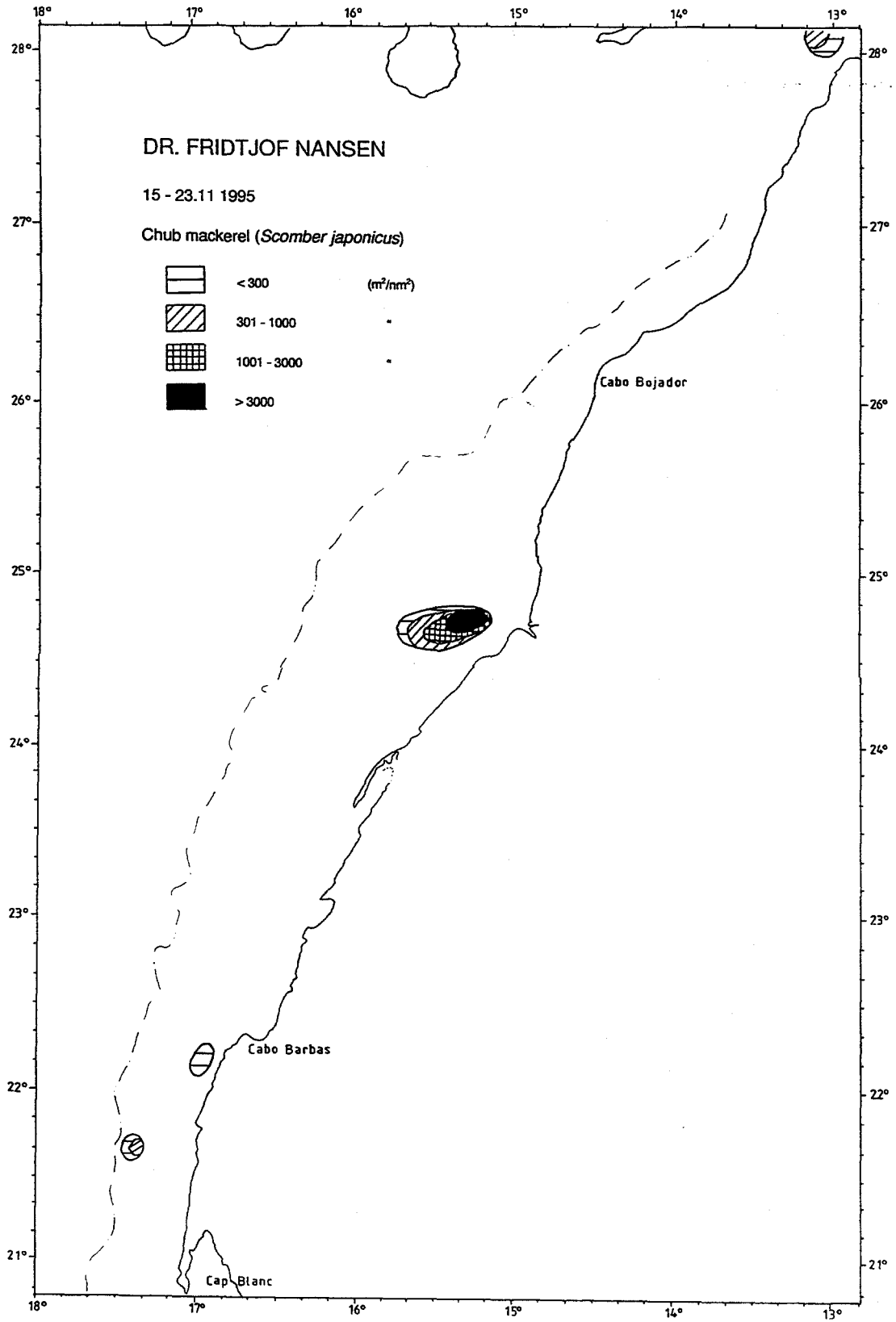


Figure 8 Distribution of chub mackerel, Cap Blanc to Cap Juby

Biomass estimates

Detailed biomass estimates in number and weight by length groups are shown in Annex I.

The sardine was estimated to 3.43 million tonnes. The length distribution is shown in Figure 9. Bhattacharya analysis gave three main cohorts in the population with modes on 12.5, 17.5 and 22.5 cm and biomasses of respectively 129, 160 and 2 970 tonnes.

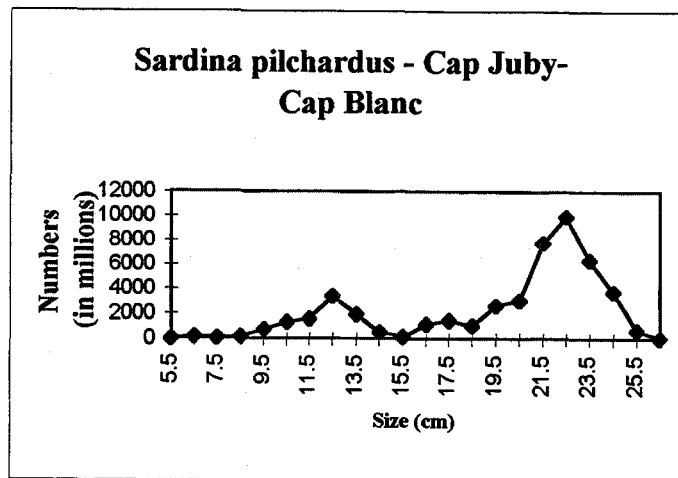


Figure 9 Length frequency distributions of sardine Cap Juby-Cap Blanc

Table 1 gives the estimates of sardinella and horse mackerel. The total estimate of sardinella is 955 thousand tonnes of which 67% is round and 33% is flat sardinella. The total estimate of horse mackerel is 340 thousand tonnes of which 74% is Atlantic and 26% is Cunene horse mackerel.

Table 1 Cap Blanc to Cap Juby. Biomass estimates of pelagic fish, 1000 tonnes				
Sardines	Round sardinella	Flat sardinella	Atlantic horsem.	Cunene horsem.
3430	640	315	250	90

2.3 Pelagic fish on the shelf from Cap Juby to Cap Jorf Lasfar.

Sardine was found in most of the shallow areas in the region (fig. 11). The main concentrations with high densities were between 10° and 12°W. Outside this area mainly scattered occurrences were encountered. The estimated length frequency distribution (fig. 10) shows that most of the sardine is small sized, below 18cm. From Bhattacharya analysis two modes were detected, at 13.5 and 18.3 cm, respectively.

Horse mackerel was identified by echotraces at two locations, the main part scattered (fig. 12). Chub mackerel was located in scattered patches along the coast (fig. 13), usually outside the sardine distributions.

Anchovy was only found in low densities in very few hauls and it was practically not possible to produce maps or any biomass estimates for this species.

In the surveyed area north of Safi substantial amounts of young fish of various species, but mainly sardine were recorded off the bottom, in the shallow waters. This fish was around 5-6 cm length and is not included in the maps or in any biomass estimates.

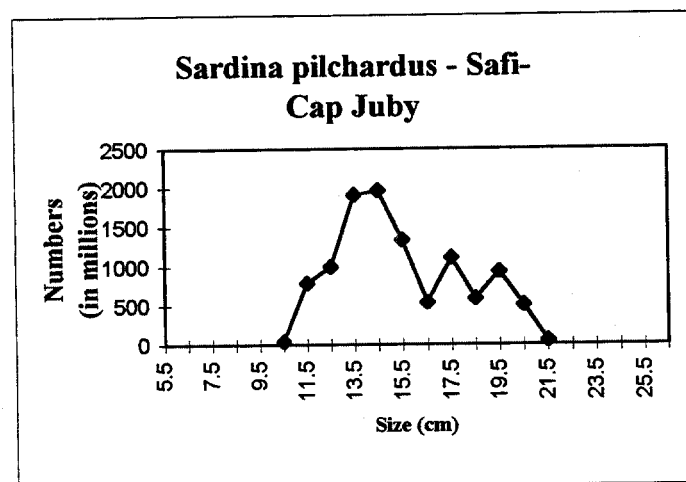


Figure 10 Length frequency distribution of sardine Cap Juby-Cap Jorf Lasfar

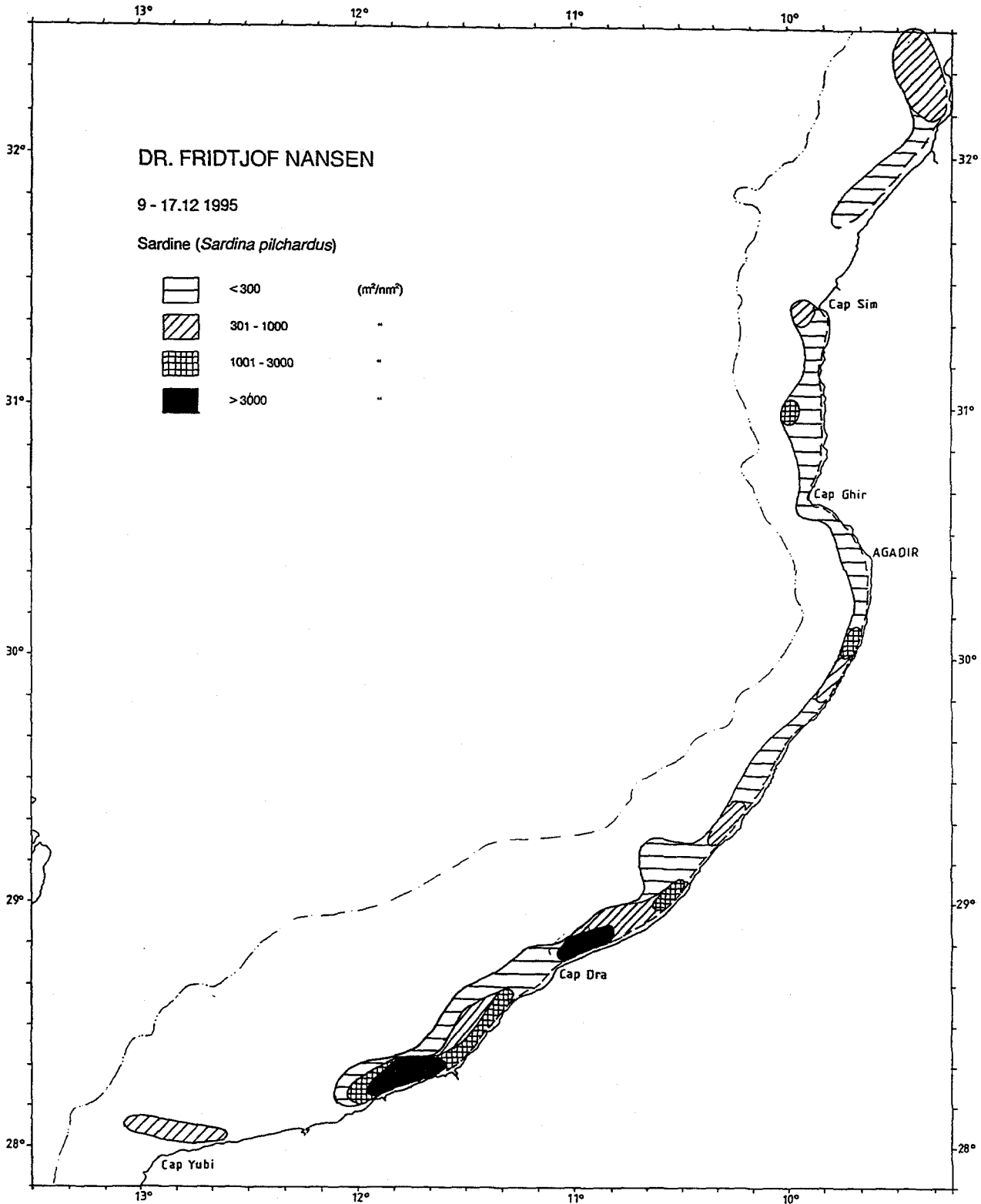


Figure 11 Distribution of sardine, Cap Juby to Cap Jorf Lasfar

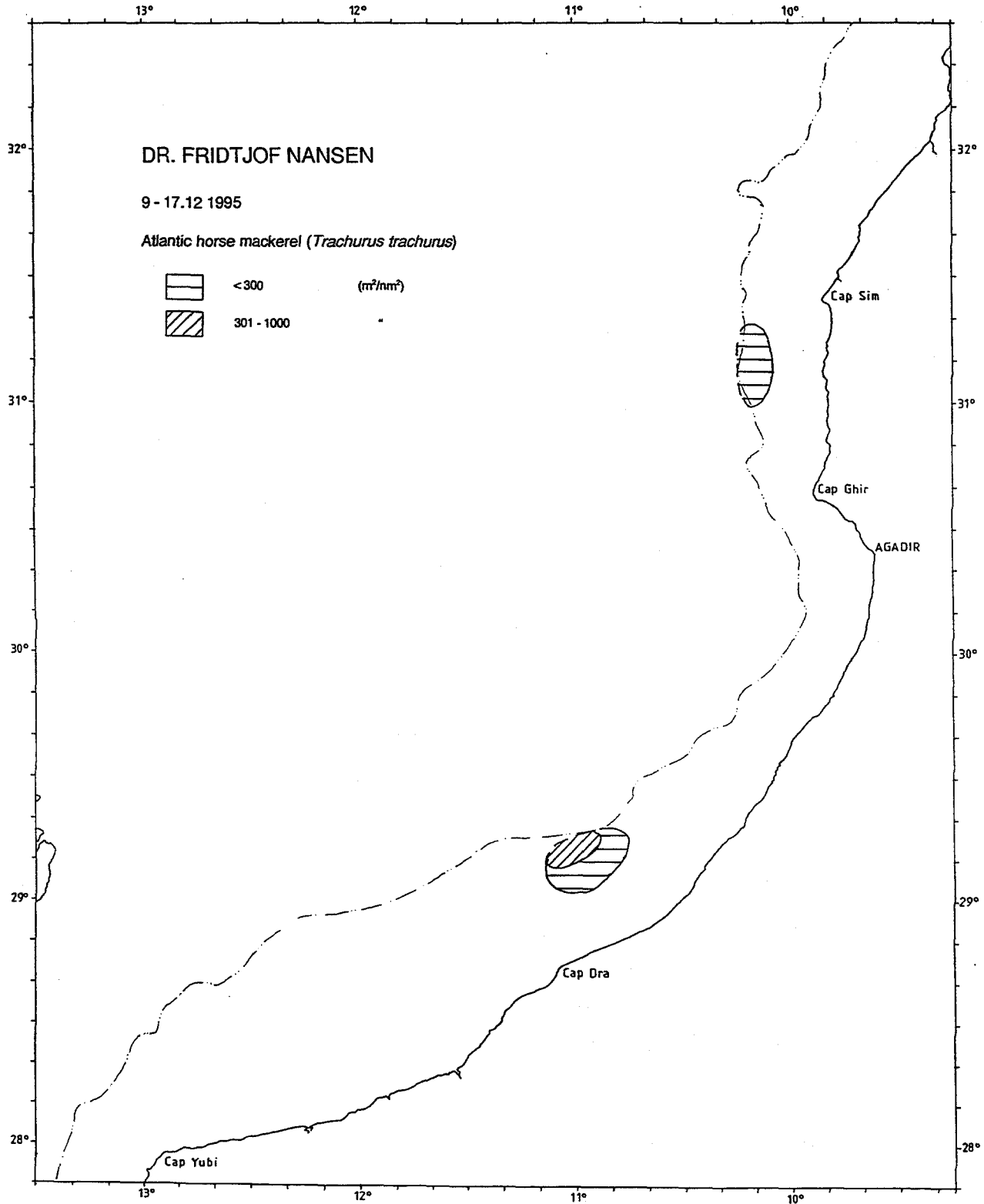


Figure 12 Distribution of horse mackerel, Cap Juby to Cap Jorf Lasfar

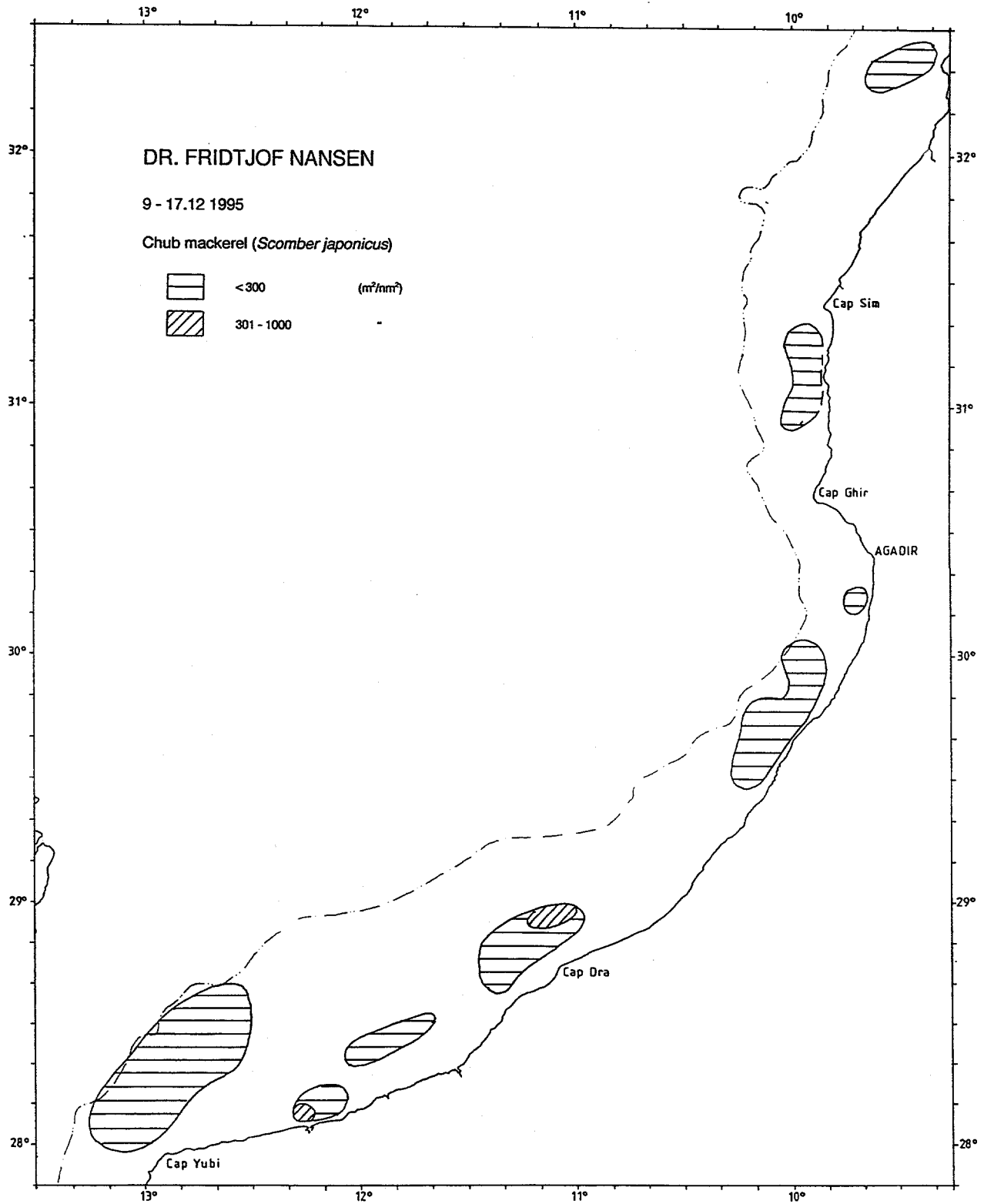


Figure 13 Distribution of chub mackerel, Cap Juby to Cap Jorf Lasfar

Biomass estimates

The sardine was estimated to 315 thousand tonnes of which 112 tonnes belong to the 13.5 cm modal length group and 172 tonnes to the 18.3 cm modal length group.

The estimate for horse mackerel in the northern area is only 8 thousand tonnes.

Chub mackerel was estimated to 32 thousand tonnes of which 30 thousand tonnes was of size less than 20cm.

CHAPTER 3 CONCLUDING REMARKS

The survey was conducted successfully in the period 24 November to 21 December with a course track of 4 800 nm and 51 fishing stations. The limits of the school areas of the targeted species are thought to have been well determined and the main areas adequately sampled.

The hydrographic data show well developed upwelling along the entire coastline, and the whole shelf holds water well enriched with oxygen. Except for the upwelling, no fronts or oceanographic barriers were observed on the shelf.

Sardine was found in high densities between CaboBarbas and 25°N, between Tan Tan and 12°W and at one location between Cap Bojador and Cap Juby. Outside these locations the species was found scattered in most of the shallow areas north of Cap Juby.

Round and flat sardinellas were found north to 25°N, in considerable abundance and density at two locations, northwest of Cap Blanc and northwest of Dakhla. The presence of sardinella in high abundance so far north, and almost coexisting with the sardine, has not been earlier reported. This might be the result of the expansion of the population in the 90ies.

Horse mackerel was found in high abundance between Cap Blanc and Cabo Barbas, a continuation of the distribution recorded in Mauritania during the previous survey. Further north, horse mackerel was recorded only in scattered aggregations.

A good concentration of chub mackerel was located at 25°N. Further north the species was common but usually in low densities that mainly consisted of small fish less than 20 cm.

The biomass estimates are summarized in Table 2.

	C. Blanc-C. Juby	C. Juby- Safi	Total
Sardine	3435	315	3750
Sardinellas	955	0	955
Chub mackerel	160	30	190
Horse mackerel	340	8	348

Figure 14 shows the biomass estimates of sardine compared with results from previous Dr. Fridtjof Nansen surveys. The sardine in the south shows a decline from 4.05 million to 3.43 million tonnes since the previous survey, and the stock is now probably at the same level as in 1989. The central stock between Cap Juby and Safi is estimated to the same size as in 1992 and has still not recovered from its low level compared to the situation in the 80ies.

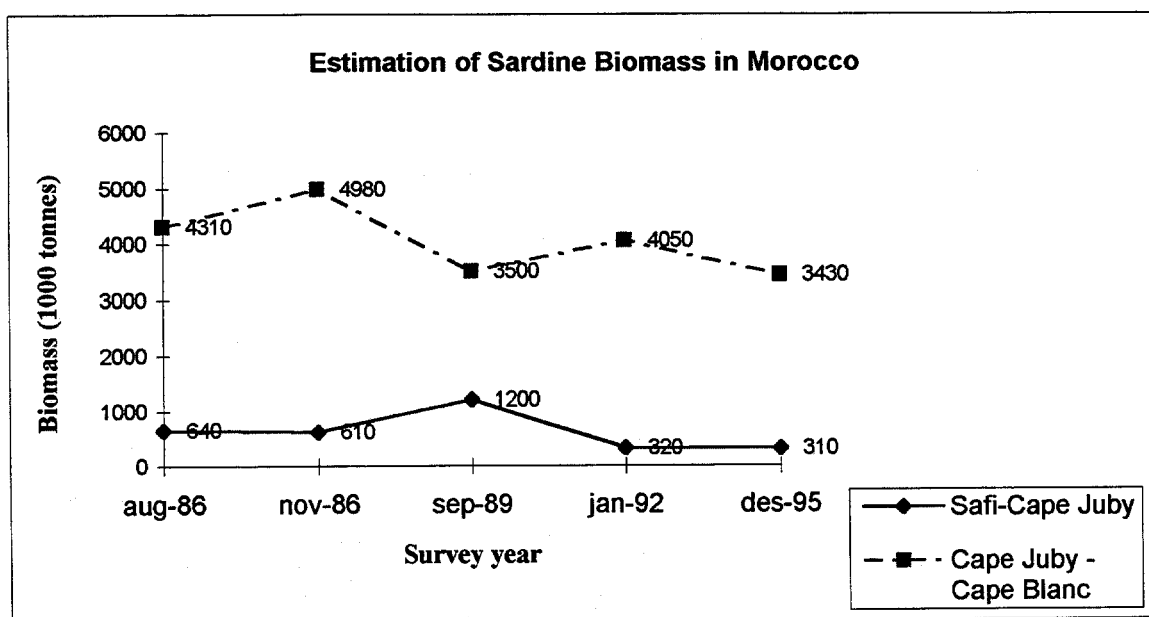


Figure 14 Biomass comparisons with previous 'Dr. Fridtjof Nansen' surveys

Sardinella was first estimated in 1992, but only to 10 thousand tonnes, and the present level close to one million tonnes is remarkable. Chub mackerel was estimated to 45 thousand tonnes in 1992 compared to the present 160 thousand tonnes. Also horse mackerel shows a strong increase from 120 thousand tonnes in 1992 to 340 thousand tonnes at present. Most of the horse mackerel is located close to Cap Blanc and the increase can be explained by seasonal migration between Mauritania and Morocco.

Annex I Biomass and number by length

Biomass of sardine by length groups						
Length cm	Safi - Cap Juby		Cap Juby - Cap Blanc		Total	
	tonnes	n.10E6	tonnes	n.10E6	tonnes	n.10E6
5			18	14	18	14
6			362	163	362	163
7			266	78	266	78
8			742	149	742	149
9			5177	745	5177	745
10	349	41	12074	1288	12423	1328
11	8835	785	19371	1572	28206	2357
12	14384	995	53474	3380	67858	4375
13	34848	1914	38970	1955	73818	3869
14	44519	1973	12368	501	56887	2474
15	37005	1343	4132	137	41137	1480
16	18059	543	41533	1141	59592	1685
17	43976	1109	63119	1454	107096	2563
18	27692	591	52749	1029	80442	1620
19	51105	931	155398	2587	206503	3519
20	32058	503	212159	3040	244217	3543
21	3861	53	624031	7752	627892	7804
22			921083	9983	921083	9983
23			671110	6384	671110	6384
24			449115	3770	449115	3770
25			89236	664	89236	664
26			6859	46	6859	46
Sum	316692	10781	3433345	47833	3750038	58614

Acoustic estimate of *Sardinella aurita*, November-December 1995
Senegal - Gambia - Mauritania - Morocco

Length	Number in millions				Biomass in tonnes			
	Senegal	Mauritania	Morocco	TOTAL	Senegal	Mauritania	Morocco	TOTAL
5	0.0			0.0				0
6	942.4			942.4	2200			2200
7	388.8			388.8	1394			1394
8	244.7			244.7	1277			1277
9	154.3			154.3	1125			1125
10	200.2			200.2	1970			1970
11	137.8			137.8	1781			1781
12	123.8			123.8	2055			2055
13	40.9	0.1		40.9	855	2		856
14	21.7			21.7	562			562
15	48.5			48.5	1536			1536
16				0.0				0
17				0.0				0
18		26.0		26.0		1532		1532
19	7.2			7.2	455			455
20		0.1	5.5	5.6		6	413	419
21	53.1	0.1	5.5	58.7	4484	6	477	4967
22	62.7	0.1	18.4	81.2	6075	7	1822	7905
23	107.5	2.5	35.4	145.4	11853	296	4002	16152
24	199.9	0.2	9.7	209.9	24989	34	1247	26270
25	232.4	4.1	29.9	266.4	32755	631	4314	37701
26	234.9	4.8	114.1	353.9	37156	837	18477	56471
27	205.6	12.8	185.7	404.2	36352	2482	33599	72433
28	161.3	71.5	169.6	402.4	31747	15400	34151	81298
29	75.8	84.8	70.8	231.4	16548	20249	15814	52610
30	31.8	148.7	22.0	202.5	7674	39226	5424	52324
31	23.8	105.8	1.1	130.7	6320	30748	312	37380
32	13.4	306.8	7.6	327.8	3920	97954	2258	104132
33		565.5	100.5	665.9		197712	32858	230570
34		468.7	418.5	887.2		179003	149513	328516
35	0.8	294.3	588.5	883.6	317	122468	229042	351826
36		28.3	237.5	265.8		12818	100464	113282
37	2.1	2.2	13.3	17.6	949	1068	6084	8101
38	4.2			4.2	2054			2054
39				0.0				0
40				0.0				0
Total	3719.8	2127.4	2033.5	7880.8	238404	722479	640270	1601154

Acoustic estimate of *Sardinella maderensis*, November-December 1995

Senegal - Gambia - Mauritania - Morocco

Length	Number in millions				Biomass in tonnes			
	Senegal	Mauritania	Morocco	TOTAL	Senegal	Mauritania	Morocco	TOTAL
5	0.3			0.3	0			0
6	10.7			10.7	25			25
7	191.3			191.3	678			678
8	74.1			74.1	382			382
9	11.4			11.4	82			82
10	16.1			16.1	156			156
11	15.3			15.3	195			195
12	10.4			10.4	170			170
13	10.9	0.6		11.5	226	13		238
14	51.8	5.6		57.4	1326	158		1484
15	84.9	12.4		97.2	2654	424		3079
16	16.9	9.7		26.6	637	401		1038
17	21.2	4.6		25.8	953	229		1182
18	10.7	1.4		12.1	568	82		650
19	33.0	0.4		33.5	2058	29		2087
20	140.7	0.3		141.0	10185	22		10207
21	204.8			204.8	17100			17100
22	372.3			372.3	35626			35626
23	636.4	0.2		636.7	69382	25		69407
24	747.8	0.3	7.7	755.8	92372	47	1032	93451
25	624.0	0.6	7.6	632.2	86906	94	1145	88145
26	341.5	16.2	7.7	365.4	53391	2768	1305	57464
27	130.9	77.4	1.7	210.0	22860	14806	326	37992
28	42.6	289.2	4.9	336.7	8275	61588	1035	70898
29	32.3	371.0	56.1	459.4	6972	87619	13116	107706
30	39.0	716.0	276.7	1031.7	9285	186908	71438	267631
31	27.4	888.2	289.1	1204.8	7196	255413	82240	344848
32	16.0	595.1	201.0	812.1	4616	187938	62779	255333
33	6.0	335.1	190.3	531.5	1903	115919	65116	182939
34	3.2	125.9	37.3	166.4	1094	47551	13957	62602
35		25.3	3.4	28.8		10423	1402	11825
36		64.4		64.4		28824		28824
37		4.8		4.8		2319		2319
38								0
39								0
40								0
Total	3923.7	3544.8	1083.7	8552.2	437273	1003599	314891	1755763

Biomass of horse mackerel (<i>T.trachurus</i>) by length groups						
Length cm	Safi - Cap Juby		Cap Juby - Cap Blanc		Total	
	tonnes	n*10E6	tonnes	n*10E6	tonnes	n*10E6
10						
11			18	1	18	1
12			41	2	41	2
13	78	4	23	1	101	5
14	146	6	40	2	186	8
15	297	11	113	3	409	14
16	143	4	343	9	486	13
17	342	9	1677	36	2019	44
18	202	4	6494	118	6696	122
19	828	15	13436	208	14264	223
20	1786	28	10434	139	12220	167
21	1109	15	11579	134	12688	149
22	1635	19	3250	33	4885	52
23	620	6	102	1	723	7
24	234	2	2340	18	2574	20
25			2813	19	2813	19
26			10156	63	10156	63
27			9298	51	9298	51
28			731	4	731	4
29	408	2	19276	86	19685	88
30			45481	184	45481	184
31			57131	210	57131	210
32			46992	157	46992	157
33			6575	20	6575	20
34			2160	6	2160	6
35			1706	4	1706	4
Sum	7829	125	252208	1512	260037	1637

Biomass of horse mackerel (<i>T.trecae</i>) by length groups						
Length cm	Safi - Cap Juby		Cap Juby - Cap Blanc		Total	
	tonnes	n.10E6	tonnes	n.10E6	tonnes	n.10E6
10			1	0	1	0
11			1	0	1	0
12			0	0	0	0
13			0	0	0	0
14			0	0	0	0
15			0	0	0	0
16			0	0	0	0
17			0	0	0	0
18			0	0	0	0
19			0	0	0	0
20			239	3	239	3
21			3893	45	3893	45
22			10584	107	10584	107
23			16370	145	16370	145
24			10034	78	10034	78
25			2613	18	2613	18
26			4251	26	4251	26
27			6769	37	6769	37
28			5360	27	5360	27
29			3743	17	3743	17
30			5564	23	5564	23
31			5696	21	5696	21
32			4635	16	4635	16
33			2297	7	2297	7
34			1201	3	1201	3
35			2986	8	2986	8
36			2347	6	2347	6
37			866	2	866	2
38			0	0	0	0
39			0	0	0	0
40			1091	2	1091	2
Sum			90540	590	90540	590

Biomass of chub mackerel by length groups						
Length	Safi - Cap Juby		Cap Juby - Cap Blanc		Total	
	cm	tonnes	n.10E6	tonnes	n.10E6	tonnes
10			0	0	0	0
11			0	0	0	0
12	104	9	0	0	104	9
13	1721	117	0	0	1721	117
14	6134	335	0	0	6134	335
15	6500	291	2013	72	8513	363
16	6375	237	19736	586	26111	822
17	4927	153	27223	677	32151	831
18	3420	90	35248	742	38668	832
19	702	16	25435	457	26137	473
20	215	4	21891	339	22106	343
21	497	8	8314	112	8811	120
22	438	6	4078	48	4516	54
23			1622	17	1622	17
24			157	1	157	1
25	228	2	522	4	749	6
26			804	6	804	6
27	285	2	5982	38	6267	41
28			1642	9	1642	9
29			1512	8	1512	8
30			872	4	872	4
31			502	2	502	2
32			184	1	184	1
33			92	0	92	0
34			0	0	0	0
35			0	0	0	0
Sum	31546	1271	157830	3124	189376	4395

Annex II Records of fishing stations

PROJECT STATION: 372
 DATE: 22/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2048 Long W 1712
 start stop duration
 TIME : 22:02:00 22:29:00 27 (min) Purpose code: 1
 LOG : 9285.10 9286.50 1.40 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 38 43 Validity code:
 Towing dir: 298° Wire out: 1403 m Speed: 30 kn*10

Sorted: 5 Kg Total catch: 451.20 CATCH/HOUR: 1002.67

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	777.78		77.57	
Euthynnus alletteratus	111.11		11.08	
Engraulis encrasicolus	87.78	7882	8.75	723
Loligo vulgaris	14.22	378	1.42	
Trachurus trecae	7.78	1622	0.78	722
Decapterus rhonchus	4.89	89	0.49	724
Sepia sp.	0.67	22	0.07	
Boops boops	0.67	67	0.07	
Total	1004.90		100.23	

PROJECT STATION: 373
 DATE: 23/11/95 GEAR TYPE: BT No:7 POSITION: Lat N 2054 Long W 17086
 start stop duration
 TIME : 00:30:00 00:37:00 7 (min) Purpose code: 1
 LOG : 9301.10 9301.70 0.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 10 10 Validity code:
 Towing dir: 180° Wire out: 140 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 3002.42 CATCH/HOUR: 25735.03

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	22554.00	1752857	87.64	726
Engraulis encrasicolus	1682.57	291429	6.54	725
Decapterus rhonchus	718.29	3214	2.79	
Campogramma glaycos	439.71	1071	1.71	
Trachurus trecae	278.57	21429	1.08	727
Pomatomus saltatrix	61.97	43	0.24	
Total	25735.11		100.00	

PROJECT STATION: 374
 DATE: 23/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2054 Long W 17116
 start stop duration
 TIME : 01:50:00 02:20:00 30 (min) Purpose code: 1
 LOG : 9307.30 9308.80 1.50 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 42 41 Validity code:
 Towing dir: 180° Wire out: 140 m Speed: 30 kn*10

Sorted: 21 Kg Total catch: 1518.48 CATCH/HOUR: 3036.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	2635.20	272880	86.77	728
Trachurus trecae	295.20	19584	9.72	729
Decapterus rhonchus	60.48	288	1.99	
Loligo vulgaris	46.08	1152	1.52	
Total	3036.96		100.00	

PROJECT STATION: 375
 DATE: 23/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2054 Long W 17159
 start stop duration
 TIME : 03:38:00 03:43:00 5 (min) Purpose code: 1
 LOG : 9314.90 9315.10 0.20 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 43 43 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10

Sorted: 40 Kg Total catch: 39.94 CATCH/HOUR: 479.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	217.20	720	45.32	730
Trichiurus lepturus	133.20	168	27.79	
Scomber japonicus	75.60	204	15.77	734
Decapterus rhonchus	19.20	48	4.01	733
Sardinella maderensis	18.72	48	3.91	732
Auxis thazard	8.40	12	1.75	
Sardinella aurita	4.56	12	0.95	731
Pomadourys incisus	2.40	12	0.50	
Total	479.28		100.00	

PROJECT STATION: 376
 DATE: 23/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2054 Long W 17305
 start stop duration
 TIME : 05:57:00 06:20:00 23 (min) Purpose code: 1
 LOG : 9331.50 9332.70 1.20 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 85 79 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10

Sorted: 51 Kg Total catch: 50.92 CATCH/HOUR: 132.83

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	89.74	154	67.56	
Sardinella maderensis	27.65	83	20.82	736
Trachurus trecae	11.53	34	8.68	737
Sardinella aurita	2.61	8	1.96	735
Scomber japonicus	1.10	5	0.83	
Illex coindetii	0.21	5	0.16	
Total	132.84		100.01	

PROJECT STATION: 377
 DATE: 25/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2110 Long W 1716
 start stop duration
 TIME : 16:19:00 16:42:00 23 (min) Purpose code: 1
 LOG : 9541.40 9542.60 1.20 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 56 62 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 30 kn*10

Sorted: 96 Kg Total catch: 95.66 CATCH/HOUR: 249.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	177.39	587	71.08	739
Sardinella aurita	44.09	110	17.67	738
Sarda sarda	26.09	10	10.45	
Campogramma glaycos	1.98	3	0.79	
Total	249.55		99.99	

PROJECT STATION: 378
 DATE: 25/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 2120 Long W 1717
 start stop duration
 TIME : 20:31:00 20:46:00 15 (min) Purpose code: 1
 LOG : 9579.20 9580.30 1.80 Area code :
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 62 61 Validity code:
 Towing dir: 90° Wire out: 100 m Speed: 42 kn*10

Sorted: 88 Kg Total catch: 883.10 CATCH/HOUR: 3532.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trachurus	2744.00	11052	77.68	742
Trachurus trecae	416.00	2280	11.78	743
Sardinella aurita	213.60	520	6.05	740
Trichiurus lepturus	76.00	120	2.15	
Sardinella maderensis	40.00	120	1.13	741
Scomber japonicus	36.80	80	1.04	
Loligo vulgaris	6.00	160	0.17	
Total	3532.40		100.00	

PROJECT STATION: 379
 DATE: 26/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2130 Long W 1709
 start stop duration
 TIME : 02:31:00 03:01:00 30 (min) Purpose code: 1
 LOG : 9636.80 9638.60 1.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 59 62 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 30 kn*10

Sorted: 124 Kg Total catch: 183.74 CATCH/HOUR: 367.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	128.60	176	35.00	
Scomber japonicus	114.94	192	31.28	744
Trachurus trecae	71.26	240	19.39	745
Sarda sarda	32.14	10	8.75	
Arius parkii	10.18	6	2.77	
Loligo vulgaris	6.58	144	1.79	
Trachurus trachurus	1.98	8	0.54	746
Sardinella aurita	1.18	2	0.32	
Sardina pilchardus	0.64	6	0.17	
Total	367.50		100.01	

PROJECT STATION: 380
 DATE: 26/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2129 Long W 1709
 start stop duration
 TIME : 04:00:00 04:44:00 44 (min) Purpose code: 1
 LOG : 9644.50 9647.20 2.80 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 56 53 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 30 kn*10

Sorted: 163 Kg Total catch: 203.25 CATCH/HOUR: 277.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	128.15	179	46.24	
Euthynnus alletteratus	55.36	14	19.97	
Sarda sarda	44.18	19	15.94	
Scomber japonicus	17.32	30	6.25	748
Trachurus trecae	16.70	57	6.03	747
Arius parkii	9.27	4	3.34	
Loligo vulgaris	5.05	16	1.82	
Octopus vulgaris	0.70	1	0.25	
Sardinella aurita	0.42	1	0.15	
Total	277.15		99.99	

PROJECT STATION: 381
 DATE: 26/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 2140 Long W 1711
 start stop duration
 TIME : 07:40:00 08:00:00 20 (min) Purpose code: 1
 LOG : 9675.30 9676.60 1.30 Area code :
 FDEPTH: 20 13 GearCond.code: 3
 BDEPTH: 62 57 Validity code: 9
 Towing dir: 90° Wire out: 100 m Speed: 39 kn*10

Sorted: 11 Kg Total catch: 11.15 CATCH/HOUR: 33.45

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	15.90	21	47.53	
Prionace glauca	11.40	3	34.08	
Loligo vulgaris	6.15	9	18.39	
Total	33.45		100.00	

PROJECT STATION: 382
 DATE: 26/11/95 GEAR TYPE: BT No: POSITION: Lat N 2140 Long W 1716
 start stop duration
 TIME :09:11:00 09:56:00 45 (min) Purpose code: 1
 LOG :9685.70 9688.10 2.40 Area code :
 FDEPTH: 67 65 GearCond.code:
 BDEPTH: 67 65 Validity code:
 Towing dir: 90° Wire out: 250 m Speed: 35 kn*10

Sorted: 57 Kg Total catch: 286.25 CATCH/HOUR: 381.67

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	175.33	767	45.94	
Trachurus trachurus	85.67	993	22.45	749
Trachurus trecae	44.67	173	11.70	750
Loligo vulgaris	42.33	560	11.09	
Zeus faber	12.33	7	3.23	
Citharus linguatula	4.53	133	1.19	
Dentex macropthalmus	4.53	193	1.19	
SOLEIDAE	3.00	247	0.79	
Chelidonichthys obscurus	2.73	33	0.72	
Dentex gibbosus	1.47	7	0.39	
Sparus pagrus pagrus *	1.40	7	0.37	
Diplodus vulgaris	1.07	7	0.28	
Pagellus acarne	1.07	40	0.28	
Alloteuthis africana	0.73	360	0.19	
Boops boops	0.53	7	0.14	
Spondyliosoma cantharus	0.27	20	0.07	
Total	381.66		100.02	

PROJECT STATION: 383
 DATE: 26/11/95 GEAR TYPE: BT No: POSITION: Lat N 2139 Long W 1722
 start stop duration
 TIME :11:23:00 11:53:00 30 (min) Purpose code: 1
 LOG :9700.20 9701.60 1.40 Area code :
 FDEPTH: 97 95 GearCond.code:
 BDEPTH: 97 95 Validity code:
 Towing dir: 180° Wire out: 350 m Speed: 28 kn*10

Sorted: 96 Kg Total catch: 1574.54 CATCH/HOUR: 3149.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trachurus	1438.20	11594	45.67	751
Scomber japonicus	671.50	3128	21.32	752
Zeus faber	298.18	238	9.47	
Dentex macropthalmus	204.00	1428	6.48	
Pagellus acarne	201.96	714	6.41	
Raja sp.	126.82	102	4.03	
Boops boops	94.18	1122	2.99	
Loligo vulgaris	76.16	578	2.42	
Sardina pilchardus	24.48	204	0.78	
Scorpaena sp.	10.20	136	0.32	
Alloteuthis africana	3.40	782	0.11	
Total	3149.08		100.00	

PROJECT STATION: 384
 DATE: 26/11/95 GEAR TYPE: BT No: POSITION: Lat N 2150 Long W 1726
 start stop duration
 TIME :14:45:00 15:17:00 32 (min) Purpose code: 1
 LOG :9729.40 9731.20 1.80 Area code :
 FDEPTH: 151 115 GearCond.code:
 BDEPTH: 151 115 Validity code:
 Towing dir: 160° Wire out: 400 m Speed: 30 kn*10

Sorted: 44 Kg Total catch: 1479.68 CATCH/HOUR: 2774.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Capros aper	2463.94	155486	88.81	
Dentex macropthalmus	123.04	956	4.43	
Zeus faber	71.40	64	2.57	
Boops boops	39.53	319	1.42	
Macrorhamphosus scolopax	33.15	2550	1.19	
Loligo vulgaris	24.23	128	0.87	
Trachurus trachurus	11.48	64	0.41	
Sardina pilchardus	7.65	64	0.28	
Total	2774.42		99.98	

PROJECT STATION: 385
 DATE: 26/11/95 GEAR TYPE: BT No: POSITION: Lat N 2149 Long W 1715
 start stop duration
 TIME :17:23:00 18:10:00 47 (min) Purpose code: 1
 LOG :9751.50 9754.20 2.70 Area code :
 FDEPTH: 63 63 GearCond.code:
 BDEPTH: 63 63 Validity code:
 Towing dir: 85° Wire out: 200 m Speed: 30 kn*10

Sorted: 61 Kg Total catch: 917.55 CATCH/HOUR: 1171.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	455.74	2106	38.91	
Pomadasyus incisus	279.57	1360	23.87	
Trachurus trachurus	245.11	2260	20.93	753
Loligo vulgaris	115.85	1015	9.89	
Trachurus trecae	26.81	57	2.29	754
Raja miraletus	19.53	19	1.67	
Spondyliosoma cantharus	16.47	77	1.41	
Dentex macropthalmus	7.66	153	0.65	
Alloteuthis subulata	1.34	517	0.11	
Zeus faber	1.34	19	0.11	
Scorpaena sp.	0.96	19	0.08	
Citharus linguatula	0.57	19	0.05	
Serranus cabrilla	0.38	19	0.03	
Total	1171.33		100.00	

PROJECT STATION: 386
 DATE: 26/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 2201 Long W 1709
 start stop duration
 TIME :21:52:00 22:52:00 60 (min) Purpose code: 1
 LOG :9791.30 9795.40 4.10 Area code :
 FDEPTH: 15 15 GearCond.code: 3
 BDEPTH: 62 54 Validity code: 9
 Towing dir: 70° Wire out: 100 m Speed: 41 kn*10

Sorted: 47 Kg Total catch: 46.70 CATCH/HOUR: 46.70

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	30.00		64.24	
Auxis rochei	6.40	9	13.70	
Mugil cephalus	4.20	2	8.99	
Sarda sarda	2.30	1	4.93	
Trachurus trecae	2.25	4	4.82	
Scomber japonicus	0.90	3	1.93	
Camogramma glaycos	0.65	1	1.39	
Total	46.70		100.00	

PROJECT STATION: 387
 DATE: 27/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2209 Long W 1656
 start stop duration
 TIME :05:40:00 06:10:00 30 (min) Purpose code: 1
 LOG :9865.80 9867.40 1.60 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 43 49 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 30 kn*10

Sorted: 103 Kg Total catch: 465.00 CATCH/HOUR: 930.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus rhonchus	297.60	960	32.00	758
Sardinella aurita	166.40	352	17.89	755
Trachurus trecae	124.00	1024	13.33	756
Loligo vulgaris	123.20		13.25	
Sarda sarda	102.00	36	10.97	
Scomber japonicus	96.00	528	10.32	757
Mugil cephalus	17.60	16	1.89	
Tylosurus crocodilus crocodil.	3.20	16	0.34	
Total	930.00		99.99	

PROJECT STATION: 388
 DATE: 28/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2239 Long W 1636
 start stop duration
 TIME :02:55:00 03:25:00 30 (min) Purpose code: 1
 LOG :9994.00 9995.70 1.70 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 47 39 Validity code:
 Towing dir: 90° Wire out: 140 m Speed: 30 kn*10

Sorted: 55 Kg Total catch: 4010.62 CATCH/HOUR: 8021.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	757.40	167900	94.47	762
Engraulis encrasicolus	140.16	26718	1.75	761
Scomber japonicus	138.70	1022	1.73	760
Sardinella aurita	102.20	2044	1.27	759
Trachurus trachurus	39.42	146	0.49	
Loligo vulgaris	23.36	438	0.29	
Total	8021.24		100.00	

PROJECT STATION: 389
 DATE: 28/11/95 GEAR TYPE: BT No:1 POSITION: Lat N 2238 Long W 1635
 start stop duration
 TIME :04:14:00 04:24:00 10 (min) Purpose code: 1
 LOG :9997.30 9997.80 0.50 Area code :
 FDEPTH: 38 40 GearCond.code:
 BDEPTH: 38 40 Validity code:
 Towing dir: 290° Wire out: 140 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 554.04 CATCH/HOUR: 3324.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	3067.20	236286	92.27	763
Pagellus bellottii	79.92	864	2.40	
Pomadasyus incisus	58.32	108	1.75	
Engraulis encrasicolus	57.24	17064	1.72	765
Diplodus bellottii	16.20	756	0.52	764
Chelidonichthys cuculus	7.56	432	0.23	
Boops boops	7.56	108	0.23	
Dentex gibbosus	5.40	108	0.16	
Dentex macropthalmus	3.24	216	0.10	
Decapterus rhonchus	2.16	108	0.06	
Loligo vulgaris	1.08	108	0.03	
Spondyliosoma cantharus	1.08	108	0.03	
Total	3324.24		99.99	

PROJECT STATION: 390
 DATE: 28/11/95 GEAR TYPE: BT No:1 POSITION: Lat N 2251 Long W 1707
 start stop duration
 TIME : 09:32:00 10:02:00 30 (min) Purpose code: 1
 LOG : 54.30 54.90 1.60 Area code :
 FDEPTH: 97 102 GearCond.code:
 BDEPTH: 97 102 Validity code:
 Towing dir: 271° Wire out: 350 m Speed: 32 kn*10
 Sorted: 55 Kg Total catch: 220.92 CATCH/HOUR: 441.84

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex maroccanus	147.20	1444	33.32	
Pagellus acarne	66.00	224	14.94	
Dentex macrophthalmus	48.40	576	10.95	
Capros aper	32.80	956	7.42	
Zeus faber	31.20	48	7.06	
Merluccius senegalensis	27.20	24	6.16	
Dentex angolensis	22.00	80	4.98	
Allothetis subulata	17.20		3.89	
Scyliorhinus canicula	13.44	36	3.04	
Loligo vulgaris	11.60	84	2.63	
Trachurus trachurus	8.00	48	1.81	
Uranoscopus sp.	7.20	8	1.63	
Raja miraletus	4.00	16	0.91	
Boops boops	2.40	8	0.54	
Citharus linguatula	1.20	40	0.27	
Callanthias ruber	1.04	40	0.24	
Lepidopus caudatus	0.96	8	0.22	
Total	441.84		100.01	

PROJECT STATION: 391
 DATE: 28/11/95 GEAR TYPE: PT No:1 POSITION: Lat N 2249 Long W 1659
 start stop duration
 TIME : 12:15:00 14:10:00 115 (min) Purpose code: 2
 LOG : 68.90 76.20 7.30 Area code :
 FDEPTH: 32 50 GearCond.code:
 BDEPTH: 75 100 Validity code:
 Towing dir: 270° Wire out: 100 m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 392
 DATE: 28/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2249 Long W 1635
 start stop duration
 TIME : 17:35:00 18:05:00 30 (min) Purpose code: 1
 LOG : 109.10 110.70 1.60 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 41 44 Validity code:
 Towing dir: 270° Wire out: 140 m Speed: 30 kn*10
 Sorted: 4 Kg Total catch: 244.80 CATCH/HOUR: 489.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Engraulis encrasicolus	296.00	53120	60.46	767
Sardina pilchardus	160.00	10080	32.68	766
Camogramma glaycos	20.80	32	4.25	
Stromateus fiatola	11.20	16	2.29	
Loligo vulgaris	1.60	16	0.33	
Total	489.60		100.01	

PROJECT STATION: 393
 DATE: 28/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2254 Long W 1620
 start stop duration
 TIME : 20:34:00 20:49:00 15 (min) Purpose code: 1
 LOG : 132.90 133.80 9.00 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 24 24 Validity code:
 Towing dir: 10° Wire out: 140 m Speed: 30 kn*10
 Sorted: 35 Kg Total catch: 701.20 CATCH/HOUR: 2804.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	1504.00	151340	53.62	770
Decapterus rhonchus	552.00	2160	19.68	771
Sardina pilchardus	368.00	3120	13.12	769
Pomatomus saltatrix	163.20	2960	5.82	
Sardinella aurita	89.60	5760	3.19	768
Camogramma glaycos	72.00	160	2.57	
Loligo vulgaris	34.40	320	1.23	
Diplodus bellottii	12.00	80	0.43	
Engraulis encrasicolus	9.60	3280	0.34	
Total	2804.80		100.00	

PROJECT STATION: 394
 DATE: 29/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2320 Long W 1612
 start stop duration
 TIME : 08:52:00 09:14:00 22 (min) Purpose code: 1
 LOG : 263.40 264.60 1.20 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 25 24 Validity code:
 Towing dir: 215° Wire out: 140 m Speed: 30 kn*10
 Sorted: 63 Kg Total catch: 1567.50 CATCH/HOUR: 4275.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	4029.55	41670	94.26	772
sardinella aurita	245.45	1227	5.74	773
Total	4275.00		100.00	

PROJECT STATION: 395
 DATE: 29/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2330 Long W 1615
 start stop duration
 TIME : 16:00:00 16:40:00 40 (min) Purpose code: 1
 LOG : 337.10 339.50 2.40 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 29 28 Validity code:
 Towing dir: 240° Wire out: 140 m Speed: 30 kn*10
 Sorted: 48 Kg Total catch: 2392.50 CATCH/HOUR: 3588.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	3588.75	39600	100.00	774
Total	3588.75		100.00	

PROJECT STATION: 396
 DATE: 29/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2340 Long W 1619
 start stop duration
 TIME : 19:48:00 20:18:00 30 (min) Purpose code: 1
 LOG : 371.50 373.20 1.70 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 39 39 Validity code:
 Towing dir: 280° Wire out: 140 m Speed: 34 kn*10
 Sorted: 64 Kg Total catch: 320.20 CATCH/HOUR: 640.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	487.00	5094	76.05	778
Sardinella aurita	126.00	640	19.68	776
Scomber japonicus	10.80	50	1.69	
Sardinella aurita	8.00	490	1.25	775
Sardinella maderensis	7.00	20	1.09	777
Loligo vulgaris	1.20	30	0.19	
Trachinus draco	0.40	10	0.06	
Total	640.40		100.01	

PROJECT STATION: 397
 DATE: 30/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2350 Long W 1610
 start stop duration
 TIME : 05:00:00 05:30:00 30 (min) Purpose code: 1
 LOG : 465.80 467.50 1.70 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 38 41 Validity code:
 Towing dir: 286° Wire out: 140 m Speed: 30 kn*10
 Sorted: 98 Kg Total catch: 489.80 CATCH/HOUR: 979.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	851.00	4172	86.87	779
Sardinella maderensis	70.00	260	7.15	780
Scomber japonicus	27.80	200	2.84	782
Sardina pilchardus	26.60	290	2.72	781
Loligo vulgaris	4.20	40	0.43	
Total	979.60		100.01	

PROJECT STATION: 398
 DATE: 30/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2347 Long W 1600
 start stop duration
 TIME : 07:17:00 07:30:00 13 (min) Purpose code: 1
 LOG : 481.00 481.80 0.80 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 29 28 Validity code:
 Towing dir: 280° Wire out: 140 m Speed: 40 kn*10
 Sorted: 63 Kg Total catch: 2514.00 CATCH/HOUR: 11603.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	10680.00	104677	92.04	783
Sardinella aurita	672.00	4062	5.79	784
Loligo vulgaris	88.62	185	0.76	
Diplodus vulgaris	48.00	738	0.41	
Sardinella aurita	42.46	2585	0.37	785
Pagellus acarne	29.54	554	0.25	
Pomadasys incisus	24.00	185	0.21	
Decapterus rhonchus	18.46	185	0.16	
Total	11603.08		99.99	

PROJECT STATION: 399
 DATE: 30/11/95 GEAR TYPE: PT No:2 POSITION: Lat N 2359 Long W 1604
 start stop duration
 TIME : 10:21:00 10:51:00 30 (min) Purpose code: 1
 LOG : 506.50 508.20 1.70 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 35 32 Validity code:
 Towing dir: 109° Wire out: 140 m Speed: 34 kn*10
 Sorted: 32 Kg Total catch: 319.00 CATCH/HOUR: 638.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	638.00	6606	100.00	786
Total	638.00		100.00	

PROJECT STATION: 400
 DATE: 30/11/95 GEAR TYPE: PT No:7 POSITION: Lat N 2401 Long W 1545
 start stop duration
 TIME : 21:59:00 22:19:00 20 (min) Purpose code: 1
 LOG : 610.60 611.70 1.10 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 21 23 Validity code:
 Towing dir: 295° Wire out: 140 m Speed: 33 kn*10
 Sorted: 32 Kg Total catch: 482.76 CATCH/HOUR: 1448.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	1431.00	14010	98.81	788
Sardinella aurita	17.10	360	1.18	787
Engraulis encrasicolus	0.18	45	0.01	
Total	1448.28		100.00	

PROJECT STATION: 401
 DATE: 1/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2415
 start stop duration Long W 1556
 TIME :01:15:00 01:50:00 35 (min) Purpose code: 1
 LOG : 639.90 642.00 2.10 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 35 34 Validity code:
 Towing dir: 117° Wire out: 140 m Speed: 30 kn*10

Sorted: 68 Kg Total catch: 508.20 CATCH/HOUR: 871.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	765.63	8537	87.88	791
Sardinella aurita	62.35	422	7.16	790
Scomber japonicus	37.29	463	4.28	789
Sardinella maderensis	3.74	26	0.43	
Pagellus bellottii	1.68	14	0.19	
Boops boops	0.51	14	0.06	
Total	871.20		100.00	

PROJECT STATION: 402
 DATE: 1/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2428
 start stop duration Long W 1600
 TIME :09:00:00 09:20:00 20 (min) Purpose code: 1
 LOG : 715.50 716.80 1.30 Area code :
 FDEPTH: 15 15 GearCond.code: 3
 BDEPTH: 53 55 Validity code: 9
 Towing dir: 297° Wire out: 100 m Speed: 39 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 403
 DATE: 1/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2426
 start stop duration Long W 1533
 TIME :14:26:00 14:38:00 12 (min) Purpose code: 1
 LOG : 769.70 770.40 0.70 Area code :
 FDEPTH: 27 26 GearCond.code:
 BDEPTH: 27 26 Validity code:
 Towing dir: 115° Wire out: 120 m Speed: 30 kn*10

Sorted: 85 Kg Total catch: 84.98 CATCH/HOUR: 424.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	299.25	3190	70.43	793
Scomber japonicus	117.50	1490	27.65	792
Loligo vulgaris	8.15	75	1.92	
Total	424.90		100.00	

PROJECT STATION: 404
 DATE: 1/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2430
 start stop duration Long W 1546
 TIME :16:23:00 16:53:00 30 (min) Purpose code: 1
 LOG : 786.10 788.00 1.90 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 35 34 Validity code:
 Towing dir: 115° Wire out: 140 m Speed: 30 kn*10

Sorted: 59 Kg Total catch: 148.70 CATCH/HOUR: 297.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella aurita	212.50	1062	71.45	797
Sardina pilchardus	34.86	640	11.72	796
Belone svetovidovi	24.51	2707	8.24	
Sardinella maderensis	18.70	110	6.29	795
Scomber japonicus	6.84	70	2.30	794
Total	297.41		100.00	

PROJECT STATION: 405
 DATE: 1/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2436
 start stop duration Long W 1530
 TIME :22:07:00 22:37:00 30 (min) Purpose code: 1
 LOG : 842.40 844.20 1.80 Area code :
 FDEPTH: 33 32 GearCond.code:
 BDEPTH: 33 32 Validity code:
 Towing dir: 118° Wire out: 140 m Speed: 36 kn*10

Sorted: 25 Kg Total catch: 50.14 CATCH/HOUR: 100.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomber japonicus	47.20	1014	47.07	798
Sardina pilchardus	28.40	476	28.32	799
Pagellus bellottii	6.00	28	5.98	
Chelidonichthys obscurus	5.20	104	5.19	
Loligo vulgaris	4.00	32	3.99	
Dicologlossa cuneata	3.20	40	3.19	
Trachinus draco	2.00	4	1.99	
Sardinella aurita	1.68	20	1.68	
Decapterus rhonchus	1.52	8	1.52	
Pagellus bellottii	0.64	20	0.64	
Dentex maroccanus	0.40	24	0.40	
Serranus cabrilla	0.04	4	0.04	
Total	100.28		100.01	

PROJECT STATION: 406
 DATE: 2/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2430
 start stop duration Long W 1512
 TIME :00:52:00 01:08:00 16 (min) Purpose code: 1
 LOG : 865.50 866.40 0.90 Area code :
 FDEPTH: 22 22 GearCond.code:
 BDEPTH: 22 22 Validity code:
 Towing dir: 34° Wire out: 120 m Speed: 30 kn*10

Sorted: 28 Kg Total catch: 251.91 CATCH/HOUR: 944.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	597.38	9518	63.24	800
Diplodus bellottii	330.75	5636	35.01	
Pomadasys incisus	6.75	68	0.71	
Loligo vulgaris	6.41	101	0.68	
Diplodus vulgaris	3.38	101	0.36	
Total	944.67		100.00	

PROJECT STATION: 407
 DATE: 2/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2443
 start stop duration Long W 1518
 TIME :03:25:00 03:55:00 30 (min) Purpose code: 1
 LOG : 889.30 891.10 1.80 Area code :
 FDEPTH: 31 31 GearCond.code:
 BDEPTH: 31 31 Validity code:
 Towing dir: 120° Wire out: 120 m Speed: 30 kn*10

Sorted: 26 Kg Total catch: 51.74 CATCH/HOUR: 103.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomber japonicus	82.20	1772	79.44	802
Trachurus trachurus	8.56	44	8.27	801
Loligo vulgaris	4.28	32	4.14	
Chelidonichthys obscurus	3.96	72	3.83	
Pagellus bellottii	3.32	20	3.21	
Trachinus draco	0.48	8	0.46	
Spondyliosoma cantharus	0.28	4	0.27	
Boops boops	0.28	4	0.27	
Serranus cabrilla	0.12	4	0.12	
Total	103.48		100.01	

PROJECT STATION: 408
 DATE: 2/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2510
 start stop duration Long W 1515
 TIME :13:05:00 13:32:00 27 (min) Purpose code: 1
 LOG : 990.30 991.80 1.50 Area code :
 FDEPTH: 57 52 GearCond.code:
 BDEPTH: 57 52 Validity code:
 Towing dir: 204° Wire out: 200 m Speed: 30 kn*10

Sorted: 55 Kg Total catch: 55.12 CATCH/HOUR: 122.49

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus acarne	44.56	360	36.38	
Pagellus bellottii	31.67	171	25.86	
Loligo vulgaris	14.98	29	12.23	
Sparus aurata	11.56	2	9.44	
Campogramma glaycos	7.53	9	6.15	
Boops boops	4.09	33	3.34	
Balistes capriciscus	2.13	2	1.74	
Trachurus trachurus	1.51	9	1.23	
Zeus faber	1.24	2	1.01	
Mullus surmuletus	1.20	9	0.98	
Pomadasys incisus	0.80	4	0.65	
Spondyliosoma cantharus	0.69	4	0.56	
Trachinus draco	0.36	4	0.29	
Chelidonichthys obscurus	0.18	2	0.15	
Total	122.50		100.01	

PROJECT STATION: 409
 DATE: 3/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2348
 start stop duration Long W 1614
 TIME :08:23:00 08:53:00 30 (min) Purpose code: 1
 LOG : 1202.10 1204.10 2.00 Area code :
 FDEPTH: 12 12 GearCond.code: 3
 BDEPTH: 42 44 Validity code: 9
 Towing dir: 155° Wire out: 100 m Speed: 40 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 410
 DATE: 7/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2537
 start stop duration Long W 1539
 TIME :10:07:00 10:37:00 30 (min) Purpose code: 1
 LOG : 2017.20 2018.70 1.50 Area code :
 FDEPTH: 200 197 GearCond.code:
 BDEPTH: 200 197 Validity code:
 Towing dir: 245° Wire out: 650 m Speed: 30 kn*10

Sorted: 57 Kg Total catch: 683.88 CATCH/HOUR: 1367.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	1164.00	13568	85.10	
Trachurus trachurus	68.40	264	5.00	803
Merluccius senegalensis	46.80	72	3.42	
Macrorhamphosus scolopax	38.40	4066	2.81	
Zeus faber	31.20	48	2.28	
Dentex maroccanus	18.00	216	1.32	
Argentina sphyraena	0.72	48	0.05	
Capros aper	0.24	24	0.02	
Total	1367.76		100.00	

PROJECT STATION: 411
 DATE: 8/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2704
 start stop duration Long W 1336
 TIME :12:00:00 12:28:00 28 (min) Purpose code: 1
 LOG : 2291.70 2293.30 1.60 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 80 84 Validity code:
 Towing dir: 197° Wire out: 140 m Speed: 30 kn*10

Sorted: 1 Kg Total catch: 1.04 CATCH/HOUR: 2.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Exocoetus volitans	2.08	9	93.27	
Sardina pilchardus	0.15	2	6.73	
Total	2.23		100.00	

PROJECT STATION: 412
 DATE: 8/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2703 Long W 1336
 start stop duration
 TIME :13:35:00 14:10:00 35 (min) Purpose code: 1
 LOG :2301.20 2302.70 1.50 Area code :
 FDEPTH: 80 82 GearCond.code:
 BDEPTH: 80 82 Validity code:
 Towing dir: 200° Wire out: 280 m Speed: 30 kn*10
 Sorted: 74 Kg Total catch: 632.05 CATCH/HOUR: 1083.51

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	830.57	13305	76.66	804
Sardina pilchardus	123.94	8685	11.44	806
Lithognathus mormyrus	121.46	117	7.52	
Pagellus acarne	21.86	74	2.02	
Scomber japonicus	14.43	495	1.33	805
Loligo vulgaris	5.54	74	0.51	
Trachurus trachurus	2.04	15	0.19	
Macrorhamphosus scolopax	1.61	132	0.15	
Alloteuthis africana	1.32	453	0.12	
Dentex maroccanus	0.74	15	0.07	
Total	1083.51		100.01	

PROJECT STATION: 413
 DATE: 8/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2739 Long W 2215
 start stop duration
 TIME :21:45:00 22:15:00 30 (min) Purpose code: 1
 LOG :2348.40 2386.00 1.60 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 102 94 Validity code:
 Towing dir: 160° Wire out: 140 m Speed: 32 kn*10
 Sorted: 32 Kg Total catch: 2208.50 CATCH/HOUR: 4417.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	3661.00	188020	82.88	808
Scomber japonicus	756.00	35840	17.12	807
Total	4417.00		100.00	

PROJECT STATION: 414
 DATE: 9/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2749 Long W 1311
 start stop duration
 TIME :01:00:00 01:20:00 20 (min) Purpose code: 1
 LOG :2411.80 2412.80 1.00 Area code :
 FDEPTH: 46 48 GearCond.code:
 BDEPTH: 46 48 Validity code:
 Towing dir: 257° Wire out: 180 m Speed: 30 kn*10
 Sorted: 60 Kg Total catch: 598.50 CATCH/HOUR: 1795.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trachurus	1347.00	25740	75.02	809
Pagellus acarne	288.00	960	16.04	
Sardina pilchardus	40.20	1170	2.24	810
Loligo vulgaris	31.50	150	1.75	
Scomber japonicus	30.30	210	1.69	811
Pagellus bellottii	20.40	270	1.14	
Boops boops	16.50	300	0.92	
Chelidonichthys obscurus	9.00	270	0.50	
Merluccius senegalensis	6.00	30	0.33	
Dentex macrophthalmus	2.10	240	0.12	
Trachinus draco	1.80	30	0.10	
Arnoglossus thori	1.20	240	0.07	
Citharus linguatula	0.90	120	0.05	
Dicologlossa hexophthalma	0.60	60	0.03	
Arnoglossus imperialis	0.00	30		
Total	1795.50		100.00	

PROJECT STATION: 415
 DATE: 9/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2815 Long W 1300
 start stop duration
 TIME :10:03:00 10:25:00 22 (min) Purpose code: 1
 LOG :2495.80 2497.10 1.30 Area code :
 FDEPTH: 96 96 GearCond.code:
 BDEPTH: 96 96 Validity code:
 Towing dir: 175° Wire out: 350 m Speed: 30 kn*10
 Sorted: 31 Kg Total catch: 941.70 CATCH/HOUR: 2568.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex maroccanus	1149.55	11321	44.76	
Scomber japonicus	846.82	33278	32.97	812
Trachurus trachurus	175.91	2782	6.85	813
Pagellus acarne	150.55	1227	5.86	
Loligo vulgaris	99.82	736	3.89	
Sardina pilchardus	98.18	6545	3.82	814
Mullus surmuletus	34.36	327	1.34	
Diplodus vulgaris	13.09	82	0.51	
Total	2568.28		100.00	

PROJECT STATION: 416
 DATE: 9/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2837 Long W 1243
 start stop duration
 TIME :14:30:00 15:00:00 30 (min) Purpose code: 1
 LOG :2536.00 2537.50 1.50 Area code :
 FDEPTH: 198 188 GearCond.code:
 BDEPTH: 198 188 Validity code:
 Towing dir: 240° Wire out: 650 m Speed: 30 kn*10
 Sorted: 65 Kg Total catch: 1500.75 CATCH/HOUR: 3001.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomber japonicus	2028.60	96922	67.59	816
Macrorhamphosus scolopax	411.24	44574	13.70	
Trachurus trachurus	372.60	6256	12.41	815
MACROHAMPHOSIDAE	110.86	12006	3.69	
Dentex angolensis	24.38	230	0.81	
Dentex macrophthalmus	17.02	276	0.57	
Merluccius senegalensis	13.80	46	0.46	
Pagellus acarne	11.50	46	0.38	
Illex coindetii	9.20	46	0.31	
Capros aper	0.92	46	0.03	
Zeus faber	0.92	46	0.03	
sardina pilchardus	0.46	46	0.02	
Total	3001.50		100.00	

PROJECT STATION: 417
 DATE: 10/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2818 Long W 1145
 start stop duration
 TIME :12:02:00 12:32:00 30 (min) Purpose code: 1
 LOG :2766.50 2768.20 1.70 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 37 40 Validity code:
 Towing dir: 70° Wire out: 140 m Speed: 30 kn*10
 Sorted: 67 Kg Total catch: 336.05 CATCH/HOUR: 672.10

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	657.10	17330	97.77	818
Scomber japonicus	13.70	160	2.04	819
Engraulis encrasicolus	1.30	90	0.19	817
Total	672.10		100.00	

PROJECT STATION: 419
 DATE: 11/12/95 GEAR TYPE: PT No:7 POSITION: Lat N 2837 Long W 1115
 start stop duration
 TIME :06:15:00 06:45:00 30 (min) Purpose code: 1
 LOG :2957.50 2959.20 1.70 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 30 28 Validity code:
 Towing dir: 55° Wire out: 140 m Speed: 34 kn*10
 Sorted: 91 Kg Total catch: 122.52 CATCH/HOUR: 245.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lepidopus caudatus	120.00	60	48.97	
Sardina pilchardus	118.40	7074	48.32	823
Trachurus trachurus	4.04	60	1.65	824
Engraulis encrasicolus	2.12	204	0.87	826
Scomber japonicus	0.32	8	0.13	825
Allotheutis subulata	0.16	48	0.07	
Total	245.04		100.01	

PROJECT STATION: 420
 DATE: 11/12/95 GEAR TYPE: BT No:1 POSITION: Lat N 2849 Long W 1059
 start stop duration
 TIME :12:25:00 12:47:00 22 (min) Purpose code: 1
 LOG :3017.00 3018.20 1.20 Area code :
 FDEPTH: 35 30 GearCond.code:
 BDEPTH: 35 30 Validity code:
 Towing dir: 235° Wire out: 120 m Speed: 30 kn*10
 Sorted: 73 Kg Total catch: 496.20 CATCH/HOUR: 1353.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	1217.18	62675	89.94	827
Scomber japonicus	32.45	57	2.40	
Diplodus bellottii	24.82	286	1.83	
Pomadasys incisus	24.63	229	1.82	
Trachurus trachurus	23.67	535	1.75	828
Loligo vulgaris	17.56	57	1.30	
Zeus faber	5.18	3	0.38	
Chelidonichthys lucerna	4.96	76	0.37	
Engraulis encrasicolus	1.91	57	0.14	
Allotheutis subulata	0.76	248	0.06	
Mullus surmuletus	0.14	3	0.01	
Total	1353.26		100.00	

PROJECT STATION: 421
 DATE: 11/12/95 GEAR TYPE: PT No:7 POSITION: Lat N 2902 Long W 1033
 start stop duration
 TIME :19:33:00 20:03:00 30 (min) Purpose code: 1
 LOG :3091.10 3092.70 1.60 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 24 26 Validity code:
 Towing dir: 240° Wire out: 140 m Speed: 32 kn*10
 Sorted: 38 Kg Total catch: 160.85 CATCH/HOUR: 321.70

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	296.00	24600	92.01	829
Lepidopus caudatus	15.40	8	4.79	
Allotheutis subulata	3.20	1050	0.99	
Engraulis encrasicolus	3.10	330	0.96	830
Diplodus bellottii	1.60	10	0.50	
Trachurus trachurus	1.50	20	0.47	
Scomber japonicus	0.50	10	0.16	
Loligo vulgaris	0.40	50	0.12	
Total	321.70		100.00	

PROJECT STATION: 422
 DATE: 12/12/95 GEAR TYPE: PT No:2 POSITION: Lat N 2923 Long W 1016
 start stop duration
 TIME :04:00:00 04:30:00 30 (min) Purpose code: 1
 LOG :8173.20 8175.00 1.80 Area code :
 FDEPTH: 10 10 GearCond.code:
 BDEPTH: 42 38 Validity code:
 Towing dir: 150° Wire out: 140 m Speed: 30 kn*10
 Sorted: 32 Kg Total catch: 170.52 CATCH/HOUR: 341.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardina pilchardus	256.80	11388	75.30	834
Trachurus trachurus	39.60	426	11.61	831
Engraulis encrasicolus	36.84	3864	10.80	832
Scomber japonicus	6.48	108	1.90	833
Allotheutis subulata	1.32	240	0.39	
Total	341.04		100.00	

PROJECT STATION: 423
 DATE:13/12/95 GEAR TYPE: BT No:1 POSITION:Lat N 3129 Long W 1011
 start stop duration
 TIME :15:45:00 16:15:00 30 (min) Purpose code: 1
 LOG :3558.10 3560.00 1.90 Area code :
 FDEPTH: 136 131 GearCond.code:
 BDEPTH: 136 131 Validity code:
 Towing dir: 180° Wire out: 450 m Speed: 30 kn*10

Sorted: Kg Total catch: CATCH/HOUR:

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

PROJECT STATION: 424
 DATE:14/12/95 GEAR TYPE: PT No:2 POSITION:Lat N 3201 Long W 942
 start stop duration
 TIME :03:05:00 03:50:00 45 (min) Purpose code: 1
 LOG :3669.60 3672.20 2.60 Area code :
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 49 47 Validity code:
 Towing dir: 120° Wire out: 140 m Speed: 30 kn*10

Sorted: 73 Kg Total catch: 73.09 CATCH/HOUR: 97.45

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Lepidopus caudatus	67.60 53	69.37	
Diplodus puntazzo	26.93 24	27.63	
Loligo vulgaris	1.60 1	1.64	
Sardina pilchardus	0.71 21	0.73	835
Diplodus vulgaris	0.35 1	0.36	
Engraulis encrasicolus	0.11 8	0.11	836
Allotheutis subulata	0.09 49	0.09	
Sepiella rondeleti	0.04 55	0.04	
SQUSE13	0.03 1	0.03	
Total	97.46	100.00	

PROJECT STATION: 425
 DATE:16/12/95 GEAR TYPE: PT No:2 POSITION:Lat N 3309 Long W 843
 start stop duration
 TIME :07:56:00 08:20:00 24 (min) Purpose code: 1
 LOG :4006.40 4007.80 1.40 Area code :
 FDEPTH: 16 15 GearCond.code:
 BDEPTH: 58 47 Validity code:
 Towing dir: 46° Wire out: 100 m Speed: 40 kn*10

Sorted: 2 Kg Total catch: 2.12 CATCH/HOUR: 5.30

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sarda sarda	5.25 5	99.06	
Sardina pilchardus	0.05 3	0.94	
Total	5.30	100.00	

PROJECT STATION: 426
 DATE:16/12/95 GEAR TYPE: PT No:2 POSITION:Lat N 3258 Long W 856
 start stop duration
 TIME :10:50:00 11:15:00 25 (min) Purpose code: 1
 LOG :4029.60 4031.10 1.50 Area code :
 FDEPTH: 65 65 GearCond.code:
 BDEPTH: 88 87 Validity code:
 Towing dir: 43° Wire out: 200 m Speed: 32 kn*10

Sorted: 34 Kg Total catch: 2497.50 CATCH/HOUR: 5994.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sardina pilchardus	4164.72 279720	69.48	838
Engraulis encrasicolus	1829.28 199622	30.52	837
Total	5994.00	100.00	

PROJECT STATION: 427
 DATE:16/12/95 GEAR TYPE: PT No:1 POSITION:Lat N 3233 Long W 923
 start stop duration
 TIME :15:55:00 16:15:00 20 (min) Purpose code: 1
 LOG :4075.80 4076.90 1.10 Area code :
 FDEPTH: 40 40 GearCond.code:
 BDEPTH: 67 74 Validity code:
 Towing dir: 43° Wire out: 150 m Speed: 30 kn*10

Sorted: 38 Kg Total catch: 495.30 CATCH/HOUR: 1485.90

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Engraulis encrasicolus	1380.60 142779	92.91	839
Sardina pilchardus	105.30 5538	7.09	840
Total	1485.90	100.00	

PROJECT STATION: 428
 DATE:17/12/95 GEAR TYPE: PT No:2 POSITION:Lat N 3155 Long W 935
 start stop duration
 TIME :01:15:00 02:05:00 50 (min) Purpose code: 1
 LOG :4167.70 4170.90 3.20 Area code :
 FDEPTH: 5 5 GearCond.code:
 BDEPTH: 37 30 Validity code:
 Towing dir: 32° Wire out: 140 m Speed: 30 kn*10

Sorted: 110 Kg Total catch: 109.67 CATCH/HOUR: 131.60

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Lepidopus caudatus	116.23 106	88.32	
Engraulis encrasicolus	4.02 626	3.05	842
Allotheutis subulata	2.46 1102	1.87	
Stromateus fiatola	2.10 1	1.60	
Pagellus acarne	1.58 6	1.20	
Loligo vulgaris	1.43 5	1.09	
Sardina pilchardus	1.28 112	0.97	841
Diplodus sargus *	0.77 1	0.59	
Trachurus trachurus	0.49 12	0.37	845
Scomber japonicus	0.36 4	0.27	844
Merluccius merluccius	0.36 31	0.27	843
Sepia orbignyana	0.30 1	0.23	
Argentina sphyraena	0.13 233	0.10	
Sepiella rondeleti	0.08 65	0.06	
Total	131.59	99.99	

Annex III Instruments and fishing gear used

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

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

Tranceiver-1 menu (38 kHz lowering keel)

Transducer depth	0.00 m
Absorbtion coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducer gain	28.1 dB
TS transducer gain	28.0 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg
Alongship offset	0.00 "
Athwardship offset	0.04 "

Display menu

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

Printer- menu

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

Bottom detection menu Minimum level -50 dB

Fishing gear

The vessel has two different sized "Åkrahavn" pelagic trawls and one 'Gisund super bottom trawl'. Both the bottom trawl and the smallest pelagic trawl were used during the survey.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernet of 10 mm meshsize. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m², 1670 kg, their distance while trawling about 46 m in average. A tickler chain was used when trawling for shrimp.

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

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

