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COMMISSION STAFF WORKING PAPER

**REPORT OF
THE SCIENTIFIC, TECHNICAL AND ECONOMIC
COMMITTEE FOR FISHERIES**

DISCARDS FROM COMMUNITY VESSELS

STECF opinion expressed during plenary meeting held in Ispra from 6-10
November 2006

*This report does not necessarily reflect the view of the European Commission
and in no way anticipates the Commission's future policy in this area.*
18 November 2006

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1 TERMS OF REFERENCE

The STECF Sub-group SGRST on Discarding by EU fleets met in Brussels, from October 9th to the 12th, 2006, with the following Terms of Reference:

- 1) *compile an overview of discards from Community vessels in the Mediterranean and the North East Atlantic (all ICES areas) by fleet, stock and quarter. The overview should provide estimates of the total amounts and amounts relative to total catches. Information should be provided on basis of both weight and numbers. The overview should cover the period 2003-2005.*
- 2) *provide examples of different discard patterns such as discarding due to MLS regulations, to above-quota catches in mixed fisheries, high grading and discarding due to poor quality. To the extent possible provide information on the relative importance of the various causes for discards in the fisheries covered in a. These examples should include examples of length frequencies of discards relative to landings.*
- 3) *provide information on any qualifiers regarding data availability, data representatively and data coverage which is important for the interpretation of the overview. For fleets where estimates as described in (a) cannot be made the reasons should be stated.*

2 STECF REMARKS

STECF appreciates the work done during the meeting and notes that several issues in the data call and submission were encountered before and during the meeting including difficulties to upload the data into the JRC database, late data submission by some MS, inconsistencies in the different codifications. As a consequence, there are limitations in the output of the meeting with regards to the terms of reference and only two sets of results were presented:

- discards ratios relative to total catch (ToR a)
- examples of length distributions as a aid to analyse the causes for discards (ToR b).

STECF draws the attention on the fact that high discards ratios may represent a small overall volume of discards and, conversely, low ratios is not equivalent to low volume of discards. Therefore, STECF considers that the estimated discard ratios for different fleets are unlikely to indicate, their absolute level of discarding. Furthermore, STECF notes that the precisions of the estimates of discard ratios are poor due to the small numbers of discard samples and inconsistent data processing.

3 STECF OPINION

STECF supports the recommendations made by the SGRN WG and wishes to emphasise the following:

- the lessons learned during this exercise should be used to ensure that the problems encountered are not repeated in future. Particular problems encountered were that the data call was not precisely specified leading to the provision of unsuitable data, communication between those parties involved in the provision of data was inadequate, there were shortfalls in data provision and uploading

data to the database was problematic. As a result the meeting proved to be too short.

- the importance of setting up the discard atlas as proposed by the February 2006 report of the discard atlas steering group to get a comprehensive overview of discarding which could help to inform future decisions on sampling strategies under the DCR.
- The development of indicators for monitoring the ecosystem effects of fishing require that there is a need to extend the list of species beyond those listed in appendix XII of the current DCR to include other species – both commercial and non-commercial – to be chosen on a case by case basis.
- For the Mediterranean discard estimates should be derived at the GFCM_GSA level, rather than the Division level proposed by the SGRN WG. STECF suggests that summary information on discards should be presented for three separate areas namely Western, Central and Eastern Mediterranean.

ANNEX SUB-GROUP ON RESEARCH NEEDS (SGRN)
DISCARDING BY EU FLEET 9-12 OCTOBER, 2006



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**REPORT OF
THE SCIENTIFIC, TECHNICAL AND ECONOMIC
COMMITTEE FOR FISHERIES (STECF)
SUB-GROUP ON RESEARCH NEED (SGRN)**

DISCARDING BY EU FLEET

Brussels 9-12 October, 2006

This report will be evaluated by the Scientific, Technical and Economic Committee for Fisheries (STECF)
by correspondence

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Commission's future policy in this area*

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1.2 TERMS OF REFERENCE

The group met in Brussels, from October 9th to the 12th, 2006, with the following Terms of Reference:

- a. compile an overview of discards from Community vessels in the Mediterranean and the North East Atlantic (all ICES areas) by fleet, stock and quarter. The overview should provide estimates of the total amounts and amounts relative to total catches. Information should be provided on basis of both weight and numbers. The overview should cover the period 2003-2005.
- b. provide examples of different discard patterns such as discarding due to MLS regulations, to above-quota catches in mixed fisheries, high grading and discarding due to poor quality. To the extent possible provide information on the relative importance of the various causes for discards in the fisheries covered in *a*. These examples should include examples of length frequencies of discards relative to landings.
- c. provide information on any qualifiers regarding data availability, data representatively and data coverage which is important for the interpretation of the overview. For fleets where estimates as described in (*a*) cannot be made the reasons should be stated.

1.3 ORGANISATIONAL ASPECTS

The first day of the meeting was chaired by Joel Vigneau (IFREMER) where a preliminary exploration of the data and the JRC database was made. The remaining days were chaired by Lisa Borges (IMARES).

The data submitted to the group were examined in six sub-groups, according to geographical area: Arctic (ICES Subareas I and II) and Baltic Sea (Div. IIIb-d), North Sea (Div. IV, Subdiv. IIIa and VIId), North East-Atlantic North (Div. V, VI, XII, XIV), North-East Atlantic Centre (Div. VII, except VIIId), North-East Atlantic South (Div. VIII, IX, X, CECAF) and Mediterranean. Each sub-group was composed of experts of that geographical area. All sub-groups had common guidelines on which aspects of the data they had to address and report. A list of priority species (given in Annex II) was chosen as the basis of the analysis and a common format for presenting the results was agreed in plenary.

2 DATA QUALITY

2.1 DATA SUBMISSION

There were several issues regarding the data call and the submission of the data. The deadline for the submission of the discard data was extended beyond the normal period of 20 days but it was still short and in a period where most institutes have reduced staff due to holidays and surveys. The difficulty of the task was further compounded by the facts that the issue is complex and was being undertaken for the first time.

The data call is inconsistent with the nature of the discard data and the DCR specification. As a consequence the data call was open to different interpretations (see sub-section 2.3 for specifications). The description of the data to be submitted should have been more fully described in the data call, which created a misunderstanding on several levels. Some fields on the data request were not clearly specified and the guidelines are open to different interpretations, namely the units of the data, the sampling size, number of samples, starting point, grouping and length. The areas from which data should have been submitted was also not clear since some MS's considered only EU waters, while others considered all ICES areas. Furthermore, the data call specifies that if a fleet segment other than the ones specified by the DCR was sampled, then the data could be submitted by that fleet segment/metier. However, DCR format is not by metier, therefore the JRC database was not prepared for data by metier and thus the data could not be uploaded. MS's then had the choice to either recode the data (and probably lose significant information) or match the metier to the DCR code (gear and vessel length class) by assuming that the majority of a metier corresponded to one gear and vessel length class. Finally, the units of the length frequency specified in the data call (by a 1000 fish) only allowed for a relative comparative analysis between the shape and range of landings and discards length frequencies.

The group was also aware of several technical problems with the uploading of the data in the JRC website, regarding the excel spreadsheets and the XML format. The excel example provided in the JRC website is not consistent with the XML format and it is also not compatible with the database (does not upload data) and the data call (e.g. has euro units). The files to upload were limited in size which made MS's divide the data in several files. The error messages were generated too slowly and were not specific enough. There were also inconsistency problems between the data originally submitted and the data stored in the JRC database for several MS's data. At the end all the data submitted were in Excel.

Due to the issues described above and also to late data submission by some MS's (even during the meeting), some of the data submitted was not uploaded into the JRC database. To accommodate for all the data submitted, the group decided to divide the data in large geographical areas, screen and analyse it outside the JRC database.

Finally some reference has to be made about late submissions of data. These were related to MS (a) submitting data late (the week before the meeting and also during the meeting) or (b) resubmitting data. The data in (a) was submitted late mainly due to national coordination issues and/or because of problems in uploading data. The problems related to (b), resubmitting data were due to issues or misunderstandings described above with the JRC format and the data call specifications, and to make the analyses possible the data had to be submitted in a different format (usually different aggregation level). The group decided that any late data submission was considered only if the respective area subgroup were able to analyse it. If it was impossible to include the extra data in order to have the analysis ready by the end of the meeting, the data was not considered in the analysis (although it is included in the data submission table in the next section 2.2).

2.2 DATA AVAILABILITY AND COVERAGE

Discards and landings data were submitted by 14 countries (Table 2-1). The discard data submitted covered all the seven main geographical areas: Arctic, Baltic Sea, North Sea, North-East Atlantic North, North-East Atlantic Centre, North-East Atlantic South and Mediterranean. However, in several areas only a few countries submitted data. Therefore, in some of the areas, e.g. in the Mediterranean and the Baltic, the most important fleets are not represented. A complete description of the data is provided in each geographical area section.

Several MS's have decided *a priori* not to submit data by a specific stratification level when it was considered that the sampling level achieved was not sufficient to produce a reliable estimate. Furthermore, some MS's have not submitted length frequency data when numbers sampled by length class were deemed insufficient to produce reliable estimates. Several MS's have also only submitted discard length frequency according to the DCR, i.e. when the percentage of that species discard was higher than 10% or 20% in weight or number respectively.

Table 2-1 List of countries and data submitted by geographical area.

		Belgium	Denmark	Estonia	France	Germany	Ireland	Italy	Lithuania	Netherlands	Poland	Portugal	Spain	Sweden	UK
ARCTIC	Landings				2003 - 2004 2004	2003 - 2004 2005				2003 - 2005 2005					2004
	Discards				2003 - 2004 2004	2003 - 2004 2005				2003 - 2005 2005					
BALTIC SEA	Landings		2003 - 2005 2005	2005 2005		2003 - 2005 2005			2005 2005		2005			2003 - 2005 2005	
	Discards			2005 2005		2003 - 2005 2005			2005 2005		2005			2003 - 2005 2005	
NORTH SEA	Landings	2003 - 2004*	2003 - 2005 2005		2003 - 2005 2005	2003 - 2005 2005				2003 - 2005 2005				2003 - 2005 2005	2003 - 2005 2005
	Discards		2003 - 2005 2005		2003 - 2005 2005	2003 - 2005 2005				2003 - 2005 2005				2003 - 2005 2005	2003 - 2005 2005
NE ATLANTIC - NORTH	Landings	2003 - 2004*	2003 - 2005		2002 - 2005 2005	2003 - 2005 2005	2003 - 2005 2005			2003 - 2005 2005			2003 - 2005 2005		2003 - 2005 2005
	Discards				2003	2005 2005	2003 - 2005 2005			2003 2005			2003 - 2005 2005		2003 - 2005 2005
NE ATLANTIC - CENTRE	Landings	2002 - 2004*			2002 - 2005 2005	2003 - 2005 2005	2003 - 2005 2005			2003 - 2005 2005			2003 - 2005 2005		2003 - 2005 2005
	Discards				2003 - 2005 2005	2003 - 2005 2005	2003 - 2005 2005		2005 #	2005			2003 - 2005 2005		2003 - 2005 2005
NE ATLANTIC - SOUTH	Landings	2002 - 2004*			2003 - 2005 2005	2003 - 2005				2003 - 2005		2003 - 2005 2005	2003 - 2005 2005		2003 - 2005
	Discards				2003 - 2005 2005	2003, 2005						2004 - 2005 2005	2003 - 2005 2005		2003, 2005
MEDITERRANEAN	Landings							2002 - 2005					2005 2005		
	Discards							2005**					2005 2005		

* Belgium data supplied by JRC are all zero values

** 2005 discard analysis has been carried out for all fleet segment except trawlers.

Error in JRC database?

2.3 DATA ASSUMPTIONS

The first assumption made by the group was to consider that the raised estimated discards are comparable between fleets, although it has been raised by different methods. Since a description of the raising method used was not available to the group, when similar national fleets were aggregated it was assumed that the differences between discard values were due to differences between fleet discard behaviour. Another issue coming from the raising method is the fact that raising by species landings, a method used by the majority of the MS's, will in most cases underestimate the discards (and particularly in pelagic gears) since when a specific species is targeted the others are discarded and vice versa. It also means that only partially discarded species are not significantly underestimated.

A further assumption is that the discard samples are representative of the fleets sampled and/or strata. This corresponds to an appropriate sampling design and a significant sampling effort. The group considered all data regardless of the sampling levels reported.

A major issue with the data is the matching between landings data and discard data. The first originates by port sampling and is usually provided by stock. This data is submitted according to the DCR by stock, gear and vessel length class to JRC. The discard data originates by sea sampling and is provided by fleet/metier segmented. The problem is how to match these data. Some countries assumed that the majority of their landings correspond to a fleet segment, while other MS's decided to provide data by stock. This created additional data aggregation problems. The group then decided to divide the data by area when possible (usually requiring additional data submission), and if it was not possible to divide it the data were not analysed (see each geographical section for details, sub-sections 3.1 to 3.7).

2.4 DATA ANALYSIS

The group decided to present only results regarding the species discard ratios (in weight) by year, gear and if possible vessel length within each geographical area defined in sub-section 1.3. The weight ratios are only representative of their respective fleets and not for the whole geographical area. Numbers ratios are not presented in the report due to missing data (mainly in landings data) and time constraints. Total quantities discarded and landed are also not presented in the report since the group felt that the values produced could be seriously inaccurate. This is the consequence of the partial nature of the data submitted concerning area, gear and species.

The proportion of the catch discarded by species was calculated by strata based on the following assumption, considering all situations encountered when calculating the discard percentage (Table 2-2): the group assumed that when discards of a given species are missing in the dataset (case 2) and the strata has been sampled, the discards of this species are assumed to be 0 (case 3).

Table 2-2 Example of calculating the discard proportion (p), considering all situations (cases 1 to 5) encountered in the dataset.

	Landings (l)	Discards (d)	p	Comments
case 1	80	20	0.2	
case 2	1500	-	-	Discards not sampled
case 3	1000	0	0	No discards of that species
case 4	-	300	-	Landings information is missing
case 5	0	200	1	No landings of that species
<i>Overall p for a strata with cases 1,3,5</i>			0.17	

Let

k = the strata index

nk = the total number of strata

lk = the volume of landings (by number or by weight) in strata k

dk = the volume discarded (by number or by weight) in strata k

then the overall discard proportion is

$$\bar{p} = \frac{\sum_{k=1}^{nk} d_k}{\sum_{k=1}^{nk} (d_k + l_k)} = \frac{20 + 0 + 200}{100 + 1000 + 200} = 0.17$$

Regarding case 4 where landings were missing, the group decided not to do the assumption that the landings were 0 (a case 5), because several strata had no landings information due to the different aggregation level between logbook and discard data. Furthermore, when there were no discards for a species in all stratum of a gear/metier, and therefore the overall discard proportion (\bar{p}) is 0, the group decide not to present these results. This is because the group felt that the 0 discard ratio was probably reflecting low sampling levels than a real 0 discard ratio.

In several MS's, landings data for anglerfish (*Lophius* spp.), megrim (*Lepidorhombus* spp.), horse mackerel (*Trachurus* spp.) and mullet (*Mullus* spp.) are not reported separately by species, although discard data is disaggregated by species. In these cases the group decided to sum the species and present the discard rates for the combined species. There were also mismatches between landings and discard data on other aggregation levels (e.g. annual, area, metier), and thus the merging of the landings and discards datasets had to be made on a country by country base.

3 DISCARDS BY GEOGRAPHICAL AREA

3.1 ARCTIC (I, II)

The data submitted to the Arctic region are considered too sparse to calculate a discard percentage for any species or fishing techniques. Landings data were provided from Germany, France, the Netherlands, Denmark and UK. Discards weight data were submitted only from Germany, France and the Netherlands. Germany has submitted data for long rough dab (*Hippoglossoides platessoides*) only for 2003, 3rd quarter while the Netherlands has submitted data for herring only, for 2003 2nd quarter and 2005 3rd quarter. France has provided weight annual data for haddock and cod for 2004. Only two MS's (Germany and the Netherlands) submitted length compositions; these were for long rough dab and herring, respectively. Spain did not submit data for this area because it is outside EU waters.

3.2 BALTIC SEA (IIIb-d)

The Lithuanian data contained only four records of cod discards. It was assumed that the values provided were not raised to an annual estimate of discards, and have therefore been omitted from the analysis. The Estonian discard data contained information on salmon, sea trout and eel discards but it was difficult to judge if the figures represented raised amounts. Estonia also submitted cod discard data from surveys but the values are unlikely to represent raised estimates. The Estonian landings reported are extremely small so there must be a problem with either the raising procedure or the units reported (kg instead of tonnes). Polish discard data for cod was provided during the meeting. The discard data were given by gear and vessel length segment, but the corresponding landings were only given by quarter for all gear types. It is therefore impossible to calculate a discard rate based on gear from the Polish data.

Only German and Swedish data were used in the analysis. The German data although raised (after resubmission during the meeting) had extremes values and therefore were not combined with other nation's data (see below). The Swedish submitted data aggregated to area level, but disaggregated to fleet/metier level.

In order to compare data from different countries, codes on different gear types were assumed to be comparable. The gears OTB, PTB and TTB were converted into DTS, LLS into HOK, GND and GNS into DFN, OTM into PTS (see Annex III for gear description). Because of the apparent problem in raised German data, the data have not been combined and the discard ratios are presented as the average of the two nation's data (Table 10-1 in Annex IV).

Cod is discarded in small percentages by the four gear groups considered. The 100% discard rates presented for herring with demersal trawl (DTS) highlights the fact that this species is not targeted by this gear and if caught will be discarded. However herring will only seldom be caught by a demersal trawl (Figure 3-1).

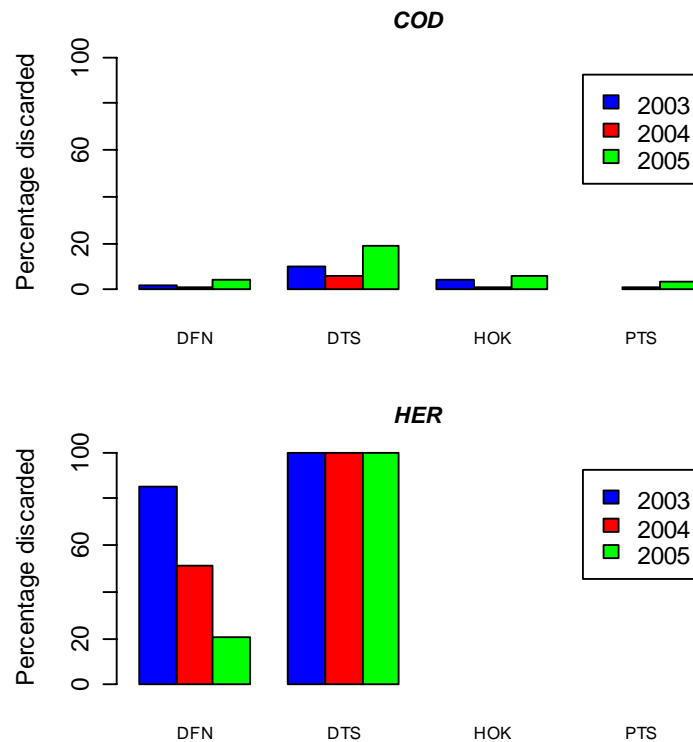


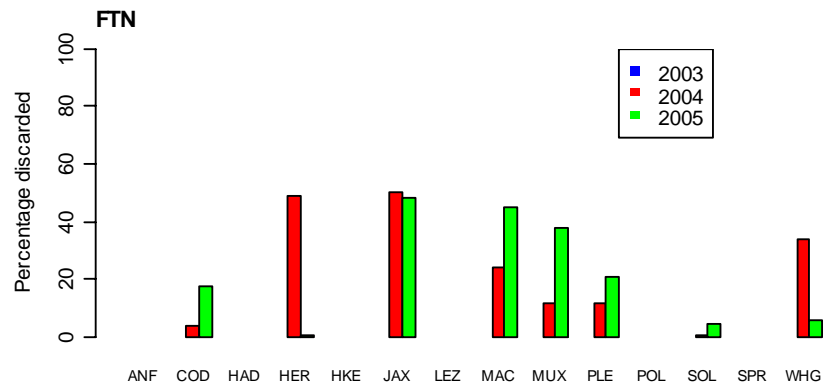
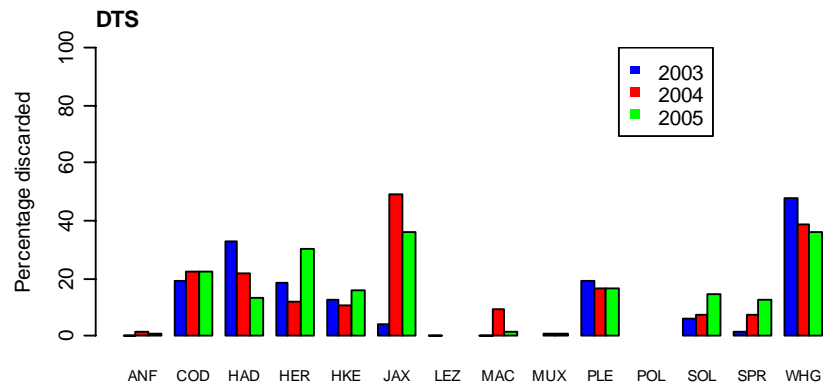
Figure 3-1 Average discard rates (in weight) by gear and year for cod and herring. A list of the priority species is given in Annex II and gear codes in Annex III.

3.3 NORTH SEA (IV, IIa, VIIId)

Discards and landings data were provided by Belgium, Germany, Denmark, France, Netherlands, UK (England & Scotland) and Sweden. The data were updated several times during the meeting, but some data remained incomplete. The fact that some fishing techniques and vessel lengths were missing made comparisons difficult. The main problems with the data were:

- The data provided by JRC for Belgium landings were all set to zero so it was assumed that there was an error in the data, and therefore all data from Belgium was excluded from the analysis.
- France landings data in 2003 were inconsistent between the data submitted and available on the JRC database and therefore were excluded from the analysis;
- Germany originally submitted sampled discard and landing data (not raised) and resubmitted raised data during the meeting. However, the values provided were extreme and therefore the data was excluded from the analysis;
- France, Sweden and the UK data were not disaggregated by vessel length class;
- France data was not disaggregated by quarter.

The discard ratios obtained show that the demersal trawl and seine (DTS) discard most species considered were around 20%. Trammel nets (FTN) discard around 40% of the catch of herring, horse mackerel, mackerel, mullets and whiting with year-to-year variability; while pelagic trawl (PTS) have low discard rates of only pelagic species. Beam trawl (TBB) discards between 40 to 60% of targeted and non-targeted species (Figure 3-2; Table 10-2 in Annex IV).



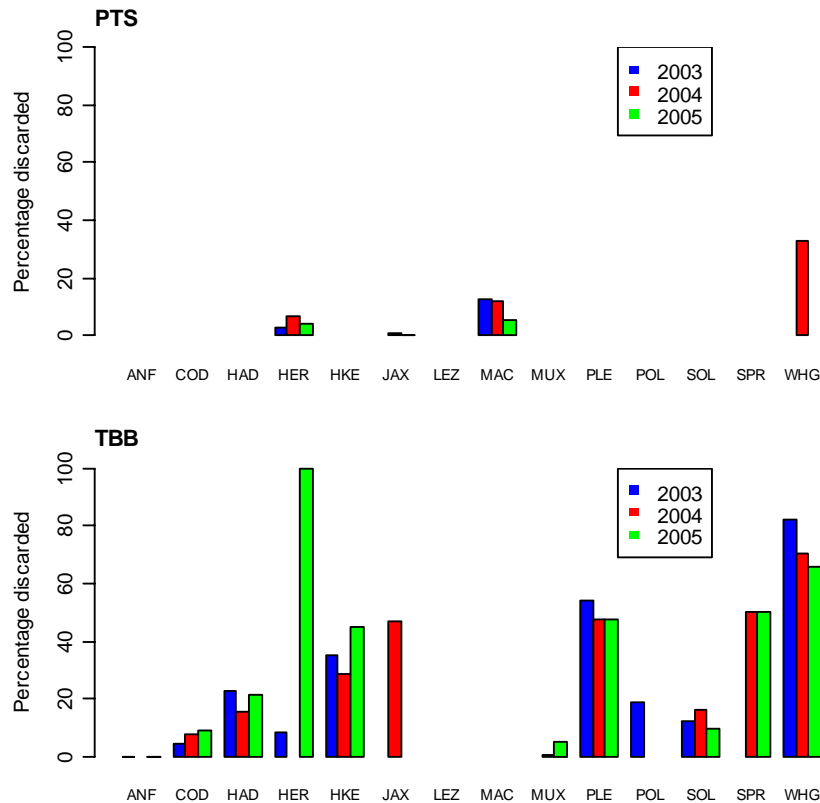


Figure 3-2 Discard rates (in weight) by species and year for demersal trawl and seine (DTS), trammel nets (FTN), pelagic trawl (PTS) and beam trawl (TBB). A list of the priority species is given in Annex II and gear codes in Annex III.

3.4 NORTH EAST ATLANTIC – NORTH (V, VI, XII, XIV)

Landings and discard weight data were provided by Germany, France, Ireland, the Netherlands, Denmark, Belgium, Spain and the UK (England & Scotland). However, not all countries data were used in the analysis:

- Denmark provided landings weight data for 2003 – 2005 but there was no associated discard weight data.
- Data provided by JRC also implied Belgium fleet activity in this area but as all the values were set to zero it was assumed that there was an error in the data and it was excluded from the analysis.

Furthermore, this area is characterised by a number of different activities which, in many cases, were pursued by individual Member States, e.g. Germany has a fishery for greenland halibut (*Reinhardtius hippoglossoides*), Spain a fishery targeting among other species roundnose grenadier (*Coryphaenoides rupestris*), the Netherlands and Scotland a pelagic fishery for herring, mackerel and blue whiting (*Micromesistius poutassou*). In such cases the data available was insufficient for a detailed analysis. The closer inshore demersal fisheries were, in the main, prosecuted by Ireland and the UK.

Discard rates by weight are provided for selected species in the following graphs but these data must be considered with extreme caution. Collating all the available data in an acceptable format was a difficult task (see section 2) and time constraints meant that data quality control checks were almost non-existent. This caveat only serves to reinforce the points made in section 5, namely due to technical and logistic problems all data should be treated with extreme care. Pair bottom trawl (PTB) and Scottish seine (SSC)

discard only a few species, although at high levels (around 40%). Single bottom trawl (STB) discards between 20 to 40% of the catch of haddock, herring, mackerel, plaice, saithe and whiting (Figure 3-3; Table 10-3 in Annex IV)

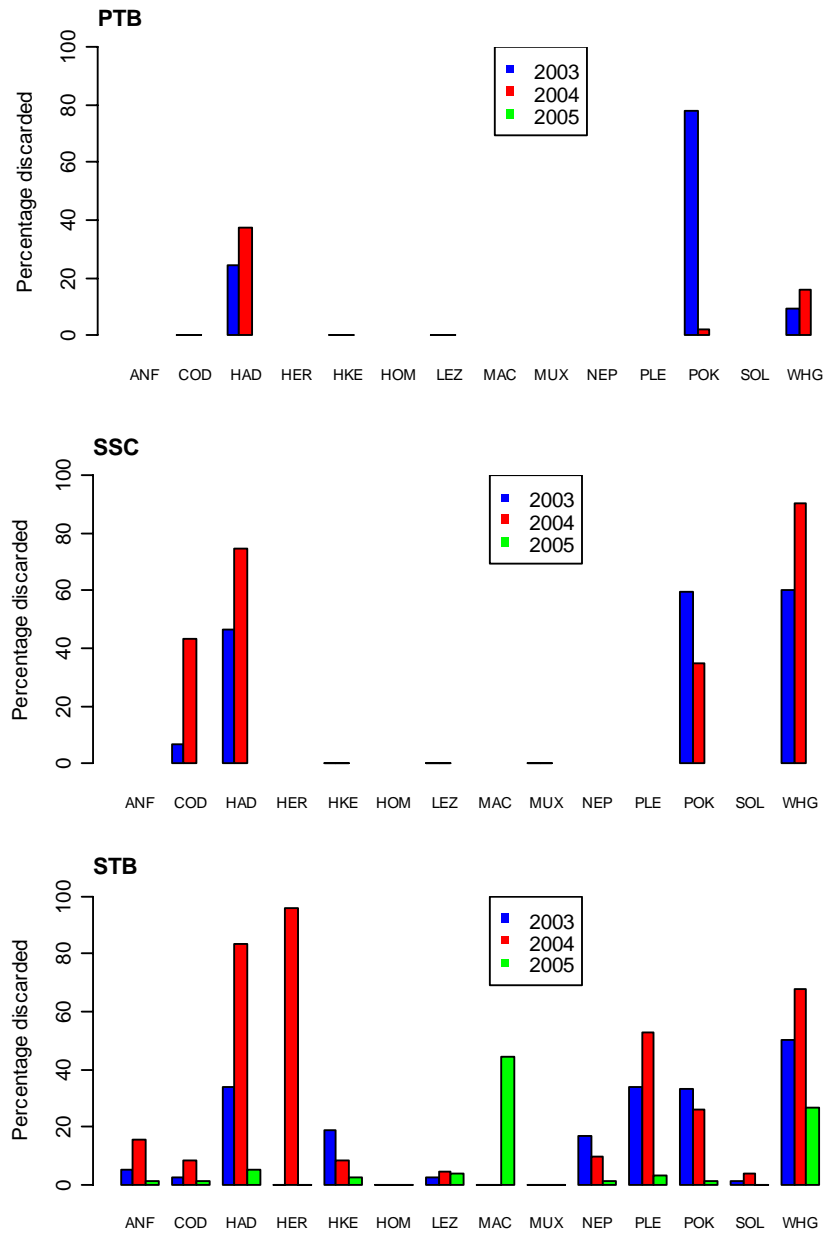


Figure 3-3 Discard rates (in weight) by species and year for pair bottom trawl (PTB), Scottish seine (SSC) and single bottom trawl (STB). A list of the priority species is given in Annex II and gear codes in Annex III.

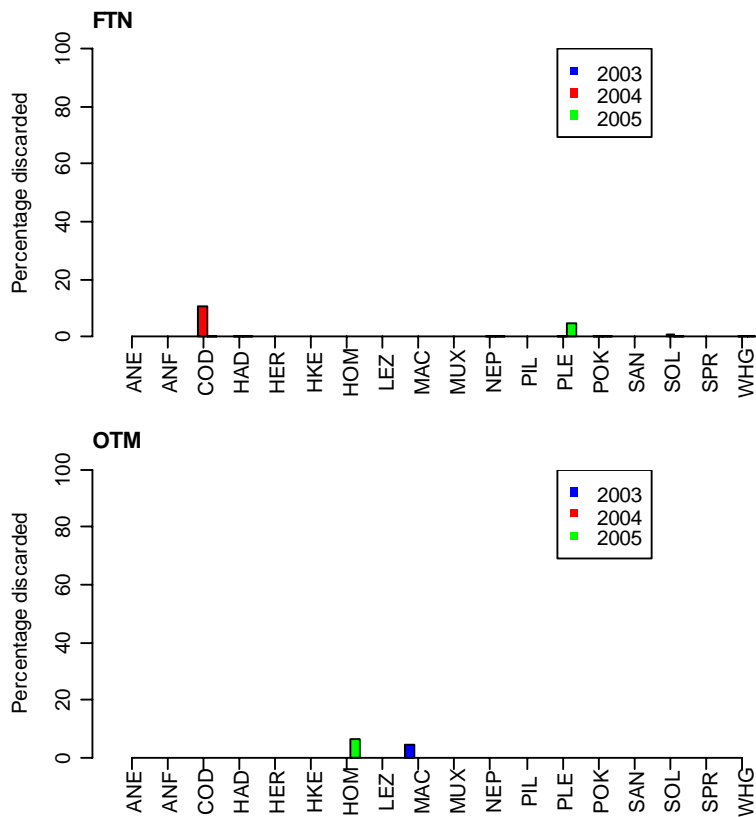
3.5 NORTH EAST ATLANTIC – CENTRAL (VII, except VIIId)

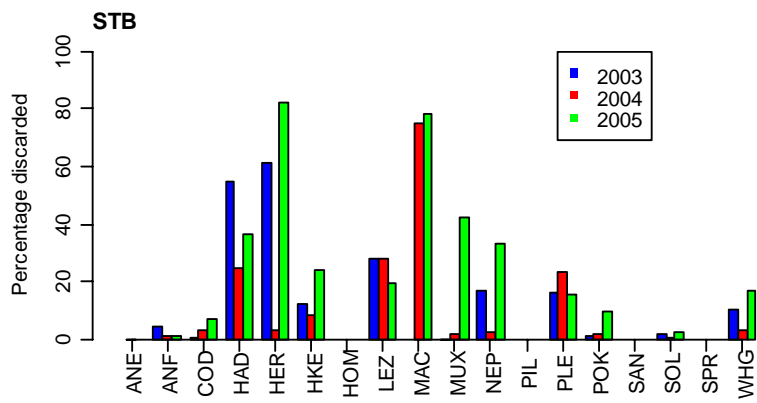
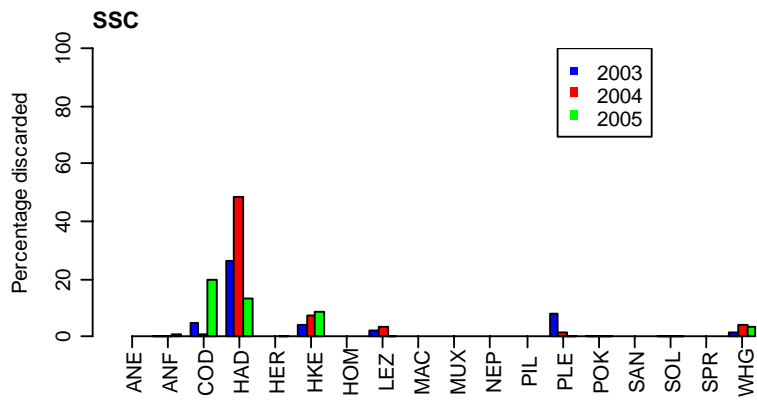
The Atlantic central area comprises all ICES subarea VII excluding the division VIIId. The data available to the group was provided by Belgium, Germany, Spain, France, Ireland, the Netherlands and the UK

(England & Scotland), and required a lot of manipulation. The data screening put in evidence the following mismatches:

- different codes between countries for the same area (ex. VIIa, 7a), prior to the splitting of the datasets between the areas;
- different codes between countries for the same gear (ex. GNS for GIN);
- different codes between the files for the same country (landings gear codes different from discards gear codes);
- Positioning the right length information in different fields of the dataset depending on the country;
- All economic information, present in the same field as the weight information, were excluded from the analysis;
- Data from France in 2002 and 2003 were inconsistent between the data submitted and available on the JRC database and therefore were excluded from the analysis;
- Data provided by JRC also implied Belgium fleet activity in this area but as all the values were set to zero it was assumed that there was an error in the data and it was excluded from the analysis.

Trammel nets (FTN), pelagic trawl (OTM), Scottish seine (SSC) and twin bottom trawl (TTB) discard less than 20% of a small number of species. In contrast, beam trawl (TBB) and single bottom trawl (STB) around 60 and 40% respectively of the majority of species considered. STB discards mainly herring, haddock and mackerel, while TBB discards mostly anglerfish, herring, hake, horse mackerel, mackerel and whiting (Figure 3-4; Table 10-4 in Annex IV).





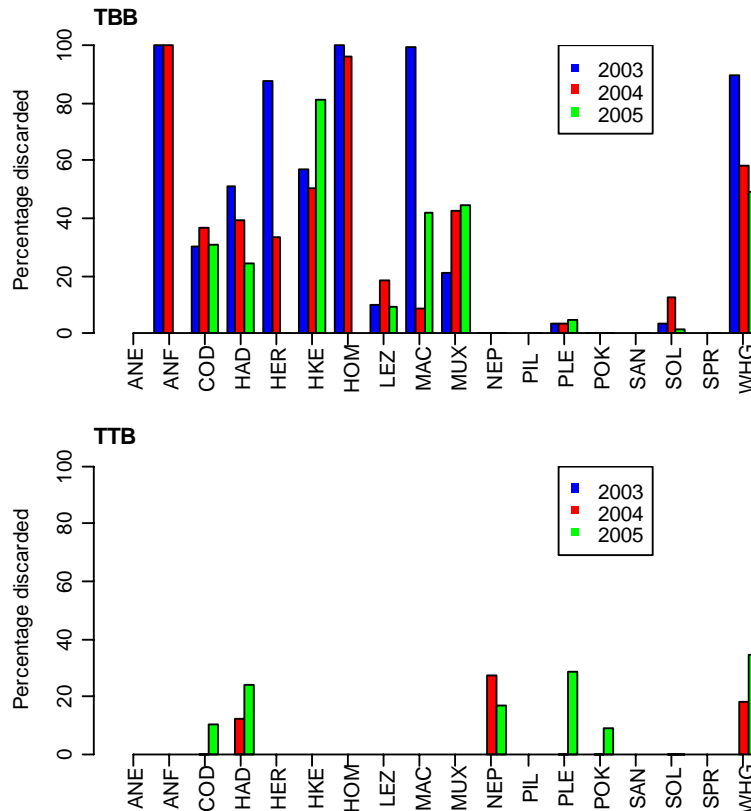


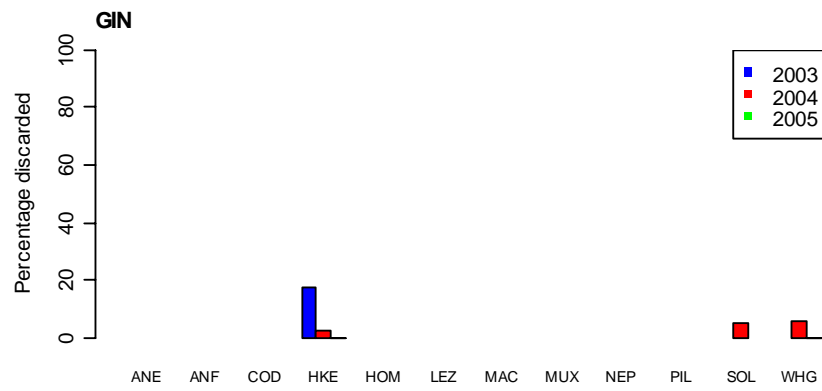
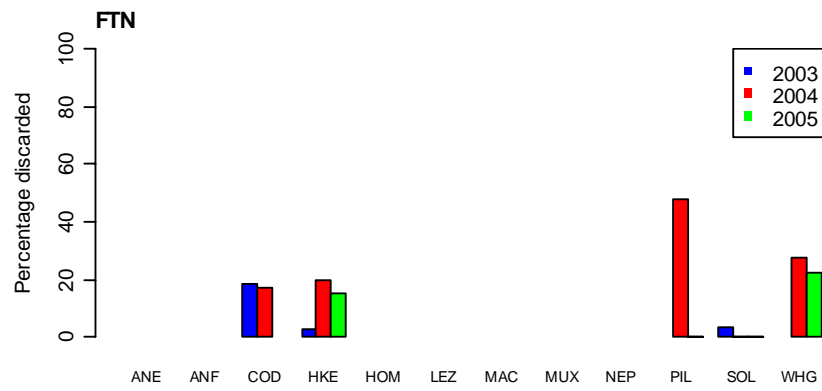
Figure 3-4 Discard rates (in weight) by species and year for trammel nets (FTN), pelagic trawl (OTM), Scottish seine (SSC), single bottom trawl (STB), beam trawl (TBB) and twin bottom trawl (TTB). A list of the priority species is given in Annex II and gear codes in Annex III.

3.6 NORTH EAST ATLANTIC – SOUTH (VIII, IX, X, CECAF)

Five countries submitted data to this geographical area: Belgium, Portugal, Spain, France, Germany and UK (England & Scotland). There were several problems with the data submitted:

- Data in ICES subarea X consists of landings and discard in 2003 and 2005 for Portugal and Spain, respectively; but no length frequency of landings and discards was reported.
- There was no information submitted for CECAF areas.
- Portugal landings data was submitted in Kg and euros but only the economic data was uploaded into the JRC database. Portugal resubmitted the landings data after the meeting.
- France and Portugal economic data was removed from the analysis.
- Data provided by JRC also implied Belgium fleet activity in this area but as all the values were set to zero it was assumed that there was an error in the data and it was excluded from the analysis.

Spain reported zero discards for tuna and tuna like species in ICES subarea XII. All fleet/métiers of trammel nets (FTN), single bottom trawl (STB) and twin trawl (TTB) were aggregated to gear level. Further, OTB was included in STB. Trammel nets (FTN) and gill nets (GIN) discard less than 20% of a few species catch. Pair bottom trawl (PTB) discard 60% of mainly mackerel and horse mackerel, while twin trawl bottom (TTB) discard 30% of hake, *Nephtrops* and sardine. Single bottom trawl (STB) discards 30% of most species caught, but particularly of sardine (Figure 3-5; Table 10-5 in Annex IV).



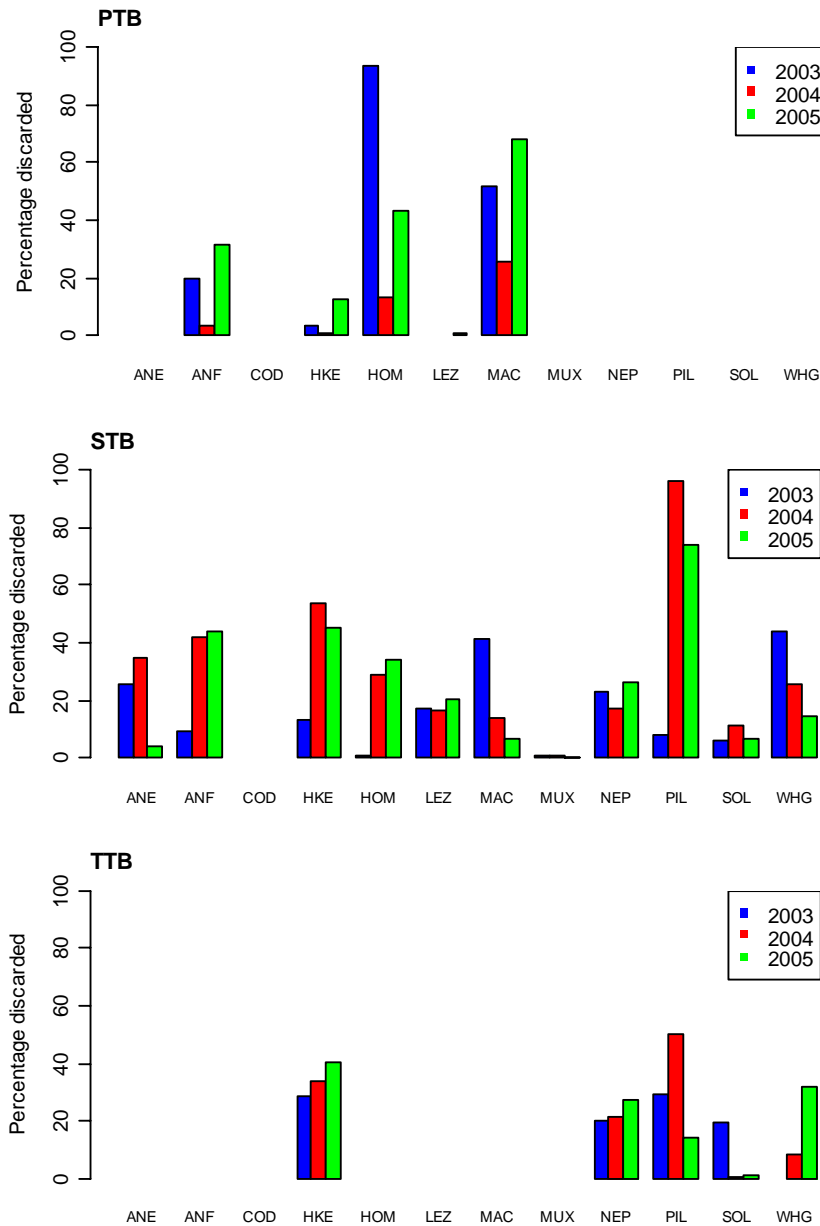


Figure 3-5 Discard rates (in weight) by species and year for trammel nets (FTN), gill nets (GIN), pair bottom trawl (PTB), single bottom trawl (STB), twin trawl bottom (TTB). A list of the priority species is given in Annex II and gear codes in Annex III.

3.7 MEDITERRANEAN

The heterogeneity of the Mediterranean area, in terms of species diversity, fishing techniques and practices (seasonally varying target species, fishing practices, etc.), together with its economic structure, is quite complex. Therefore, to carry out an analysis quite homogenous and try to harmonize the data (also for the future analysis) the first step has been to subdivide the Mediterranean in three areas taking into account the GFCM/FAO division:

Western Mediterranean - including Geographical subareas 1, 2, 5, 6, 7 and 8

Central Mediterranean - including Geographical subareas 9, 10, 11, 15, 16, 17, 18 and 19

Eastern Mediterranean - including Geographical subareas 20, 22, 23 and 25

Only Italy and Spain submitted data for the Mediterranean area. Consequently, the available data allowed only a preliminary analysis of the discarding practice. The discards data available referred only to 2005 and cover partly the Western and Central area. No data were submitted for the Eastern part of the Mediterranean.

Western Mediterranean

Discards data refer to 2005 for vessel lengths between 24 to 40 m of drift longline (HOK), purse seine (SSC) and single bottom trawl (STB). The main target species of longline and purse seine vessels are big pelagic species (tuna and swordfish), and for those species no discards were reported. Purse seine also targets small pelagic, but again no discards were reported.

The discarded fraction of the single bottom trawl (STB) was above 10% only for *Pagellus erythrinus* (PAC). *Merluccius merluccius* (HKE) and *Lophius budegassa* (ANK) also showed a discrete percentage of discarded fraction around 5% and 7% respectively. Concerning the two species of the genus *Trachurus* (*T. mediterraneus* and *T. trachurus*) the landing and discard value is given jointly due to the difficulty in distinguishing between those two species. The total discarded fraction of JAX was below 2%.

Table 3-1 Discard rates (in weight) by species for single bottom trawl.

Zone	Gear	Vessel length class (m)	Species	Discard %
Mediterranean Western	STB	24-40	ANE	0.0
			ANK	7.9
			HKE	5.2
			JAX	1.9
			MON	1.2
			MUR	0.4
			MUT	0.0
			PAC	10.2

Central Mediterranean

Discards data referred to 2005 and include different fleet segments grouped into the polyvalent passive gears (PGP) and the pelagic trawl (OTM). Only *Pagellus erythrinus* (PAC) and *Mullus barbatus* (MUT), both caught with polyvalent passive gears (PGP) less than 12 meters, showed a discrete percentage of discarded fraction: 9% and 6% respectively. For the other species, the discarded fraction could be considered negligible or absent. PGP vessels between 12 and 24 m confirm this trend, with low values of discarded fraction for most the species landed. The pelagic trawl (OTM) targets mainly pelagic species; sardine *Sardina pilchardus* (PIL) and anchovy *Engraulis encrasicolus* (ANE) are the only two species with a discarded fraction for this fleet, around 1% for sardine and 4% for anchovy. From the data available it seems that there are no discards for all the other species caught by this fleet.

Table 3-2 Discard rates (in weight) by species, gear and fleet segment.

Zone	Gear	Vessel length class	Species	Discard %
Mediterranean Centre	OTM	12-40	ANE	0.7
			ANK	0.0
			CTC	0.0
			HKE	0.0
			MAC	0.0
			MON	0.0
			MUT	0.0
			PAC	0.0
			SOL	0.0
			WHG	0.0
	PGP	00-12	ANE	0.0
			ANK	0.0
			CTC	0.1
			HKE	0.8
			MAC	0.0
			MON	0.0
			MUR	0.7
			MUT	6.4
			PAC	9.2
			SOL	2.2
		WHG	0.0	
		12-24	ANE	0.0
			ANK	0.0
			CTC	1.9
			HKE	0.0
			MAC	0.0
			MON	0.0
MUR	2.5			
MUT	0.2			
PAC	0.0			
SOL	0.0			
WHG	0.0			

4 DISCARDS AND LANDINGS LENGTH FREQUENCIES

The length frequencies presented in the following subsections 4.1 to 4.6 are examples illustrating possible different discard patterns, and were chosen for being the most discarded species by selected gears (see section 3). Consequently, the examples presented are not an exhaustive representation of the discard patterns that can be observed in all metiers and in all geographical areas.

4.1 BALTIC SEA (IIIb-d)

For the length frequencies all gears show clearly the effect of the minimum landing size of 38 cm for cod. All catch over the MLS is landed and all fish under are discarded.

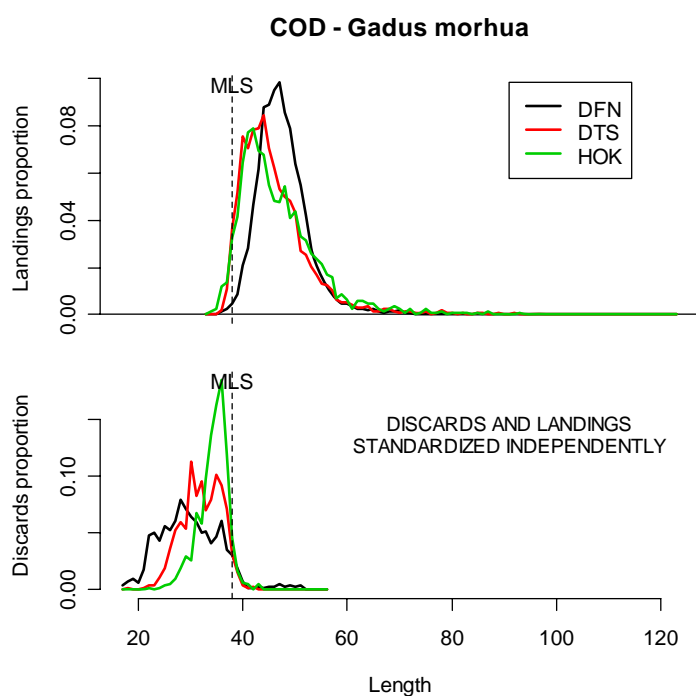


Figure 4-1 Annual length frequencies of discards and landings in 2005 by metier for cod. The broken line indicates minimum landing size (MLS).

4.2 NORTH SEA (IV, IIa, VIId)

Discarding seems to be influenced by the MLS for all the species presented below, except herring in pelagic trawl. Even species that are normally discarded in other areas above MLS, due to probably market forces or quota restrictions, are not discarded above the MLS in the North Sea. It is interesting to point out the fact that both gears demersal trawl and beam trawl, catch all the species studied well below the MLS. Herring in pelagic trawls are caught at lengths higher than MLS, and are discarded at the same length range as landings.

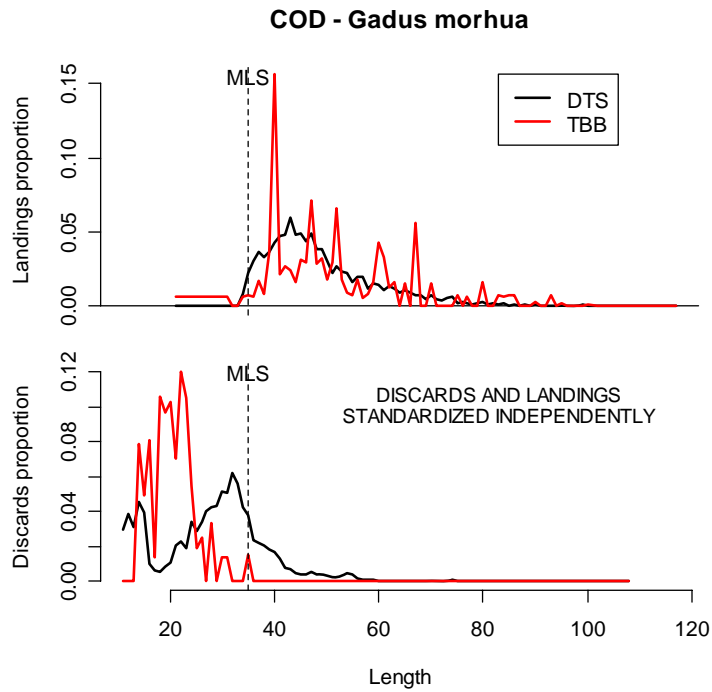


Figure 4-2 Annual length frequencies of discards and landings in 2005 by metier for cod. The broken line indicates minimum landing size (MLS).

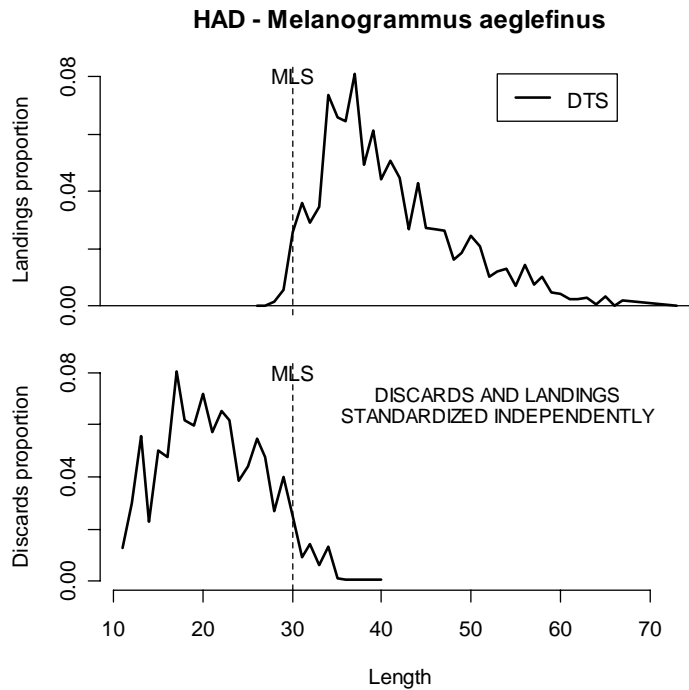


Figure 4-3 Annual length frequencies of discards and landings in 2005 by metier for haddock. The broken line indicates minimum landing size (MLS).

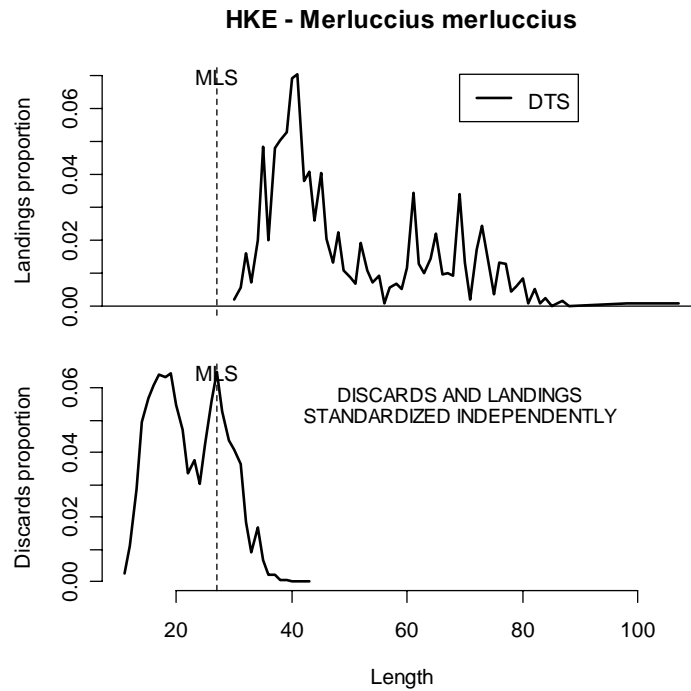


Figure 4-4 Annual length frequencies of discards and landings in 2005 by metier for hake. The broken line indicates minimum landing size (MLS).

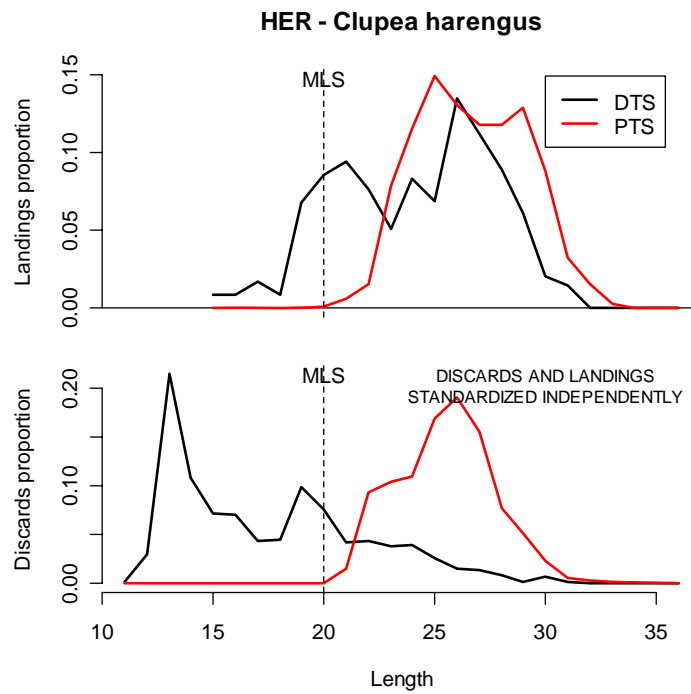


Figure 4-5 Annual length frequencies of discards and landings in 2005 by metier for herring. The broken line indicates minimum landing size (MLS).

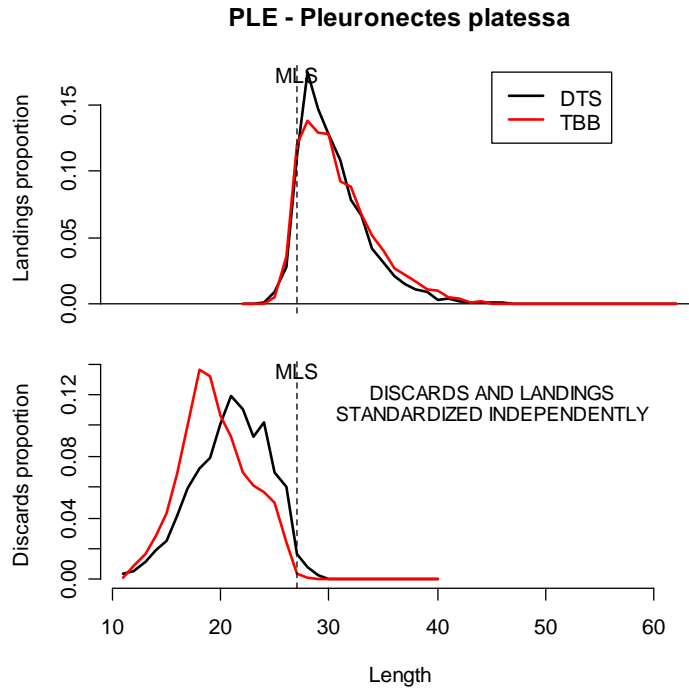


Figure 4-6 Annual length frequencies of discards and landings in 2005 by metier for plaice. The broken line indicates minimum landing size (MLS).

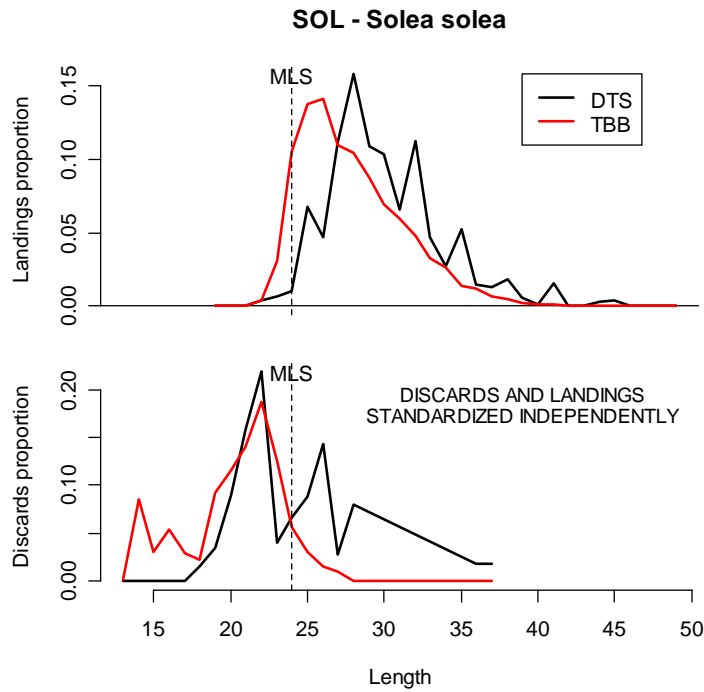


Figure 4-7 Annual length frequencies of discards and landings in 2005 by metier for sole. The broken line indicates minimum landing size (MLS).

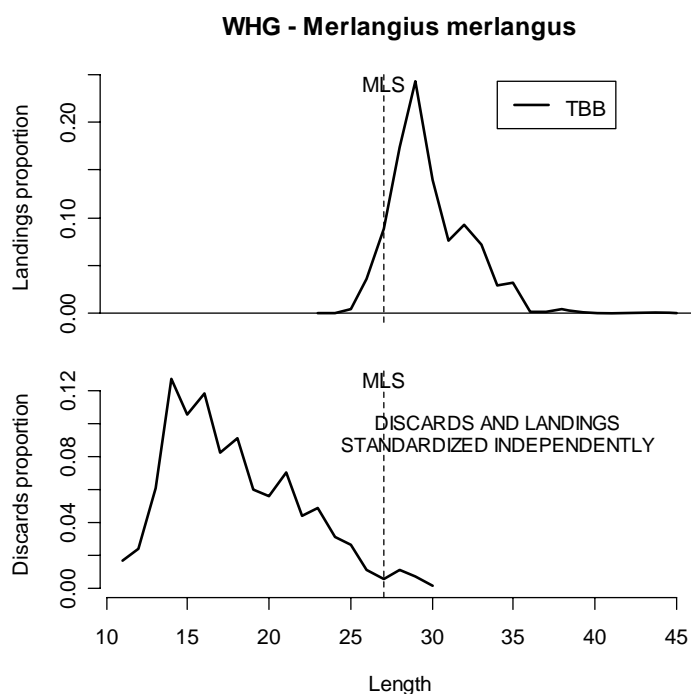


Figure 4-8 Annual length frequencies of discards and landings in 2005 by metier for whiting. The broken line indicates minimum landing size (MLS).

4.3 NORTH EAST ATLANTIC – NORTH (V, VI, XII, XIV)

Length frequencies for both landings and discards were provided by Germany, Ireland, the Netherlands, Spain and the UK. No information on length frequencies was provided by France but this was a reflection of the minimal French fleet activity reported in this area. English length data did not include gear as a parameter. The length frequency figures show a progression of the effect of the MLS: it is the main factor for cod discards, it has some influence in the decision to discard haddock although there seems to be other factors at play, and finally MLS has no impact on whiting and saithe since the lengths where the maximum discards occur are higher than the MLS. In the case of the two latter species it is obvious that other influences are at play – auction prices for whiting?, quota restrictions for saithe?

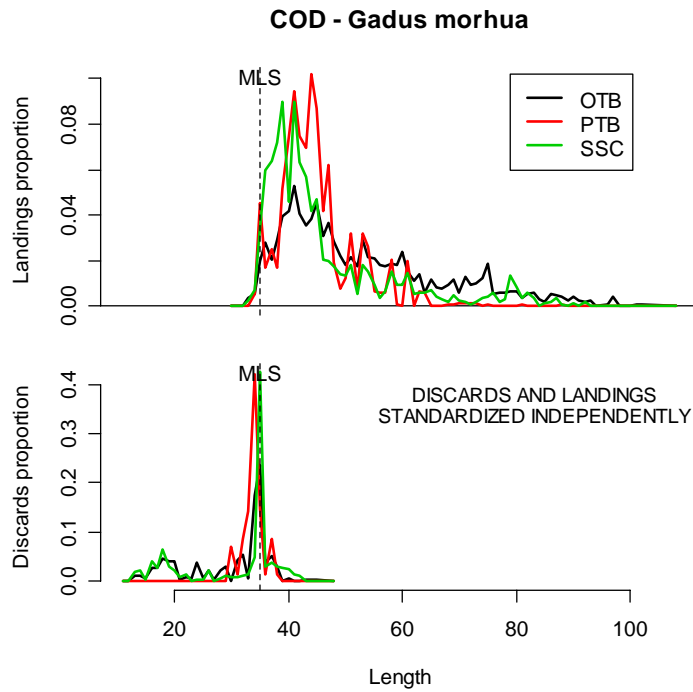


Figure 4-9 Annual length frequencies of discards and landings in 2005 by metier for cod. The broken line indicates minimum landing size (MLS).

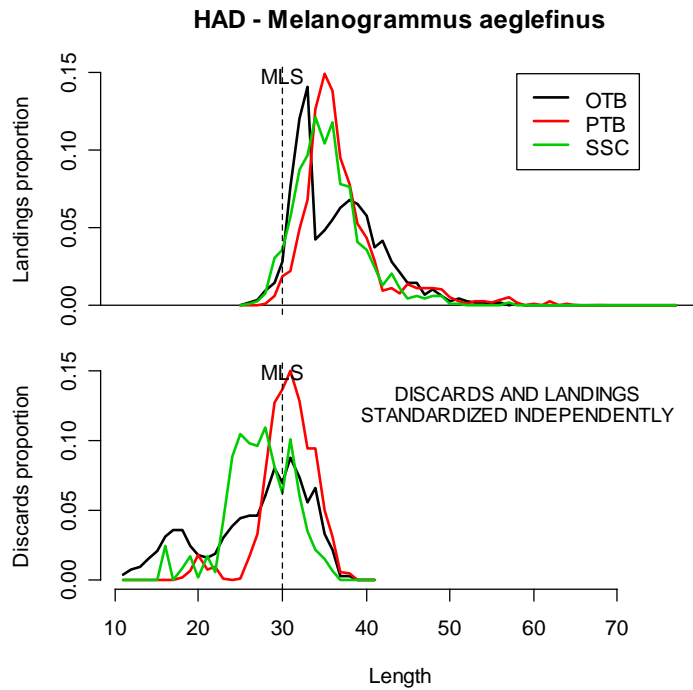


Figure 4-10 Annual length frequencies of discards and landings in 2005 by metier for haddock. The broken line indicates minimum landing size (MLS).

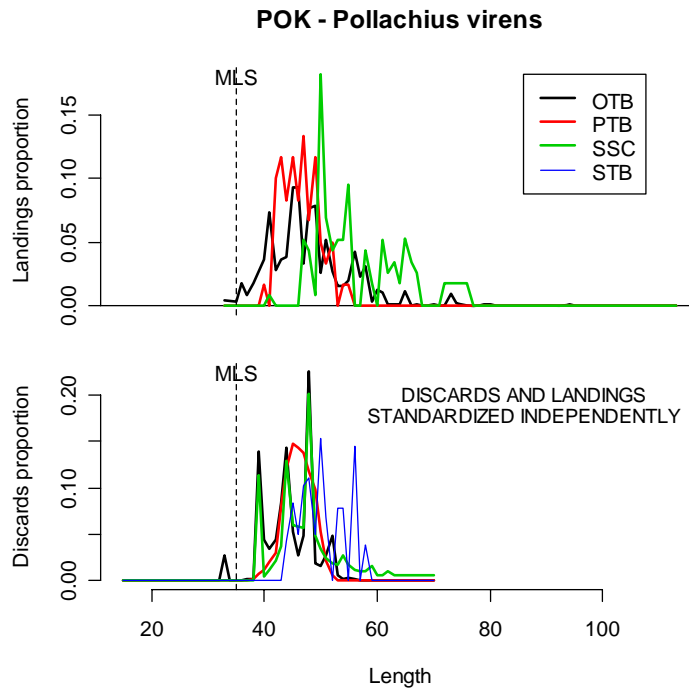


Figure 4-11 Annual length frequencies of discards and landings in 2005 by metier for saithe. The broken line indicates minimum landing size (MLS).

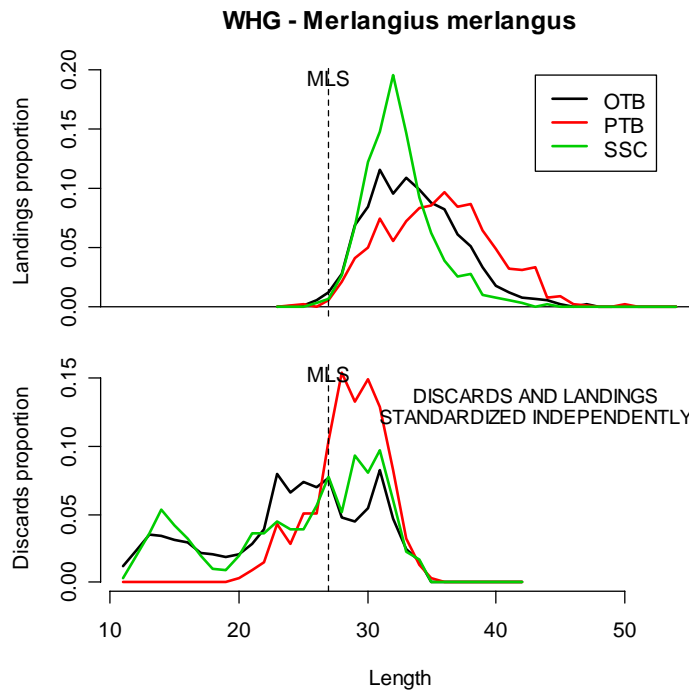


Figure 4-12 Annual length frequencies of discards and landings in 2005 by metier for whiting. The broken line indicates minimum landing size (MLS).

4.4 NORTH EAST ATLANTIC – CENTRAL (VII, except VIIId)

In the North East Atlantic Central the MLS is conditioning the level of discards of cod and hake in the majority of the fleets studied. For haddock, megrim and particularly whiting MLS does not seem to be the main factor influencing discard decision, since fish of these species are discarded at lengths above MLS. It is interesting to point out the fact that for megrim several fleets only start landing at lengths well above MLS, which is probably related to market forces (no market for small fish). The length frequencies for anglerfishes show that MSS has no effect on the decision to discard, which probably related to the species high commercial value but also to the uncertainty around the sale size.

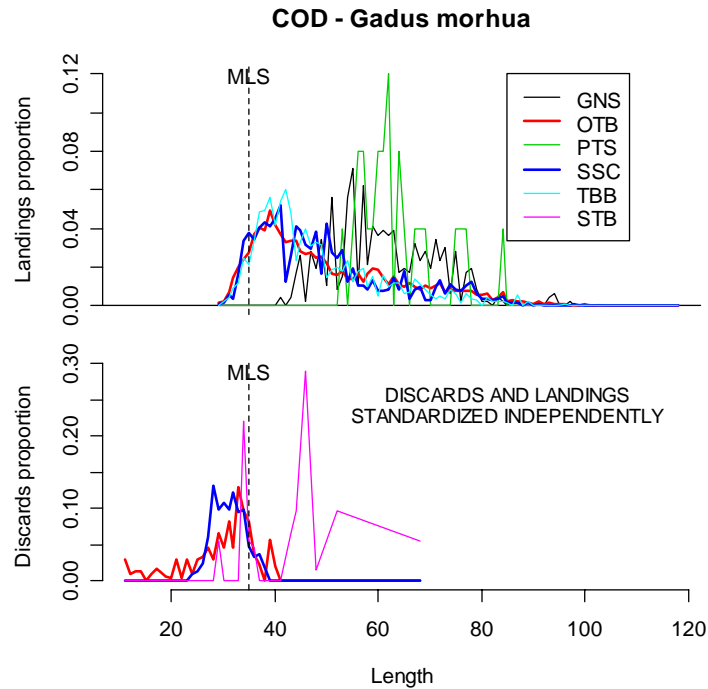


Figure 4-13 Annual length frequencies of discards and landings in 2005 by meter for cod. The broken line indicates minimum landing size (MLS).

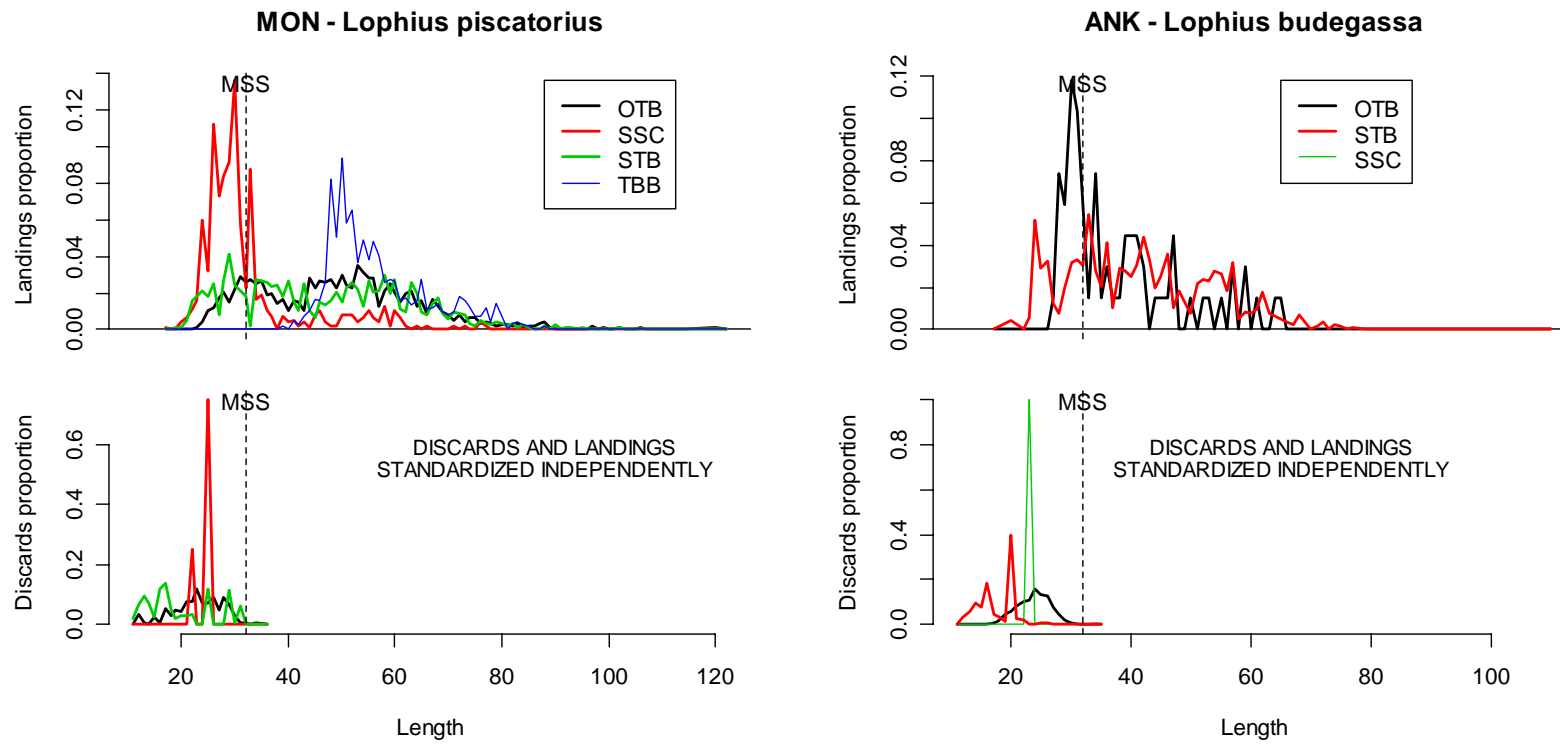


Figure 4-14 Annual length frequencies of discards and landings in 2005 by metier for anglerfish and blackbelly anglerfish. The broken line indicates minimum sale size (MSS) of 32 cm, which corresponds to the 0.5 Kg minimum sale weight.

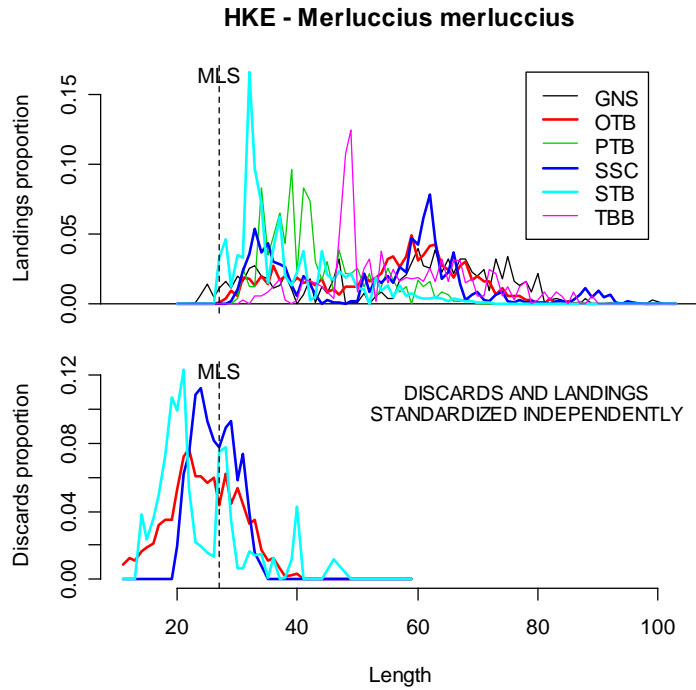


Figure 4-15 Annual length frequencies of discards and landings in 2005 by metier for hake. The broken line indicates minimum landing size (MLS).

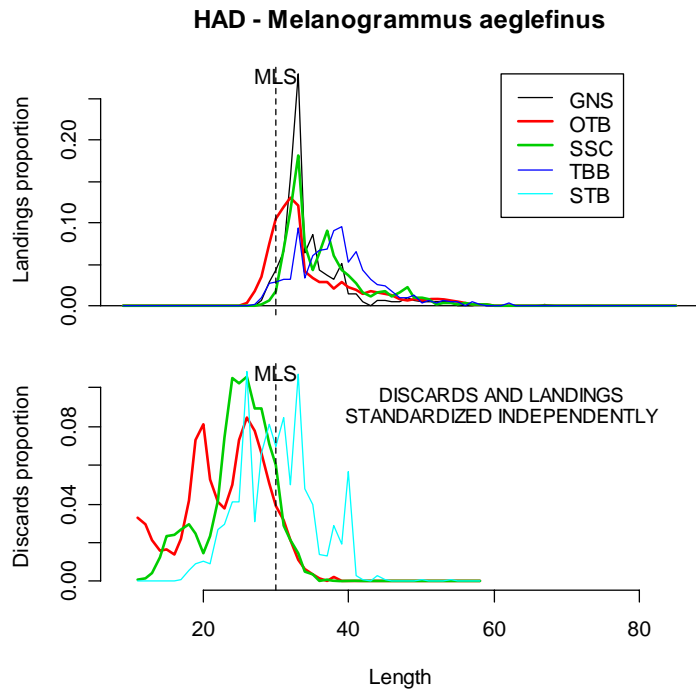


Figure 4-16 Annual length frequencies of discards and landings in 2005 by metier for haddock. The broken line indicates minimum landing size (MLS).

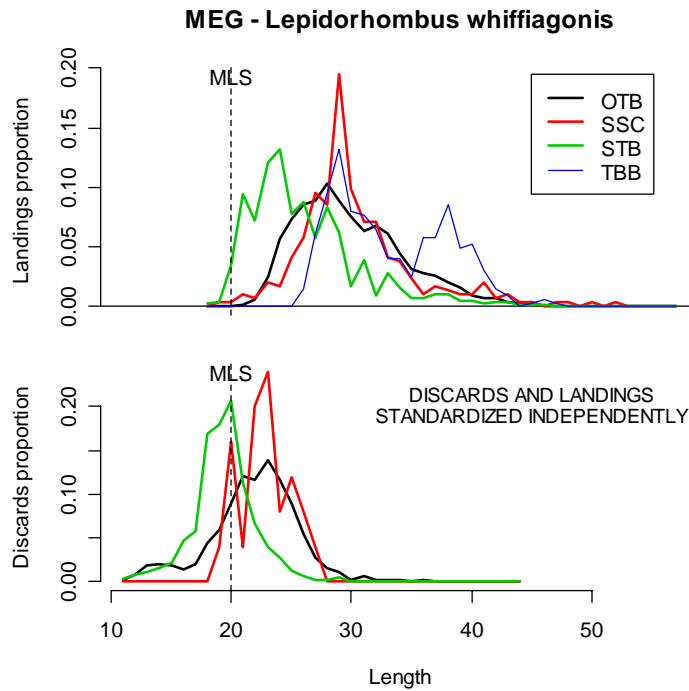


Figure 4-17 Annual length frequencies of discards and landings in 2005 by metier for megrim. The broken line indicates minimum landing size (MLS).

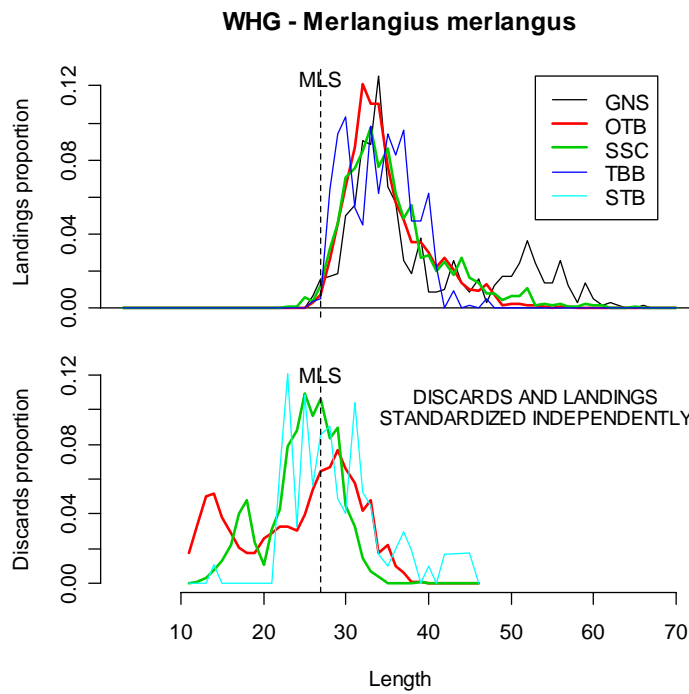


Figure 4-18 Annual length frequencies of discards and landings in 2005 by metier for whiting. The broken line indicates minimum landing size (MLS).

4.5 NORTH EAST ATLANTIC – SOUTH (VIII, IX, X, CECAF)

Portugal submitted length frequency data without fishing technique and were therefore excluded from the analysis. German and French length frequencies were not by the requested 1000 individuals. The length frequencies of discard and landings for this area show that the MLS has no effect in the discarding behaviour of horse mackerel, since the majority of discarding occurs at lengths above the MLS; while the opposite is true for hake. MSS has no effect on the decision to discard anglerfish, which is probably related to the species high commercial value but also to the uncertainty around the sale size. Mackerel is discarded above and below MLS, so there seems to be a mixture of economic and MLS factors influencing discarding.

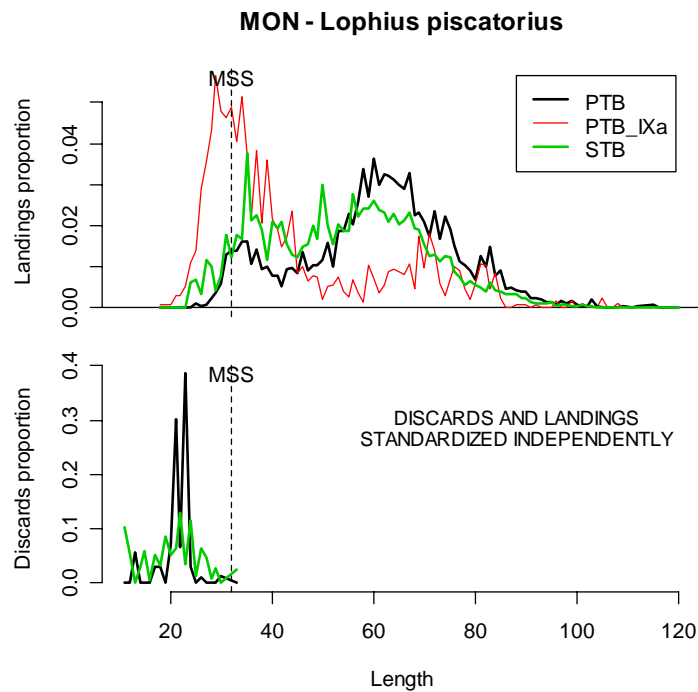


Figure 4-19 Annual length frequencies of discards and landings in 2005 by metier for anglerfish. The broken line indicates minimum sale size (MSS) of 32 cm, which corresponds to the 0.5 Kg minimum sale weight.

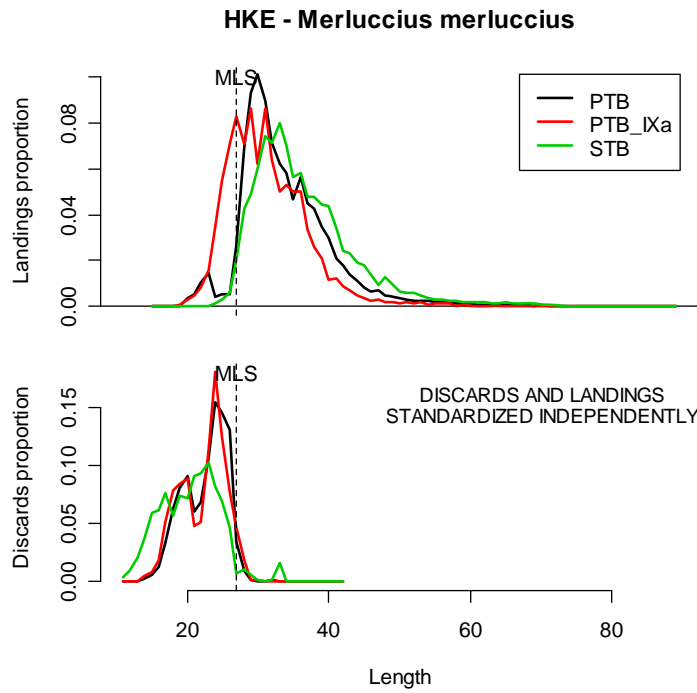


Figure 4-20 Annual length frequencies of discards and landings in 2005 by metier for hake. The broken line indicates minimum landing size (MLS).

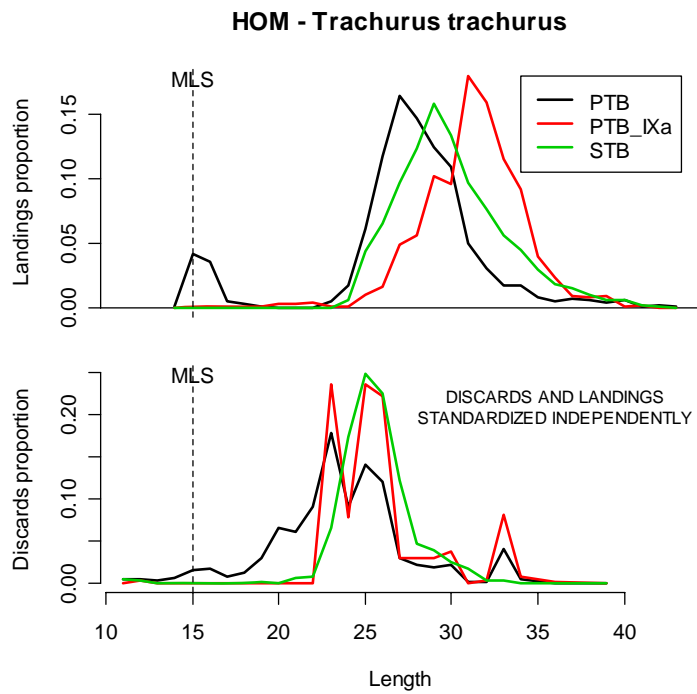


Figure 4-21 Annual length frequencies of discards and landings in 2005 by metier for horse mackerel. The broken line indicates minimum landing size (MLS).

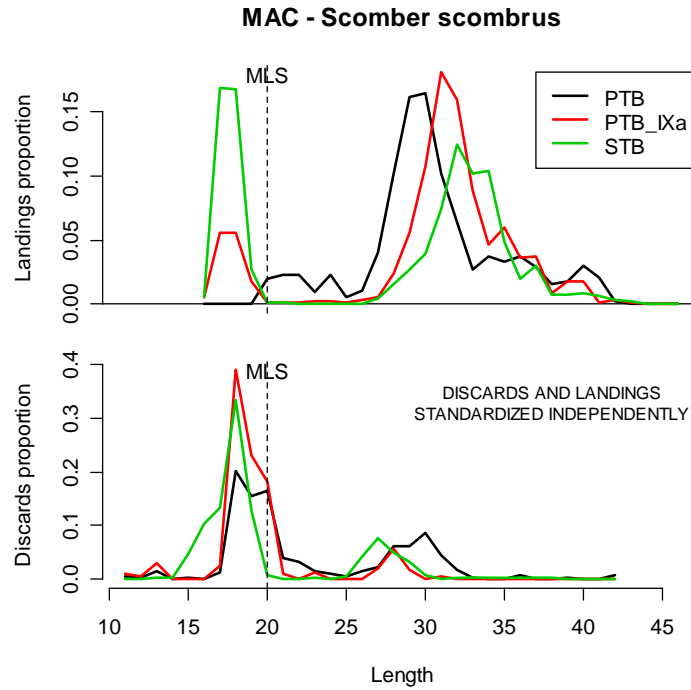


Figure 4-22 Annual length frequencies of discards and landings in 2005 by metier for mackerel. The broken line indicates minimum landing size (MLS).

4.6 MEDITERRANEAN

Western Mediterranean

The available data were limited only to the Western Mediterranean and for one fishing technique (STB, vessels 24-40 m). Only the length frequency distributions of the species when both discards and landings data exist are presented. For hake, landings and discards both occur under the MLS, while the opposite is true for horse mackerel, so there seems to be a mismatch between the fishery and MLS. Furthermore, for both species the modal length of discards is above the modal length of landings. For pandora the MLS is low, lower than the market demand for that species, therefore all the fish under 15 cm are discarded. Only anglerfish shows discarding regulated by MLS.

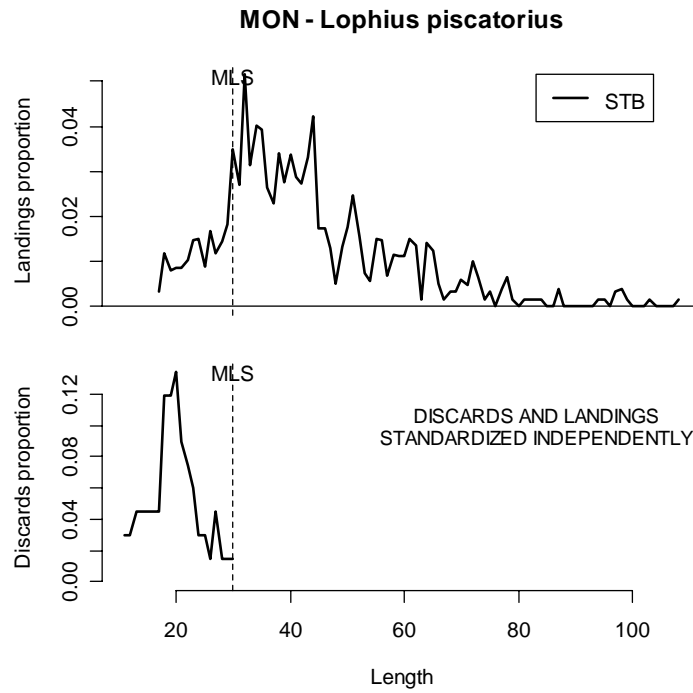


Figure 4-23 Annual length frequencies of discards and landings in 2005 by metier for anglerfish. The broken line indicates minimum landings size (MLS).

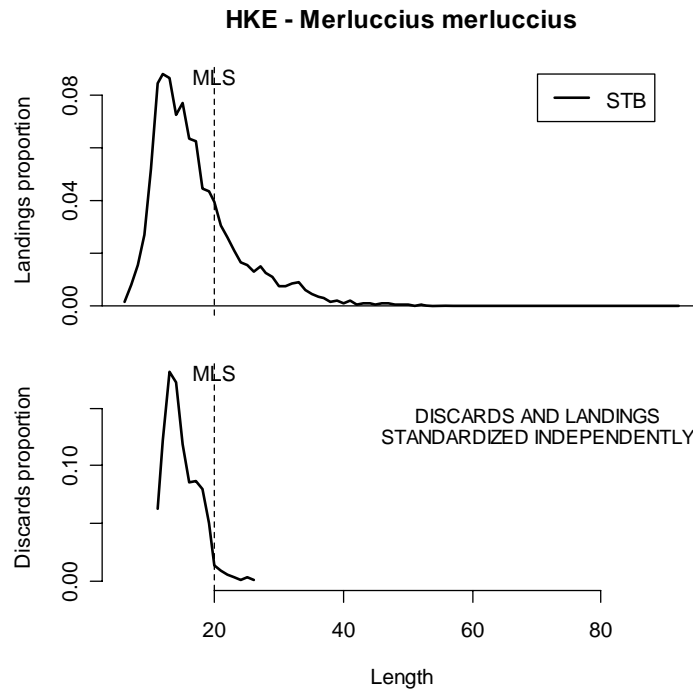


Figure 4-24 Annual length frequencies of discards and landings in 2005 by metier for hake. The broken line indicates minimum landing size (MLS).

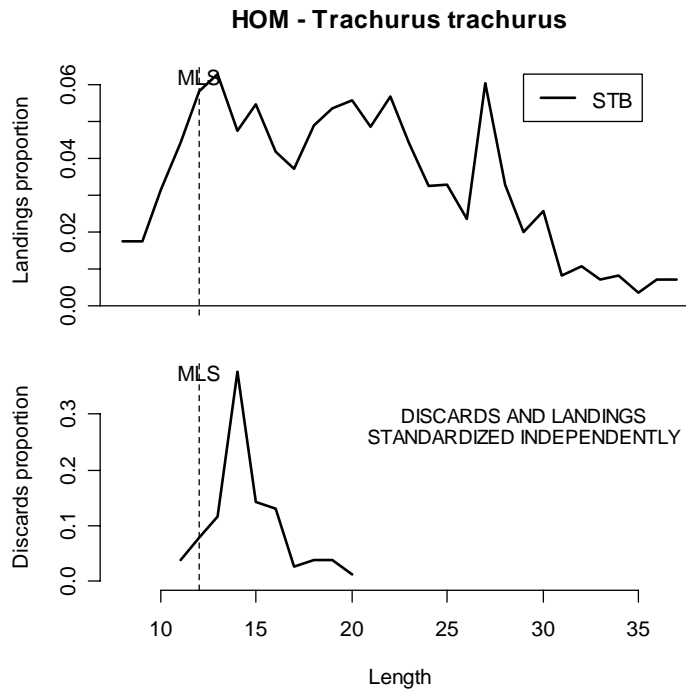


Figure 4-25 Annual length frequencies of discards and landings in 2005 by metier for horse mackerel. The broken line indicates minimum landing size (MLS).

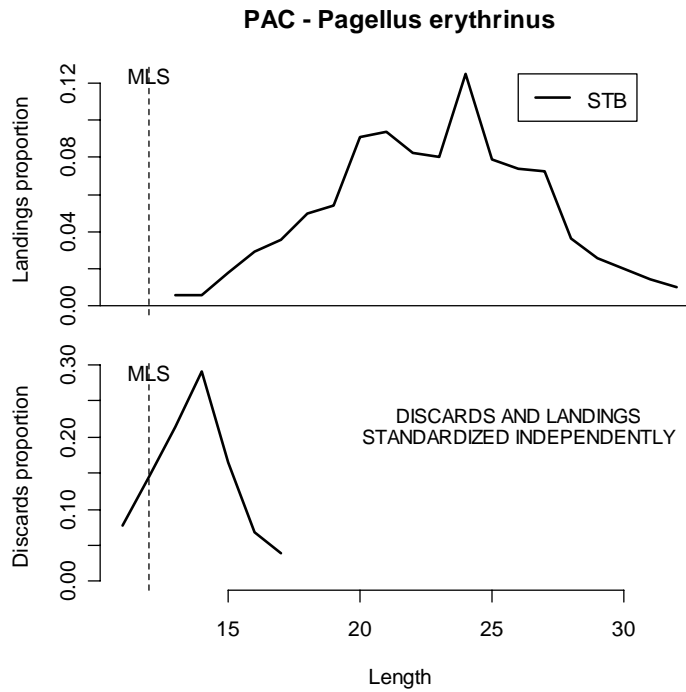


Figure 4-26 Annual length frequencies of discards and landings in 2005 by metier for pandora. The broken line indicates minimum landing size (MLS).

Central Mediterranean

No discards length composition is presented because all the species listed in the above tables represent on an annual basis, less than 10% of the total catches by weight and less than 20% of the catches in numbers.

5 DISCUSSION AND CONCLUSIONS

The sheer volume of the data, the complexity of the task, the problems encountered with the data and the JRC database, and finally with the short period of time available to analyse the data, has made this exercise extremely difficult. Furthermore, the results presented here are bound to be inaccurate due first of all to the short time available, which on its own did not permit a careful and detailed analyse of the data. It is fundamental to have a proper, detailed study of discarding in Europe. Only with detailed, non-raised data can some of the assumptions made by the group be revised and probably corrected. It is the group's opinion that a project like the discard atlas is fundamental to understand the mechanisms behind discarding, issues related to data collection and sampling levels, and ways of improving the discard programmes.

It was also acknowledged by the group that future meetings to calculate European discard levels will need to improve in several levels, from the data call specification to the database (see recommendations section). Nevertheless, it is the group's opinion that an annual/biannual meeting should be held to review the data collected and the discard percentages obtained previously. This meeting should be at least a week long and be based on a reliable database to avoid several of the issues encountered by the group.

The discard ratios presented show a predictable picture: bycatch species are frequently discarded; target species vary between fleets, they can be targeted by one gear but be considered bycatch in others; beam and single trawl are one of the gears with high discard rates and in a wide range of the studied species, while other gears such as hooks, gill nets and trammel nets have low discards as they are more selective. Beam trawl is a non-selective gear, but also a very targeted fishery, and consequently beam trawl fisheries catch several species but only retain a few species. It is important to note that some of the bycatch species (such as pelagic species in demersal gears), although having a 100% discard rate are seldom caught and therefore the actual amounts discarded can be small.

The length frequency analysis shows that the majority of the species are either discarded due to MLS restrictions (such as highly valuable species like cod, hake and plaice), or to market forces, namely due to low commercial value in general (whiting) or for small sizes (megrim and horse mackerel). There are also examples of discarding as a result of the interaction between market requirements and multispecies quota restrictions (herring, mackerel and saithe). There is no clear change in discarding behaviour between areas, except for the North Sea where discarding of all species studied is related to MLS restrictions, and in the Mediterranean where there is a fishery targeting hake well below MLS. Finally it is important to point out the clear mismatch between MLS and gear selectivity for most of the metiers studied.

Finally, it is important to point out that the results presented here are provisional and probably contain errors due to the diversity of data problems encountered which were allied to time constraints. Furthermore, the ratios presented are only applicable for the species, years and gears analysed. Any extrapolation of the discard percentages to other areas, gears or species is not recommended by the group.

6 RECOMMENDATIONS

1. The DCR data call has to be extremely clear and detailed, with specific instruction for each sets of data required.
2. The JRC database has to be more flexible and practical to use, in order to sustain several data issues. Error messages have to be clearer and quicker. The website uploading function has to be quicker and has to allow for more data to be uploaded.
3. Any codification used needs to be clearly specified and standardized.
4. The datasets provided by MS's should explicitly contain 0 values for discards when a species has been fished but was totally retained in the sampled trips.
5. Landings and discard data should be raised to the geographical division level (level 3 of Appendix I of the DCR) to allow flexibility in the analysis.
6. Future analyses of discard data will have to be made on a standardized way, taking into consideration other European initiatives (ICES Workshop on Discard Raising Procedures, the COST project and the Discard Atlas project).
7. Future analyses of discard data should also include non-commercial species.
8. The Mediterranean area should be divided in three areas in any future analysis.
9. Next meeting?

7 ANNEX I

Annex I - List of participants contacts.

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8 ANNEX II

Annex II - List of priority species.

CODE	English name	Latin name
SAN	Sandeel	<i>Ammodytidae</i>
HER	Herring	<i>Clupea harengus</i>
ANE	Anchovy	<i>Engraulis encrasicolus</i>
COD	Cod	<i>Gadus morhua</i>
LDB	Four-spot megrim	<i>Lepidorhombus boscii</i>
MEG	Megrim	<i>Lepidorhombus whiffiagonis</i>
LEZ	Megrim	<i>Lepidorhombus whiffiagonis</i> and <i>L. boscii</i>
ANK	Blackbellied anglerfish	<i>Lophius budegassa</i>
ANF	Anglerfishes	<i>Lophius budegassa</i> and <i>L. piscatorius</i>
MON	Anglerfish	<i>Lophius piscatorius</i>
HAD	Haddock	<i>Melanogrammus aeglefinus</i>
WHG	Whiting	<i>Merlangius merlangus</i>
HKE	Hake	<i>Merluccius merluccius</i>
MUT	Striped mullet	<i>Mullus barbatus</i>
MUR	Red mullet	<i>Mullus surmuletus</i>
MUX	Mulletts	<i>Mullus surmuletus</i> and <i>M. barbatus</i>
NEP	Norway lobster	<i>Nephrops norvegicus</i>
PAC	Pandora	<i>Pagellus erythrinus</i>
PLE	Plaice	<i>Pleuronectes platessa</i>
POL	Pollack	<i>Pollachius pollachius</i>
POK	Saithe	<i>Pollachius virens</i>
MAC	Mackerel	<i>Scomber scombrus</i>
CTC	Cuttlefish	<i>Sepia officinalis</i>
SOL	Sole	<i>Solea solea</i>
SPR	Sprat	<i>Sprattus sprattus</i>
JAA	Blue jack mackerel	<i>Trachurus picturatus</i>
HOM	Horse mackerel	<i>Trachurus trachurus</i>
JAX	Horse mackerel	<i>Trachurus trachurus</i> and <i>T. picturatus</i>

9 ANNEX III

Annex III - List of gears.

CODE	Description
DFN	Drift and fixed nets
DRB	Dredges
DTS	Demersal trawl and seine
FPO	Pots and traps
FTN	Trammel nets
GIN	Gill nets
HOK	Longlines
OTB	Bottom trawl
OTM	Pelagic trawl
PGP	Polyvalent passive gears
PTB	Pair bottom trawl
PTM	Pelagic pair trawl
PTS	Pelagic trawl and seine
SSC	Scottish seine
STB	Single bottom trawl
TBB	Beam trawl
TTB	Twin bottom trawl

10 ANNEX IV

Table 10-1 Discard percentage (weight) by species and gear for the Baltic Sea.

Gear	Year	COD	HER	PLE
DFN	2003	1.5	85.2	
	2004	0.8	51.2	
	2005	4.6	20.2	
DTS	2003	10.1	100	
	2004	6.0	100	
	2005	18.5	99.7	34.7
HOK	2003	4.1		
	2004	1.1		
	2005	5.7		
PTS	2004	1.2		
	2005	3.8		

Table 10-2 Discard percentage (weight) by species and gear for the North Sea.

Gear	Year	ANF	COD	HAD	HER	HKE	JAX	LEZ	MAC	MUX	PLE	POL	SOL	SPR	WHG
DTS	2003	0.3	19.0	32.7	18.6	12.6	3.9	0.0	0.1		18.9		5.9	1.4	47.8
	2004	1.4	22.5	22.1	12.3	11.0	49.1		9.4	0.7	16.7		7.7	7.6	38.5
	2005	1.0	22.3	13.4	30.4	15.7	35.9		1.8	1.1	16.5		14.6	12.3	36.1
FTN	2004		4.0		48.9		50.0		23.9	11.9	11.7		0.9		34.1
	2005		17.7		0.4		48.0		45.2	37.5	20.8		4.3		6.1
GIN	2005		0.0												
PTS	2003				3.2				12.5						
	2004				6.7		1.0		11.7						32.9
	2005				4.2		0.4		5.3						
TBB	2003	0.0	4.6	22.6	8.3	35.2					53.8	19.0	12.5		81.9
	2004		7.6	15.8		28.8	47.0			0.5	47.4		16.4	50.1	70.4
	2005	0.0	9.4	21.5	99.7	44.7				4.9	47.2		10.0	50.0	66.1

Table 10-3 Discard percentage (weight) by species and gear for the NE Atlantic North.

Gear	Year	MON	COD	HAD	HER	HKE	MAC	MEG	NEP	PLE	POK	SOL	WHG
PTB	2003		0.4	24.3							77.8		9.2
	2004			37.5							2.2		16.0
PTS	2003				1.8		0.1						
	2004				0.9								
	2005				5.2		6.4						
SSC	2003		6.6	46.8							59.7		60.2
	2004		43.0	74.6							34.7		90.6
STB	2003	5.3	2.9	34.1		19.0		2.4	16.7	33.9	33.4	1.5	50.4
	2004	15.7	8.7	83.6	95.7	8.2		4.8	9.9	52.9	25.7	3.9	67.5
	2005	1.3	1.2	5.4		2.5	44.2	3.7	1.1	3.4	1.1		26.5

Table 10-4 Discard percentage (weight) by species and gear for the NE Atlantic Centre.

Gear	Year	MON	COD	HAD	HER	HKE	HOM	MAC	MEG	MUR	NEP	PLE	POK	SOL	WHG
FTN	2004		10.8											1.1	
	2005											4.8		0.3	
OTM	2003							4.8							
	2005						6.5								
SSC	2003	0.4	4.7	26.5		4.5			2.3			7.9	0.2		1.5
	2004	0.1	0.8	48.3		7.1			3.7			1.3			4.4
	2005	1.2	19.7	13.6		8.5									3.7
STB	2003	4.3	0.3	54.8	61.5	12.4			28.0		16.8	16.4	1.5	2.0	10.3
	2004	1.1	3.3	25.0	3.0	8.7		75.2	28.2	2.0	2.8	23.1	1.8	0.3	3.2
	2005	1.3	7.0	36.6	82.3	23.8		78.3	19.3	42.4	32.9	15.6	9.7	2.7	16.6
TBB	2003	100	30.3	50.9	87.9	56.7	99.8	99.6	10.0	20.9		3.8		3.8	89.4
	2004	99.8	36.7	39.3	33.3	50.4	96.0	8.8	18.4	42.7	0.0	3.3		12.7	58.1
	2005		31.1	24.6		81.3		41.8	9.6	44.8	0.2	4.8		1.8	49.3
TTB	2004			12.6							27.5				17.9
	2005		10.2	24.2							17.0	28.8	9.0		34.6

Table 10-5 Discard percentage (weight) by species and gear for the NE Atlantic South.

Gear	Year	MON	ANE	COD	HKE	HOM	MAC	MEG	MUR	NEP	PIL	SOL	WHG
FTN	2003			18.8	2.8							3.8	
	2004			17.2	19.6						48.0	0.6	27.6
	2005				15.0						0.5	0.4	22.5
GIN	2003				17.3								
	2004				2.3							5.1	6.0
	2005				0.1								0.2
OTM	2005					7.1							
PTB	2003	20.1			3.5	93.9	51.9						
	2004	3.8			1.0	13.5	25.9						
	2005	31.7			12.3	43.3	68.0	1.0					
STB	2003	9.7	25.7		13.3	0.9	41.3	17.3	1.1	22.8	8.0	5.9	44.2
	2004	42.2	34.8		53.6	29.0	14.3	16.9	0.6	17.4	96.1	11.4	25.7
	2005	44.3	4.2		45.6	34.5	6.6	20.2	0.0	26.7	74.1	7.0	14.8
TTB	2003				28.9					20.4	29.6	19.6	
	2004				33.6					21.7	50.0	0.5	8.7
	2005				40.4					27.6	14.6	1.5	31.7