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An international bottom trawl survey in the Mediterranean : the MEDITS programme

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Abstract

An international bottom trawl survey (the MEDITS programme) has been designed from a European Commission's initiative to produce biological data on the demersal resources along the coasts of the four Mediterranean countries of the European Union (Spain, France, Italy and Greece). The main objective was to obtain independent knowledges useful for the fishery management, in an area where it is difficult to follow in detail the exploitation patterns of the fishing fleets. The programme began in 1993 and, for now, four annual surveys have been conducted. Since 1996, the programme covers almost all the Adriatic sea owing to the participation of scientists from the Balkan countries. Involving about twenty institutes and laboratories from the seven participating countries, the programme is the first one which produces such common data at this scale in the Mediterranean, covering all the trawlable areas on the shelves and the upper slopes (at depths from 10 to 800 m) and using the same standardized protocol. During each survey, about one thousand hauls are carried out. At the end of each survey, all the data are combined and a working group produces standardized analyses on the abundance and the length distribution of around thirty reference species. The development of further data analyses from the first four surveys (1994 to 1997) will be incited through a symposium which will be held in 1998.

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In the Mediterranean, the main demersal fisheries are localized on narrow continental shelves along the coasts. Experiences during the last decades in this area have shown that it was difficult to obtain a global estimate of the demersal resources from fishing activity, especially due to the very large dispersion of the landing places, the important diversity of the species caught and the scarceness of reliable statistics. This situation has induced different European Union States to conduct national programmes for the assessment of these resources from repetitive trawl surveys.

A lot of the demersal resources in the Mediterranean are considered as fully or over-exploited. To support the regulation of these fisheries, particularly for the application of the common fishery policy in the Mediterranean, there was a need for standardised information on the status of these resources. In this context, the European Commission has incited to the implementation of a common programme for their assessment by trawl surveys. The need for this work has been confirmed during the last Diplomatic Conference on the fishery management in the Mediterranean (Venice, 1996).

To complete this job, different institutes from the four Mediterranean European countries gathered together in 1993 to build the Mediterranean international trawl survey (MEDITS) programme. The characteristics of this programme are presented below.

1. Current objectives

The general objectives of the programme defined during an *ad hoc* working group in 1993 are the next :

"The motivation for establishing this survey lies in the fact that comprehensive biological studies of the biological status of most of the demersal fish stocks in the Mediterranean are entirely lacking. The Commission wishes to promote such studies and one way of doing so is establish an international survey of the demersal stocks. It is hoped and expected that the collection and analysis of appropriate survey data will allow the Commission to formulate scientifically based proposals for improved conservation of the stocks" (anon., 1993).

From this general goal, the present programme has been designed with the following basic aims : (i) to contribute to the characterization of bottom fisheries resources in the Mediterranean in term of population distribution (relative abundance indices) as well as demographic structures (length distributions), (ii) to provide data for modelling the dynamic of the studied species. In this scope, estimation of total mortality of the exploited species constitutes an important aim.

The programme had also to take into consideration different observations. A simple analysis of the geography and the bathymetry of the zone shows the very great diversity of the different sub-areas. For example, one can underline differences of hydrological conditions between the waters in the Alboran sea marked by the Atlantic influence and those in the Aegean sea, in direct contact with the Black sea, or the relative monotony of bottoms of the High Adriatic opposed to their very wild aspect in the Aegean sea. Finally, the diversity of the exploited species contributes to the fisheries' wealth in the Mediterranean. If a limited number of species produces an important part of the landings value, the existence of this great species diversity needs however a special attention for the fishery management in the area.

2. History

The general orientations of this action have been defined in 1993 by an *ad hoc* working group managed by the European Commission (Directorate of Fisheries) and opened to scientists from all the Community countries (Anon., 1993). Then the project has been formalized in the MEDITS programme (Mediterranean International Trawl Survey) which began at the end of the year 1993. At the beginning of the programme, it has been decided to call up as well as possible the competencies available in the different countries concerned by the project. So, from its beginning, the programme is managed by four main partners respectively in each of the four Mediterranean European countries, the Spanish Institute of Oceanography (IEO, Spain), the French Research Institute for the Exploitation of the Sea (IFREMER, France), the

Italian Society of Marine Biology (SIBM, Italy) and the National Center of Marine research (NCMR, Greece). Those partners have been chosen for their own competency and their ability to mobilize at the national level the technical and financial means required for the programme. In each of the countries, regional co-ordinations are defined when necessary. A general co-ordination is assumed by one of the four main partners (IFREMER since the beginning of the programme till now). Since 1996, the activity of the programme has been enlarged in the Adriatic through the participation of three newcomer countries: Albania, Croatia and Slovenia. For the time being, about twenty institutes and laboratories from the Northern Mediterranean contribute in the programme.

The activity of the group is managed through a Co-ordination Committee and a Steering Committee (tab. 1). The partners organize *ad hoc* working groups when necessary and meet once a year in a general meeting. For the time being, the programme has no formal link with other international bodies, but some of the partners are mainly involved in different other groups or organizations (GFCM, ICSEM, etc.) and other international research programmes. Those networks are used to favour exchanges of information and collaboration in the area.

One of the main challenges of the programme was to define and apply standardized protocols for the whole area, despite the great diversity of situations encountered. For this reason, the co-ordination group defined in detail a common protocol to conduct the surveys in the different areas. Then, one survey has been carried out each year with the same rules since 1994.

3. Technical description

Even when they had yet organized their own survey series in some areas and when important improvements were introduced compared with theirs, all the partners accepted to fully adopt the new standardised protocols defined for the MEDITS surveys. These standardized protocols include the sampling gear (feature and handling), the design of the survey, the information collected, the management of the data as far as the common standard analysis of the data. Before the first survey, all the common protocols have been brought together in a "Manual of protocols" (Bertrand *et al.*, 1994) agreed by the Steering Committee and distributed to the participants. This manual has been established from different experiences, and particularly the one of the IBTS Group (anon., 1992). The protocols have been amended when necessary for the following surveys.

3.1 Limits of duties

The working zone is defined as the totality of the trawlable areas off the coasts of the partners' countries (fig. 1), by depths from 10 to 800 meters. These limits have been adopted to cover at best the distribution areas of the main exploited - or potentially exploitable - species, considering the administrative and technical constraints of the project.

3.2 Sampling gear design

All the hauls are carried out using the same sampling gear. The adopted gear (fig. 2) constitutes a compromise between the different constraints above mentioned. To increase the catch of demersal species, it has a vertical opening slightly superior to the most common professional gears used in the area. The design of the gear has been drawn up by fishery technologists (P.Y. Dremière, IFREMER-Sète) from specifications defined by the biologists. The gear has been tested from a model in an artificial flume then in full-size at sea, before its production for the first survey. Then, specific studies have been conducted to complete the knowledge about the efficiency of the gear (Fiorentini, 1996; Fiorentini and Dremière, 1996 and in progress).

3.3 Sampling plan

The stations are distributed applying a stratified sampling scheme with simple random drawing inside each stratum. The stratification parameter adopted is the depth, with the following bathymetric limits: 10, 50, 100, 200, 500 and 800 meters (fig. 3). Each position has been selected randomly in small sub-areas defined so as to get a compromise between the constraints of statistics based on random sampling and those of geostatistics (Green, 1979; Hilborn and Walters, 1992).

The forseen average sampling rate is one station per 60 square nautical miles in all the areas except in the Adriatic where it is laid down to one station per 200 square nautical miles because of the relative monotony of the substratum. The same positions are visited each year. A total of about one thousand hauls are carried out during each annual survey (tab. 2). A exemple of final sampling rate is given in table 3.

The duration of the hauls is fixed to half an hour on depths less than 200 meters and one hour on more important depths.

3.4 Catch sampling and data collection

A list of about thirty common target species (including fish, molluscs and crustaceans) has been adopted (tab. 4). This list of species has been established with reference to their commercial production, their accessibility for a bottom trawl and their potential interest as biological indicator. Observations on these species are the count of individuals, length frequency distribution, sex (including sexual maturity stage) and total weight. The characteristics of each kind of observation are specified in the manual of protocols (Bertrand *et al.*, 1994 & 1996). For all the other species of commercial interest (fish, crustacean and mollusc), the total number and total weight are collected for each haul. During each annual survey, a total of approximately 150 species are identified abord each of the vessels.

3.5 Data management

The data are put in computer files by the teams in charge of the survey. Three standard exchange formats (in ASCII) including normalized coding are defined (tab. 5). A specific software has been written (Souplet, 1996a) for an automatic checking of the data. This checking is done by each of the partners for its own data before their regrouping. After a second validation in the regrouping place (IFREMER-Sète), duplicates of the total set of data files are deposited on diskettes at the Co-ordinators and EC-DG XIV offices. A specific chart defines the rules for the distribution of the data.

Since 1997, an outstanding project is in growing to develop a data base for a full management of the MEDITS data (EC-DG XIV project 96-016). The objective is to constitute a unique data base and common statistical algorithms to serve the demand of the MEDITS programme. The main functions will be the control-validation of the data before storing, the storage of the data, their exploitation using standard statistics and the performance of specific requests. The new common tool will be available to the MEDITS group by the end of 1998.

3.6 Data analysis

At the end of each survey, standard analyses are produced on the data. These analyses include the production of biomass and abundance indices (in kg/km² and in N°/km²) as well length frequency distribution for each of the reference species and each of the strata. These analyses are made using a classical statistical method approved by the Steering Committee. A specific software has been written (Souplet, 1996b) for the computerization of the calculations. Routines are computerized on Excel® spreadsheets (Bertrand) for the graphic presentation of the results obtained so.

3.7 Frequency

The objectif is to conduct one survey per year. This yearly survey occurs during the spring and the beginning of summer. Till now, four common MEDITS surveys have been carried out, in 1994, 1995, 1996 and 1997. The partners are preparing a new project to continue the programme after 1997.

A working group is organized after each survey for a common analysis of the results and the estimators produced from the survey series.

3.8 Scientific effort

Each survey has been carried out aboard eight or nine vessels, according to the year. Each of those vessels works at sea during about one month per year. Research vessels and chartered fishing vessels are used depending on the local possibilities. The organisation of the work at sea mainly depends on the facilities given aboard the vessels. In some cases, the samples are only taken and preserved on board and all the biological analyses are carried out in the laboratories. On the contrary in other situations, particularly aboard the research vessels, the

whole analysis of the samples, including the data input in computer files, are conducted aboard. Generaly speaking, it is considered that the MEDITS survey mobilizes five equivalent scientist-days (at sea or in the laboratories) for one vessel-day at sea.

4. Use of survey information

The results of the surveys are used mainly at two levels by the scientists involved in the programme. At a general level, a global description on the distribution of the reference species is produced. This information is given using abundance and biomass indices as well length distribution of those species by stratum (fig. 4). Another objective is to use this information to estimate demographic parameters like recruitment and mortality. Nevertheless, for the moment, the series (three years available till the preparation of this paper) has been considered too short to introduce such analyses.

In the different sub-areas, the MEDITS results are introduced in various analyses. For instance, they have been added in a composite series of trawl surveys, from 1957 to 1995, to study the biodiversity trend of the demersal species in the Gulf of Lions (Aldebert, *in press*). In some places, they are used to study the structure of demersal fish communities and more generally to analyse the spatial distribution of the species by different spatial methods (Lembo, 1997; Corsi *et al.*, 1997). It is also proposed to use the MEDITS data for preliminary stock assessments by composite production model.

Apart from the biological observation, trawl surveys constitute an opportunity to assess the human refuses on the shelves and slopes (Galgani *et al.*, 1996).

5. Resulting publications and reports

From the beginning of the programme, all the basic information related to the programme is presented in annual reports (Bertrand *et al.*, 1994, 1995, 1996, 1997). Generally, these reports comprise two main parts. One part describes in detail the technical organisation of the surveys with a general information on the survey progress aboard each of the vessels, a description of the vessels used, the survey calendar, the lists of the scientists who took part in the survey aboard each vessel, a presentation of the final sampling scheme as well as the meeting reports. The common biological results including formal description, data tables and length distribution graphs are grouped in a second part of the reports. This information is completed with the bringing up to date of the manual of protocols, when necessary.

Other results obtained by the different teams from the MEDITS data are presented and diffused through their usual channels.

To reinforce the communication and the diffusion of the results obtained from the programme, the MEDITS partners decided to organize a symposium on "*Assessment of demersal resources by direct methods in the Mediterranean and the adjacent seas*". This symposium will occur in Pisa (Italy) by the end of March 1998, i.e. allowing to incorporate four annual MEDITS surveys. It is anticipated that this meeting will favour relationships between the scientists involved in different research surveys programmes and in different analytical approaches.

6. Critique

Regarding the reach of the objectives and the prospect of the programme, the following points may be highlighted.

The MEDITS programme was the first one in the Mediterranean where a collaboration was developed at such a scale and in such an integrated way for the assessment of the demersal resources. Particularly, with the production of a common data bank, the partners have created the basis for a common working framework. The results obtained so far are very promising.

So, at the time when the officials intend to harmonize the fishery regulation in the Mediterranean, the standardization adopted inside the MEDITS programme makes possible from now to introduce a general description of the demersal resources all along the coasts of the four Mediterranean European countries as well as in the Adriatic sea.

The first surveys gave very interesting information for the description and the production of general indicators concerning the demersal resources, particularly on their distribution in the

different areas. For the time being, the series is yet too short to permit a full analysis of the data obtained, especially for time trend analyses. Nevertheless it is anticipated that the symposium in Pisa will offer an opportunity to progress to this aim. This meeting will also give a chance for a debate on the future of the programme.

Naturalists have mainly to take part in the trawl surveys, particularly to ensure the quality of the biological data introduced in the data banks. Statisticians, data analysts, fishery biologists are also strongly required to contribute in the valorization of surveys. One of the challenges for the research survey programmes is to favour a well-balanced collaboration between these different specialists. This is particularly important to give the best conditions for the continuation of the surveys. Inside the MEDITS programme, different attempts have been done to favour this kind of collaboration (working groups, etc.). It is expected that the symposium in Pisa (March 1998) will contribute to progress on that question.

Till now, the common data collection inside the MEDITS programme has been focused on biological data. For the future, it is expected to include the collection of basic environmental data (particularly temperature) in the standard observations at each station.

The MEDITS Steering committee is preoccupied with the intercalibration between the different vessels. This question is all the more important because each of the vessels has to work in an independent area. During the last few years, the Italian partners have carried out a national and the international MEDITS surveys concurrently in same areas. As they have started a peculiar study for the calibration between the different vessels and methods used, the MEDITS group is waiting for the result of this work before further reflection.

The EC-DGXIV initiative has been a deciding factor for the establishment of the MEDITS programme. The first results obtained inside the programme can be considered very encouraging. Till now, the programme is supported through a structure of short duration research contracts. This organization does not offer the best conditions to manage lasting data collection. For the future, the need for a stabilized common management structure would be considered.

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CC: Co-ordination Committee

Table 1. The MEDITS Steering Committee

	1994	1995	1996
Spain	83	111	107
France	94	90	89
Italy 1	153	153	153
Italy 2	124	108	125
Italy 3	140	142	141
Italy 4	146	146	146
Italy 5	86	88	85
Slovenia	-	-	2
Croatia	-	-	50
Albania	-	-	40
Greece 1[1]	110	120	64
Greece 2	-	-	93
Total	936	958	1095

[1] The Greek area has been shared in two parts from the MEDITS 96 survey. The values for 1994 and 1995 are those for the total Greek area.

Table 2. Number of hauls during the MEDITS '94, '95 and '96 surveys

	Area	N°strata	10-50 m		50-100 m		100-200 m		200-500 m		500-800 m		TOTAL	
ES	1.1.1a	01-05	510	2	2081	5	1218	3	3682	11	5262	13	12753	34
				0,0171		*0,011*		*0,0138*		*0,0277*		*0,0219*		
	1.1.2a	01-05	1130	3	4095	10	3302	6	4242	6	3159	5	15928	30
				0,0109		*0,0105*		*0,0076*		*0,0111*		*0,0114*		
	1.1.3a	01-05	1896	4	7219	17	3587	9	2477	7	1399	6	16578	43
				0,0075		*0,0089*		*0,0092*		*0,0182*		*0,0273*		
FR	1.2.1a	01-05	1482	8	3911	22	819	2	709	4	660	4	7581	40
				0,0251		*0,0271*		*0,0135*		*0,0632*		*0,0542*		
	1.2.1b	06-10	696	4	2610	10	1734	8	653	2	586	1	6279	25
				0,0266		*0,0161*		*0,0239*		*0,0293*		*0,0147*		
	1.3.1a	01-05	166		521	3	234	2	920	5	867	3	2708	13
				0.0000		*0,0271*		*0,0217*		*0,0603*		*0,0433*		
	1.3.1b	06-10	0		524	3	153	3	383	3	960	2	2020	11
				0.0000		*0,0287*		*0,0737*		*0,0911*		*0,0211*		
IT1	1.3.2a	01-05	657	2	729	3	658	3	1737	7	2093	9	5874	24
				0,0146		*0,0177*		*0,0229*		*0,0381*		*0,0425*		
	1.3.2b	06-10	2053	8	1598	6	3186	13	2449	10	879	4	10165	41
				0,0183		*0,0194*		*0,0200*		*0,0349*		*0,0460*		
	1.3.2c	11-15	945	4	1506	6	2732	10	2828	11	3071	11	11082	42
				0,0232		*0,0215*		*0,0184*		*0,0381*		*0,0336*		
	1.3.2d	16-20	2107	6	2159	6	4302	13	3573	12	3148	9	15289	46
				0,0124		*0,0131*		*0,0154*		*0,0343*		*0,0286*		
IT2	1.3.3a	01-05	822	3	382	2	351	2	589	3	502	3	2646	13
				0,0153		*0,0236*		*0,0233*		*0,0428*		*0,0528*		
	1.3.3b	06-10	910	4	1592	6	839	2	765	3	855	4	4961	19
				0,0170		*0,0156*		*0,0111*		*0,0397*		*0,0418*		
	1.3.3c	11-15	627	3	796	3	512	3	500	2	242	1	2677	12
				0,0200		*0,0166*		*0,0286*		*0,0356*		*0,0278*		
	1.3.3d	16-20	431	2	541	3	896	4	471	2	335	3	2674	14
				0,0190		*0,0188*		*0,0172*		*0,0231*		*0,0804*		
	1.3.3e	21-25	1096	4	446	2	927	5	412	2	260	3	3141	16
				0,0133		*0,0178*		*0,0194*		*0,0434*		*0,1075*		
	1.3.3f	26-30	783	2	987	4	2335	11	1620	8	1041	7	6766	32
				0,0102		*0,0158*		*0,0209*		*0,0465*		*0,0589*		
	1.3.3g	31-35	705	3	350	2	768	4	1060	4	1227	6	4110	19
				0,0120		*0,0250*		*0,0202*		*0,0346*		*0,0410*		
IT3	1.3.4a	01-05	1194	4	1224	6	2095	11	3238	15	5248	21	12999	57
				0,0144		*0,0219*		*0,0255*		*0,0460*		*0,0387*		
	1.3.4b	06-10	622	4	1003	4	1224	6	1966	7	2441	7	7256	28
				0,0275		*0,0178*		*0,0237*		*0,0360*		*0,0284*		
	1.3.4c	11-15	3145	4	6610	8	9866	10	13424	15	15653	19	48698	56
				0,0055		*0,0056*		*0,0049*		*0,0111*		*0,0117*		
IT4	2.2.1a	01-05	259	3	224	2	584	3	1098	3	1273	2	3438	13
				0,0529		*0,0434*		*0,0255*		*0,0242*		*0,0142*		
	2.2.1b	06-10	306	2	278	2	258	2	886	3	989	15	2717	24
				0,0300		*0,0330*		*0,0335*		*0,0301*		*0,1393*		
	2.2.1c	11-15	455	3	305	3	357	2	972	4	1032	3	3121	15
				0,0317		*0,0475*		*0,0272*		*0,0396*		*0,0281*		
	2.2.1d	16-20	677	1	524	1	1009	3	874	5	1160	12	4244	22
				0.0070		*0,0101*		*0,0147*		*0,0560*		*0,0923*		
	2.2.1e	21-25	261		509	3	1348	8	332	5	860	4	3310	20
				0.0000		*0,0269*		*0,0289*		*0,1413*		*0,0453*		
	2.2.1f	26-30	329	3	599	3	1809	5	472	1	350	1	3559	13
				0,0442		*0,0237*		*0,0139*		*0,0190*		*0,0258*		
	2.2.1g	31-35	290	2	689	3	1214	3	260		336	1	2789	9
				0,0325		*0,0222*		*0,0120*		*0.0000*		*0,0300*		
	2.2.1h	36-40	1702	9	1307	6	1407	7	707	4	492	4	5615	30
				0,0234		*0,0215*		*0,0236*		*0,0437*		*0,0750*		
AL	2.2.1i	41-45	568	3	2231	10	2186	10	1840	8	1910	9	8735	40
				0,0241		*0,0209*		*0,0227*		*0,0405*		*0,0422*		
IT5	2.1.1a	01-05	17300	25	8200	12							25500	37
				0,0063		*0,0071*								
	2.1.1b	06-10	4700	8	10350	14	14950	19	3900	5	950	2	34850	48
				0,0075		*0,0062*		*0,0063*		*0,0112*		*0,0197*		
SL	2.1.1c	11-	184	2									184	2
				0,0462										
HR	2.1.1d	16-19	7308	12	14785	18	7225	17	2409	3			31727	50
				0,0068		*0,0052*		*0,0106*		*0,0128*				
GR1	2.2.4	06-10	8645	7	8489	13	15823	14	19774	21	15426	9	68157	64
				0,0033		*0,0057*		*0,0039*		*0,0090*		*0,0050*		
GR2	2.2.2	16-20	2916	2	4365	8	2536	4	3158	4	3848	4	16823	22
				0,0026		*0,0074*		*0,0051*		*0,0122*		*0,0091*		
	2.2.3a	01-05	4918	2	4090	8	13269	14	18100	20	22224	8	62601	52
				0,0016		*0,0073*		*0,0041*		*0,0083*		*0,0027*		
	2.2.3b	16-20	2467	2	587	4	7143	7	6074	4	8645	2	24916	19
				0,0026		*0,0217*		*0,0037*		*0,0031*		*0,0017*		
									With :		S.(km²)	Nb hauls	504471	1095
												Sampl. rate (%)		

Table 3. MEDITS 96 : Sampling scheme on the different strata
(including the surface of the strata, the haul numbers and the sample rates).

Species	Code	Usual name	
		French	English
Citharus linguatula	CITH MAC	Feuille	Spotted flounder
Eutrigla gurnardus	EUTR GUR	Grondin gris	Grey gurnard
Helicolenus dactylopterus	HELI DAC	Rascasse de fond	Rockfish
Lepidorhombus boscii	LEPM BOS	Cardine à quatre taches	Four-spotted megrim
Lophius budegassa	LOPH BUD	Baudroie rousse	Black-bellied angler
Lophius piscatorius	LOPH PIS	Baudroie commune	Angler
Merluccius merluccius	MERL MER	Merlu commun	European hake
Micromesistius poutassou	MICM POU	Merlan bleu	Blue whiting
Mullus barbatus	MULL BAR	Rouget-barbet de vase	Red mullet
Mullus surmuletus	MULL SUR	Rouget-barbet de roche	Striped red mullet
Pagellus acarne	PAGE ACA	Pageot acarné	Axillary seabream
Pagellus bogaraveo	PAGE BOG	Dorade rose	Blackspot seabream
Pagellus erythrinus	PAGE ERY	Pageot commun	Common pandora
Phycis blennoides	PHYI BLE	Phycis de fond	Greater forkbeard
Raja clavata	RAJA CLA	Raie bouclée	Thornback ray
Solea vulgaris	SOLE VUL	Sole commune	Common sole
Spicara flexuosa	SPIC FLE	Gerle	Picarel
Trachurus mediterraneus	TRAC MED	Chinchard à queue jaune	Mediterranean horse mackerel
Trachurus trachurus	TRAC TRA	Chinchard d'Europe	Atlantic horse mackerel
Trisopterus minutus capelanus	TRIS CAP	Capelan	Poor-cod
Zeus faber	ZEUS FAB	Saint-Pierre	John dory
Aristaeomorpha foliacea	ARIS FOL	Gambon rouge	Giant red shrimp
Aristeus antennatus	ARIT ANT	Crevette rouge	Blue and red shrimp
Nephrops norvegicus	NEPR NOR	Langoustine	Norway lobster
Parapenaeus longirostris	PAPE LON	Crevette rose du large	Deep-water pink shrimp
Eledone cirrhosa	ELED CIR	Poulpe blanc	Horned octopus
Eledone moschata	ELED MOS	Poulpe musqué	Musky octopus
Illex coindetii	ILLE COI	Encornet rouge	Broadtail squid
Loligo vulgaris	LOLI VUL	Encornet	European squid
Octopus vulgaris	OCTO VUL	Pieuvre	Common octopus
Sepia officinalis	SEPI OFF	Seiche commune	Common cuttlefish

Ref. Usual names for fish : Fischer W., M.L. Bauchot, M. Schneider (rédacteurs), 1987. Fiches FAO d'identification des espèces pour les besoins de la pêche (Révision 1). Méditerranée et Mer Noire Zone de pêche 37. Rome, FAO, vol 1 et 2, 1530 p.

Table 4. Codes and usual names of the species included in the reference list.

Haul characteristics (file A)	Catch per haul (file B)	Biological parameters (file C)
COUNTRY	COUNTRY	COUNTRY
VESSEL	VESSEL	VESSEL
GEAR	YEAR	YEAR
RIGGING	HAUL NUMBER	HAUL NUMBER
DOORS	CODEND CLOSING DEVICE	CODEND CLOSING DEVICE
YEAR	PART OF THE CODEND	PART OF THE CODEND
MONTH	FAUNISTIC CATEGORY	FAUNISTIC CATEGORY
DAY	SPECIES CODE (RUBBIN)	SPECIES CODE (RUBBIN)
HAUL NUMBER	TOTAL WEIGTH IN THE HAUL	LENGTH CLASS CODE
CODEND CLOSING DEVICE	TOTAL NUMBER IN THE HAUL	FRACTION WEIGHT
SHOOTING TIME	FEMALES NUMBER	SUBSAMPLE WEIGHT
SHOOTING QUADRANT	MALES NUMBER	SEX
SHOOTING LATITUDE	UNSEXED NUMBER	NUMBER OF MEASURED INDIVIDUALS
SHOOTING LONGITUDE		LENGTH CLASS
SHOOTING DEPTH		MATURITY
HAULING TIME		NB OF INDIVIDUALS IN THAT CLASS
HAULING QUADRANT		
HAULING LATITUDE		
HAULING LONGITUDE		
HAULING DEPTH		
HAUL DURATION		
VALIDITY CODE		
COURSE (RECTILINEAR OR NOT)		
SPECIES REPORTING CODE		
DISTANCE		
VERTICAL OPENING		
WING OPENING		
BRIDDLES LENGTH		
WARP LENGTH		
WARP DIAMETER		
HYDROLOGICAL STATION NUMBER		
OBSERVATIONS		

Table 5. Parameters included in the exchange files

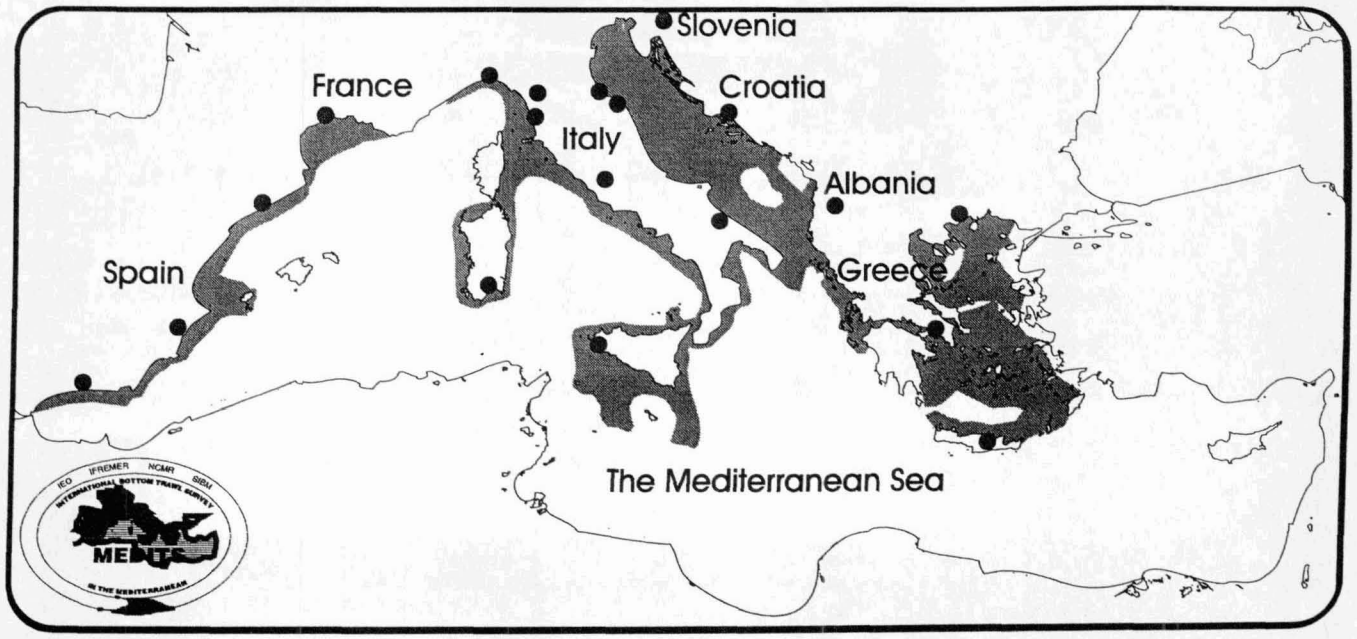
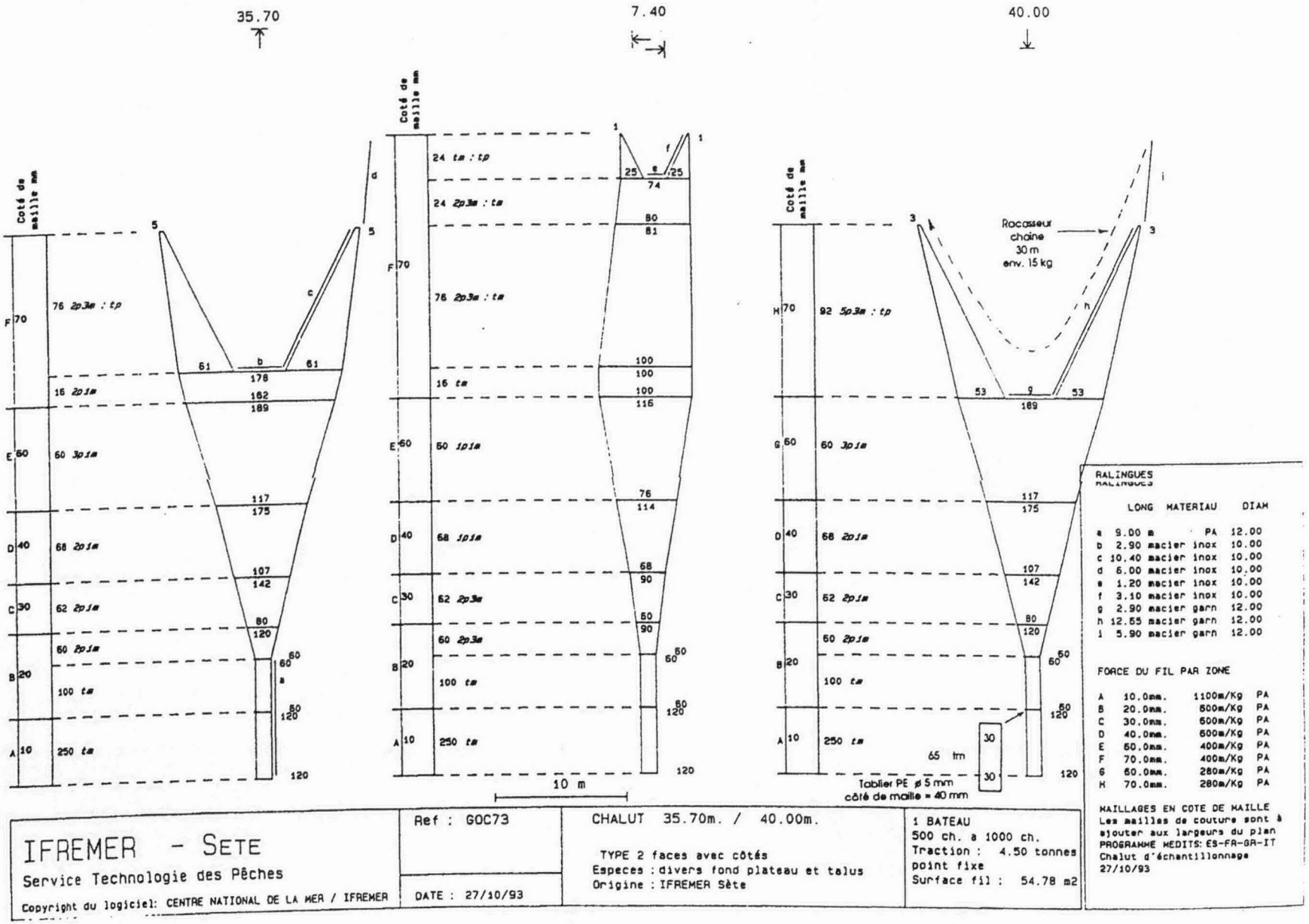


Figure 1. The MEDITS area in 1996 (circle: location of the main partner institutes)



RALINGUES

	LONG	MATERIAU	DIAM
a	9.00 m	PA	12.00
b	2.90	acier inox	10.00
c	10.40	acier inox	10.00
d	6.00	acier inox	10.00
e	1.20	acier inox	10.00
f	3.10	acier inox	10.00
g	2.90	acier garn	12.00
h	12.65	acier garn	12.00
i	5.90	acier garn	12.00

FORCE DU FIL PAR ZONE

A	10.0mm.	1100m/Kg	PA
B	20.0mm.	600m/Kg	PA
C	30.0mm.	600m/Kg	PA
D	40.0mm.	600m/Kg	PA
E	60.0mm.	400m/Kg	PA
F	70.0mm.	400m/Kg	PA
G	60.0mm.	280m/Kg	PA
H	70.0mm.	280m/Kg	PA

MAILLAGES EN COTE DE MAILLE
Les mailles de couture sont à ajouter aux largeurs du plan
PROGRAMME MEDITS: ES-FR-GR-IT
Chalut d'échantillonnage
27/10/93

IFREMER - SETE
Service Technologie des Pêches

Ref : GOC73

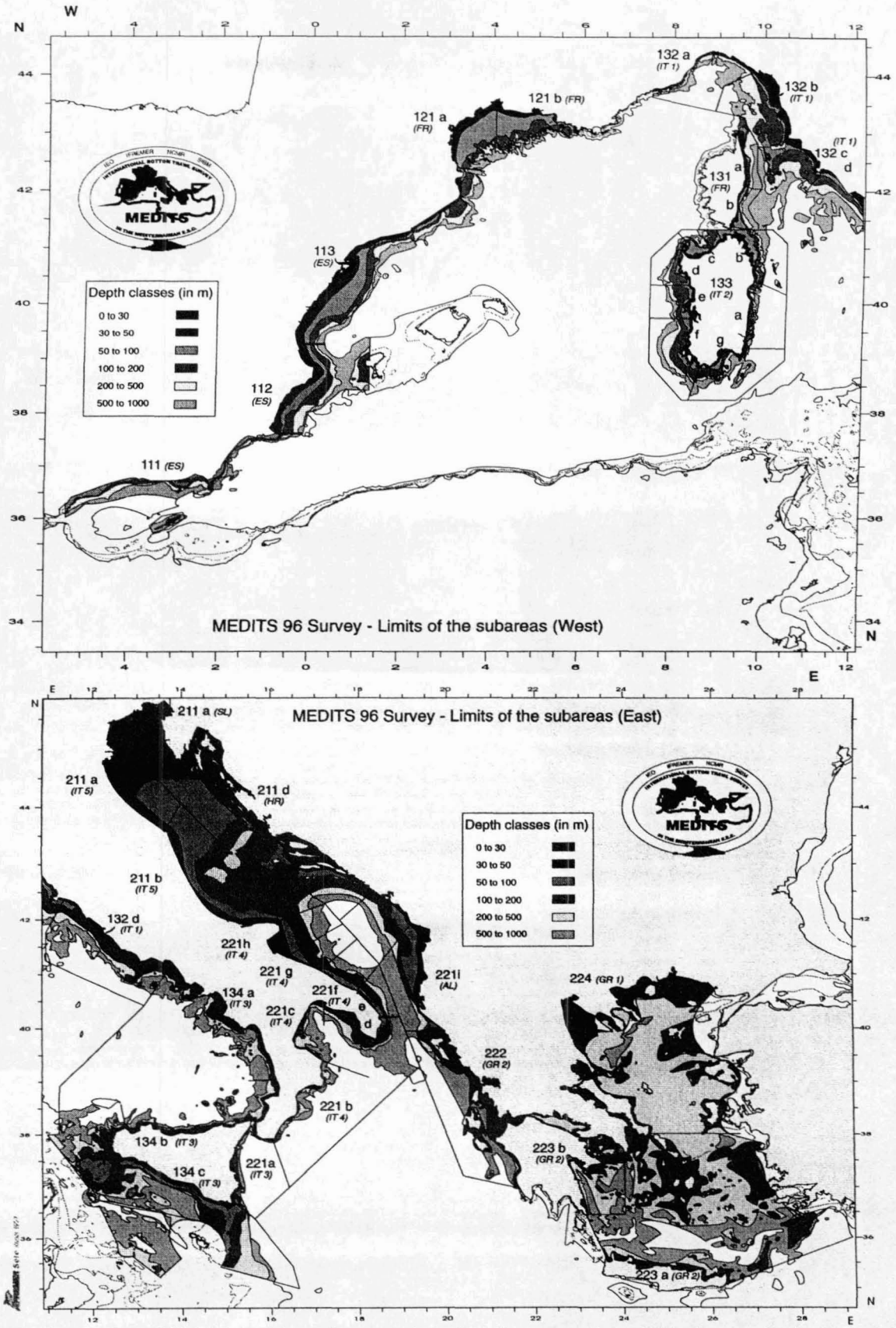
DATE : 27/10/93

CHALUT 35.70m. / 40.00m.

TYPE 2 faces avec côtés
Especes : divers fond plateau et talus
Origine : IFREMER Sète

1 BATEAU
500 ch. à 1000 ch.
Traction : 4.50 tonnes
point fixe
Surface fil : 54.78 m2

Figure 2. MEDITS sampling gear



NB. The depths of 10 and 800 meters have been replaced by the nearest available (respectively 30 and 1000 m) on the map used.

Figure 3. Limits of the sampling strata

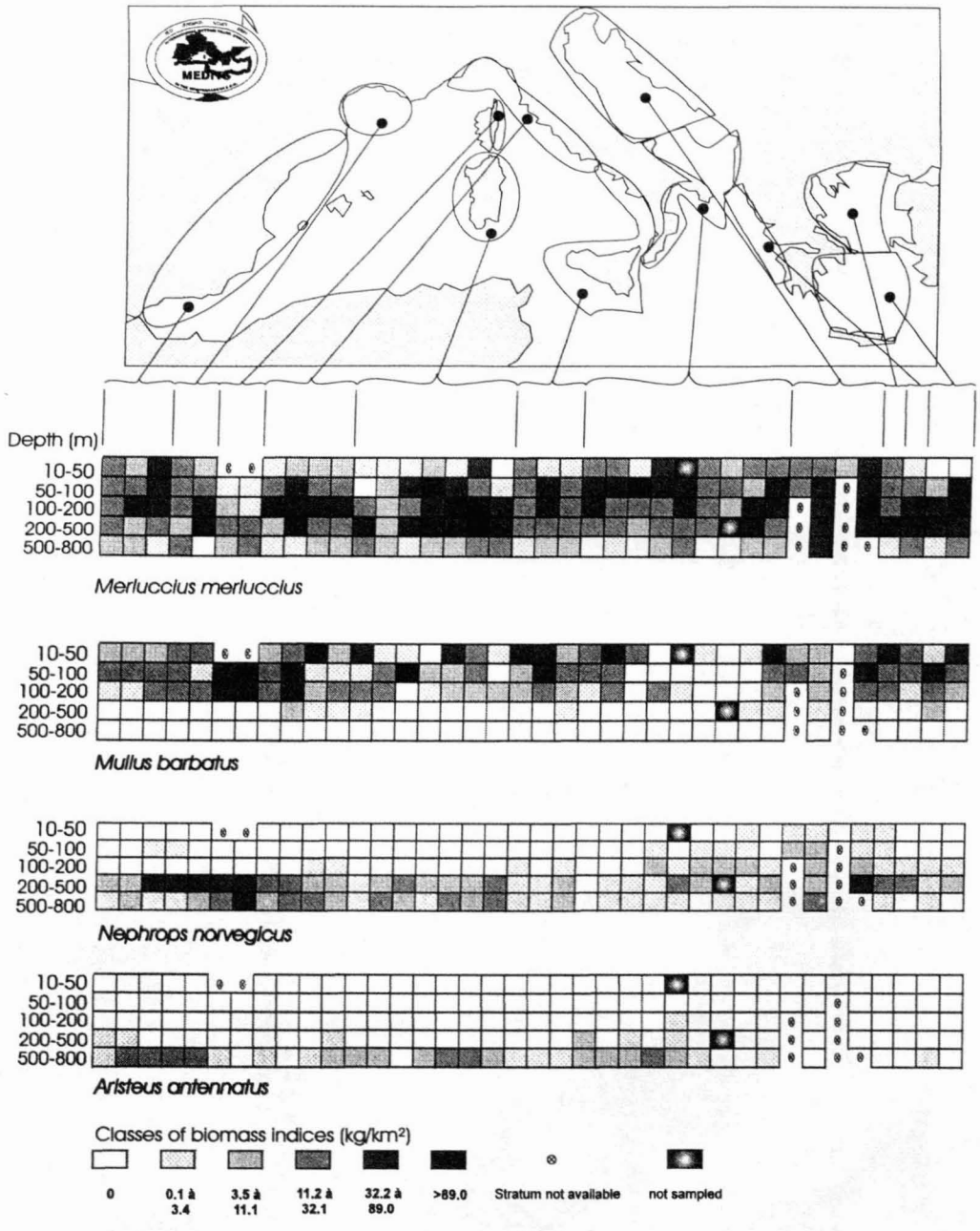


Figure 4. MEDITS 96. Biomass indices by strata for some species.