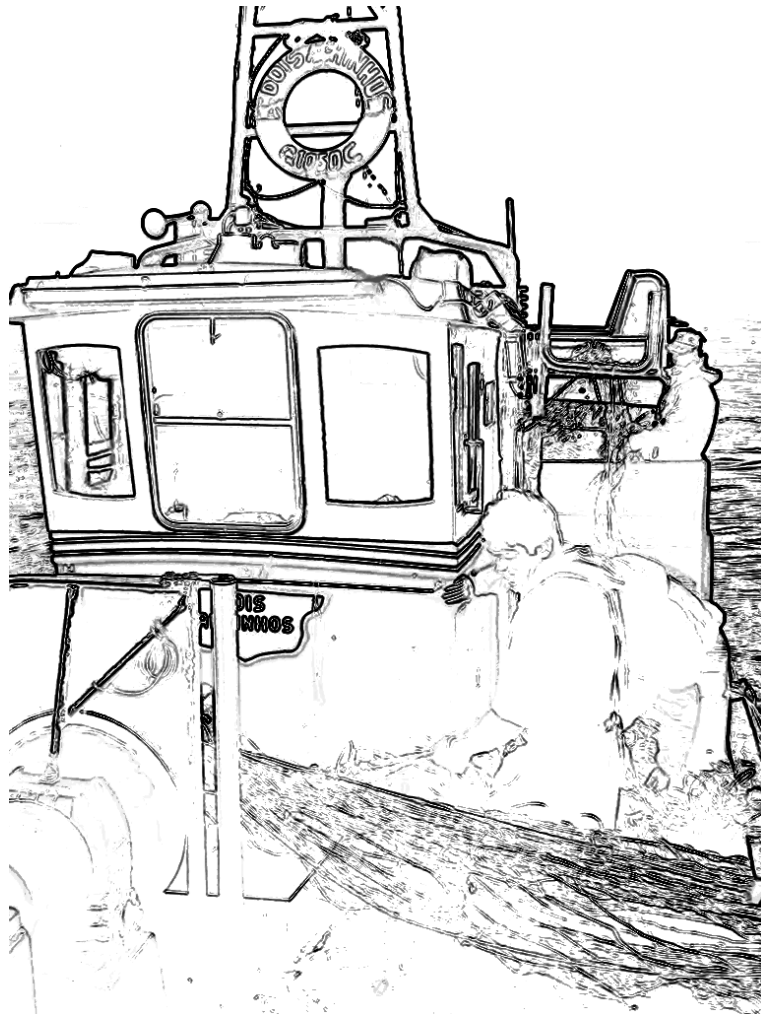




COMMISSION OF THE EUROPEAN COMMUNITIES  
DG XIV/C/1

**TRAMMEL NET SELECTIVITY STUDIES IN THE  
ALGARVE (SOUTHERN PORTUGAL), GULF OF  
CADIZ (SPAIN), BASQUE COUNTRY (SPAIN)  
AND CYCLADES ISLANDS (GREECE)**

REF. NO. 98/014



**FINAL REPORT**  
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# INDEX

<b>ABSTRACT .....</b>	<b>i</b>
<b>SUMMARY FOR NON SPECIALISTS .....</b>	<b>iii</b>
<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1. Artisanal / small scale fisheries in the Basque country .....	1
1.2. Artisanal / small scale fisheries in the Algarve .....	5
1.3. Artisanal / small scale fisheries in the Gulf of Cádiz .....	10
1.4. Artisanal / small scale fisheries in the Cyclades .....	17
1.5. Static gear studies in the Cantabrian Region.....	20
1.6. Static gear studies in the Algarve .....	21
1.7. Static gear studies in the Gulf of Cádiz.....	21
1.8. Static gear studies in the Cyclades .....	22
1.9. Objectives.....	23
<b>2. MATERIAL AND METHODS .....</b>	<b>25</b>
2.1. Survey and characterization of trammel net métiers .....	25
2.1.1. Basque Country .....	25
2.1.2. Algarve .....	26
2.1.3. Gulf of Cádiz .....	26
2.1.4. Cyclades .....	27
2.2. Experimental fishing and sampling.....	28
2.2.1. Basque Country .....	28
2.2.2. Algarve .....	31
2.2.3. Gulf of Cádiz .....	34
2.2.4. Cyclades .....	38
2.3. Size selectivity.....	41
2.4. Diversity, dominance and multivariate analyses.....	44
2.5. Other analyses .....	45
<b>3. RESULTS.....</b>	<b>46</b>
3.1. Survey and characterization of trammel net métiers .....	46
3.1.1. Basque Country .....	46
3.1.2. Algarve .....	51
3.1.3. Gulf of Cádiz .....	54
3.1.4. Cyclades .....	58
3.2. Species composition, catch rates and diversity .....	60
3.2.1. Overall and seasonal changes.....	60
3.2.1.1. Basque Country .....	60
3.2.1.2. Algarve .....	82
3.2.1.3. Gulf of Cádiz .....	114
3.2.1.4. Cyclades .....	141
3.2.2. Depth related changes .....	201
3.2.2.1. Basque Country .....	201
3.2.2.2. Algarve .....	204
3.2.2.3. Gulf of Cádiz .....	207
3.2.2.4. Cyclades .....	209

3.2.3. Discards and discarding practices .....	213
3.2.3.1. Basque Country .....	213
3.2.3.2. Algarve .....	229
3.2.3.3. Gulf of Cádiz .....	246
3.2.3.4. Cyclades .....	255
3.3. Selectivity .....	271
3.3.1. Basque Country .....	271
3.3.1.1. Catch size frequency distributions .....	271
3.3.1.2. Size selectivity .....	290
3.3.2. Algarve .....	298
3.3.2.1. Catch size frequency distributions .....	298
3.3.2.2. Size selectivity .....	317
3.3.3. Gulf of Cádiz .....	323
3.3.3.1. Catch size frequency distributions .....	323
3.3.3.2. Size selectivity .....	347
3.3.4. Cyclades .....	355
3.3.4.1. Catch size frequency distributions .....	355
3.3.4.2. Size selectivity .....	367
3.4. Method of capture .....	375
3.4.1. Basque Country .....	375
3.4.2. Algarve .....	378
3.4.3. Gulf of Cádiz .....	381
3.4.4. Cyclades .....	384
3.5. Multivariate analyses .....	386
3.5.1. Basque Country .....	386
3.5.2. Algarve .....	392
3.5.3. Gulf of Cádiz .....	400
3.5.4. Cyclades .....	404
3.5.5. Between- area comparisons .....	410
3.6. Length-girth relationships in Cyclades .....	417

**4. DISCUSSION..... 424**

**5. REFERENCES ..... 428**

**ANNEX I**

**ANNEX II**

## ABSTRACT

Trammel net fisheries were studied in four areas: the Cantabrian Sea (Basque Country, Spain), the Algarve (Southern Portugal), the Gulf of Cádiz (Spain) and the Cyclades Islands (Greece). Surveys were carried out in order to identify trammel net métiers and to characterise the gear used. Trammel nets were among the most important gears used in the small-scale fisheries, with up to 9 different métiers identified in each area. The most important métiers in the Algarve and the Gulf of Cádiz were those for cuttlefish (*Sepia officinalis*) and soles (*Solea senegalensis*, *Microchirus azevia*, *Synaptura lusitanica*). In the Cantabrian Sea, sole (*Solea vulgaris*), shellfish (several species) and scorpion fish (*Scorpaena spp.*) métiers dominated while a variety of species were targeted in the multi-species trammel net fishery in the Cyclades.

In each area, experimental trammel nets of six different types (combinations of 2 large mesh outer panel sizes and 3 small mesh outer panels) corresponding to the most common métier, were constructed and fishing trials carried out on a seasonal basis (4 seasons in the Cantabrian Sea, Algarve and Cyclades and 2 in the Gulf of Cádiz) using chartered commercial fishing vessels. Overall, 271, 360, 185 and 185 km of trammel nets were fished in the experimental fishing trials in the Cantabrian Sea, Algarve, Gulf of Cádiz and Cyclades Islands respectively.

The trammel nets caught a large number of species: 79, 128, 63 and 79 in the Cantabrian Sea, the Algarve, the Gulf of Cádiz and the Cyclades Islands respectively. In the Cantabrian Sea trials *Solea vulgaris* (19%), *Trisopterus luscus* (12%), *Scomber scombrus* (9%) and *Trachinus draco* (8%) dominated the catches. In the Algarve, *Scomber japonicus* (21%), *Sepia officinalis* (17%), *Microchirus azevia* (12%) and *Trachinus draco* (6%) were the most important species in the trammel net catches. *Sepia officinalis* (43%), *Solea senegalensis* (8%), *Sardina pilchardus* (7%) and *Torpedo torpedo* (7%) accounted for most of the catch in the Gulf of Cádiz. In the Cyclades Islands, *Mullus surmuletus* (15%), *Pagellus erythrinus* (14%), *Diplodus annularis* (10%) and *Scorpaena porcus* (9%) were the four numerically most important species. Totals of 17041 (Cantabrian Sea), 16574 (Algarve), 8178 (Gulf of Cádiz) and 9619 (Cyclades Islands) individual fish, crustaceans and cephalopods were caught.

The multivariate analysis (cluster analysis and MDS) showed that there were significant differences in the species composition and relative abundance of the most important species between the seasons, especially in the cases of the Cantabrian Sea and the Algarve fisheries. Catch rates (numbers per 1000 m of trammel net) also showed depth related patterns for most of the dominant species. In general, catch rates increased with decreasing inner panel mesh sizes, whereas the mesh size of the outer panel had no significant effect.

Significant numbers of species and proportions of the catches were discarded in each area. Overall, 65, 105, 46 and 32 species were entirely or partly discarded in the Cantabrian Sea, Algarve, Gulf of Cádiz and Cyclades Islands respectively. The overall discard rate in terms of catch in numbers ranged from 15% for the Cyclades to 49% for the Algarve, with the high discard rate for the latter due largely to *Scomber japonicus*. The main reasons for discarding were as follows: 1) species of no or low commercial value (e.g. *Scomber japonicus*, *Torpedo torpedo*), 2) commercial species that were damaged or spoiled (e.g. *Merluccius merluccius*), 3) undersized commercial species (e.g. *Lophius piscatorius*) and 4) species of commercial value but not caught in sufficient quantities to warrant sale (e.g.

*Sardina pilchardus*). The number of discarded species and discard rates generally decreased with increasing inner panel mesh size.

Trammel nets generally caught a wide size range of the most important species, with distributions that were skewed to the right and/or bimodal. In many cases the catch frequency distributions of the different nets were highly overlapped, indicating little or no size selectivity. In general, the Kolmogorov-Smirnov test showed that the large mesh outer panels had no effect in terms of size selectivity, while the opposite was true for the small mesh inner panels.

Of the three methods of capture recorded, entangling was by far the most important, with combinations of entangling and wedging and entangling and gilling accounted for the greater part of the catches of all the species in the four different areas.

Six different selectivity models (normal scale, normal location, Gamma, log-normal, bi-modal and Gamma-Wileman) were fitted to data for the most abundant species in the four areas using the GillNet software (Constat, 1998). In general, the bi-modal model provided the best fits for a wide range of species, with the uni-modal models giving poor fits in most cases. For some species, in particular *Sepia officinalis*, where entangling was the method of capture in 100% of the cases, none of the GillNet models fitted the data, whereas the logistic model fitted by maximum likelihood (Wulff, 1986) adequately described the selective properties of the trammel nets.

**Key words:** trammel nets, catch rates, discards, size selectivity, Cantabrian Sea, Algarve, Gulf of Cádiz, Cyclades Islands

## SUMMARY FOR NON-SPECIALISTS

Trammel nets are fixed gear, generally fished on the bottom, that are composed of a small mesh inner panel and two large mesh outer panels. The netting material can be of several types, with monofilament and multifilament trammel being the most widely used. The netting panels are hung loosely and the objective to catch fish, cephalopods and crustaceans primarily by entangling in the pocket formed when a fish/cephalopod/crustacean forces the small mesh inner panel through one of the meshes of the outer panel.

Trammel nets are widely used throughout the world, particularly in small-scale fisheries. Unlike gillnets, few studies have been carried out on trammel nets and little is known of their size-selective properties. The objectives of this study were the following: 1) to identify and characterise the main trammel net métiers in the Cantabrian Sea (Basque Country, Spain), the Algarve (southern Portugal), the Gulf of Cádiz (Spain) and the Cyclades Islands (Greece), 2) to construct experimental trammel nets based on the most important *métier* in each area and to carry out fishing trials with these nets, 3) to quantify species composition, catch rates, discard rates and method of capture on a seasonal and a depth basis, and 4) to estimate the size selectivity parameters for the most important species.

Questionnaire surveys were carried out in each of the four areas. These allowed us to identify up to 9 different *métiers* in each area and to identify the characteristics (material used to construct the nets and method of construction) as well as to obtain information on vessel and crew characteristics, fishing grounds and fishing strategies.

Experimental trammel nets using 3 mesh sizes for the inner panel and 2 mesh sizes for the outer panel were constructed in each area, giving a total of 6 trammel net types for each area. Commercial fishing vessels were chartered for carrying out fishing trials. Members of each team went on board each trip in order to sort the catch according to the six trammel net types and to record information on fishing grounds, depth, number of fleets, times of setting and hauling, method of capture and discarding practices. All organisms that were caught were identified, measured and weighed. At least 40 fishing trials were carried out in each area, over all four seasons in the case of the Cantabrian Sea, the Algarve and the Cyclades Islands. In the case of the Gulf of Cádiz, fishing took place in only two seasons because of the seasonal nature of the trammel net fishery.

A total of 271, 360, 185 and 185 km of trammel nets were fished in the Cantabrian Sea, the Algarve, the Gulf of Cádiz and the Cyclades Islands respectively. Species diversity was very high, with 79, 128, 63 and 79 different species caught in the Cantabrian Sea, the Algarve, the Gulf of Cádiz and the Cyclades Islands. Overall, 17041, 16574, 8178 and 9619 fish/crustaceans/cephalopods were caught in the four areas, with the great majority of the catch consisting of fish.

Relatively few species dominated the catches in numbers in all four areas. In the Cantabrian Sea trials *Solea vulgaris* (19%), *Trisopterus luscus* (12%), *Scomber scombrus* (9%) and *Trachinus draco* (8%) dominated the catches. In the Algarve, *Scomber japonicus* (21%), *Sepia officinalis* (17%), *Microchirus azevia* (12%) and *Trachinus draco* (6%) were the most important species in the trammel net catches. *Sepia officinalis* (43%), *Solea senegalensis* (8%), *Sardina pilchardus* (7%) and *Torpedo torpedo* (7%) accounted for most of the catch in the Gulf of Cádiz. In the Cyclades Islands, *Mullus surmuletus* (15%), *Pagellus erythrinus*

(14%), *Diplodus annularis* (10%) and *Scorpaena porcus* (9%) were the four numerically most important species.

Significant numbers of species and proportions of the catches were discarded in each area. Overall, 65, 105, 46 and 32 species were entirely or partly discarded in the Cantabrian Sea, Algarve, Gulf of Cádiz and Cyclades Islands respectively. The overall discard rate in terms of catch in numbers ranged from 15% for the Cyclades to 49% for the Algarve, with the high discard rate for the latter due largely to *Scomber japonicus*. The main reasons for discarding were as follows: 1) species of no or low commercial value (e.g. chub mackerel, *Scomber japonicus*; Torpedo ray, *Torpedo torpedo*), 2) commercial species that were damaged or spoiled (e.g. hake, *Merluccius merluccius*), 3) undersized commercial species (e.g. angler fish, *Lophius piscatorius*) and 4) species of commercial value but not caught in sufficient quantities to warrant sale (e.g. sardine, *Sardina pilchardus*). The number of discarded species and discard rates generally decreased with increasing inner panel mesh size.

The size of the outer panel had little or no effect on the catch rate, discard rate or the sizes that were caught. In contrast, catch rates and discard rates generally decreased with increasing inner panel mesh size. Also, although for many species the catch size distributions were highly overlapped, indicating that the different trammel nets were not size selective, in some cases the distributions for the different inner panel mesh size were clearly different. Thus, for species where there was evidence of size selectivity, this was largely or entirely due to the mesh size of the inner panel.

Most of the distributions were skewed to the right, showing that trammel nets catch a wide size range for most species. Furthermore, many distributions were bi-modal, with two peaks. This suggests that fish were caught in more than one way. In fact analysis of the method of capture showed that while entangling was by far the most important method, there were many species where fish were either entangled and wedged or entangled and gilled.

Selectivity models were fitted to the catch size frequency data for the most abundant species in each area. Unlike the case of gillnets where entangling is unimportant, uni-modal (one peak) models generally gave poor fits to the trammel net catch frequency data. In fact, the bi-modal model was the best for most species. However, in the case of species such as the cuttlefish (*Sepia officinalis*) where only entangling was important, the bi-modal model also did not fit the data. Instead, size selectivity was more adequately described using the logistic model, which is normally used for trawl or other bag-type gear. This suggests that entangling by formation of a “pocket” of the small mesh inner panel passing through the larger mesh outer panel, ensures that above a certain size all individuals are retained and there is no loss of the larger individuals.

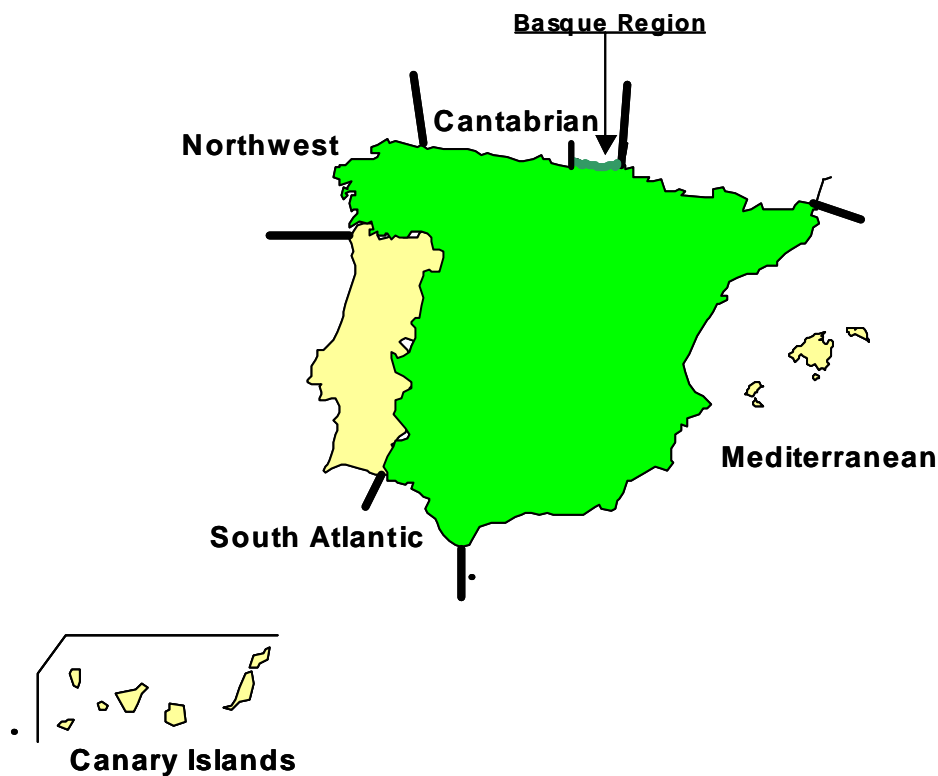
The multivariate analysis showed that there were significant differences in the species composition catches and the relative abundance of the most important species in each area, particularly in the Cantabrian Sea and the Gulf of Cádiz. In addition to the seasonal effect, depth was also an important factor. Fishing trials took place at depths to 80 m in the Cantabrian Sea and the Cyclades Islands, 100 m in the Algarve and to 20 m in the Gulf of Cádiz. For many of the most important species, catch rates in numbers per 1000 m of trammel net differed according to depth stratum, showing that different species have different depth distributions.

This project has provided important new information on trammel net fisheries in four areas in Portugal, Spain and Greece. This information will be useful for the improved understanding, management and conservation of the multi-species, multi-gear fisheries that are characteristic of the small-scale fisheries in southern European waters.

# 1. INTRODUCTION

## 1.1. Artisanal / small scale fisheries in the Basque country

The importance of the artisanal fisheries in northern Spain, is best described taking the Cantabrian Region, covering approximately 500 km of northern Spain's coastline (Figure 1.1.1), as one's reference point.

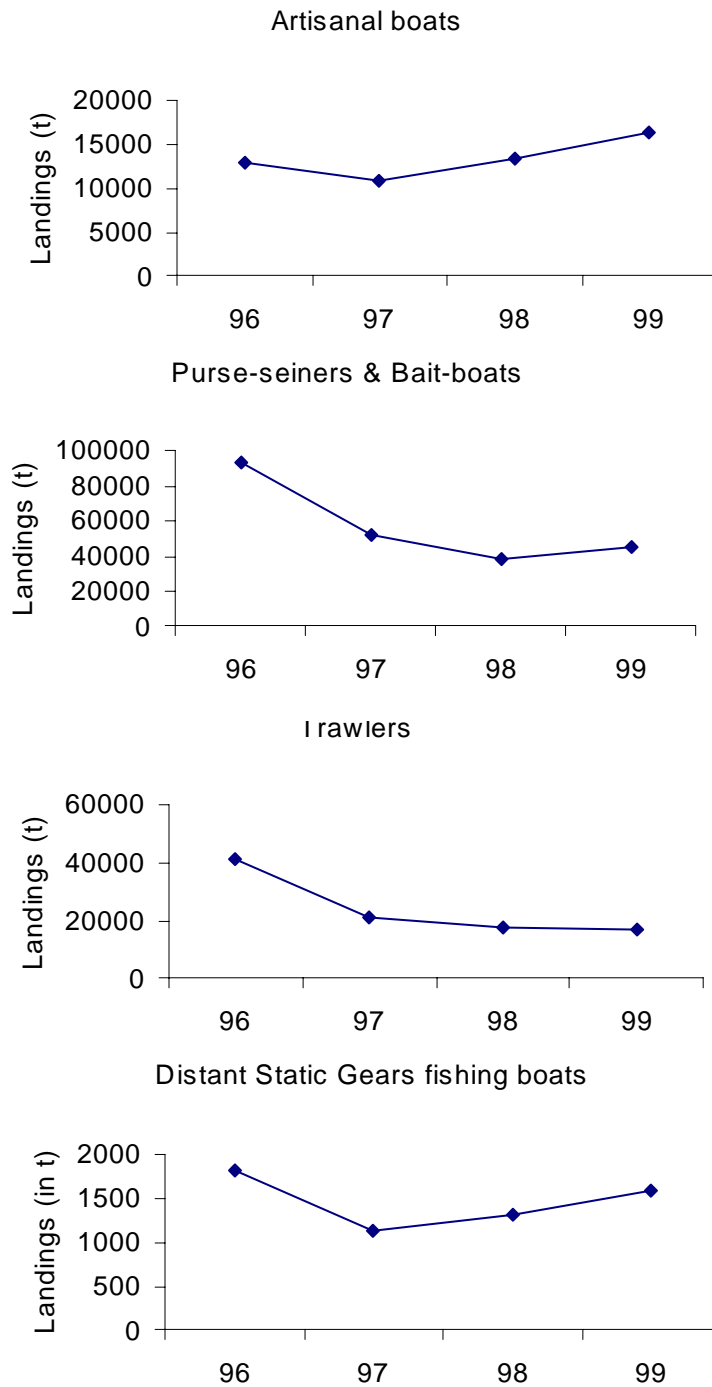


**Figure 1.1.1. Basque country. Geographical location of the Basque Country in the Cantabrian Region of Northern Spain.**

The Cantabrian Region's artisanal fishing fleet is well represented throughout the region's fishing ports.

The Basque Country, with two of the four sea-bound provinces comprising the Cantabrian Region, was chosen by way of example, to show the importance of the artisanal fisheries in relation to other ones (trawlers, purse-seiners & bait-boats, distant fisheries involving static fishing gears).

The Basque Country artisanal fishing fleet landings (Figure 1.1.2) in terms of weight represent 20% of the total landings for 1999, as against 56% of the purse-seiners & bait-boats, 21% of the trawlers and 2% of the distant fisheries involving static fishing gears.



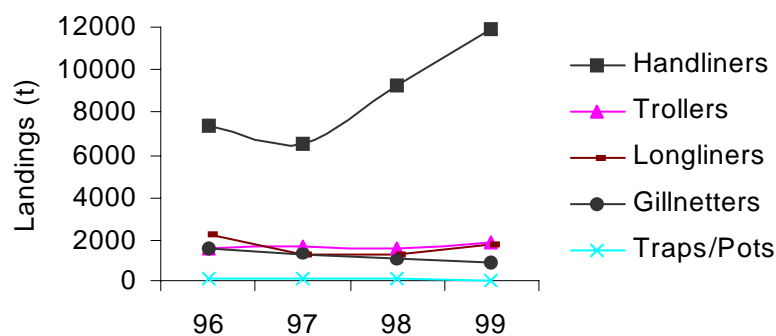
**Figure 1.1.2. Basque country. Annual total landings in the Basque Country by fishing fleet category, 1996-1999 (Source: AZTI fisheries monitoring)**

There has been a decrease in the landings of purse-seine and trawl boats during the time period considered, but artisanal and distant static gear boats show an opposite trend.

The artisanal fishing fleet is that operating with small scale fishing gears, which generally make short fishing trips (lasting one day) to inshore fishing waters, except for the

odd fishing *métier* such as trolling targeting tuna fish (*Thunnus spp.*), where fishing trips may last for up to 15 days, with vessels going out as far as 800 nautical miles from their base ports.

The main fishing gears used by the artisanal fishing fleet, as per the landings for 1999 on a decreasing weighting scale, (Figure 1.1.3) were the handlines (69%), trolling (13%), longline (12%), gillnets including the trammel net (5%) and in last place the traps and pots (0.1%). The relative gillnet importance as regards the aforementioned data on landings, is an underestimation, because a part of the catches obtained with this fishing gear is commercialised differently from the fish market sales, meaning exact catch total information cannot be obtained.



**Figure 1.1.3. Basque Country. Annual total landings of the Basque Country small scale fishing fleet 1996-1999 (AZTI)**

For 1999, the main species landed by the artisanal fishing fleet are mackerel (*Scomber scombrus*), accounting for 72% of this fleet's total landings and tuna fish (*Thunnus spp.*) with 11% of the total landings.

The Basque Country artisanal fishing fleet is comprised of a total of 199 vessels whose mean features are as follows: (a) 13m length (b) 23 GRT (c) main engine of 161 Horse power (d) 3 man crew. The majority of the vessels comprising the artisanal fishing fleet alternate with several of the aforementioned fishing gears throughout the year, clearly related to the seasons of certain migratory species, i.e. mackerel (*Scomber scombrus*) in spring and tuna fish (*Thunnus spp.*) in summer, whilst other vessels use different fishing gears on the same fishing trip. However, it is difficult to determine the exact number of vessels that use more than one gear during the same trip. The trammel net is a widely used fishing gear, as around 40% of the Basque Country artisanal fishing fleet uses it at some time during the year, mainly in conjunction with the small meshed gillnets.

The trammel net fisheries are affected by several fishing regulation from different administrations:

The European Regulation CE n° 850/98 (30<sup>th</sup> Mars 1998) established the minimum stretched mesh size of the netting of enmeshing fishing gears in relation with the target species regardless of the gear type (no distinction between gillnet, trammel and entangling fishing gears). For some of the main species caught with trammel nets in the Cantabrian Region, the minimum stretched mesh size are as follow:

- . Sole: 80 mm
- . Bib: 50 mm
- . Scorpion fishes : 60 mm
- . Gurnards : 50 mm
- . Bass: 80 mm
- . Mackerel: 100 mm
- . Greater weaver: 100 mm
- . Hake: 80 mm

On the other hand, the Royal Decree 410/2001, of 20th April, regulating fixed fishing gears in the National Fishing Area of the Cantabrian and the North West, stipulates that the stretched mesh size of the inner panel of the “trasmallo”, may not be less than 60 mm and the stretched mesh size of the outer panel may not be less than 400 mm with a maximum height of 2 m for the fishing gear. As for the “miño”, the stretched mesh size of the inner panel is set at 90 mm and that of the outer panel stretched mesh size at 500 mm with a maximum height of 3 m. The maximum permitted length for both trammel net types is 4500 metres.

Lastly, the local regulation applicable to the Basque Country inshore waters set out in the Decree n° 212/2000 of 24th October, typifies different fishing schemes for each of the Basque Country seabound provinces (Bizkaia and Gipuzkoa):

The Bizkaia fishing scheme authorises the use of trammel nets to a maximum depth of 40 fathoms between the 003° 08.8’W meridian (bordering the province of Cantabría) and Villano Cape, on the 002° 56.1’W meridian, and a maximum depth of 30 fathoms from the latter meridian to the Point of Saturrarán, on the 002° 24.7’W meridian, with a 2 fathom tolerance in both cases.

The Gipuzkoa fishing scheme limits the maximum net length to be used in relation to vessel length, i.e. 3000 m for vessels whose length is less than 10 m, and 4500 m for vessels

whose length is equal or exceeds 10 m.

Only one haul per day is allowed in both provinces. Furthermore, fishing is banned at the weekend when the fishing gear must remain in port for 48 consecutive hours.

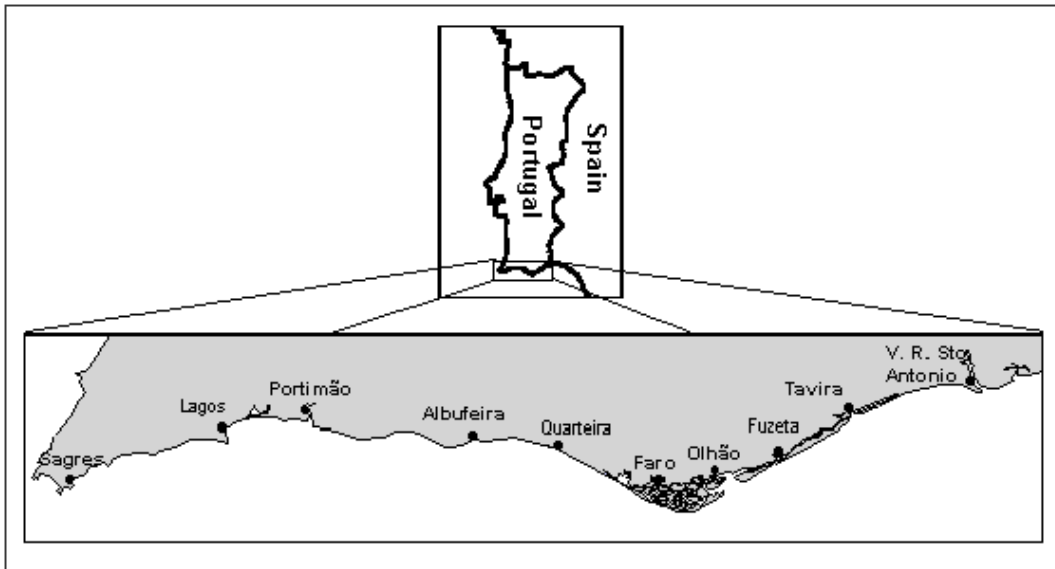
Due to the decline in recent years of other métiers of the small-scale fisheries (mainly longline), gillnet fishing activity has increased considerably, and is currently the most important in the small-scale fisheries. Moreover, the trammel net is one of the most widely used static gears in the small-scale fisheries in the Cantabrian Region. There has been a considerable increase in the use of this fishing gear in recent years due to its versatility in catching a wide number of species with a high market value. This means that the fishermen's risk of failure in relation to catches resulting from the poor conditions of some of the resources, is minimised.

From the dynamic changes of the small-scale fisheries explained above, a restructure of this fishing activity should probably be deployed in the near future. Therefore, detailed information on these fisheries is an absolute necessity.

## **1.2. Artisanal / small scale fisheries in the Algarve**

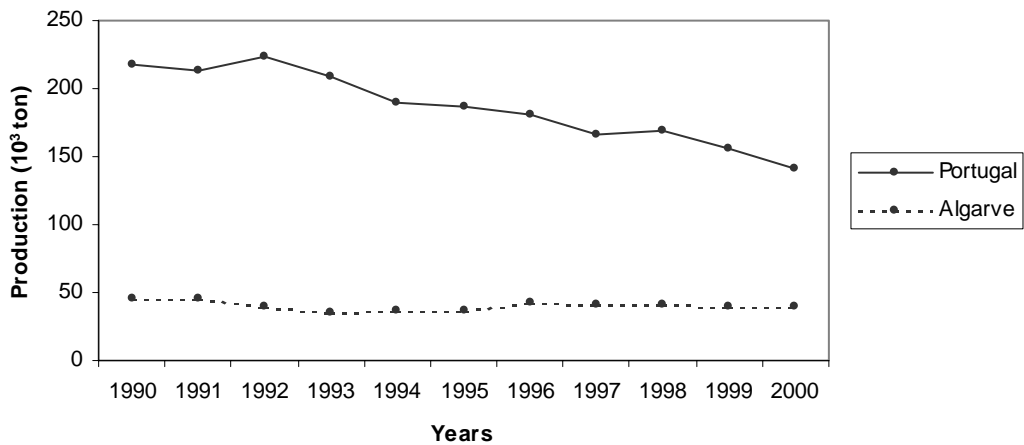
The Algarve coast (south Portugal) extends from Cabo São Vicente (8° 59'W) in the west to the border with Spain in the east (7° 24'W) (Figure 1.2.1). Compared to the west coast of Portugal, the Algarve continental shelf is relatively wide, with canyons being important features. The proximity to the Strait of Gibraltar and the occurrence of south-easterly winds, particularly in the summer, are responsible for the strong Mediterranean influence which is seen in the fish community. The Algarve coast is commonly divided into two distinct areas: the Barlavento (western Algarve) and the Sotavento (eastern Algarve), based on the direction of the prevailing winds. The two areas differ in terms of coastline and type of bottom, with the Sotavento being poor in hard bottom compared to the Barlavento. The two areas also differ in terms of fish diversity and fishing yields, with the Barlavento being generally richer in terms of species and with higher catch rates.

The Portuguese fisheries are highly diverse, with a significant artisanal component. According to DataPesca (1999) the main Algarve fishing ports in terms of the quantities of the landings are Olhão (18,100 MT) and Portimão (15,563 MT). The most important landings in the Algarve in 1999 were of sardine (19,718 MT), chub mackerel (2,581 MT), horse mackerel (1,949 MT), octopus (1,644 MT), and deep water shrimps (842 MT).

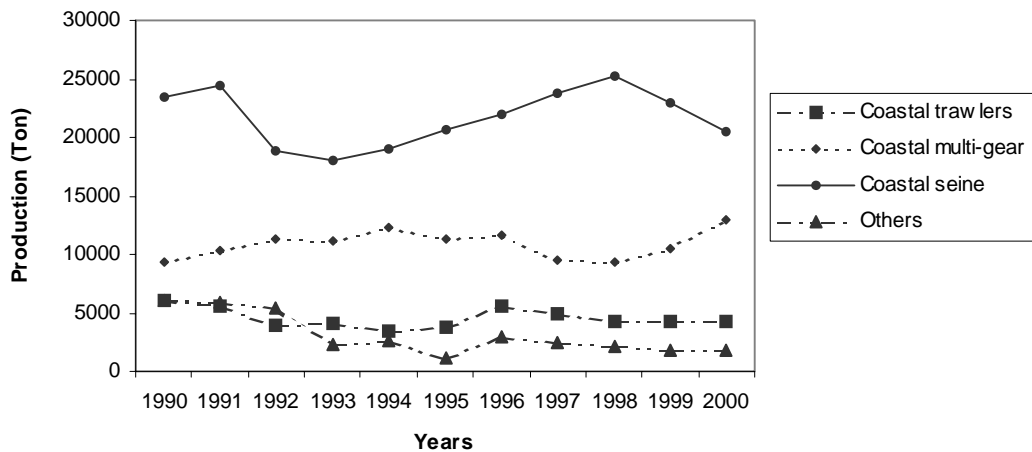


**Figure 1.2.1. Algarve. The Algarve coastline, with the main ports.**

The total landings for Portugal and the Algarve from 1990 to 2000 are given in Figure 1.2.2, while the Algarve landings for the main gear categories over the same time period are shown in Figure 1.2.3.



**Figure 1.2.2. Algarve. Annual total fisheries production in Portugal and the Algarve (thousand tons), 1990-2000 (DGPA, 1991-2001).**



**Figure 1.2.3. Algarve. Annual total fisheries production in the Algarve by coastal trawlers, coastal multi-gear, coastal seine, and all other gears, 1990-2000 (DGPA, 1991-2001).**

Portuguese landings decreased from 218 thousand tons in 1990 to 142 thousand tons in 2000, representing a decrease in landings of almost 35% in the last decade. The decrease in landings in the Algarve has been less dramatic (11%).

In 1999 the Algarve fleet consisted of 2369 boats, of which 2005 belonged to the local category, 363 to the coastal category, and only 1 was an offshore vessel. Table 1.2.1 shows the number of boats registered by port in the Algarve. The local fleet (85% in number) is composed of boats of at least 9 m in length and which cannot fish within  $\frac{1}{4}$  or 1 mi of the shore, respectively for open-deck and close-deck vessels. Part of this fleet does not fish year-round; particularly during the winter. The coastal category accounts for 15% of the total Algarve fleet and consists of boats more or equal than 9m in length and which are allowed to fish in depths greater than 20m or in areas at least one mile from the shore. Four types of coastal category boats are found: “pequena pesca / artes fixas” - small-scale / static gear fisheries (42%), “boats  $\geq 12\text{m}$ ” - artisanal (40%), seiners (8%) and trawlers (10%). The offshore category (<1%) of the fleet consists of only one large fishing vessel.

According to Datapesca (1999) in 1998, although only 8% of the fleet consisted of seiners, these landed 65% of the total catch by weight in the Algarve. The main species landed are the sardine and the horse mackerel. Trawlers (10%) landed 11% of the total catch by weight. More than 80% of the Algarve fishing boats belong to the artisanal or multi-purpose fishing fleet. These boats landed 24% of the total catch by weight in 1998. The latter boats generally are licensed to fish a number of different gears; in particular longlines, gill nets,

trammel nets, traps and pots. A wide variety of species are fished; mainly at depths between 20 and 100m and rarely more than 5 miles from the coast. With seasonal availability in abundance of different resources, these boats alternate fishing gears and fishing grounds.

**Table 1.2.1. Algarve. Number of boats registered by port in the Algarve as of January 1, 1998 (source: DGPA).**

Category Ports / Fleet	Local	Coastal				Offshore	Total
		small-scale	artisanal	seiners	trawlers		
Albufeira	101	3		2			106
Faro	166	7	10				183
Fuzeta	139	12	16		2		169
Lagos	217	20	11	5			253
Olhão	371	23	26		4	1	425
Portimão	269	18	20	8	10		325
Quarteira	159	21	4	5			189
Sagres	169	5	15	3			192
Tavira	208	34	22	1	1		266
V.R.S.A.	206	10	21	6	18		261

The distribution of fishing licences by gear and by the ports in the Algarve are given in Tables 1.2.2 and 1.2.3, for the local and coastal fleets, respectively.

**Table 1.2.2. Algarve. The distribution of fishing licences by gear and by the ports of the Algarve coast (South region), for the local fleet, as of December 31, 1998 (source: DGPA).**

Gear/ Port	Purse- seine	Trawl	Long- line	Gill net	Trammel net	Pots	Octopus trap	Others	Total
Albufeira	-	-	78	20	29	31	17	75	250
Faro	-	-	79	24	55	28	15	30	231
Fuzeta	-	-	77	6	15	54	19	37	208
Lagos	13	-	81	40	29	48	42	86	339
Olhão	1	-	68	40	79	20	8	51	267
Portimão	-	-	199	61	56	21	74	188	599
Quarteira	1	-	82	63	85	16	5	83	335
Sagres	5	-	120	39	46	20	70	111	411
Tavira	1	-	38	25	27	28	17	21	157
VRSA	-	-	98	60	128	15	11	6	318
Total	21	0	920	378	549	281	278	688	3115

For the Algarve fleet, 76.2% of licenses were for the local component, 23.8% for coastal and less than 0.1% for the offshore. By far the most important port in number of licenses was Portimão with 18.5%, followed by Sagres (12.1%) and Lagos (11%). VRSA,

Quarteira and Olhão had around 10% of licenses and Tavira, Faro, Fuzeta and Albufeira around 7%. The gear with most licenses issued in the Algarve was the longline with 27.3%, followed by trammel net with 16.9%, gill net with 13.4% and pots and octopus traps with nearly 10%.

The number of licenses for the Algarve local fleet by port (Table 1.2.3) shows that Portimão (19.2%) is again the most important, followed by Sagres (13.2%), and Lagos, Quarteira and VRSA with around 10%.

**Table 1.2.3. Algarve. The distribution of fishing licences by gear and by the ports of the Algarve coast (South region), for the coastal fleet, as of December 31, 1998 (source: DGPA).**

<b>Gear/ Port</b>	<b>Purse- seine</b>	<b>Trawl</b>	<b>Long -line</b>	<b>Gill net</b>	<b>Trammel net</b>	<b>Pots</b>	<b>Octopus trap</b>	<b>Others</b>	<b>Total</b>
Albufeira	2	-	2	2	2	2	2	4	16
Faro	6	-	13	10	9	6	11	4	59
Fuzeta	1	2	24	14	5	5	10	2	65
Lagos	11	-	16	23	19	9	17	14	109
Olhão	16	3	29	22	18	13	13	20	134
Portimão	15	10	28	23	19	12	29	20	156
Quarteira	6	-	9	12	18	16	17	9	87
Sagres	4	-	21	17	16	2	11	11	82
Tavira	7	2	34	24	20	28	32	12	159
VRSA	7	17	20	22	18	5	13	4	106
<b>Total</b>	<b>75</b>	<b>34</b>	<b>196</b>	<b>169</b>	<b>144</b>	<b>98</b>	<b>155</b>	<b>102</b>	<b>973</b>

Fixed nets are not permitted within 1/4 of a mile of the shore. Between 1/4 of a mile and 1 mile from the shore fixed gears can only be set by boats of up to 5 GRT or of length up to 9 m. Between 1 and 2 miles fixed nets can be used by boats up to 5 GRT or less than 9m in length, and by all other fishing boats as long as the depth is at least 20 m. Beyond 15 miles, only trammel nets with at least a 240 mm stretched mesh inner panel can be used. Fixed nets of all kinds should not be set within ¼ of a mile of each other. The maximum lengths of nets permitted by vessel category are given in Table 1.2.4.

**Table 1.2.4. Algarve. Fishing vessel categories and maximum length and heights of gill nets and trammel nets allowed by law.**

<b>Vessel length (VL)</b>	<b>Maximum total length of net (m)</b>	<b>Maximum net height (m)</b>
<b>Gill nets</b>		
VL < 9 m open deck	2000	10
VL < 9 m covered deck	3500	10
9 m < VL ≤ 12 m	5000	10
12 m < VL ≤ 14 m	8000	10
14 m < VL ≤ 16 m	10000	10
16 m < VL ≤ 18 m	12000	10
18 m < VL ≤ 20 m	13500	10
VL > 20 m	15000	10
<b>Trammel nets</b>		
VL ≤ 9 m	2500	3
9 m < VL ≤ 12 m	3500	3
12 m < VL ≤ 16 m	5500	3
16 m < VL ≤ 20 m	7000	3
VL > 20 m	9000	3
<b>Drift nets for small pelagics</b>		
All fishing vessels	500	10

At the present there are no regulations concerning the way nets are constructed or the type of materials used. Nevertheless, the use of biodegradable materials in the construction of the fishing gears may be a future requirement.

On the south coast of Portugal, fixed nets cannot remain in the water for more than 12 consecutive hours in each 24-hour period. However, gill nets of stretched mesh size greater than 100 mm can be set for a maximum of 72 consecutive hours in each 96-hour period if fished at depths greater than 300 m.

### **1.3. Artisanal / small scale fisheries in the Gulf of Cádiz**

The coastline of Andalucía covers a total length of 875 Km., divided among the Provinces of Huelva, Cádiz, Málaga, Granada and Almería, and has one of the most important fishing fleets of Spain. Within the Andalusian fishing sector, two different sub-regions can be identified: South – Mediterranean, and South - Atlantic. The fleet working Mediterranean waters engages principally in artisanal/craft and coastal fishing, whereas that working in the Atlantic is more diversified, comprising not only the artisanal and coastal fleets but also the

deep sea and very deep sea fleets.

The Andalusian fishing fleet consists of some 2612 vessels, with a total gross registered tonnage (GRT) of 63,655.3 tonnes. The largest category in terms of numbers is the low-tonnage artisanal fleet (43.5% of the total), followed by the trawler fleet (24% of the total), the fishing boats using dredges (16.5% of the total), the purse seine type (9%) and the longliners (7%).

Regarding the artisanal fleet, apart from its numerical significance, there are certain differentiating characteristics that should be noted. These are essentially boats of less than 20 GRT that practice several different fishing methods, which makes them very versatile and capable of adapting easily to changes in the availability of resources. In general, they operate under business management structures that are markedly family-run in character.

This artisanal fleet can be differentiated under five main types of technique or nets employed: trawling, purse seine, gears, longlines and dredge. According to the typological classification of the official Census of the Fishing Fleet, a total of 12 basic types can be differentiated: stern and side trawlers, purse seine, handlines, longlines, other hook types (rods and lines, tuna-type lures and jigs), traps, vertical net, dredges, multiple-type nets and multi-purpose fishing vessels.

According to the Fishing Census of 1999, in Andalucía there are 1,839 boats of less than 20 GRT, of which 1151 belong to the Atlantic region and 688 to the Mediterranean. With regards to the number of boats by type, those dedicated to vertical net fishing represent 41% of the total artisanal fleet, followed by those using drag-nets (16%), purse seines (10%), stern trawl and multiple techniques (9%), longliner (7%), hand-held lines (5%) and traps account for 1%. (Table 1.3.1).

**Table 1.3.1. Gulf of Cadiz. Number of boats of Andalusian artisanal fleet by principal fishing types.**

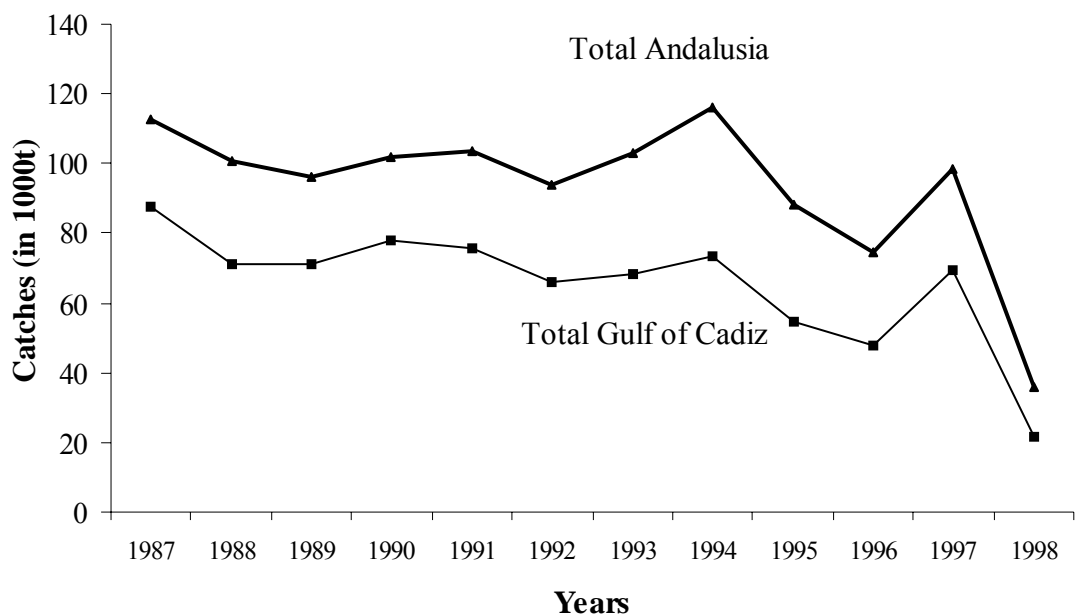
	Trawls	Purse sein	Dredge	Gear nets	Traps	Handlines	Longlines	Others hook gears	Polivalent gears	Polivalent boats	Total port
Ayamonte	9		16	16	2	6	1	1	5	1	<b>57</b>
Isla Cristina	28	14	47	33	4	1	1		11	1	<b>140</b>
Lepe	17	3	5	42					5		<b>72</b>
Huelva	3	1	1	8	1		1				<b>15</b>
Punta Umbria	7	22	1	32			2		5		<b>69</b>
Palos	1	2		1							<b>4</b>
Sanlucar	56	12	4	66		1	1		2		<b>142</b>
Chipiona	1			37					1		<b>39</b>
Rota	3			43		1			4		<b>51</b>
Puerto de Santa Maria	4			9		1			2		<b>16</b>
Puerto Real				3							<b>3</b>
Cadiz				16		6		2	5		<b>29</b>
San Fernando		3		30	1	2		1	3		<b>40</b>
Barbate	4	16		23	2		6		4		<b>55</b>
Conil			3	77	1	3	1		5		<b>90</b>
Tarifa	1	4	12	23	2	6	44	1	8		<b>101</b>
<b>Total by fishing type</b>	<b>135</b>	<b>79</b>	<b>89</b>	<b>459</b>	<b>13</b>	<b>27</b>	<b>57</b>	<b>5</b>	<b>60</b>	<b>2</b>	<b>923</b>
Per cent	14.62	8.56	9.64	49.73	1.41	2.92	6.17	0.54	6.50	0.22	100

The artisanal fleet of Andalusia not only uses a variety of fishing techniques and net types but also targets a wide range of different species (i.e. it is multi-specific). Over the entire length of the regional coastline, a total of 90 species of fish are caught, as well as 31 species of molluscs and 14 species of crustaceans. In terms of weight of catch, however, there are 9 significant species of fish (Table 1.3.2); most notable among the molluscs are *Octopus* and *Eledone* (4.78%), *Venerupis rhomboides* (3.26%) and *Sepia officinalis* (0.58%); and among the crustaceans, *Parapenaeus longirostris* (3.25%).

**Table 1.3.2. Gulf of Cadiz. Principal target species, in percentage by weight of total catches, of the Andalusian artisanal fishing fleet, total and by sub-region.**

<b>Species</b>	<b>Andalucia</b>	<b>South - Atlantic</b>	<b>South - Mediterranean</b>
	(%)	(%)	(%)
<i>S. pilchardus</i>	9.43	6.05	12.23
<i>T. trachurus</i>	8.93	7.82	16.62
<i>E. encrasicolus</i>	5.09	4.48	3.43
<i>Scomber sp.</i>	4.77	4.11	7.58
<i>M. merluccius</i>	14.47	21.72	1.74
<i>P. saltator</i>	3.53	4.46	0.00
<i>M. potassou</i>	1.71	0.74	2.75
<i>Solea sp</i>	1.50	2.99	0.16
Others	50.57	47.63	55.49

Among the fish, the most important species is *Merluccius merluccius*, which represents 14.47% of the total annual fish catch of this fleet for Andalusia as a whole, and 21.72% of the total catch of the Atlantic sub-region. This compares with, for example, *Solea sp.* which represents 1.50% and 2.99%, respectively, of total catch. The total annual catch of this fleet for Andalusia as a whole, during the period between 1987 and 1998, varied between an upper figure of 116040 mt, in 1994, and a lower figure of 35810 mt in 1998. In these same two years, catches landed in the Gulf of Cadiz totalled 78500 mt and 21830 mt, with the Gulf accounting for 63.34% and 60.96% of the total landings of fresh fish catches by the fleets of Andalusia. (Figure 1.3.1).



**Figure 1.3.1. Gulf of Cadiz: Total annual catches in Andalusia marine waters and Gulf of Cadiz between 1987 and 1998 (Data from the Direccion General de Pesca, Andalusia Government)**

The total of 534 vessels dedicated to trammel net fishing in Andalucía were constructed between 1900 (oldest) and 1999 (newest), with an average year of construction of 1965. Of this total, 436 vessels fish in the Gulf of Cádiz, and represent 26.2% of the total artisanal fleet of Andalusia, and 47.35% of all fishing vessels working in Gulf of Cádiz. There are 13 ports in the Gulf from which trammel net fishing is conducted, indicating that 60% of all the fishing ports of this zone have trammel net activity. There are 7 of these ports in municipalities of the province of Cádiz, comprising Algeciras, Barbate, Conil, Chipiona, Rota, Sanlúcar and Tarifa and another 6 ports are in municipalities of the province of Huelva: Ayamonte, Isla Cristina, Lepe, Punta Umbría, Mazagón and El Rompido. (Table 1.3.3. Gulf of Cádiz).

**Table 1.3.3. Gulf of Cádiz. Numbers of vessels, numbers of crew members, mean values of TRB, length and motor HP of the trammel net fleet, for the various ports of the Gulf of Cádiz (- : data not available).**

		Total Vessels	Number of Crew	Mean GRT	Mean Length (m)	Mean HP
CÁDIZ	Sanlúcar	66	2-3	2.92	6.00	22
	Chipiona	37	2-4	3.24	6.46	29
	Rota	43	3-4	3.20	6.30	20
	Conil	77	3-4	3.20	6.40	25
	Barbate	23	2-3	2.30	6.00	42
	Tarifa	23	4-5	6.00	8.00	60
	Algeciras	20	2-3	3.20	6.30	32
HUELVA	Lepe	42	6	4.31	5.90	93
	Mazagón	15	2-3	-	6.00	25
	Pta.Umbría	32	2	5.23	6.95	54
	Isla Cristina	33	2-3	7.60	8.07	90
	Ayamonte	16	4	3.64	6.22	54
	Rompido	70-80	2	-	-	60-70

The “Real Decreto” (Royal Decree) of 15-9-1997, number 1428/1997, regulates fishing by craft techniques (i.e. non-industrial) in the external waters (exclusively within the competence of the Spanish State in accordance with Article 149.1.19.<sup>a</sup> of the Spanish Constitution) of the Gulf of Cádiz fishing grounds. The National Fishing Grounds of the Gulf of Cádiz are defined as extending between the mouth of the River Guadiana in the north, and the meridian of Punta Marroquí (05 36' W) in the south. The text of this Decree complies with the objectives set out in Regulation (CEE) 3760/92 and is based on technical measurements of conservation of fishing resources, established by Regulation (CEE) 894/97.

According to the above-cited Royal Decree, the minimum net mesh dimension is 60 mm. (valid until 30th December 1999 as established in Regulation CE 3071/95). Annexe VI of Regulation (CEE) 894/97 establishes the following minimum dimensions of net mesh for the different species caught (Table 1.3.4). In Division IX, which includes the Gulf of Cádiz, there is a provisional minimum of between 80 and 99 mm for *Solea vulgaris* for a period of two years from the entry into force of the Regulation, in which the specified minimum is 60 mm.

**Table 1.3.4. Gulf of Cádiz. Minimum dimensions of net mesh for the different species caught.**

SPECIES	MINIMUM NET MESH
<i>Sardina pilchardus</i> , <i>Palaemon</i> spp., and <i>Coris juli</i>	< 40 mm
<i>Boops boops</i> , <i>Penaeus</i> spp., <i>Squilla mantis</i> , <i>Mullidae</i> , and <i>Dicologlossa cuneata</i>	40-49 mm
<i>Labridae</i> , <i>Trachurus trachurus</i> , <i>Scomber scombrus</i> , <i>Trisopterus luscus</i> and <i>Sepia</i> spp.	50-59 mm
<i>Triglidae</i> , <i>Sparidae</i> , <i>Scorpaenidae</i> , <i>Microchirus acevia</i> , <i>Omnastrephidae</i> , <i>Conger conger</i> , <i>Phycys</i> spp., <i>Scopthalmus rombus</i> and <i>Trachinidae</i>	60-79 mm
<i>Centracanthidae</i> , <i>Dicentrarchus labrax</i> , <i>Merlangius merlangus</i> , <i>Pollachius pollachius</i> and <i>Psetta maxima</i>	80-99 mm
<i>Pleuronectidae</i>	80-99 mm
<i>Merluccius merluccius</i> and <i>Solea vulgaris</i>	≥100 mm

The maximum permitted length of the net is 4500 m, its maximum permitted vertical dimension is 4 m and between the upper headline of the gear when set for fishing and the surface of the sea a free space of at least 1.5 m must be maintained. The gear must be raised, i.e. not used, for a continuous period of 48 h each week, and within the period of one day of fishing, the fishing activity may only be practised with one set of gear or tackle.

The technical characteristics of the methods of buoying and weighting/sinking are also regulated in the Decree. In general, the maximum engine power of vessels dedicated to this kind of fishing should not exceed 250 HP and the maximum length should be 15m. For boats with outboard motors, there are different maxima for power and length, of 50 HP and 5 m., respectively. All newly-constructed vessels intended for this kind of fishing must have inboard motors in all cases, and have a minimum length of 5 m and a minimum GRT of 2.5.

The “Boletín Oficial” (Official Bulletin) of the province of Cádiz, 12-8-1980 regulates the trammel net fishing activity in the Bay of Cádiz. On 26 March 2001, the State Law of Maritime Fishing N° 3/2001 was approved. This has not yet been specified as Royal Decrees setting out the basic rules and establishing in detail the governing of the activities of the fishing sector, the sale of fishery products, nor the fisheries and oceanographic research under the competence of the State.

#### 1.4. Artisanal / small scale fisheries in the Cyclades

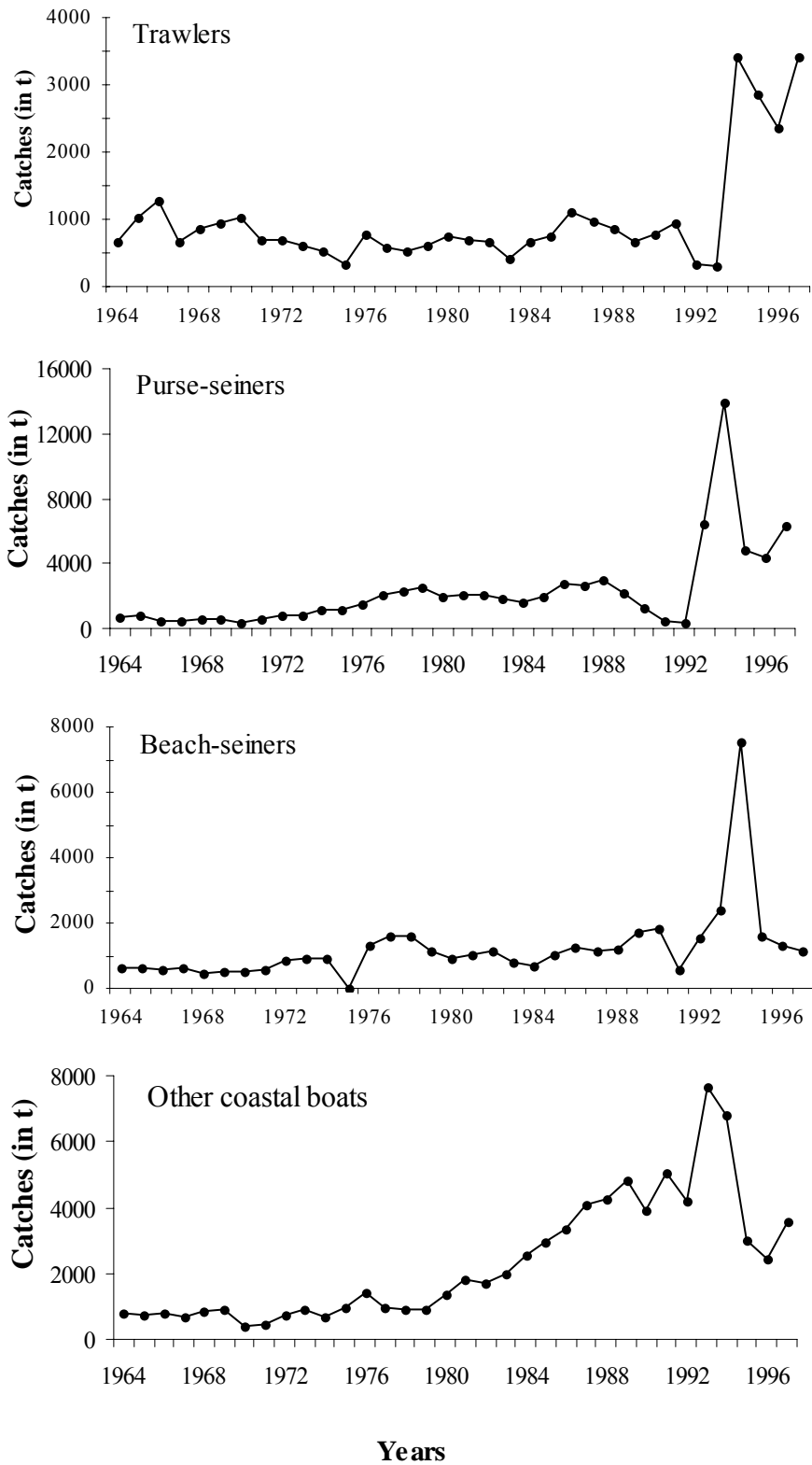
Artisanal fisheries are of great importance in Hellas. The Hellenic fishing fleet includes: (a) fishing vessels operating in distant waters (Atlantic Ocean and northern African coast); (b) trawlers operating in Hellenic open-sea waters; (c) purse-seiners operating in Hellenic open-sea and coastal waters; (d) beach seiners operating along the Hellenic coasts; and (e) "other coastal boats" (including small ring netters, gill and trammel netters, longliners, etc.) operating along the Hellenic coasts (Stergiou et al., 1997a). The last two categories, (d) and (e), comprise the small-scale fisheries. Hake (*Merluccius merluccius*), pickerel (*Spicara smaris*), horse mackerels (*Trachurus* spp.) and red mullets (Mullidae) dominate the trawl catch. The purse-seine catch is mainly composed of anchovy (*Engraulis encrasicolus*) and, to a lesser degree, of sardine (*Sardina pilchardus*), horse mackerels (*Trachurus* spp.) and bogue (*Boops boops*). The beach-seine catch is mainly dominated by pickerel (*Spicara smaris*) and, to a lesser degree, by sardine and bogue. Finally, the "other coastal boats" catch is mainly composed of bogue, pickerel and grey mullets (Mugilidae).

The small-scale fisheries operate mainly with beach seines, trammel and gill nets and longlines. Their socio-economic importance is greater when compared with the trawl and purse-seine Hellenic fisheries. Thus, the artisanal fisheries fleet accounted for 57.5% of the mean total Hellenic engine horsepower, 87.5% of the mean number of boats, 63.7% of the mean number of fishers and 47.4% of the mean wholesale value of catch over the 1964-1989 period (Stergiou et al., 1997a). In 1997, the number of boats involved in the small-scale fisheries was 20196, with a total catch of 76500 t, representing some 45% of the total Hellenic marine catch, and the number of fishers involved amounted to more than 30000 (representing 85% of the total number of fishers). These figures do not include those referring to the sport fishery, which may locally be relatively important (e.g. 11.8% and 4.5% of the total fisheries catches from the Korinthiakos and Patraikos Gulfs, respectively; Stergiou et al., 1989).

The boats involved in the Hellenic small-scale fisheries are generally small (90% of the boats are less than 9 m long) and operate mostly at depths smaller than 100 m and at a distance from the coastline less than 2 miles. The crew per boat usually ranges from 1 to 3 fishers, depending on the capacity of the vessel and the fishing method employed. The stretched nominal mesh size of the trammel nets usually ranges from 34 to 108 mm, with the latter being mainly used for the *Pagrus pagrus* and lobster fisheries. The nets are usually fixed to the bottom and deployed in the evening, or 2 to 3 hours before the sunrise, and hand-hauled in the next morning. The type of net used depends on the species pursued and the nature of the

bottom substrate. In areas where bivalves and algae cover the bottom and/or the catch is expected to consist of species of high abundance but of low commercial value, fishers generally use gill nets. This is mainly attributed to the fact that the time required for the removal of the catch is greater for trammel than for gill nets. The only restrictions referring to the Hellenic small-scale fishery using gill and trammel nets are limitations for the height of nets (<5 m) and the total length of nets used per boat (<5000 m).

Fishing is an important activity in the Cyclades, especially so in the summertime when, because of the increased tourist activity, demand for fish is very high, thus increasing prices considerably. Officially, the total number of boats registered in Cyclades amounts to 246 boats, 225 (91.5%) of which are small coastal boats of lengths ranging from 3.5 to 15 m (modal length: 5-9 m; data from the Department of Fisheries, Prefecture of Cyclades). Forty-seven (47) out of the 225 registered boats use trammel and gill nets as the main gear and 161 boats as a secondary fishing gear. The total reported fisheries landings from the Cyclades in 1997 amounted to about 15000 t representing more than 7% of the total Hellenic landings, 34% of which is attributed to the small-scale fishery (Figures 1.4.1 and 1.4.2). However, the total annual landings in the area are most probably much higher inasmuch as an important part of the catch during the high tourist season (April-September) goes directly to the local market and restaurants without being reported.



**Figure 1.4.1. Annual total catches in the Cyclades by trawlers, purse-seiners, beach-seiners and other coastal boats, 1964-1997 (from Stergiou et al., 1997a and NSSH, 1990-1999).**

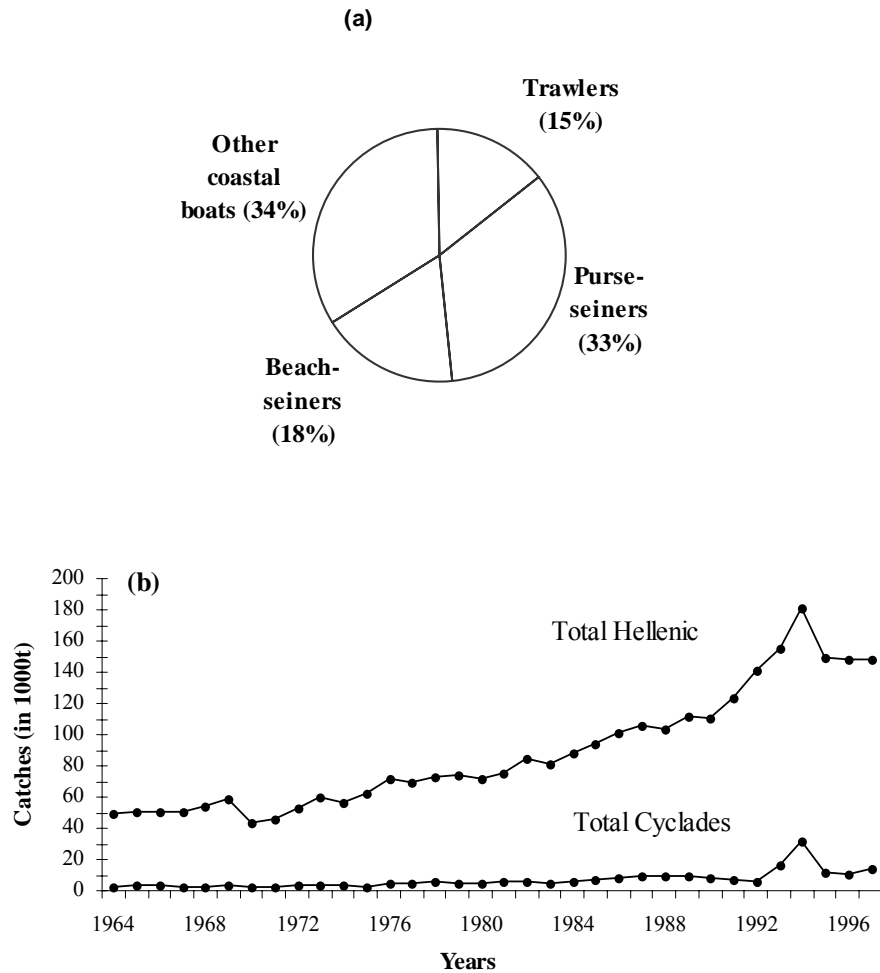


Figure 1.4.2. (a) Mean annual percentage contribution of the major fishing gears to the total Cyclades catches, and (b) total annual catches in Hellenic waters and in Cyclades, 1964-1997 (from Stergiou *et al.*, 1997a, NSSH 1990-1999).

### 1.5. Static gear studies in the Cantabrian Region

To date very few studies on characterisation of the fisheries using the trammel net have been carried out in the Cantabrian Region. Gonzalez *et al.* (1986) described the different artisanal fisheries in the Cantabria province, including general characteristics of the trammel net gears and main target species. More recently, Puente (1990 and 1993) studied in detail the different fishing *métiers* practised using this fishing gear in the Basque Country (fishing gears, fishing seasons, target species,...). However, the current study is the first concerning the selectivity of trammel nets in the waters of the Cantabrian.

## **1.6. Static gear studies in the Algarve**

In the Algarve, gillnet studies have been carried out by Martins et al. (1992), Santos and Monteiro (1995), Santos (1997) and Erzini et al. (2000). Martins et al. (1992) fished 20, 30 and 40 mm monofilament gill nets in 50 fishing trials carried out from April 1990 to November 1991 throughout the Algarve at depths from 12 to 49 m. This study was continued by Santos and Monteiro (1995) with 43 more fishing trials that ended in August 1993. Two more mesh sizes (25 and 35 mm) were added for purposes of estimation of selectivity curves. Santos (1997) used 20, 25, 30, 35 and 40 mm nominal bar length mesh monofilament gill nets to monitor the fish communities of artificial reefs in the Algarve from October 1990 to June 1995. Erzini et al. (2000) used four mesh sizes of 25, 30, 35, and 40 mm nominal bar length in 1997-1998. The latter study also included experimental fishing trials with longlines and had as the primary objective the comparative selectivity of the two gears.

A number of longline métiers have also been studied in the Algarve (Erzini et al. 1996, 1998, 2001). These include small hook longlines for inshore ‘white’ sea breams (Erzini et al. 1996), small hook longlines for deeper water ‘red’ sea breams (Erzini et al. 1998) and the semi-pelagic longline for *Merluccius merluccius* (Erzini et al. 2001). The only other study involving longlines in the Algarve was that of Santos (1997) who used this gear to monitor artificial reef communities.

To date no studies of trammel nets have been carried out in Algarve waters. Given the importance of this gear in the artisanal/small scale fisheries, and the general lack of information on different trammel net métiers, trammel net métiers fishing effort, landings, size selectivity and discards, it was decided to focus on this fishing gear in the current project.

## **1.7. Static gear studies in the Gulf of Cádiz**

Although there are published works describing these fisheries and the fishing techniques and gear used (Martínez de Mora 1779, Marín and Cuvillos 1806, Mirabent and Soler 1850, Muñoz 1972, Anón. 1991, 1994, Baro *et al.* 1993, Sobrino *et al.* 1994), the biology of the various species of fishery interest (Massutí 1959, Rodríguez 1977, Sardá *et al.* 1981, Fernández *et al.* 1984, Sobrino *et al.* 1998, Soriguer *et al.* 2000, Bravo *et al.* 2000, among others) and cartography of the fishing grounds worked by the trawler fleet in the Gulf of Cádiz (Sobrino *et al.* 1996), there are very few studies on the selectivity of the types of gear used, and to date, there has been no study of trammel net fishing in these grounds.

Studies have been carried out on the selectivity of trawling gear in prawn fisheries (Sobrino I. et al, 1999), the effects of a change of mesh size and fishing effort in multi-specific fisheries in Atlantic waters of the Iberian Peninsula (Trujillo *et al.*, 1993) and there is currently a study in progress of the selectivity of vertical longlines for catching *Pagellus bogaraveo* in Tarifa (Cádiz) (Hernando *et al.*, 2001, in preparation). Only one previous study has been conducted (Zuñiga, 1966) on the selectivity of the trammel net for *Mullus barbatus* in the Mediterranean zone of Castellón (Spain).

### **1.8. Static gear studies in the Cyclades**

Despite the major socio-economic importance of the small-scale fisheries in Hellas, many aspects have not been comprehensively studied. Thus, there are few thorough studies dealing with the major features of the artisanal fisheries in Hellenic waters (i.e., catch statistics for all small-scale gears combined: Stergiou et al., 1989, 1997a; Stergiou and Petrakis, 1993; catch species composition for some fixed gear: Kyrtatos, 1982; Papaconstantinou et al., 1988; Stergiou et al., 1996; Erzini et al., 1999; gill net selectivity for few main species: Petrakis and Stergiou, 1995, 1996; Erzini et al., 1999; competition in terms of species between gill nets, trammel nets and beach seines: Stergiou et al., 1996; competition in terms of species between gill nets of different mesh sizes and longlines of different hook sizes: Erzini et al., 1999; size selectivity for longlines: Erzini et al., 1999). In particular, there are very few studies concerning various aspects of the trammel net fisheries (i.e., catch species composition of the 60 mm, stretched mesh, trammel net in Kastellorizo waters: Papaconstantinou et al., 1988; catch species composition and overlap of the 38, 48 and 60 mm, stretched mesh, trammel nets in South Evvoikos Gulf: Stergiou et al., 1996) whereas there is a lack of information on size selectivity of trammel nets in Hellenic waters. It is noteworthy that the analysis of available data concerning catch species compositions and length frequencies for a variety of gears in Cyclades and Hellenic waters in general (Stergiou unpublished data), clearly indicate that trammel nets highly compete for the same resources with gears such as trawls, purse seines, beach seines, gill nets and longlines. This has inevitably important socio-economic consequences for the local communities.

## 1.9. Objectives

Trammel nets are a widely used fixed gear in European waters, consisting of three walls of netting, with a loosely hung, small mesh inner net between larger mesh netting. Hanging ratios for the inner net are typically between 0.3 and 0.5, with net height up to 2 times that of the larger mesh outer nets which have greater hanging ratios (from 0.5 to 0.7). Trammel nets are used to catch a variety of demersal species such as soles, sea breams, red mullets, skates, and cuttlefish.

Fish are caught in trammel nets either by gilling/wedging in the smaller mesh inner net, and/or by tangling in the pocket formed when the smaller mesh inner net is pushed through the a mesh of the larger mesh outer net. Consequently, for a given species, depending on the size ranges and the proportions retained by each of the principle capture mechanisms, selectivity curves will either resemble those of gill nets (unimodal), or may be skewed to the right or even bi-modal in the case where smaller individuals are gilled or wedged, while larger fish are tangled.

While mesh size, hanging ratio and netting material are the primary factors affecting catch rates and selectivity of gill nets, trammel net selectivity is also affected and confounded by the amount of vertical slack in the inner and outer nets, as well as the characteristics of the two types of nets used.

Compared to gill nets, trammel net selectivity is relatively poorly studied. Some studies have reported little evidence of size selectivity, especially when the main capture mechanism is by entanglement. In the case of relatively small species which are caught by wedging or gilling in the inner small mesh net, differences in catch size frequency distributions have been found for a range in inner wall mesh sizes.

In comparison with other fixed or static gears, relatively little is known of the species and size selectivity of trammel nets and of their impact on living resources. Thus, these studies will contribute new and important information for the management of multi-species small-scale fisheries. The proposed research is a natural continuation of a series of studies in Portugal, Spain and Greece on fixed gears used in small-scale coastal fisheries.

The objective of this project was to study trammel net gear used in the small-scale fisheries in southern Portugal (Algarve), northern Spain (Basque Country), southern Spain (Gulf of Cádiz), and Greece (Cyclades Islands).

The specific objectives are as follows:

- to survey and characterise the different trammel net métiers

- to evaluate size selectivity of the main trammel net métier in each area
- to quantify catch composition and catch rates
- to evaluate seasonal changes in catch composition and catch rates
- to analyse depth and area related changes in catch composition and catch rates
- to study by-catches and discards of trammel net gear

## 2. MATERIAL AND METHODS

### 2.1. Survey and characterisation of trammel net métiers

#### 2.1.1. Basque Country

A survey of the gillnet fishing *métiers* practised in the northern waters of Spain has been carried out in the main fishing ports of the Cantabrian Region (645 artisanal vessels in all) representing over 500 km of the north coast of Spain (see Figure 1).

The population chosen for the survey is made up of the traditional gillnet fishing fleet skippers of the Cantabrian region. The survey has been done by means of a personal interview with each of the skippers selected after sampling. Table 1 in Annex I shows the enquiry form used during the survey.

Random sampling is the method used for the survey, stratified by fishing ports and vessel categories. Previous knowledge of the gillnet fishing fleet activity typology led to the establishment of two vessel categories in relation to the Gross Register Tonnage (G.R.T.): a) vessels under 10 G.R.T.; b) vessels with tonnage equal to or over 10 G.R.T. In all, 17 ports were visited and 89 skippers interviewed (13,8% of the total number of small scale fisheries skippers).

Each gillnet fishing *métier* has been defined as the fishing activity of a particular fishing gear targeting a main fish species during a period of time of the year. Other complementary characteristics of this fishing *métier* definition include the fishing season, the type and depth of bottom, as well as the soak time.

As not all the vessels of the gillnet fleet practise all the fishing *métiers* identified nor the duration of the fishing season is the same among *métiers*, the relative importance of the different fishing *métiers* was determined using two criteria:

- . Number of vessels practising each fishing *métier*

- . Fishing effort: bearing in mind it is not possible to determine with precision the amount of fishing gear the vessels use, the fishing effort expended by a given *métier* has been estimated roughly as the product of the number of vessels fishing with it by the number of months that lasts its fishing season throughout the year (both factors deduced from the survey). Bearing in mind that the fishing effort (number of nets deployed) is related to the vessel size, the effort of the vessels of more than 10 GRT was weighted with a multiplier of the same estimated also roughly in two (the multiplier factor (x 2) derives from the fact that, considering the number of nets used by a vessel is more or less directly related to size of its

crew, those vessels below 10 GRT usually have a crew of 2-3 seamen, whereas that of those vessels of over 10 GRT is usually in the region of 4 to 5 men).

In order to determine the technical characteristics of the trammel nets used by the artisanal fleet, a survey on fishing gear features has been carried out at the same time that the fishermen survey. Table 1 in Annex II shows an example of measurements taken on commercial trammel nets as well as the results obtained from these data in order to define the fishing gears types.

### 2.1.2. Algarve

A survey of the trammel net metiers of the Algarve was carried out in 10 ports (Table 2.1.2.1). Trammel net metiers were defined in terms of the fishing activity of a particular fishing gear targeting a species or group of species during a specific period of time of the year.

Our goal was to sample at least 10% of the boats stratified by port and fleet. The distribution of the licences by port and fleet is given in Table 2.1.2.1. The distribution of the number of interviews to be carried out by fleet and port on the basis of a 10% coverage is also given in Table 2.1.2.1. The questionnaire used in the interviews is given in Annex I, Table1.

**Table 2.1.2.1. Stratification of the interviews by port and fleet**

Fishing Port	Fleet		Surveys (10%)	
	Coastal	Local	Coastal	Local
VRSA	18	128	2	13
Tavira	22	25	2	3
Fuzeta	5	15	1	2
Olhao	20	77	2	8
Faro	11	53	1	5
Quarteira	18	85	2	8
Albufeira	2	29	0	3
Portimao	19	56	2	6
Lagos	20	28	2	3
Sagres	15	47	2	5
Total	150	543	16	56

### 2.1.3. Gulf of Cádiz

A survey on the trammel net fishing *métiers* practised in the Gulf of Cadiz has been carried out in thirteen fishing ports: six in the province of Huelva and seven in the province of Cadiz (Figure 2.1.3.1). Trammel net *métiers* were defined in terms of the fishing activity of a particular fishing gear targeting a main species during a specified period of time in the year. Other complementary information gathered on these fishing *métiers* includes the bottom type, soak time and fishing depth.

For the accurate definition of the various different *métiers*, interviews were conducted with trammel fishermen and net-makers at the various ports, in collaboration with the Masters of the various “cofradías” or occupational associations of fishermen. The following information was recorded during the interviews: boat length and engine horsepower, inner/outer panel mesh size, main target species, length and height of nets, time period of year and times of setting and retrieval of nets.

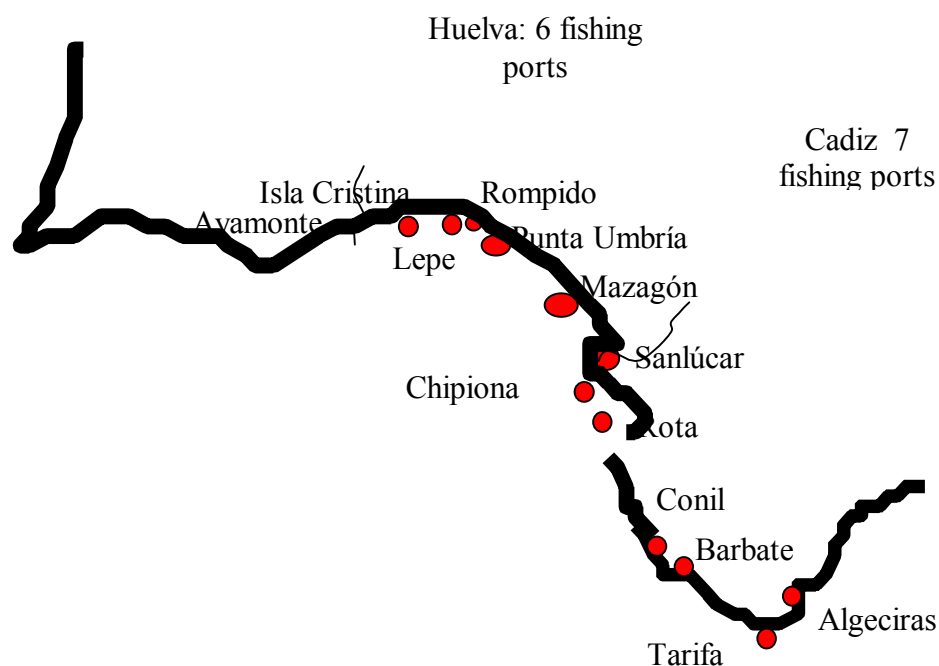


Figure 2.1.3.1: Gulf of Cadiz: Location of thirteen fishing ports in the Gulf of Cadiz

### 2.1.4. Cyclades

A survey on the trammel net fishing *metiers* practised in the Cyclades waters was

carried out in six fishing ports of five Cyclades islands (i.e., Siros, Paros, Naxos, Koufonisia and Amorgos Islands: see Figure 2.2.4.1 in section 2.2.4). Trammel net *métiers* were defined as the fishing activity of a particular fishing gear targeting a main species during a particular period of time of the year. Other complementary characteristics of such a fishing *métier* definition include the bottom type, fishing depth and soak time.

As mentioned in the introduction, officially the small-scale fleet in Cyclades involves 225 boats of which 47 boats use trammel and gill nets as the main gear and 161 boats as a secondary fishing gear (data from the Department of Fisheries, Prefecture of Cyclades). For the purposes of the present study, 37 skippers of small-scale boats, using trammel nets, were interviewed (contact information was obtained from the Department of Fisheries). The following information was recorded during the interviews: (a) boat length and engine horsepower; (b) inner/outer panel mesh sizes; (c) main target species; (d) length and height of nets; (e) time period of year; and (f) time of setting and retrieval of nets.

## **2.2. Experimental fishing and sampling**

### **2.2.1. Basque Country**

The selection of the trammel net fishing *métier* to be considered as a case study in this project was based on the size of the fleet involved in the fishing activity and with the estimated fishing effort deployed.

The results of the survey for characterising the fishing activity with trammel nets (see section 3.1.1) showed that the *métier* targeting sole is the most important one in the Cantabrian Region, both in terms of number of boats practising this particular *métier* as well as the estimated fishing effort deployed during the year. Most of the activity in this particular fishing *métier* takes place during winter and spring but some vessels still continue to fish sole during the rest of the year.

Based on all the available information, it was decided to choose the trammel net *métier* targeting sole for studying the selectivity of the fishing gear. Moreover, a seasonal plan of fishing trials was established in order to assess a seasonal effect on the selectivity of the fishing gear.

The survey carried out to determine the main technical features of the different trammel net gears in the Cantabrian Region permitted the determination of the most common technical characteristics of the trammel nets used to catch sole. One of the trammel net types

under the category locally called “miño”, the type A, is the most widely used gear in Cantabrian fisheries because of its good compromise between catch efficiency and ease to maintain (see paragraph 3.1.1 and Table 2). It is the one selected as a reference for designing the experimental fishing gears to be used for the fishing trials.

The study of gillnet selectivity by indirect methods involves comparative fishing trials with fishing gears of different mesh sizes (Hamley, 1975). Thus, a set of 6 different trammel nets types were mounted by combining two mesh sizes in the outer panel with three mesh sizes in the inner panel. Iterative calculations of horizontal hanging ratio and height of the mounted nets were performed with a spread sheet to ensure that the modification of these parameters due to the change in mesh size of the panels were as slight as possible among experimental trammel nets types. The aim was to minimise the variability of the shape of the mesh and the height of the trammel nets among experimental trammel types to reduce an eventual effect of those parameters on the selectivity process.

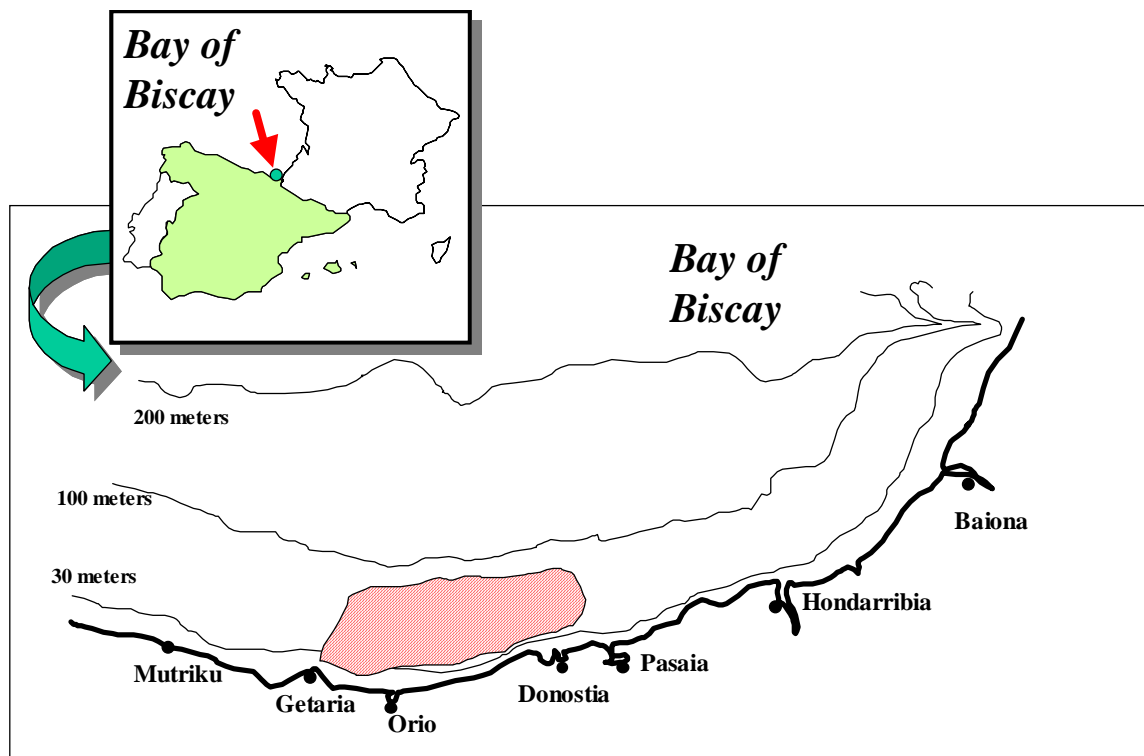
The combination of different mesh sizes in the inner and outer netting panels of the experimental trammel nets have some constrictions on the mounting process of the nets. Thus some slight differences between the gear parameters of the six experimental trammel nets types were obtained (Table 2.2.1.1.). The range of variation of the main gear parameters among the experimental trammel types are as follows:

- the horizontal hanging ratio varies between 0.39 and 0.45 in the inner panel and between 0.50 and 0.52 in the outer panel;
- the calculated height of the mounted trammel nets varies between 1.82 and 1.95 metres.

**Table 2.2.1.1. Main fishing gear characteristics of the six experimental trammel net types used during the fishing trials. Notes: <sup>1)</sup> The hanging ratio in the headline and the footrope are equal.**

Type	Twine type		Twine colour		Mesh size (mm)		Mesh depth		Hanging ratio <sup>1)</sup>		Height (meters)	Length (meters)	Number of nets
	Inner	outer	inner	outer	inner	outer	inner	outer	inner	outer			
3	Mono	Mono	Green	Green	90	500	40	4,5	0.41	0.52	1.92	82,6	12
4	"	"	"	"	90	600	40	3,5	0.42	0.50	1.82	83,4	12
1	"	"	"	"	100	500	33	4,5	0.42	0.50	1.95	83,4	12
2	"	"	"	"	100	600	33	3,5	0.43	0.50	1.82	85,8	12
5	"	"	"	"	110	500	33	4,5	0.39	0.52	1.92	79,8	12
6	"	"	"	"	110	600	33	3,5	0.45	0.50	1.82	91,0	12

A total of 12 daily fishing trials were carried out by season over the year 2000 (48 fishing days in all). A commercial fishing boat was hired for the fishing trials (“Padilla Anaiak”; 11 metres overall length) and all the fishing operations were carried out by professional fishermen. Most of the fishing trials took place in shallow waters close to the coast of the Basque Region in the north of Spain (Figure 2.2.1.1).



**Figure 2.2.1.1. Geographic location of the fishing grounds (shaded area) in which experimental fishing trials were carried out.**

In order to minimise bias due to the different composition of the fleets and their different location in the fishing grounds all the fleets were composed of the same amount of panels of the different trammel types: 3 panels of each of the 6 types (18 panels in total). On each fleet, all the trammel nets types were distributed in a random order. Moreover, to minimise the “leading effect” of fishes among nets of different mesh size a “window” (no netting between panels) of at least 1 fathom (1.8 metres) was used between each two nets tied together.

Four fleets were set on each fishing day (72 panels; around 6 kilometres of nets) except for a few days in which only three fleets were set due to bad weather conditions. In contrast, during the summer time, the good weather conditions allowed the use of one extra-fleet with the same composition in number and type of panels in order to increase the amount

of catch data.

The setting time of the nets was 24 hours for most of the fishing days. The soak time was longer than 24 hours in a few of the fishing trials due to bad weather conditions that prevented hauling the nets at the right time. In these cases the nets were hauled after a period of around 48 hours.

The data collected during the retrieval of the nets were the following:

- fleet number
- trammel net type
- species caught
- way in which the fish is caught: wedged in a) the mouth, b) gills/opercula or c) the body –close to the maximum girth part-, d) entangled (the net twine is caught in some part of the body).
- total length
- species retained or discarded

### **2.2.2. Algarve**

Following identification of the main trammel net *métiers* in the Algarve region and the evaluation of their relative importance in terms of the number of vessels involved in the fishing activity and the fishing effort (section 3.1.2), it was decided to carry out this study using the type of monofilament trammel nets used by the “coastal” category boats to target cuttlefish/sole and assorted demersal fin-fish. The trammel nets for selectivity studies were constructed by a commercial enterprise and by the fishermen according to design specifications appropriate for the selected *métier*. These characteristics were similar to those used by local fishermen (i.e. in terms of hanging ratios, number of meshes deep, floats). To avoid possible effects of differential net construction on species and size selectivity, all nets have the same construction and hanging ratio.

The experimental nets consisted of two larger mesh outer panels (600 and 800 mm stretched mesh) and three smaller mesh inner panels (100, 120, 140 mm stretched mesh). Thus experimental nets consisted of 6 different combinations. The main characteristics of the six experimental trammel net types are given in Table 2.2.2.1. The combination of different mesh sizes in the inner and outer netting panels of the experimental trammel nets resulted in some constrictions on the mounting process of the nets. Thus some small differences between

the gear parameters of the six experimental nets were obtained (Table 2.2.2.1).

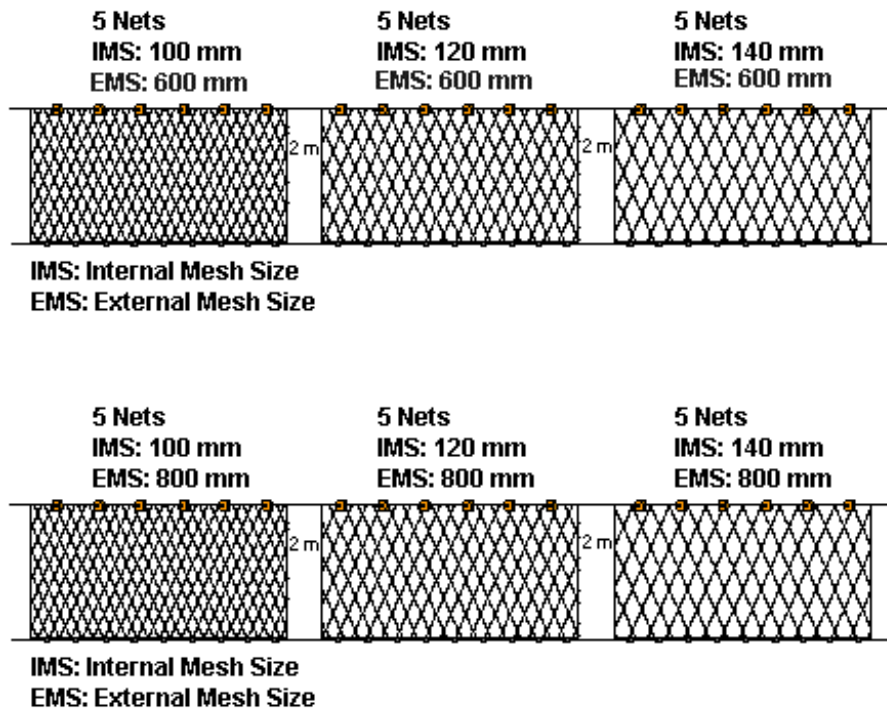
**Table 2.2.2.1. Algarve. Main fishing characteristics of the six experimental trammel net types used during the fishing trials. Notes: 1) The hanging ratio in the headline and the footrope are equal.**

Type	Twine type		Twine colour		Mesh size (mm)		Meshes depth		Hanging ratio <sup>1)</sup>		Height (meters)	Length (meters)	Number of nets
	inner	outer	inner	outer	inner	outer	inner	outer	inner	outer			
1	Mono	Mono	Green	Green	100	600	50	4	0.493	0.411	2.4	49.3	25
2	"	"	"	"	100	800	50	3	0.493	0.308	2.4	49.3	25
3	"	"	"	"	120	600	50	4.5	0.494	0.494	2.7	59.3	25
4	"	"	"	"	120	800	50	4	0.494	0.371	3.2	59.3	25
5	"	"	"	"	140	600	40	5.5	0.481	0.561	3.3	67.3	25
6	"	"	"	"	140	800	40	4	0.481	0.421	3.2	67.3	25

Each combination was composed of 5 nets with equal mesh size for each panel (Figure 2.2.2.1). Overall 5 groups of these combinations were used giving a total of 150 nets. The 6 distinct combinations were joined together by a footrope, leaving a 2 m gap between them so that fish are not led from one combination to the adjacent combination, thereby introducing error. A total of 8900 m composed by 2500, 3000, 3400 m of each inner mesh size (100, 120 and 140, respectively) were used in Portugal.

Hanging ratios were calculated according to FAO (1978 *in* Sparre and Venema, 1992) formula: length of the head rope / (number of meshes) × (mesh size). For 100, 120 and 140 mm inner panel mesh sizes, the calculated values were 0.5, 0.5 and 0.48, respectively.

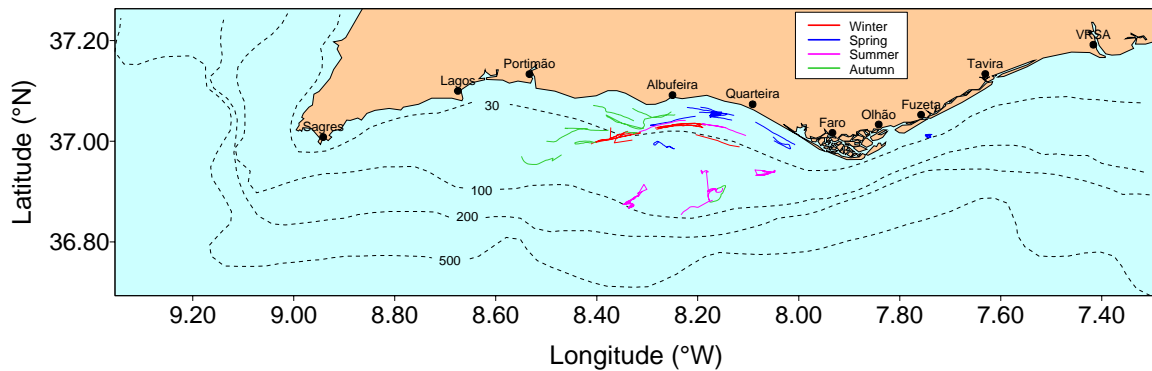
Normal fishing practices were followed, with the setting of the gear taking place in the afternoon or evening before sunset and hauling taking place after sunrise. Since hauling usually took all morning and part of the afternoon, setting of the nets also occurred after finishing hauling. The soak time was calculated as the time in minutes elapsed between the time of setting the nets (average between the beginning and the end of the operation) and the time of hauling them (average between the beginning and the end of the operation).



**Figure 2.2.2.1 Algarve. Experimental trammel nets design.**

Two to four members of the research group accompanied the fishermen in order to separate, identify and measure the catches coming on board. The position of each of set was recorded with a GPS (Figure 2.2.2.2). The catch was sorted according to the mentioned 6 combinations of inner/outer net panels. All fish, crustaceans and molluscs were measured (total length, disc width or mantle length) to the nearest mm. The catches were classified according to value: “Commercial”, “Discard” and “Self-consumption”. The way in which each fish, crustacean or mollusc was caught was recorded: a) gilled, b) wedged and c) tangled.

Experimental fishing trials were carried out on a seasonal basis, with 10 fishing trials per season with 25 nets of each of the six combinations of inner and outer panels. Fishing took place in the same general area in Algarve waters (Figure 2.2.2.2).



**Figure 2.2.2.2. Algarve. Map of the location of the fishing grounds and of the trammel net sets by season.**

### 2.2.3. Gulf of Cádiz

Having identified the principal *métiers* used in the Gulf of Cádiz, it was decided to carry out a study of the *métiers* dedicated to the fishing of cuttlefish and flat fishes, since these activities use the same type of net. The study of the *métiers* used for prawns and red mullet requires the manufacture of other types of experimental net and the fishing periods coincide, therefore this must be undertaken in subsequent projects.

The experimental nets used for this study were produced by an expert net-maker of the municipality of Lepe (Huelva), who used for the purpose commercial materials usually employed and traditional production techniques, following the technical specifications set out in Table 2.2.3.1.

The experimental nets were assembled combining two types of outer panel of 300 mm and 400 mm mesh size, respectively, with three types of inner panel of 80 mm, 90 mm and 100 mm, respectively. Thus six different possible combinations are obtained. A total of 120 trammel nets were produced, 20 of each combination (Table 2.2.3.1). The parameters of the nets were calculated so that the six combinations should have approximately the same length and height per panel. In this way, once the panels were joined together, a structure that would be stable in the water was obtained, while at the same time facilitating the calculation and the interpretation of the results.

**Table 2.2.3.1. Gulf of Cadiz: Main fishing gear characteristics of the six experimental trammel net types used during the fishing trials. (\* = monofilament)**

		300			400		
		80 mm	90 mm	100 mm	80 mm	90 mm	100 mm
<b>PANEL</b>							
<b>Inner</b>	Material	PA*	PA*	PA*	PA*	PA*	PA*
	Thickness(mm)	0.3	0.3	0.3	0.3	0.3	0.3
	Mesh number	30	25	20	30	25	20
<b>Outer</b>	Material	PA*	PA*	PA*	PA*	PA*	PA*
	Thickness(mm)	0.6	0.6	0.6	0.6	0.6	0.6
	Mesh number	3.5	3.5	3.5	2.5	2.5	2.5
<b>LINES</b>							
<b>Headline</b>	Type	Cord	Cord	Cord	Cord	Cord	Cord
	Material	PE	PE	PE	PE	PE	PE
	Diameter (mm)	6	6	6	6	6	6
	Frame length (cm)	15	15	15	20	20	20
	n°mesh inner/frame	4	4	4	6	4	5
	n°mesh outer/frame	1	1	1	1	1	1
<b>Footrope.</b>	Type	Cord	Cord	Cord	Cord	Cord	Cord
	Material	PE	PE	PE	PE	PE	PE
	Diameter (mm)	6	6	6	8	8	8
	Ballast (Kg/100 m)	15	15	15	14	14	14
	Frame length (cm)	4	4	4	21	21	21
	n°mesh inner/frame	1	1	1	6	5	5
	n°mesh outer/frame	1	1	1	1	1	1

(To be concluded in next page)

**Table 2.2.3.1. Concluded.**

<b>FLOAT</b>							
Type		Donut	Donut	Donut	Donut	Donut	Donut
Floatability (gf)		28	28	28	28	15	28
n° of frames/float		8	8	8	6	3	6
<b>NET</b>							
Floatability (Kgf/100 m)		2.3	2.3	2.3	2.3	2.5	2.3
	Ballast (Kg/100 m)	14	14	14	14	14	14
Inn.	L (m)	48.44	43.06	38.75	42.71	51.11	41.00
	H (m)	2.10	2.03	1.84	2.17	1.85	1.82
Out	L (m)	51.7	51.7	51.7	51.3	51.3	51.3
	H (m)	0.90	0.90	0.90	0.86	0.86	0.86
<b>Outer panel/Inner panel</b>		0.43	0.44	0.49	0.40	0.46	0.47
			INNER	PANEL		INNER	PANEL
		Headline	Headline	Headline	Headline	Headline	Headline
	Hanging Ratio	0.47	0.42	0.38	0.42	0.56	0.40
		Footrope	Footrope	Footrope	Footrope	Footrope	Footrope
	Hanging Ratio	0.50	0.44	0.40	0.44	0.47	0.42
			OUTER	PANEL		OUTER	PANEL
		Headline	Headline	Headline	Headline	Headline	Headline
	Hanging Ratio	0.50	0.50	0.50	0.50	0.50	0.50
		Footrope	Footrope	Footrope	Footrope	Footrope	Footrope
	Hanging Ratio	0.53	0.53	0.53	0.53	0.53	0.53

Fishing was carried out with 10 trammel nets of each mesh size and each type of net, i.e. using a total of 60 panels, the remainder being held in reserve in case of damage, theft or loss of the nets in use. Each panel has an approximate length of 50 m, hence on each sampling occasion, fishing was carried out with approximately 3000 m of net.

For ease of handling, these nets were divided into two separate fleets, one with nets of a mesh size of 400mm and the other with nets of 300mm mesh, although 5 panels of the larger mesh size had to be added to the run of those of the smaller mesh size, to avoid having in the water an excessive length of nets of the larger mesh.

The panels were joined together with headline rope, leaving a separation between them

of 1 m to avoid catching fish from the adjacent panels, thus reducing the degree of error in the selectivity of the different nets.

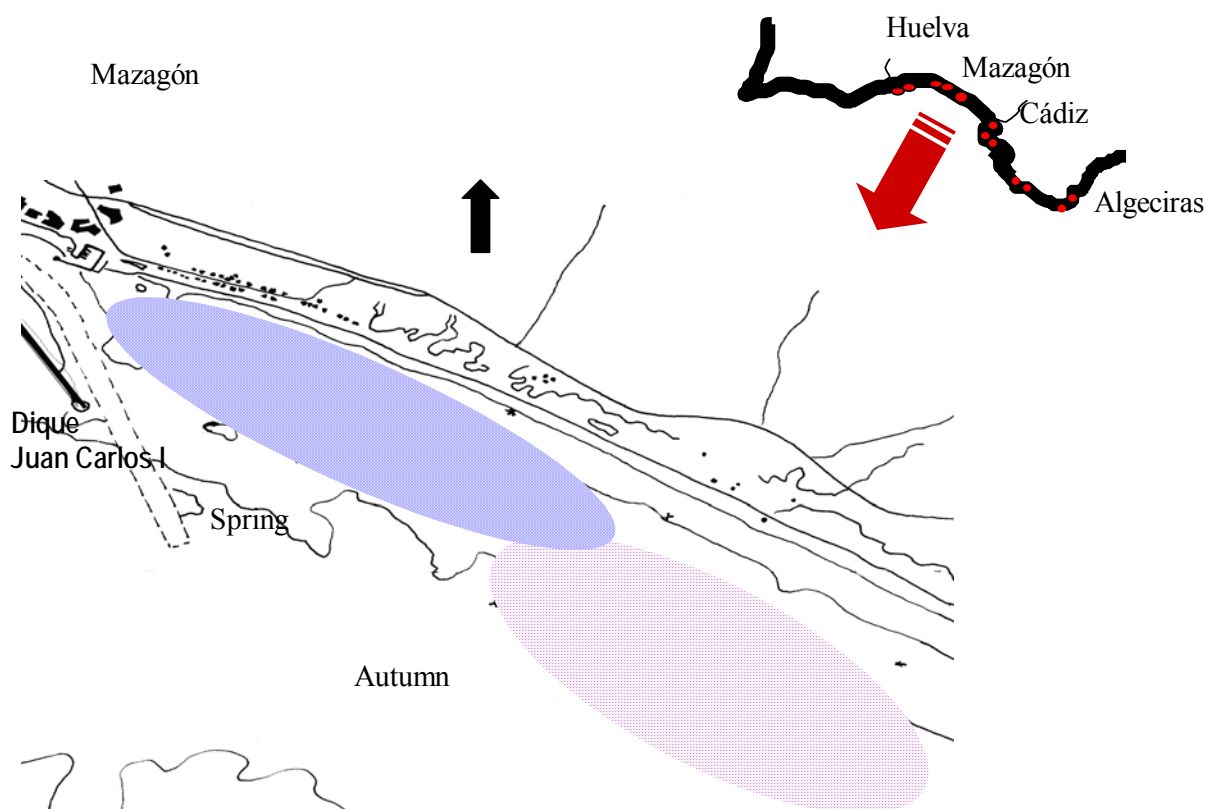
At each end of the run there are grapnels of 25kg each, and a buoy fitted with a locating flag. The grapnels grip into the seabed, and serve the two purposes of firstly, preventing movement of the gear by wave action, groundswell, wind or coastal drift, and secondly, of facilitating the extension of the gear vertically in the water column.

The samplings were carried out in a professional fishing vessels with the typical technical characteristics of the trammel fleet of the zone (boat length 6.5 m, powered by an inboard motor of 75 HP, with GPS, radio and a system of hydraulic pulleys to raise the net, a crew of two members, and two or three members of the research group). A total of 60 samplings were performed, spread over two fishing campaigns, 30 samplings in each. In the first campaign the target species was *Sepia officinalis*, and in the second, flat fish.

The fishing grounds were selected by the master of the boat, in traditional areas in order to ensure the highest possible catches and to fish according to the methodology as similar as possible to the traditional fishing activities with which the experimental nets had to be compared (Figure 2.1.3.2: Gulf of Cadiz). Normal fishing practices were followed, the gears were cast before sunrise between 4.00 – 4.30 (solar time) and hauled in between 9.00 – 9.30 (solar time). The fishing area was situated 10 nautical miles distant from the port, located by means of GPS and coastal bearings. When the net was hauled in, each specimen of the catch was labelled with a unique number which was recorded using a microcassette recorder, together with the type of net, position of catch, and category of netting (wedged, entangled or gilled). Using portable monitors, measurements were taken of the pH, salinity, water temperature (°C), concentration of dissolved oxygen (mg/l) and percentage of oxygen saturation in the surface of the water. At the meteorological station closest to the fishing area, measurements were obtained of the direction, average and maximum speed of wind; of the external temperature of breeze and spray; of the barometric pressure; and of the relative humidity, during the entire period of fishing.

All the specimens caught were transported in isothermal containers to the laboratory, where they were measured (total, fork and standard length in fishes, length to 1st and 2nd disc in bathoids, length of mantle in cuttlefish and squid, length of the cephalic region in prawns and crabs) and weighed. In the fish, the scales from the base of the insertion of the right pectoral fin were extracted to determine age. Lengths were measured using an ichthyometer to 1 mm accuracy, the weights using portable scales to 0.5g accuracy, and the cephalic region of prawns and crabs using electronic callipers to 0.0001cm accuracy.

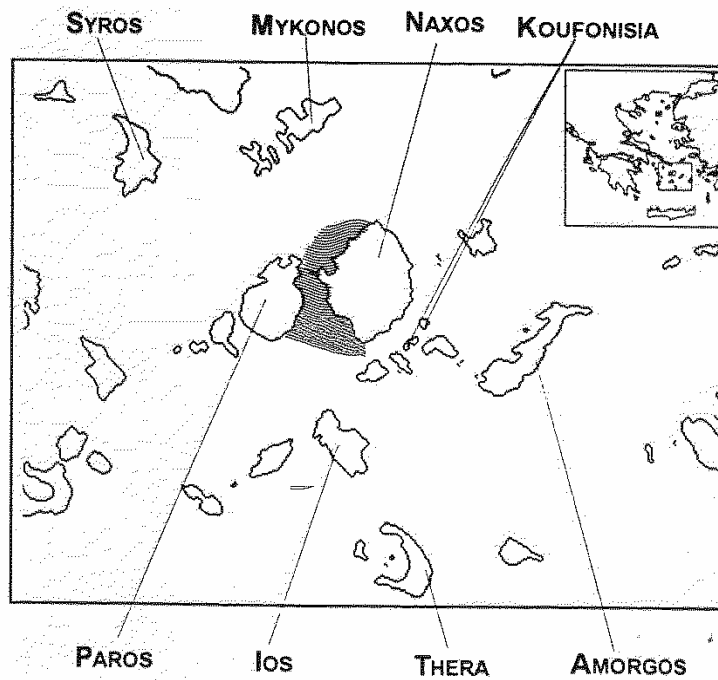
All fish, crustaceans and molluscs were classified according to value, as follows: "Commercial", "Discard", "Self-Consumption", "Discard or Self-Consumption" (species for either consumption or discarding, depending on their size) and "Other uses".



**Figure 2.1.3.2: Gulf of Cadiz. Location of fishing areas in the Gulf of Cadiz**

#### **2.2.4. Cyclades**

Experimental fishing was conducted in the Cyclades (in the waters off Naxos Island, Aegean Sea, Hellas; Figure 2.2.4.1) in 1999-2000 using trammel nets of different inner/outer panel mesh size combinations.



**Figure 2.2.4.1. Cyclades. The sampling area.**

The selection of the trammel net fishing *métier* to be studied in the present project was based on the results of the interview surveys (see section 3.1.4), which showed that the trammel net metier (40/220 mm inner/outer panel stretched mesh sizes) targeting *Mullus surmuletus*, and to a lesser extent *Boops boops*, is very important in the Cyclades region, with its activity extending throughout the year and with the nets set one to three hours either before sunrise or sunset and retrieved one to two hours after sunrise or sunset, respectively. Thus, the 40 mm inner mesh size trammel net was selected for the study of selectivity. Since the study of selectivity by indirect methods involves comparative fishing trials with gears differing in mesh sizes (Hamley, 1975), a set of six different trammel nets types was mounted by combining two outer panel mesh sizes with three mesh sizes in the inner panel. Thus, the following types of trammel nets were mounted by a local fisher: (a) 40/220, 48/240 and 56/280 mm, stretched, inner/outer panel mesh sizes, as normally mounted in the local trammel net fisheries; and (b) three trammel nets of inner panel mesh sizes similar to those mentioned above having outer panel mesh sizes larger by 20 mm, 40/240, 48/260 and 56/300 mm of stretched inner/outer mesh size (which are not mounted in the local fisheries). The technical characteristics of the mounted nets are shown in Table 2.2.4.1. Iterative calculations with a spreadsheet of horizontal hanging ratio and height of the mounted nets were performed to

ensure that the modification of these parameters because of changes in the mesh size of the panels were as slight as possible among experimental trammel nets types. The aim has been to minimise the variability of the shape of the mesh and the height of the trammel nets among types to reduce their effect on selectivity.

**Table 2.2.4.1. Main fishing gear characteristics of the six experimental trammel net types used during the fishing trials. Notes: 1) The hanging ratio in the headline and the footrope are equal.**

Type	Twine type		Twine colour		Mesh size (mm)		Meshes depth		Hanging ratio <sup>1)</sup>		Height (meters)	Length (meters)	Number of nets
	Inner	outer	inner	outer	inner	outer	inner	outer	inner	outer			
1	Mono	Mono	Yellow	Yellow	40	220	60	13			-	150	5
2	"	"	"	"	48	240	75	9			-	150	5
3	"	"	"	"	56	280	60	9			-	150	5
4	"	"	"	"	40	240	60	13			-	150	5
5	"	"	"	"	48	260	60	9			-	150	5
6	"	"	"	"	56	300	60	9			-	150	5

Sampling took place seasonally at different fishing grounds with a chartered commercial small-scale fishing vessel (boat length 8.5 m; engine horsepower 63 HP), at depths ranging from 10 to 81 m. Fishing started in October 1999 and ended in September 2000. Fishing trials were conducted using fleets of 750 m for each inner/outer mesh size combination, each composed of 5 panels of 150 m each. Extra net panels for each of the above-mentioned combinations were also mounted for replacing nets damaged by dolphins, which abound in the study area. Overall, 41 successful experimental fishing trials were conducted at different depth ranges. The number of fishing trials conducted in autumn 1999 and winter 2000, 8 and 7 respectively, was smaller than that in spring and summer 2000, 11 and 15 respectively, because of extremely adverse weather conditions.

The fishing grounds were selected by the local fisher in traditional fishing areas in order to ensure the highest possible catches. Normal fishing practices were followed, with the gears fished one to three hours either before sunrise or sunset and retrieved one to two hours after sunrise or sunset, respectively. One to three members of the research groups accompanied the crew in order to separate the catches coming on board and record all the required information.

During hauling, the way each fish was caught was recorded (i.e., entangled, wedged and gilled) whereas after hauling the catch was removed and separated by inner/outer panel mesh size combination. The number of specimens and the total weight per species were recorded. Consequently, individual fish were measured (total length, TL, fork length, FL, and standard length, SL; all to the nearest mm) and weighed (gross wet weight, W; to the nearest g). In addition, the body girth (G) of fish (a) across the vertical eye diameter (G1), (b) behind the gill-cover (G2), and (c) in front of the first dorsal fin (G3) was measured to the nearest mm, for a subsample of individuals.

### 2.3. Size selectivity

In general, there are two main experimental methods for the estimation of selectivity parameters: (a) the indirect method, in which selectivity parameters are estimated from catches taken by gears of slightly different sizes; and (b) the direct method, in which the estimation of selectivity parameters is based on the proportions of fish caught from different size classes of a population with known length frequency distribution (e.g. fishing with an unselective gear) (Sparre et al., 1989). The latter method is rarely used due to the difficulty in obtaining data on the size structure of the population. In contrast, there are various methods for calculating indirect selectivity of gill nets and hooks, recently reviewed by Holst and Moth-Poulsen (1995), Holst et al. (*In press*), and Millar and Fryer (1999).

While there is a general consensus on the form of selection curves for gill nets, the same is not true for trammel nets. In the present study, trammel net selectivity parameters were estimated using the generalised extension of the SELECT method of Millar (1992a) implemented in the GILLNET (**G**eneralised **I**ncluding **L**og-**L**inear **N** **E**stimation **T**echnique) software (ConStat, 1998, Holst et al., *In press*). In addition, the indirect method proposed by Wulff (1896) and Kirkwood and Walker (1986) was used to fit the logistic model. The methods are outlined below.

The general SELECT model (Millar and Fryer 1999) assumes that  $n_{lj}$ , the number of fish of length  $l$  caught in mesh size  $j$  has a Poisson distribution. Three processes determine each  $n_{lj}$ : (a)  $\lambda_l$ : the abundance of length  $l$  fish contacting the combined gear, and is Poisson distributed; (b)  $p_j(l)$ : the relative fishing intensity, which is the probability that a fish of length  $l$  contacts gear  $j$ , given that it has come into contact with the combined gear. Since  $\lambda_l$  is Poisson distributed, the number of length  $l$  fish coming into contact with gear  $j$  is also Poisson

distributed with mean  $p_i(l) \lambda_l$  (Feller, 1968; cited in Millar and Fryer, 1999); (c)  $r_j(l)$  is the contact selection curve for given gear size  $j$ . The  $n_{lj}$  is Poisson distributed with mean  $p_i(l) \lambda_l r_j(l)$ :  $n_{lj} \approx \text{Pois}(p_i(l) \lambda_l r_j(l))$ .

Since  $r_j(l)$  and  $p_i(l)$  can not both be simultaneously estimated from comparative selectivity experiments, assumptions must be made about one or the other. Usually, relative fishing intensities are assumed to be constant and the general model for analysing data from comparative fishing trials with gears of different dimensions is:

$$n_{lj} \approx \text{Pois}(p_j \lambda_l r_j(l)).$$

The log-likelihood of  $n_{lj}$  is

$$\sum_l \sum_j \{n_{lj} \log_e [p_j \lambda_l r_j(l)] - p_j \lambda_l r_j(l)\} .$$

The number of parameters to be estimated is reduced in the SELECT method because proportions of the total catch for each length class and each gear are used ( $y_{lj} = n_{lj}/n_{l+}$ , where  $n_{l+}$  is the total catch for each length class for all gears), thereby eliminating the  $\lambda_l$  parameters (abundance) from the maximisation problem. The proportions have a multinomial distribution with  $n_{l+}$  trials and probabilities:

$$\phi_{lj} = \frac{p_j \lambda_l r_j(l)}{\sum_j p_j \lambda_l r_j(l)} ,$$

where  $j = 1$  to  $J$  (for  $J$  mesh sizes). The log-likelihood for the proportions ( $y_{lj}$ ) is:

$$\sum_l \sum_j n_{lj} \log_e (\phi_{lj}).$$

The software package GILLNET (ConStat, 1998) incorporates a very stable and efficient engine, which uses the first and second derivatives of the log-likelihood function to find its maximum. This ensures a relatively quick estimation of its maximum point. Experience indicates that the algorithm is very robust to the starting values. However, a good starting point may significantly reduce the number of iterations required to reach the maximum point.

The parameters of six selection curves were estimated using GILLNET: Normal location, Normal scale, Log-normal, Gamma, Bi-modal and Gamma semi-Wileman. Further

details of the SELECT and GILLNET methods are provided in a number of publications (Boje et al., 1998, Cadigan and Millar, 1992, Holst et al., *In press*, Huse and Nedreaas, 1995, Millar, 1991a,b, 1992a, b, Millar, *In press*, Millar and Walsh, 1990, 1992, Millar and Holst, 1997, Millar and Fryer, 1999, Xu and Millar, 1993).

Wulff (1986) introduced a flexible model for gear selectivity in which no assumptions are required concerning the efficiency of different mesh or hook sizes. Selectivity curves of different gear sizes are assumed to belong to the same family (e.g. normal, skew-normal, gamma probability distributions) and their similarity can be expressed by the relationship between gear size and parameters of the chosen model. As an example, Wulff (1986) modelled the optimum selectivity, the optimum length at capture, and the standard deviation as linear functions of mesh size in a skew-normal selectivity curve. Wulff (1986) showed that the parameters of the selectivity curve could be estimated by maximising the following objective function:

$$\sum_{l,m} \left[ c_{l,m} \cdot \ln(S_{l,m} / \sum_m S_{l,m}) \right]$$

where  $c_{l,m}$  and  $S_{l,m}$  are the catches and the selectivities for size classes  $l$  and mesh sizes  $m$ . This is the same objective function proposed by Kirkwood and Walker (1986), who modelled gill net selectivity with a gamma distribution, with length at optimal selectivity proportional to mesh size, and with constant variance for all mesh sizes. An alternative approach to maximising the above maximum likelihood is to fit the following model by non-linear least-squares regression (Erzini and Castro, 1998):

$$c_{l,m} = \left( \sum_m c_{l,m} / \sum_m S_{l,m} \right) \cdot S_{l,m}$$

In this model, the independent variables are  $\sum_m c_{l,m}$ , mesh or hook size, and the midpoint of the size classes.

For some species where none of the GILLNET software selectivity models could be fitted, the parameters of the logistic selectivity curve were estimated using the NLP procedure in SAS (SAS Institute Inc., 1989, Hartman, no date). A series of models where the parameters  $b$  and  $L_{50}$  of the logistic model were a function of inner panel mesh size were fitted and the goodness of fit evaluated by comparison of the values of the maximum likelihood. In the case of the GILLNET fittings, the goodness of fit was evaluated by comparison of the deviance with the degrees of freedom, the p-value of the fit and by examination of the estimated modal lengths.

## 2.4. Diversity, dominance and multivariate analysis

Catch species composition per inner/outer panel mesh combination of trammel nets used was analysed using the following measures and/or techniques: number of species, species diversity, richness and evenness, and dominance curves. Diversity was calculated using the Shannon-Wiener diversity index  $H'$ , species richness using Margalef's  $D$  index, and evenness using Pielou's  $J$  measure (Maguran, 1988). The Shannon-Wiener diversity index  $H'$  is defined as:

$$H' = -\sum_i p_i (\log p_i),$$

where  $p_i$  is the proportion of the total number (or weight) arising from the  $i_{th}$  species. The Margalef's  $D$  index is as follows:

$$D = (S-1)/\log N,$$

where  $S$  is the total number of species and  $N$  is the total number of individuals. Finally, Pielou's  $J$  measure is estimated as follows:

$$J = H'_{(observed)} / H'_{max},$$

where  $H'_{max}$  is the maximum possible diversity that would be achieved if all species were equally abundant ( $=\log S$ ). All the above-mentioned measures were estimated using the neperian logarithm.

Dominance curves (e.g. Lamshead et al., 1983) represent a graphical method in which the percentage cumulative abundance is plotted against log species rank. In the present study, cumulative dominance curves, based on both catch numbers and weights per 1000 m of net, were plotted for various inner/outer mesh combinations (i.e., all mesh size combinations combined per season; all inner mesh sizes combined per outer panel mesh size used, all outer panel mesh sizes combined per inner panel mesh size used).

To study gear overlap, matrices comprising the numbers and weights of each species from each inner/outer mesh combination per each season (i.e., average of all trials per season) were constructed [i.e., (all species) X (6 inner/outer mesh combinations) X (4 seasons)] for each geographic area. Numbers and weights (the latter were not available for the Basque waters) were both expressed per 1000 m for trammel nets. From these matrices, triangular matrices of similarities between all pairs of inner/outer mesh combinations were computed using the Bray-Curtis coefficient (Bray and Curtis, 1957). Prior to this computation, data were transformed using the double square root transformation to reduce the weighting of abundant species (Field et al., 1982). The adequacy of the representation in two, rather than more than two dimensions, is expressed by a "stress coefficient" (Field et al., 1982). In general, stress

values  $<0.2$  imply rather good representation (Carr, 1997). Discontinuities between combinations may be accepted as real when the results of the two methods agree (Field et al., 1982). The contribution of each species to the average Bray-Curtis dissimilarity between groups of combinations as well as to similarity within a group of combinations was identified using Simper analysis (Clarke and Warwick, 1994; Carr, 1997), which uses the standard deviation (s.d.) of the Bray-Curtis dissimilarity, attributed to a species, for all pairs and compares that with the average contribution of a species to the dissimilarity.

All the above-mentioned analyses, which have been successfully applied to experimental fisheries catch data (e.g., Stergiou et al., 1996, 1997b), were carried out using PRIMER for Windows (Carr, 1997).

## **2.5. Other analyses**

The discard/total catch ratio (D/T), in terms of both weight and number, was calculated separately for each individual inner/outer mesh size and season. In addition, TL-girth relationships were constructed for the most numerically abundant species in the Cyclades region. Least squares regressions of girth on TL were derived after log transformation of the two variables ( $\log G = \log a + b \log TL$ ).

The length frequency distributions of the most numerically important species for different inner/outer mesh combinations were compared with the Kolmogorov-Smirnov test (Siegel and Castellan, 1988). Comparisons of mean diversity indices, numerical abundances and catch rates between different inner/outer panel mesh size combinations, seasons and geographic areas were done using t-test and one way analysis of variance (ANOVA), according to the case, and Fisher's Least Significance Difference (LSD) test (Zar, 1984).

### 3. RESULTS

#### 3.1. Survey and characterization of trammel net métiers

##### 3.1.1. Basque Country

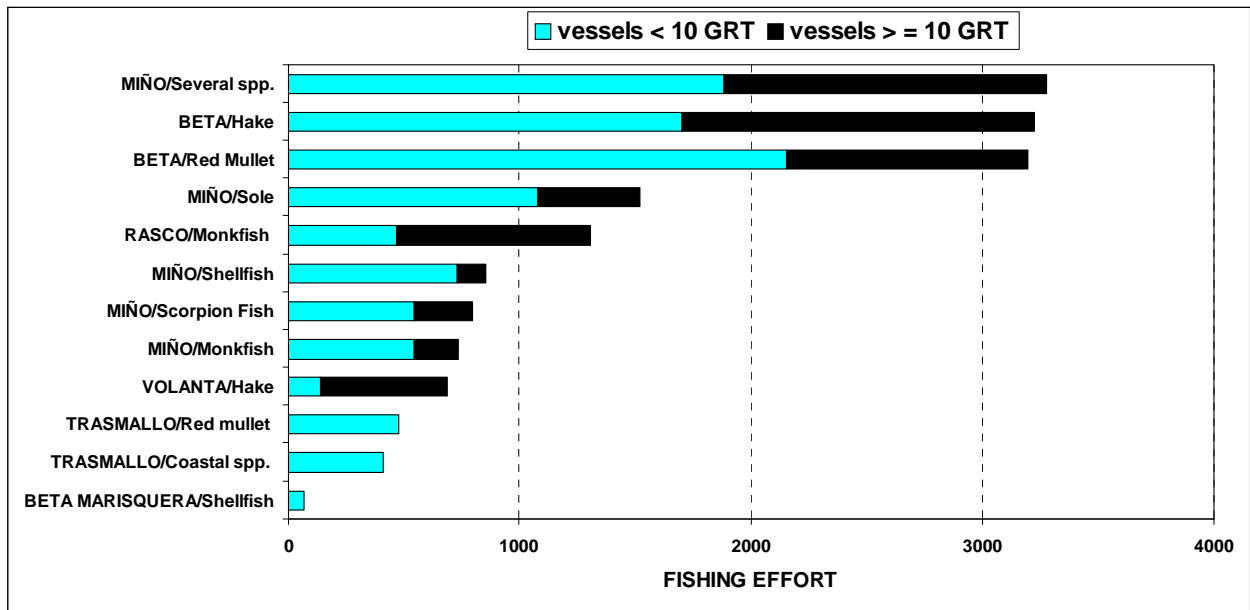
Altogether twelve gillnet fishing métiers were identified in the survey; seven corresponding to trammel net (Table 3.1.1.1). From the information collected, the trammel nets were divided into two main types: “miño” (local name used to call big mesh trammel nets: minimum stretched mesh size of 90 and 500 mm in the inner and outer panels respectively according to the fisheries regulations); “trasmallo” (small mesh trammel net: minimum stretched mesh size of 60 and 400 mm in inner and outer panels respectively).

If one takes into account the fishing effort (number of vessels x number of months dedication), three fishing métiers must be highlighted: different target species fished with trammel nets plus red mullet and hake fishing with *betas* (Figure 3.1.1.1). Others métiers of certain importance but with lower fishing effort values are those of the *miño*/sole and the *rasco*/monkfish. Following in decreasing importance are those fishing métiers of different target species with trammel net of the *miño* kind and hake fishing with *volantas*. In this latter métier, the majority of the effort corresponds to vessels over 10 GRT.

Most of the skippers interviewed stated that they worked with different fishing métiers over the year. Some of these métiers involve trammel nets but not all of them. Figure 3.1.1.2 shows the importance of each of the fishing métiers in terms of number of vessels involved. Most of the fishing activity with trammel nets is carried out by small vessels under 10 GRT . Trammel netting targeting sole is the most common trammel fishing métier: around one third of the gillnet fishing fleet works in this particular fishing métier which takes place mainly during winter and spring.

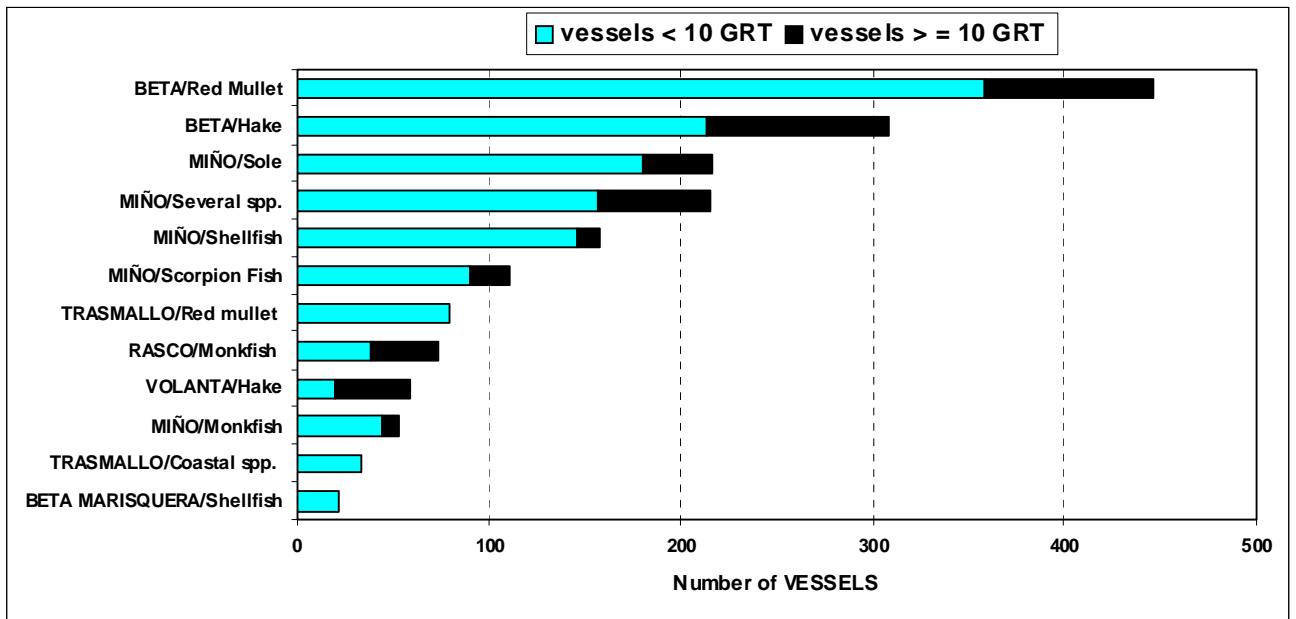
**Table 3.1.1.1. Basque Country. Cantabrian region gillnet fishing métiers (Notes: BETA: small gillnet; MIÑO: trammel net; TRASMALLO: small trammel net; RASCO: tangle net; VOLANTA: gillnet; BETA MARISQUERA: gillnet. Trammel net fishing métiers are those whose local name for the fishing gear are “miño” and “trasmallo”. Mesh size: stretched mesh opening size).**

FISHING MÉTIER (FISHING GEAR/Target species)	Most common VESSEL size (GRT)	Main fishing season	Depth (fathoms)	Main fishing grounds type	Soak time (hours)
BETA/Red Mullet	All vessel size	May to October	Oct-50	Soft bottoms close to rocky areas	5-Mar
BETA/Hake	All vessel size	September to April	25-70	Mainly soft bottoms	3-5 ó 22
MIÑO/Sole	All vessel size	November to Mars	Oct-50	Sandy-muddy	24-48
MIÑO/Several spp.	All vessel size	All year round	Oct-50	All bottom types	3-5-72
MIÑO/Shellfish	<10 GRT	May to September	Oct-60	Rocky	48-72
MIÑO/Scorpion Fish	All vessel size	April to September	<40	Rocky	20-22
TRASMALLO/Red mullet	<10 GRT	November to April	<20	Soft bottoms close to rocky areas	3
RASCO/Monkfish	All vessel size	All year round	20-600	Sandy-muddy	48-120
VOLANTA/Hake	>10 GRT	September to Mars	30-300	Sandy-muddy	24
MIÑO/Monkfish	All vessel size	All year round	25-45	Sandy-muddy	48-72
TRASMALLO/Coastal spp.	<10 GRT	All year round	<20	All bottom types	22-Mar
BETA MARISQUERA/Shellfish	<10 GRT	May to July	<20	Rocky	48-72



**Figure 3.1.1.1: Basque Country. Relative importance of the different fishing métiers with gillnets in the Cantabrian region in terms of annual fishing effort, per GRT vessel category (Gross Register Tonnage). (Note: annual fishing effort in a fishing métier expressed as the product of the number of vessels fishing in this métier by the number of months of fishing activity. Fishing effort of vessels with tonnage equal to or over 10 GRT has been weighted by a factor 2).**

The importance of these fishing métiers is very variable if one bears in mind the number of vessels involved throughout the year (Figure 3.1.1.2). The métier practised by the greatest number of vessels is the red mullet (*Mullus surmuletus*) fishing with nets known as *betas* with a mesh size between 50 and 70 mm (69% of the vessels). This is followed by hake (*Merluccius merluccius*) fishing with nets of a similar kind and mesh size between 70 and 90 mm (48% of the vessels). Other fishing métiers are of secondary importance (between 17 and 33% of the entire fleet dedicated to them according to métiers). These are practised by the smallest vessels in the shallow waters of the continental shelf, using trammel nets for the capture of different target species, amongst those which stand out, are the sole (*Solea vulgaris*), the scorpion fish (*Scorpaena spp.*) and the Crustaceans (crawfish- *Palinurus sp.*- and lobster –*Homarus gammarus*-). The fishing of monkfish (*Lophius spp.*) with *rasco* and hake with *volanta* (12 and 9% of all the vessels respectively) are characteristic fishing métiers of the larger vessels of the fleet, as these work fishing grounds farther away from the coast, usually on the outer part of the continental shelf or slope. The three remaining fishing métiers are of marginal importance (less than 9% of the vessels dedicated to each of the métiers).



**Figure 3.1.1.2: Basque Country. Relative importance of the different fishing *métiers* with gillnets in the Cantabrian region as per number of vessels practising each *métier* at some time in the year or per vessel GRT category (*Gross Register Tonnage*) out of the total number of the gillnet fleet vessels (645 vessels). (Notes: *BETA*: small meshed gillnet; *MIÑO*: trammel net; *TRASMALLO*: small meshed trammel net; *RASCO*: tangle net; *VOLANTA*: gillnet; *BETA MARISQUERA*: gillnet).**

Thus the results of the survey show that the trammel net is a fishing gear that is widely used in the Cantabrian Region. The main targeted species are sole (*Solea vulgaris*), scorpion fish (*Scorpaena spp.*), monkfish (*Lophius spp.*) and shellfish (*Homarus gammarus*, *Palinurus elephas* and *Maja squinado*). Whilst none of these species is caught in large quantities, they have high market values, thereby increasing the importance of this fishing gear.

Other important trammel net *métiers* target different species in shallow waters throughout the year. Some of these *métiers* have clearly identified target species (shellfish and scorpion fish) but others target a range of other target species that are not so well identified because they are caught in small quantities.

Twenty trammel nets in all were measured in the fishing gear survey. According to the results obtained, the fishing gears have been classified in five main types (Table 3.1.1.2). Twine type (monofilament or multifilament) and mesh size of the netting panels have been the main criteria used to distinguish among fishing gear types.

**Table 3.1.1.2. Basque Country. Trammel nets types identified from the survey of fishing gears. (Notes: The hanging ratio in the headline and the footrope are equal. Least common values of the parameters are among brackets).**

Trammel type	Twine type		Twine colour		Twine diameter (mm)		Mesh size (mm)		Meshes depth		Hanging ratio 1)		Height (metres)	Sampling Level (N)
	inner	outer	inner	outer	inner	outer	inner	outer	inner	outer	inner	outer		
A	PA Monof	PA Mono	Green White	Green White	0.35 -0.4	0.6	100 -90	500/600	35/40	4/4.5	45 to 55 (35)	45 to 55	1.7 - 2.4	9
B	PA Multimon of	PA Mono	Green White	Green	0.25 x 4	0.6	100	540/570	40	4	45 to 48	50-51	1.9 - 2.0	3
C	PA Multifil	PA Multifil	White	White	-	-	100	500/560	30/33	3.5/4.5	45 to 50	45 to 48	1.5 - 2.3	3
D	PA Monof	PA Mono	Green	Green	0.40.45	0.6	120/130	580/600	30	4.5	42 to 45	45 to 53	2.3 - 2.4	3
E	PA Monof	PA Mono	Green	Green	0.3	0.6	58/60	280	60	9/9.5	42/49	54/61	2.0 - 2.2	2

The results of the survey show that the same trammel net type can be used for different fishing *métiers* (Table 3.1.1.3). Type A (“miño” trammel net; monofilament twine; inner panel mesh size: 100 mm; outer panel mesh size. 500 to 600 mm) is the most common trammel net design and it is used in almost all fishing *métiers* throughout the year. In contrast, the “trasmallo” type E is the least common fishing gear, with only a few vessels involved in its fishing *métiers* all along the Cantabrian Region.

**Table 3.1.1.3. Basque Country. Use of the different trammel net types per fishing *métier*. (Notes: least common trammel types are among brackets).**

TRAMMEL MÉTIERS	Trammel net types used
MIÑO/Sole	A, (B)
MIÑO/Several spp.	A, (B), (C), (D)
MIÑO/Shellfish	A, (B), (C), (D)
MIÑO/Scorpion Fish	A, (B)
TRASMALLO/Red mullet	E
MIÑO/Monkfish	A, (B), (D)
TRASMALLO/Coastal spp.	E

In recent years there has been a tendency to change the multifilament trammel nets, widely used in the past, for ones made of monofilament netting. Monofilament trammels are by far the most commonly used trammel nets at present. The main reason for the change is that the monofilament nets are easier to clean (less tangled marine debris on the netting).

### 3.1.2. Algarve

According to fisheries statistics for the Algarve, 693 licences for trammel nets were issued in 1999; 150 for the “Coastal” fleet and 543 for the “Local” fleet. A total of 60 fishing vessels, stratified by port and fleet, were sampled. The results of the surveys showed a considerable difference between the Local and Coastal fleet. The Coastal fleet consisted of larger and more powerful boats, with higher TABs and larger crews than those of the Local fleet. The hulls of the Coastal fleet vessels were mainly made of wood, while those of the Local fleet were based on glass fibre and wood in similar proportions.

A total of 16 coastal and 55 local category trammel netters were surveyed,

corresponding to 10% of the licensed trammel netters of each size class.

Overall, five main types of trammel nets were identified (Table 3.1.2.1). The type A trammel net was the only multi-filament trammel net and was used exclusively by the small vessels of the “Local” fishing fleet. The type A trammel net main target species are cuttlefish, sole and rays, with a variety of demersal species such as sea breams and red mullets also contributing to the landings. This trammel net is mainly fished in the winter and spring, largely on soft bottoms to depths of 30-40 m. The nets are set in the afternoon and hauled at sunrise or 24 hours after setting. The total number of nets set by a fishing vessel ranged from 20 to 100, with a mean of approximately 50.

The type B trammel net is the other main type used by the “Local” fishing vessels (Table 3.1.2.1). This is a monofilament trammel net that has the same target species as the type A trammel net. Although it is also fished year round, the main fishing season is in the spring. The maximum depths fished are between 60 and 70 m and approximately 50 nets per set is typical.

Trammel nets C, D and E are those used by the larger “Coastal” category vessels (Table 3.1.2.1). The type C trammel net is used to target cuttlefish, sole, rays and assorted fin-fishes. These nets are fished year-round on soft and mixed bottom, to maximum depths of up to 80-100 m. In general, they are set at sunset and hauled at sunrise. Compared to the “Local” category fishing vessels, two to three times as many nets are set (average value between 100 and 150 nets).

Trammel net D is also of monofilament but is made of stronger material than trammel net C, since the target species are the large sea breams that are found on mixed or rocky bottom (Table 3.1.2.1). This type of trammel net is used primarily in the summer and autumn, at depths to approximately 100 m. The nets are set in the evening and hauled at sunrise.

Trammel net E has the largest outer panel mesh sizes of any of the trammel net types in use in the Algarve. The main target species is the monkfish, that is fished to depths of 200 m.

**Table 3.1.2.1. Algarve. Trammel net types identified from the survey of fishing gears. Notes: 1) The hanging ratio in the headline and the footrope are equal and 2) Least common values of the parameters are among brackets.**

Trammel type	Twine type		Twine colour		Twine diameter		Mesh size (mm)		Meshes depth		Hanging ratio <sup>1)</sup>		Height (metres)	Sampling Level (N)
	inner	outer	inner	outer	inner	outer	inner	outer	inner	outer	inner	outer		
A	PA	PA	Brown	White	0.2	0.4	80	260-680	25/30	2/2.5	45 to 55 (35)	45 to 55	2.0 - 2.4	40
	Multifil.	Multifil.	White		0.5	-100			-35	-3				
B	PA	PA	Green	White	0.3	0.5	80	400-800	40	2.5 to 4.5	36 to 63	39 to 50	2.4 - 4.0	13
	Monofil.	Monofil.	White		0.3	0.6	110	(25-30)						
C	PA	PA	Green	White	0.3	0.6	110	680	40/50	3.5 to 5.5	42 to 52	32 to 41 (52)	4.4 - 6.5	12
	Monofil.	Monofil.	White		0.4	-0.7	(120 - 130)	(600 - 750)	(45.5/80)					
D	PA	PA			0.4	0.6	150	700	35.5	4	39	35	5.3	2
	Monofil.	Monofil.			0.7	200	800			47	44	44	10	
E	PA	PA	Green	White	0.3	0.6	120	600	50	3.5 to 4.5	37 to 39	38	6	3
	Monofil.	Monofil.	White		0.4	0.7	200	800				41	10	
							220	1000				47	11	

The results of the survey show that the trammel net types in use in the Algarve can be grouped into 4 métiers (Table 3.1.2.2). The main métier is that of the cuttlefish (*Sepia officinalis*) and consists of trammel net types A and B of the “local” fishing fleet and C of the “coastal” fishing fleet. Based on the time of year and fishing grounds, a second métier based on trammel net types A, B and C can also be identified. This is the sole (*Solea senegalensis*, *Solea vulgaris*, *Microchirus azevia*) métier (Table 3.1.2.2).

The third métier (trammel net type D) is that for the large red sea breams (*Pagrus* sp., *Dentex* sp.). This involves only the “coastal” category vessels, takes place mainly in the summer and is in fact a highly specialised métier, with relatively few fishing vessels taking part.

The final métier (trammel net type E) also only involves the larger vessels and targets monkfish (*Lophius piscatorius*), generally in deeper waters than the other métiers.

Based on the number of fishing vessels, the number of fishing licences and the number of nets fished, we conclude that the trammel nets targeting cuttlefish and soles (A, B and C) are by far the most important. Overall, the most important type of trammel net in terms of the quantities of netting fished and the effort, is the type C trammel net, used by the “coastal” fishing vessels to catch cuttlefish, sole and assorted fin-fishes.

**Table 3.1.2.2. Algarve. The main trammel net fishing métiers identified from the survey of fishing gears.**

<b>Fishing Metier (Fishing Gear/Target species)</b>	<b>Most common vessel size (GRT)</b>	<b>Main fishing season</b>	<b>Main type of fishing grounds</b>	<b>Soak time (hours)</b>	<b>Trammel net types used</b>
<i>Sepia officinalis</i>	All vessel sizes	All year round	Sandy-muddy Rocky	12-24	A, B and C
<i>Solea</i> sp	All vessel sizes	All year round	Sandy-muddy Rocky	12-24	A, B and C
<i>Pagrus</i> sp	> 10 GRT	July to September	Rocky		D
<i>Lophius piscatorius</i>	> 10 GRT	All year round		19-20	E

### 3.1.3. Gulf of Cádiz

The trammel net fleet of the Gulf of Cádiz officially comprises a total of 436 vessels, accounting for 81.65 % of the total vessels using artisanal fishing gear, registered in this region (BOE 12/08/98 n° 192). However, the interviews that were carried out revealed that approximately 30% of the total trammel net fleet of more than 600 boats actually working the waters of the Gulf of Cádiz are “illegal”, with the greatest proportions of “illegal” vessels among those operating in the coastal waters of Huelva. In fact, the entire trammel fleet of El

Rompido is illegal, together with most of the boats of Ayamonte, Punta Umbría and Isla Cristina. The term “illegal” is used in the sense that these vessels do not comply with the requirements established by law in order for a commercial fishing activity to undertaken. A minority of these are small open boats of artisanal fishermen, some of which are in the process of being legalized, but the great majority (approximately 75% of all the illegals) are owned by occasional or casual fishermen, non-professionals, retired fishermen and other unemployed workers with reduced unemployment benefits who need the financial proceeds of this activity to survive. Also included among the illegal vessels are leisure boats not registered under the 3rd List (Regulation CE 3690/93).

From the survey, a total of 9 different *métiers* were identified in the area of the Gulf of Cádiz (Table 3.1.3.1). The target species of these *métiers* are: 1. flat fishes (*Solea* spp., *Synaptura lusitanica*, etc.); 2. cuttlefish (*Sepia officinalis*); 3. prawn (*Melicertus kerathurus*); 4. *Mullus* sp (Red mullet, *Mullus barbatus*, and Striped red mullet, *Mullus surmuletus*); 5. Striped sea bream (*Lithognathus mormyrus*); 6. Pandora (*Pagellus erythrinus*); 7. Sea bream (genus *Diplodus*); 8. Grunt (*Pomadacys incisus*); and 9. Octopus (*Octopus vulgaris* and *Eledone* spp). Of these, the 4 principal *métiers* are those directed towards the fishing of flat fishes, cuttlefish (*Sepia officinalis*), prawn (*Melicertus kerathurus*) and *Mullus* sp (Red mullet, *Mullus barbatus*, and Striped red mullet, *Mullus surmuletus*).

**Table 3.1.3.1.- Gulf of Cadiz. Trammel net fishing metiers identified from the survey of fishing gears**

<b>Fishing Metier (Fishing Gear/Target species)</b>	<b>Most common vessel size (GRT)</b>	<b>Main fishing season</b>	<b>Main type of fishing grounds</b>	<b>Soak time (hours)</b>
<i>Solea</i> sp	All vessel sizes	April to July	Sandy-muddy	4-48
<i>Sepia officinalis</i>	All vessel sizes	January to October	Sandy-muddy Rocky	3-48
<i>Melicertus keraturus</i>	All vessel sizes	April to July	Sandy-muddy	2 or 10-24
<i>Lithognathus mormyrus</i>	< 10 GRT	May to October	Sandy-muddy Rocky	3-6
<i>Pagellus erythrinus</i>	< 10 GRT	February to May	Sandy-muddy	3
<i>Mullus barbatus</i> and <i>M. surmuletus</i>	< 10 GRT	May to October	Rocky	3 or 12
<i>Diplodus</i> spp	< 10 GRT	May to October	Rocky	3-6
<i>Pomadacys incisus</i>	< 10 GRT	May to October	Rocky	3-6
<i>Octopus vulgaris</i>	< 10 GRT	June to October	Rocky	3

The trammel net fleet of this region is multi-purpose, and thus changes the gear employed and the target species as a function of the time of year. With regards the first main *métier*, the fishing of *Sepia officinalis* (cuttlefish) takes place principally between April and June, and *Solea* spp., *Synaptura lusitanica*, etc. (flat fish) are caught in two separate periods of

the year; one between May and June, the other between October and January. *Melicertus kerathurus* is caught between May and August; *Mullus barbatus* is fished between May and October. As can be seen in the following table (Table 3.1.3.2), the periods of fishing according to these different métiers coincide in some months of the year.

**Table 3.1.3.2 Gulf of Cadiz. Periods of fishing activity for the principal target species: (a): *Sepia officinalis*; (b) Flat fishes: *Solea* spp., *Synaptura lusitanica*, etc; (c): *Melicertus kerathurus*; (d): *Mullus* sp.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(a)											
	(b)										
(c)											
(d)											

The fishing area for *Mullus barbatus* is located close to the ports of Tarifa, Algeciras and Conil with this particular fishery of particular importance in the latter municipality. The port of Sanlúcar de Barrameda is noted for landings of *Melicertus kerathurus*. The further to the west one moves, the more intensive is the fishing of both cuttlefish (*Sepia officinalis*), which is of great socio-economic importance in the ports of Huelva, and of flat fishes (*Solea* spp., *Synaptura lusitanica*, etc.). Under each of these 3 métiers a different type of trammel net is used, and there are also small variations in net characteristics between ports (see Table 3.1.3.3).

**Tabla 3.1.3.3 Gulf of Cadiz. Material and measurements of the main trammel nets as a function of the *métiers* described for the Gulf of Cádiz. n.- number of meshes; l.- mesh size without stretching; L.- stretched mesh size; E.- hanging ratio; Ballast-weight of footrope; n int.- number of meshes per staple for the inner panel; n ext.- number of meshes per staple for the outer panels. Occasional values are between parentheses (Type A: *Solea spp.-Sepia officinalis*; Type B: *Melicertus kerathurus*; Type C: *Mullus sp.*).**

	Type A		Type B		Type C	
<b>PANNEL</b>	<b>Inner</b>	<b>Outer</b>	<b>Inner</b>	<b>Outer</b>	<b>Inner</b>	<b>Outer</b>
Material	Nylon	Nylon	Nylon	Nylon	Nylon	Nylon
Type	Plastic	Plastic	Plastic	Plastic	Plastic	Plastic
Diameter (mm)	0.2-0.3-0.4	0.4-0.6 (0.7)	0.1 (0.2-0.4)	0.4 (0.3, 0.9)	0.3	0.6 (0.7)
N	25 (26-33-38)	2-2.5-3	30-36-40	2.5 (3)	50	3.5 (4.5)
l (cm)	6-5 (9-25)		2 (3-4)		3-3.5-5.7	
L (cm)	80-90-110	35-36-44-50	30-40-50	24-26-28	50-60-64	40 (32-40)
E	0.6-0.7-0.8		0.5-0.6-0.7-0.8		0.5-0.6-0.8	
<b>ROPES</b>	<b>Headline</b>	<b>Footrope</b>	<b>Headline</b>	<b>Footrope</b>	<b>Headline</b>	<b>Footrope</b>
Type	Cord	Cord	Cord	Cord	Cord	Cord
Material	Plastic	Plastic	Plastic	Plastic	Plastic	Plastic
Diameter (mm)	6 (5-7)	6 (5-7)	5-6	5-6	6 (5-7)	6 (5-7)
Ballast (Kg/100 m)		14-20 (7-12)		12-14-20 (18)		14-20 (7-12)
Frame length (cm)	18-25 (19-22)	19-20-26 (18)	14 (11-15-17)	15 (13-16-17-18)	18-25 (19-22)	19-20-26 (18)
n int.	5 (6-7)	5 (6-7)	8 (5-7)	5-8 (7)	5 (6-7)	5 (6-7)
n ext.	1	1	1	1	1	1
<b>FLOATS</b>						
Type	Cilíndric		Cilíndric		Cilíndric	
Material	Polietileno		Polietileno		Polietileno	
Floatability (gf)	28		28		28	
n°frames/float	4 (2-3-5-6-7)		4 (6-7-9-13)		4 (2-3-5-6-7)	
<b>NET MOUNTED</b>						
L (m)	45-50 (25-30)		45-50 (25-30-70)		45-50 (25-30)	
n° redes	100 (15-25-30-50)		100 (15-50)		100 (15-25-30-50)	

Having identified these principal *métiers* used in the Gulf of Cádiz, it was decided to carry out a study of the *métiers* dedicated to the fishing of *Sepia officinalis* and *Solea spp.*, *Synaptura lusitanica*, etc. (flat fishes), since these activities use the same type of net. The study of the *métiers* used for *Melicertus kerathurus* (prawns) and *Mullus sp.* (red mullet) requires the manufacture of other types of experimental net and the fishing periods coincide. Therefore this can only be undertaken in subsequent projects.

### 3.1.4. Cyclades

The results of the interviews with respect to: (a) boat length and engine horsepower, (b) number of crew, (c) time period of year, (d) length of nets, (e) bottom type, (f) depth range and (g) time of setting and retrieval of nets, are shown in Table 3.1.4.1.

**Table 3.1.4.1. Cyclades. Results of interviews analysis.**

Engine Power (HP)	9-420, mean=99.1, SD=78.6
Boat Length (m)	4.9-14.7, mean=10.0, SD=2.38
Number of crue	1-3 persons
Fishing season	All year round
Length of trammel net (m)	900-6750, mean=3206.8, SD=1266.5
Bottom type	Mixed
Depth range (m)	10-60
Time of setting	3:00-4:00 in the winter 1:00-2:00 in the summer
Time of hauling	Sunrise

Local fishermen used a wide range of trammel net mesh sizes, ranging from 36 mm to 84 mm inner stretched mesh sizes, depending on the time of the year and the bottom type (Table 2.1.4.2). The most common types of trammel nets used were the 40 mm (36.2%) and the 44 mm (32.4%) inner stretched mesh sizes (Table 3.1.4.2), targeting mainly *Mullus surmuletus* and *Boops boops* (Table 3.1.4.3).

**Table 3.1.4.2. Cyclades. Results of interviews analysis. Common inner stretched mesh size of trammels nets used.**

Inner stretched mesh size	%
36mm	11.4
40mm	36.2
44mm	32.4
48mm	1.9
52mm	1.0
64mm	6.4
72mm	10.5
76mm	1.0
84mm	1.0

**Table 2.1.4.3. Cyclades. Main target species per each inner stretched mesh size of trammel nets used.**

<b>Target species</b>	<b>Inner stretched mesh size</b>
<i>Boops boops</i> , <i>Mullus surmuletus</i>	36mm
<i>Mullus surmuletus</i> , <i>Boops boops</i>	40mm
<i>Mullus surmuletus</i> , <i>Boops boops</i>	44mm
<i>Mullus surmuletus</i> , <i>Boops boops</i>	48mm
<i>Pagellus erythrinus</i> , <i>Sarpa salpa</i>	52mm
<i>Pagellus erythrinus</i> , <i>Sarpa salpa</i> , <i>Merluccius merluccius</i>	64mm
<i>Pagellus erythrinus</i> , <i>Merluccius merluccius</i> , <i>Scorpaena</i> spp.	72mm
<i>Merluccius merluccius</i> , <i>Pagellus erythrinus</i>	76mm
<i>Scorpaena</i> spp., <i>Merluccius merluccius</i>	84mm

The results of the interview survey analysis showed (Table 3.1.4.4) that the main target species in the study area were *Boops boops* (35.9%) and *Mullus surmuletus* (35.8%) and, to a lesser extent, *Pagellus erythrinus* (14.7%).

**Table 3.1.4.4. Cyclades. Results of interviews analysis. Main target species.**

<b>Target species</b>	<b>%</b>
<i>Boops boops</i>	35.9
<i>Mullus surmuletus</i>	35.8
<i>Pagellus erythrinus</i>	14.7
<i>Scorpaena</i> spp.	6.1
<i>Merluccius merluccius</i>	4.5
<i>Sarpa salpa</i>	2.0
<i>Pagrus pagrus</i>	1.0

## **3.2. Species composition, catch rates and diversity**

### **3.2.1. Overall and seasonal changes**

#### **3.2.1.1. Basque Country**

The total catches in all the seasons combined are presented in Table 3.2.1.1.1. The numbers caught of individuals of each species in each seasonal fishing trial with experimental trammel nets are shown in Tables 3.2.1.1.2 to 3.2.1.1.5.

**Table 3.2.1.1.1. Basque Country. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during all fishing trials (49 fishing trials). Note: n.m.: no measure taken.**

Species	90/500		90/600		100/500		100/600		110/500		110/600		Total	%						
	n	s.d.	n	s.d.	n	s.d.	n	s.d.	n	s.d.	n	s.d.								
<i>Solea vulgaris</i>	617	30.74	4.27	554	30.68	4.41	577	32.53	4.22	567	32.75	4.57	481	35.01	4.69	452	34.91	4.14	3248	19.06
<i>Trisopterus luscus</i>	440	24.47	5.8	395	24.46	6.06	332	22.48	5.53	334	22.26	5.76	258	22.45	5.04	283	22.03	4.62	2042	11.98
<i>Scomber scombrus</i>	284	35.67	2.88	236	35.11	3.51	225	36.16	3.59	266	35.66	2.97	253	35.7	3.03	287	35.24	3.46	1531	8.98
<i>Trachinus draco</i>	327	24	2.95	358	23.94	3.3	208	23.77	3.15	251	24.06	2.92	119	25.04	3.65	176	24.38	3.23	1439	8.44
<i>Sarathia pliciferus</i>	134	21.68	2.37	221	21.18	2.13	159	21.24	1.68	196	21.33	1.98	113	21.92	2.06	160	21.4	2.27	983	5.77
<i>Merluccius merluccius</i>	214	30.19	11.87	187	31.08	11.77	153	30.56	11.4	159	30.19	11.84	126	29.69	8.42	136	30.47	10.03	975	5.72
<i>Trigla lucerna</i>	157	31.19	6.1	145	32.19	5.52	100	33.54	7.44	112	32.92	7.59	104	33.51	7.64	75	33.88	9.21	693	4.07
<i>Microchirus variegatus</i>	192	16.51	4	171	16.12	2.13	86	16.12	1.81	99	16.28	1.5	42	16.91	1.47	51	16.98	2.11	641	3.76
<i>Lophius piscatorius</i>	84	36.72	19.61	61	32.07	12.27	94	31.46	10.86	75	32.5	14.17	69	34.7	12.57	101	34.47	13.28	484	2.84
<i>Solea senegalensis</i>	86	30.05	2.49	77	29.64	3.37	93	30.87	2.58	91	30.31	2.84	65	32.22	3.02	58	32.16	2.72	470	2.76
<i>Sepia officinalis</i>	91	17.51	3.27	52	16.78	3.37	71	18.23	3.81	63	19.79	8.71	80	19.4	3.78	53	18.76	2.31	410	2.41
<i>Meja squinado</i>	68	(n.m.)	-	54	(n.m.)	-	60	(n.m.)	-	55	(n.m.)	-	68	(n.m.)	-	75	(n.m.)	-	380	2.23
<i>Aspirtigla obscura</i>	55	25.15	3.38	50	24.39	4.24	54	25.66	4.23	59	26.59	3.89	38	25.91	4.96	47	26.34	2.97	303	1.78
<i>Sciaena umbra</i>	85	29.33	3.92	86	29.17	3.54	52	28.93	4.27	30	29.61	1.86	11	28	4.14	14	32.54	2.93	278	1.63
<i>Solea lascaris</i>	81	24.47	3.16	59	24.12	3.24	37	24.36	3.23	34	24.26	2.7	22	23.43	4.34	23	26.02	2.45	256	1.5
<i>Trachurus trachurus</i>	79	26.07	5.3	35	26.91	5.47	33	26.13	4.45	43	25.15	4.75	26	26.63	2.71	38	26.32	4.67	254	1.49
<i>Micromesistius poutassou</i>	29	23.13	2.4	29	21.55	2.88	37	23.25	3.9	35	23.5	3.32	21	22.13	2.81	25	23.18	2.49	176	1.03
<i>Torpedo marmorata</i>	20	(n.m.)	-	23	(n.m.)	-	28	(n.m.)	-	26	(n.m.)	-	39	(n.m.)	-	37	(n.m.)	-	173	1.02
<i>Triglae spp.</i>	37	29.52	5.27	29	29.98	7.27	23	27.7	5.62	37	26.38	6.24	18	28.89	8.46	14	29.29	7.26	158	0.93
<i>Dicentrarchus labrax</i>	35	44.89	10.71	24	48.65	12.58	23	44.17	5.74	20	46.08	2.87	22	52.76	8.56	15	50.53	3.51	139	0.82
<i>Pleuronectes platessa</i>	9	32.39	4.17	3	33.67	4.07	19	29.11	4.27	20	29.84	4.7	39	28.59	5.41	47	30	4.24	137	0.8
<i>Raja undulata</i>	17	57.44	19.68	11	57.55	15.87	17	62.79	18.44	17	56.35	14.9	44	55.67	17.57	27	58	14.96	133	0.78
<i>Raja montagui</i>	16	42.07	13.67	14	50.18	17.67	17	38.97	14.13	13	41.25	10.36	34	43.91	12.71	29	47.05	15.02	123	0.72
<i>Trisopterus minutus</i>	13	19.38	3.74	17	18.79	1.96	27	18.92	1.96	21	18.67	3.2	14	19.46	2.56	17	20.34	4.71	109	0.64
<i>Aspirtigla cuculus</i>	23	24.2	4.33	19	21.41	2.92	19	23.62	3.98	13	20.96	4.73	17	21.35	4.14	14	23	4.39	105	0.62
<i>Mullus surmuletus</i>	29	28.18	6.88	18	28.16	6.59	13	25.18	3.75	14	23.21	2.69	7	25.8	5.66	12	26.25	4.51	93	0.55
<i>Scorpaena porcus</i>	14	25.75	2.2	16	28.11	3.54	14	26.68	3	16	26.07	3.68	12	28.29	3.29	9	28.39	2.25	81	0.48
<i>Pagellus acarne</i>	12	28.82	4.15	15	28.79	4.93	10	22.56	5.75	15	24.75	4.95	8	24.83	5.01	17	22.19	-	77	0.45
<i>Diplodus sargus</i>	22	25.11	2.56	13	26.23	2.99	7	24.79	2.53	11	27.14	3.04	9	28.94	1.4	14	31	5.47	76	0.45
<i>Scophthalmus rhombus</i>	9	40.56	6.12	6	41.83	3.2	10	42.22	7.04	14	45.11	7.64	13	40.62	6.25	17	41.82	6.45	69	0.4
<i>Scomber japonicus</i>	10	32.79	4.85	15	32.19	6.23	6	27.7	8	13	33.81	4.9	12	29.21	5.18	12	32.11	4.73	88	0.4
<i>Raja clavata</i>	11	51.73	18.04	6	53.83	20.38	16	47	15.35	9	52	19.05	13	59.19	16.62	10	44.55	18.17	65	0.38
<i>Callionymus myra</i>	12	24.86	2.01	14	22.95	3.3	6	23.33	3.13	10	24.11	1.56	6	24.75	3.67	9	23.83	4	57	0.33
<i>Scyllorhinus stellaris</i>	20	53.24	3.83	21	52.02	2.62	3	52.17	1.89	5	53.3	2.02	4	51.25	4.03	4	52.75	3.97	57	0.33
<i>Boops boops</i>	27	34.3	2.3	10	33.69	5.11	6	30.88	7.82	4	33	4.83	6	29.38	6.14	3	33.5	-	56	0.33

(To be continued in next page)

Table 3.2.1.1.1. Continued.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%						
		90/500		90/600		100/500		100/600		110/500		110/600									
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		
<i>Dicologlossa cuneata</i>	SOLEDAE	13	22.77	2.14	12	24.04	2.01	11	23.65	2.7	2	24.5	0.71	7	22.33	1.4	4	23.13	1.03	49	0.29
<i>Pagellus erythrinus</i>	SPARIDAE	14	29.65	5.23	9	27.75	6.94	8	33.19	3.82	12	36.55	3.61	3	22.5	9.64	2	34.5	3.54	48	0.28
<i>Spondiosoma cantharus</i>	SPARIDAE	8	28.13	4.77	9	28.56	2.15	10	31.38	4.98	14	31.07	4.48	3	27.33	7.65	1	31	-	45	0.26
<i>Scyliorhinus canicula</i>	SCYLIORHINIDAE	12	50.13	9.02	13	53.81	3.42	3	52.5	1.8	7	46.08	11.27	5	50.5	1.77	3	52.33	2.75	43	0.25
<i>Cancer pagurus</i>	CANCERIDAE	6	(n.m.)	-	9	(n.m.)	-	2	(n.m.)	-	10	(n.m.)	-	5	(n.m.)	-	9	(n.m.)	-	41	0.24
<i>Patirus elephas</i>	PALINURIDAE	6	(n.m.)	-	4	(n.m.)	-	8	(n.m.)	-	3	(n.m.)	-	9	(n.m.)	-	11	(n.m.)	-	41	0.24
<i>Psetta maxima</i>	SCORTHALMIDAE	6	35.7	4.89	5	33.5	3.35	6	30.8	5.37	6	37.75	4.59	6	35.33	7.45	12	34.75	8.36	41	0.24
<i>Lithognathus mormyrus</i>	SPARIDAE	12	32.25	2.29	7	30.93	1.88	5	33.4	4.63	9	33.28	1.87	2	37.75	1.06	4	37.38	2.06	39	0.23
<i>Lophius budegassa</i>	LOPHIDAE	10	54.05	10.32	5	50	19.03	9	56.11	5.44	3	62	1.32	3	53.67	10.77	4	53	14.74	34	0.2
<i>Mola mola</i>	MOLDAE	6	46.25	3.97	3	47.83	5.01	5	47.5	4.18	8	46.31	8.51	3	43.83	4.51	9	44.33	2.88	34	0.2
<i>Mugil chelo</i>	MUGILIDAE	5	44.9	2.46	3	34.5	7.78	7	16.86	1.91	3	16.5	0.5	2	54.25	1.77	7	45.86	7.45	27	0.16
<i>Scorpaena notata</i>	SCORPAENIDAE	8	15.79	2.51	2	13.5	3.54	9	(n.m.)	-	3	(n.m.)	-	1	(n.m.)	-	5	(n.m.)	-	25	0.15
<i>Necora puber</i>	PORTUNIDAE	2	(n.m.)	-	3	(n.m.)	-	9	(n.m.)	-	3	(n.m.)	-	1	(n.m.)	-	5	(n.m.)	-	23	0.13
<i>Serranus cabrilla</i>	SERRANIDAE	5	19.67	4.54	2	(n.m.)	-	3	21.5	0.87	5	19	1.63	7	20.14	1.49	2	22	-	22	0.13
<i>Homarus gammarus</i>	NEPHROPIDAE	2	(n.m.)	-	2	(n.m.)	-	6	(n.m.)	-	3	(n.m.)	-	4	(n.m.)	-	2	(n.m.)	-	19	0.11
<i>Galeorhinus galeus</i>	TRIAKIDAE	5	76.3	36.94	2	57	9.9	3	93.67	31.53	7	75.57	25.81	4	(n.m.)	-	2	(n.m.)	-	17	0.1
<i>Octopus vulgaris</i>	OCTOPODIDAE	3	(n.m.)	-	5	(n.m.)	-	3	93.67	31.53	7	75.57	25.81	4	(n.m.)	-	2	(n.m.)	-	14	0.08
<i>Rajidae spp.</i>	RAJIDAE	2	52.25	22.98	2	27	5.66	3	27.5	11.17	2	26	-	2	36.75	9.55	3	55.17	9.17	12	0.07
<i>Diplodus vulgaris</i>	SPARIDAE	1	27	-	4	28.5	7.15	3	30	5.66	2	26	-	1	35	-	1	28.75	0.35	10	0.06
<i>Symphodus spp.</i>	LABRIDAE	1	26	-	3	27	-	3	25.75	10.25	1	31.5	-	3	(n.m.)	-	1	13.5	-	9	0.05
<i>Engraulis encrasicolus</i>	ENGRAULIDAE	2	13	0.71	3	13.17	0.29	2	13	-	1	(n.m.)	-	3	(n.m.)	-	1	13.5	-	9	0.05
<i>Myliobatis aquila</i>	MYLIOBATIDAE	4	16.25	2.22	3	14.67	2.02	4	(n.m.)	-	1	42	-	1	(n.m.)	-	1	26	-	8	0.05
<i>Lepidion leucas</i>	SCORTHALMIDAE	1	43	-	1	13	-	4	19	3.87	1	42	-	1	(n.m.)	-	1	26	-	8	0.05
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	40	-	3	60	-	3	51.67	2.47	1	31	-	1	19	-	1	17	-	7	0.04
<i>Aloa spp.</i>	CLUPEIDAE	2	54.75	17.32	1	26.5	-	1	63.5	-	1	17	-	1	16.5	-	2	17.25	0.35	6	0.04
<i>Sarda sarda</i>	SCOMBRIDAE	3	28.67	3.21	1	26.5	-	1	32.5	-	1	27	-	1	40	-	2	39	0.71	6	0.04
<i>Spanus pagrus</i>	SPARIDAE	1	19	-	1	(n.m.)	-	1	32.5	-	1	27	-	1	40	-	1	36.5	-	5	0.03
<i>Pagellus centodontus</i>	SPARIDAE	3	67.67	22.88	1	42.5	-	1	29	-	1	69	-	3	28.5	3.5	1	36.5	-	5	0.03
<i>Raja brachyura</i>	RAJIDAE	2	52	4.95	1	42.5	-	1	29	-	1	69	-	3	28.5	3.5	1	36.5	-	5	0.03
<i>Raja naevus</i>	RAJIDAE	1	28	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02
<i>Balistes carolinensis</i>	BALISTIDAE	1	71	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02
<i>Zeus aurata</i>	SPARIDAE	1	71	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02
<i>Zeus faber</i>	ZEIDAE	1	71	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02
<i>Mustelus spp.</i>	TRIAKIDAE	1	71	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	71	-	1	68.5	-	1	32	-	1	69	-	1	33	-	1	33.5	-	3	0.02

(To be concluded in next page)

Table 3.2.1.1.1. Concluded.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total %					
		90/500		90/600		100/500		100/600		110/500		110/600							
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	s.d.	s.d.		
<i>Belone belone</i>	BELONIDAE	1	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.01
<i>Ctenolabrus rupestris</i>	LABRIDAE	1	(n.m.)	-	-	1	15	-	-	1	14	-	-	-	-	-	-	2	0.01
<i>Loligo vulgaris</i>	LOLIGINIDAE	1	(n.m.)	1	(n.m.)	-	-	-	-	-	-	-	-	-	-	-	-	2	0.01
<i>Penaeus</i> spp.	PENAEIDAE	-	-	-	-	1	(n.m.)	-	-	-	-	-	-	-	-	-	-	2	0.01
<i>Pollachius pollachius</i>	GADIDAE	-	-	1	44.5	-	-	-	-	1	52	-	-	1	(n.m.)	-	-	2	0.01
<i>Conger conger</i>	CONGRIDAE	-	-	-	-	-	-	-	-	1	120	-	-	-	-	-	-	1	0.01
<i>Labrus bimaculatus</i>	LABRIDAE	-	-	-	-	-	-	-	-	-	-	1	22	-	-	-	-	1	0.01
<i>Mugil capito</i>	MUGILIDAE	1	56.5	-	-	-	-	-	-	-	-	1	54.5	-	-	-	-	1	0.01
<i>Mugilidae</i> spp.	MUGILIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.01
<b>Total</b>		<b>3490</b>		<b>3164</b>		<b>2758</b>		<b>2864</b>		<b>2299</b>		<b>2466</b>		<b>17041</b>					

**Table 3.2.1.1.2. Basque Country. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Winter fishing trials (12 fishing trials). Note: n.m.: no measure taken.**

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%
		90/500		90/600		100/500		100/600		110/500		110/600			
		n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.		
<i>Solea vulgaris</i>	SOLEDAE	313	31.16 4.38	296	31.15 4.41	254	33.26 4.31	299	33.56 4.54	264	35.42 4.19	281	35.64 3.84	1687	25.09
<i>Scomber scombrus</i>	SCOMBRIDAE	263	35.71 2.85	232	35.08 3.52	224	36.11 3.54	257	35.61 3	250	35.76 2.99	287	35.24 3.46	1513	22.5
<i>Sardina pilchardus</i>	CLUPEIDAE	98	22.09 1.97	157	21.79 2.19	139	21.69 1.21	153	21.99 1.78	98	21.96 1.88	132	21.92 2.14	777	11.55
<i>Microsternus luscus</i>	GADDAE	156	24.26 5.69	129	24.48 6.19	139	23.28 5.72	131	21.74 5.33	104	22.83 5.03	103	21.81 4	762	11.33
<i>Microsternus variegatus</i>	SOLEDAE	135	15.94 1.58	119	15.85 1.66	52	15.69 1.5	68	15.96 1.44	26	16.75 1.67	26	16.21 1.84	426	6.33
<i>Merluccius merluccius</i>	MERLUCCIIDAE	52	26.08 10.11	42	28.15 13.28	39	27.13 11.45	33	28.5 11.92	36	25.67 8.79	38	26.94 9.75	240	3.57
<i>Trigla lucerna</i>	TRIGLIDAE	31	33.24 6.26	29	32.45 5.75	25	32.46 5.08	19	32.44 6.71	27	34.89 6.55	18	33.35 7.08	149	2.22
<i>Triglae spp.</i>	TRIGLIDAE	31	30.21 4.99	23	31.28 7.13	19	28.19 5.91	23	28.86 6.77	17	29.19 8.73	9	32.83 6.68	122	1.81
<i>Dicentrarchus labrax</i>	MORONIDAE	29	45.72 11.33	21	46.57 9.94	19	43.68 6.06	19	46.03 2.94	20	53.32 8.83	13	50.73 3.68	121	1.8
<i>Trachinus draco</i>	TRACHINIDAE	20	23.31 2.29	34	24.44 4.2	17	24.8 3.87	14	24.42 1.61	5	23.38 2.5	13	24.46 1.94	103	1.53
<i>Sepia officinalis</i>	SEPIDAE	14	(n.m.)	11	(n.m.)	19	(n.m.)	9	(n.m.)	17	(n.m.)	15	-	85	1.26
<i>Trisopterus minutus</i>	GADDAE	13	19.38 3.74	11	19.27 1.57	18	19.14 2.23	18	18.93 3.46	9	18.89 2.46	10	19.35 1.62	79	1.17
<i>Lophius piscatorius</i>	LOPHIDAE	16	38.63 31.15	8	33.93 20.25	8	23.69 2.17	16	28.38 20.19	5	31.5 9.99	14	33.46 15.4	67	1
<i>Solea lascaris</i>	SOLEDAE	22	23.52 2.93	8	20.88 4.27	7	22.93 5.84	12	23.17 3.39	10	20.8 3.76	6	24.6 2.63	65	0.97
<i>Pleuronectes platessa</i>	PLEURONECTIDAE	6	32.67 5.15	1	29	6	29.5 5.5	8	30.88 4.53	21	28.36 5.85	19	30 4.47	61	0.91
<i>Meja squinado</i>	MAJIDAE	13	(n.m.)	4	(n.m.)	7	(n.m.)	9	(n.m.)	13	(n.m.)	10	-	56	0.63
<i>Trachurus trachurus</i>	CARANGIDAE	10	24.44 3.24	10	24.57 3.71	10	26.67 2	7	25.1 3.03	5	28 1.77	3	28.67 3.21	45	0.67
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	6	43.17 5.22	2	39.75 0.35	4	47.88 5.92	8	45.75 8.02	4	42.88 9.44	9	44.28 6.31	33	0.49
<i>Scomber japonicus</i>	SCOMBRIDAE	6	32.9 5.66	9	32.38 6.24	3	28.75 8.13	4	36.88 0.85	3	28.75 8.13	7	32.92 5.11	32	0.48
<i>Aspitrigia obscura</i>	TRIGLIDAE	4	24.63 2.87	4	26.5 2.12	6	24.92 6.5	6	28.92 3.92	2	23.75 12.37	9	27.67 2.76	31	0.46
<i>Raja montagui</i>	RAJIDAE	4	46.25 13.33	3	60.5 8.26	5	46.6 14.51	3	36 6.14	6	44.75 9.49	8	49 14.05	29	0.43
<i>Pagellus acarne</i>	SPARIDAE	7	29 4.19	3	31.5 0.5	2	32.5 0.71	2	23.75 0.35	5	22.13 2.32	6	24.83 2.04	25	0.37
<i>Sciaenops ocellatus</i>	SCIAENIDAE	11	27.75 1.21	3	27.67 3.55	3	24.17 7.11	2	28.75 0.35			1	35	20	0.3
<i>Spondyliotoma cantharus</i>	SPARIDAE	5	26.4 4.88	4	27.5 0.87	7	31.6 6.56	4	30 1.87					20	0.3
<i>Micromesistius poutassou</i>	GADDAE	1	26	5	20.38 4.75	3	23 2.83	1	24	6	23 3.82	2	22.25 3.89	18	0.27
<i>Callionymus lyra</i>	CALLIONYMIDAE	4	24.88 2.25	3	26 1.41	3	26 4.91	2	25.25 0.35	2	25.75 2.47	2	26.5	16	0.24
<i>Mullus surmuletus</i>	MULLIDAE	7	25 9.12	3	31.5 5.63	2	67.75 1.77	1	85	1	35.5	1	35.5	13	0.19
<i>Raja clavata</i>	RAJIDAE	1	21.5	2	62.25 4.6	2	21.25 1.06	3	19.67 1.15	6	72.92 4.84	2	52.25 32.88	13	0.19
<i>Serranus cabrilla</i>	SERRANIDAE	1	(n.m.)	2	(n.m.)	1	(n.m.)	2	(n.m.)	3	20.17 1.63	2	-	12	0.18
<i>Torpedo marmorata</i>	TORPEDINIDAE	4	45.13 15.34	3	53.83 3.69			2	(n.m.)	3	(n.m.)	2	-	11	0.16
<i>Scyliorhinus canicula</i>	SCYLIORHINIDAE	3	49.33 16.54	1	53	3	55 2.65	1	62.5	3	38.5 2.65	1	51	9	0.13
<i>Lophius budegassa</i>	LOPHIDAE	2	30.75 1.06	1	28.5	2	32 0.71	2	(n.m.)	4	(n.m.)	2	50 2.83	8	0.12
<i>Solea senegalensis</i>	SOLEDAE													6	0.09
<i>Octopus vulgaris</i>	OCTOPODIDAE													5	0.07
<i>Rajidae spp.</i>	RAJIDAE														

(To be concluded in next page)

Table 3.2.1.1.2. Concluded.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total %			
		90/500		90/600		100/500		100/600		110/500		110/600					
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	s.d.	s.d.
<i>Cancer pagurus</i>	CANCERIDAE	1	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	2	(n.m.)	-	-	4	0.06
<i>Necora puber</i>	PORTUNIDAE	1	(n.m.)	2	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	-	-	4	0.06
<i>Palinurus elephas</i>	PALINURIDAE	3	24	3.61	1	26.5	2	30	5.66	1	16	1	(n.m.)	-	-	4	0.06
<i>Asparigla cuculus</i>	TRIGLIDAE	1	103	-	2	94.5	2	94.5	44.55	1	48	1	55	-	-	3	0.04
<i>Diplobidus vulgaris</i>	TRIPALIDAE	1	82.5	-	2	85.25	1	28.5	1.77	1	37	1	42	-	-	3	0.04
<i>Psetta maxima</i>	SCORPTHALMIDAE	1	37.5	-	1	(n.m.)	1	(n.m.)	-	1	42	1	42	-	-	2	0.03
<i>Raja undulata</i>	RAJIDAE	1	37.5	-	2	26.5	7.07	1	12.5	1	12.5	1	12.5	-	-	2	0.03
<i>Symphodus spp.</i>	LABRIDAE	1	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	1	(n.m.)	1	(n.m.)	-	-	2	0.03
<i>Boops boops</i>	SPARIDAE	2	13.5	3.54	1	44.5	-	1	44.5	1	52	1	52	-	-	2	0.03
<i>Homarus gammarus</i>	NEPHROPIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	2	0.03
<i>Lepidorhombus whiffiagonis</i>	SCORPTHALMIDAE	1	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	1	120	1	120	-	-	1	0.01
<i>Loligo vulgaris</i>	LOLIGINIDAE	1	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	1	26	1	26	-	-	1	0.01
<i>Myliobatis aquila</i>	MYLIOBATIDAE	2	13.5	3.54	1	44.5	-	1	44.5	1	52	1	52	-	-	2	0.03
<i>Pollachius pollachius</i>	GADIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	2	0.03
<i>Scopaeana notata</i>	SCORPAENIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	2	0.03
<i>Aloea spp.</i>	CLUPEIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Baliste s. carolinensis</i>	BALISTIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Conger conger</i>	CONGRIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Dicologlossa cuneata</i>	SOLEIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Labrus bimaculatus</i>	LABRIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Mola mola</i>	MOLIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Mugilidae spp.</i>	MUGILIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Penaeus spp.</i>	PENAEIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Scopaeana porcus</i>	SCORPAENIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Trechurus mediterraneus</i>	CARANGIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
<i>Zeus faber</i>	ZEIDAE	1	40	-	1	27	-	1	27	1	26	1	26	-	-	1	0.01
Total		1302	28	-	1196	1061	1144	987	1035	6725							

**Table 3.2.1.1.3. Basque Country. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Spring fishing trials (13 fishing trials). Note: n.m.: no measure taken.**

Species	Families	Inner panel /Outer panel mesh size (mm)												Total	%						
		90/500		90/600		100/500		100/600		110/500		110/600									
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.					
<i>Trachinus draco</i>	TRACHINIDAE	96	22.8	2.28	127	23.06	2.73	71	22.41	2.72	97	22.87	2.51	24	23.23	2.25	72	23.25	2.43	487	14.94
<i>Solea vulgaris</i>	SOLEDAE	79	30.47	4.44	72	29.6	4.63	100	32.03	3.99	76	30.77	4.42	54	33.6	4.83	41	34.1	4.31	422	12.95
<i>Lophius piscatorius</i>	LOPHIDAE	49	39.18	16.38	36	35.57	11.09	58	33.09	9.49	43	36.23	12.1	44	36.22	11.89	57	37.56	13.48	287	8.81
<i>Trisopterus luscus</i>	GADIDAE	36	22.2	4.87	23	21.9	4.29	36	20.48	2.7	36	19.93	1.92	45	20.59	2.17	30	20.44	1.78	206	6.32
<i>Aspirtigia obscura</i>	TRIGLIDAE	37	25.29	3.67	37	24.55	4.54	30	25.98	4.41	31	26.52	3.9	23	25.63	3.34	21	26	2.82	179	5.49
<i>Solea lascaris</i>	SOLEDAE	46	24.7	3.14	41	24.76	2.93	26	24.48	2.29	18	25.06	2.23	10	25.72	3.73	14	26.57	2.44	155	4.76
<i>Merluccius merluccius</i>	MERLUCCIIDAE	30	23.64	2.22	26	24.45	5.47	24	23.56	2.01	31	23.43	2.01	10	23.78	1.28	18	24.63	1.42	139	4.27
<i>Torpedo marmorata</i>	TORPEDINIDAE	15	(n.m.)	-	16	(n.m.)	-	23	(n.m.)	-	21	(n.m.)	-	27	(n.m.)	-	28	(n.m.)	-	130	3.99
<i>Solea senegalensis</i>	SOLEDAE	22	30	2.57	19	29.61	2.92	19	31.34	4.49	27	30.96	2.43	20	32.25	2.39	17	33.26	3.46	124	3.81
<i>Trigla lucerna</i>	TRIGLIDAE	19	31.41	4.77	26	30.22	6.38	19	31.08	4.9	17	29.94	6.9	12	30.9	4.54	9	31.22	3.54	102	3.13
<i>Sepla officinalis</i>	SEPIDAE	15	16.87	2.52	14	18.07	3.96	20	19.05	4.87	15	18.73	3.73	20	21.03	5.04	12	18.79	2.01	96	2.95
<i>Micromesistius portosus</i>	GADIDAE	18	23.5	2.22	14	22	2.37	14	23.15	2.35	21	23.9	3.09	7	21.33	2.36	9	23.86	2.73	83	2.55
<i>Maja squinado</i>	MAJIDAE	18	(n.m.)	-	12	(n.m.)	-	6	(n.m.)	-	12	(n.m.)	-	13	(n.m.)	-	17	(n.m.)	-	78	2.39
<i>Diplodus sargus</i>	SPARIDAE	22	25.11	2.56	10	25.6	2.48	7	24.79	2.53	8	26.75	2.82	8	28.75	1.36	11	30.75	5.95	66	2.03
<i>Pleuronectes platessa</i>	PLEURONECTIDAE	3	31.83	1.53	2	36	0.71	8	28.31	5.04	8	30.21	5.71	15	28.8	5.43	27	30.09	4.21	63	1.93
<i>Trachurus trachurus</i>	CARANGIDAE	30	26.86	5.85	5	33.25	1.5	2	33	-	16	25.37	4.45	3	31	-	5	27.7	3.42	61	1.87
<i>Aspirtigia cuculus</i>	TRIGLIDAE	10	20.71	3.73	13	19.64	1.38	10	21.69	4.77	8	20.29	1.78	9	19.61	3.77	6	19.5	1.41	56	1.72
<i>Micrechius variegatus</i>	SOLEDAE	10	15.17	1.27	14	15.18	1.48	7	15.14	1.86	7	16.58	1.8	4	16.38	0.95	6	18.17	2.25	48	1.47
<i>Dicologlossa cuneata</i>	SOLEDAE	13	22.77	2.14	8	24	2.46	10	23.89	2.75	2	24.5	0.71	4	22.75	1.55	4	23.13	1.03	41	1.26
<i>Callionymus lyra</i>	CALLIONYMIDAE	7	24.75	2.23	8	22.33	2.6	3	23.5	0.5	6	23.3	1.57	4	24.25	4.41	7	23.07	4.28	35	1.07
<i>Raja montagui</i>	RAJIDAE	4	35.88	6.34	4	45.63	12.27	3	37.17	1.44	3	50.33	13.38	10	43.35	7.03	5	48	11.06	29	0.89
<i>Mullus surmuletus</i>	MULLIDAE	9	29.29	7.3	8	27.64	7.63	4	24	2.12	3	22.75	3.18	1	24	-	3	27.5	0.71	28	0.86
<i>Cancer pagurus</i>	CANCERIDAE	3	(n.m.)	-	4	(n.m.)	-	2	(n.m.)	-	9	(n.m.)	-	3	(n.m.)	-	6	(n.m.)	-	27	0.83
<i>Raja undulata</i>	RAJIDAE	6	62.17	15.12	3	67	18.86	4	69.25	22.44	7	55.29	9.71	5	55.5	10.65	2	70.75	10.25	27	0.83
<i>Scyllorhinus canalicula</i>	SCYLLORHINIDAE	8	52.63	2.34	9	53	2.63	2	52.75	2.47	3	43.33	16.4	3	50.83	2.36	2	50.75	0.35	27	0.83
<i>Mugil chelo</i>	MUGILIDAE	5	44.9	2.46	1	(n.m.)	-	4	18.88	0.85	10	44.5	3.82	2	54.25	1.77	7	45.86	7.45	25	0.77
<i>Pagellus acame</i>	SPARIDAE	1	21.5	-	6	26.8	6.3	4	18.88	0.85	6	22.6	6.11	1	33.5	-	6	18.75	1.33	24	0.74
<i>Psetta maxima</i>	SCORPETHALMIDAE	3	33.25	3.89	3	31.83	1.76	4	30.75	6.2	2	36.75	6.72	2	28.25	2.47	7	31.14	5.99	21	0.64
<i>Scorpaena porcus</i>	SCORPAENIDAE	3	25.5	1	3	31	2.83	6	25.58	1.83	6	25.5	3.15	2	26.75	2.47	2	26.75	2.47	20	0.81
<i>Boops boops</i>	SPARIDAE	2	36	2.83	5	32.83	9.41	3	29.67	9.12	1	26	-	1	20.5	-	1	20.5	-	12	0.37
<i>Raja clavata</i>	RAJIDAE	3	66.67	10.02	2	58.25	7.42	2	58.25	7.42	2	58.25	1.06	3	43.83	3.4	2	42	5.66	12	0.37
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	2	35.5	6.36	2	44	4.24	1	44	-	2	44	2.83	2	42.5	3.54	3	37.83	4.86	12	0.37
<i>Spondiliosoma cantharus</i>	SPARIDAE	1	29.5	-	4	28.88	2.78	1	30.5	-	4	28.75	2.22	1	18.5	-	1	31	-	12	0.37
<i>Lophius budegassa</i>	LOPHIDAE	2	59.5	0.71	2	63.5	17.68	4	55.75	8.26	4	55.75	8.26	2	53.25	15.2	2	53.25	15.2	10	0.31
<i>Pagellus erythrinus</i>	SPARIDAE	1	21	-	5	26	9.97	5	26	9.97	2	24.5	12.73	1	32	-	2	24.5	12.73	9	0.28

(To be concluded in next page)

Table 3.2.1.1.3. Concluded.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%
		90/500		90/600		100/500		100/600		110/500		110/600			
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)		
<i>Sciaena umbra</i>	SCIAENIDAE	4	26.88	4	29	1	29	1	29	1	29	1	29	9	0.28
<i>Scomber scombrus</i>	SCOMBERIDAE	3	(n.m.)	1	39	8	36.93	1	36.93	1	36.93	1	36.93	9	0.28
<i>Sardina pilchardus</i>	CLUPEIDAE	3	(n.m.)	2	19.25	2	17.5	2	17.5	1	40.5	2	42	7	0.22
<i>Aloea</i> spp.	CLUPEIDAE	3	(n.m.)	3	60	2	(n.m.)	2	(n.m.)	1	(n.m.)	2	(n.m.)	6	0.18
<i>Homarus gammarus</i>	NEPHROPIDAE	2	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	1	(n.m.)	2	(n.m.)	6	0.18
<i>Palinurus elephas</i>	PALINURIDAE	1	26	1	27	2	25.75	2	25.75	2	25.75	1	29	6	0.18
<i>Symphodus</i> spp.	LABRIDAE	2	42	1	39.5	1	43	1	43	1	43	1	47.5	6	0.18
<i>Dicentrarchus labrax</i>	MORONIDAE	2	42	1	39.5	1	43	1	43	1	43	1	47.5	5	0.15
<i>Lithognathus mormyrus</i>	SPARIDAE	3	32.17	1	104	2	(n.m.)	2	(n.m.)	2	(n.m.)	2	(n.m.)	5	0.15
<i>Necora puber</i>	PORTUNIDAE	3	32.17	1	104	2	(n.m.)	2	(n.m.)	2	(n.m.)	2	(n.m.)	5	0.15
<i>Trisopterus minutus</i>	GADIDAE	3	15.33	1	14	1	18	1	18	1	18	1	18.25	5	0.15
<i>Lepidion lepisosteus</i>	SCORTHALMIDAE	3	15.33	1	16.5	1	39	1	39	2	26	2	26	4	0.12
<i>Lepidion lepisosteus</i>	SCORTHALMIDAE	3	15.33	1	16.5	1	39	1	39	2	26	2	26	4	0.12
<i>Diplodus vulgaris</i>	SPARIDAE	1	(n.m.)	1	39	2	(n.m.)	2	(n.m.)	2	(n.m.)	2	(n.m.)	3	0.09
<i>Myliobatis aquila</i>	MYLIOBATIDAE	1	(n.m.)	1	39	2	(n.m.)	2	(n.m.)	2	(n.m.)	2	(n.m.)	3	0.09
<i>Octopus vulgaris</i>	OCTOPODIDAE	2	52	1	42.5	1	42.5	1	42.5	1	42.5	1	42.5	3	0.09
<i>Spanus aurata</i>	SPARIDAE	1	22.5	1	35	1	35	1	35	1	35	1	35	3	0.09
<i>Trigidae</i> spp.	TRIGIDAE	1	22.5	1	35	1	35	1	35	1	35	1	35	3	0.09
<i>Ctenolabrus rupestris</i>	LABRIDAE	1	22.5	1	35	1	35	1	35	1	35	1	35	2	0.06
<i>Scomber japonicus</i>	SCOMBERIDAE	1	(n.m.)	1	35	1	35	1	35	1	35	1	35	2	0.06
<i>Serranus cabrilla</i>	SERRANIDAE	1	(n.m.)	1	35	1	35	1	35	1	35	1	35	2	0.06
<i>Spanus pagrus</i>	SPARIDAE	1	31	1	31	1	31	1	31	1	31	1	31	2	0.06
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	31	1	31	1	31	1	31	1	31	1	31	2	0.06
<i>Zeus faber</i>	ZEIDAE	1	31	1	31	1	31	1	31	1	31	1	31	2	0.06
<i>Belone belone</i>	BELONIDAE	1	66	1	13	1	13	1	13	1	13	1	13	2	0.06
<i>Galeorhinus galeus</i>	TRIAXIDAE	1	66	1	13	1	13	1	13	1	13	1	13	2	0.06
<i>Rajidae</i> spp.	RAJIDAE	1	66	1	13	1	13	1	13	1	13	1	13	2	0.06
<i>Sarda sarda</i>	SCOMBERIDAE	1	68.5	1	92	1	92	1	92	1	92	1	92	1	0.03
<i>Scorpaena notata</i>	SCORPAENIDAE	1	42.5	1	11	1	11	1	11	1	11	1	11	1	0.03
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	42.5	1	11	1	11	1	11	1	11	1	11	1	0.03
<b>Total</b>		<b>655</b>		<b>603</b>		<b>548</b>		<b>578</b>		<b>402</b>		<b>473</b>		<b>3259</b>	

**Table 3.2.1.1.4. Basque Country. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Summer fishing trials (12 fishing trials). Note: n.m.: no measure taken.**

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%						
		90/500		90/600		100/500		100/600		110/500		110/600									
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		
<i>Trachinus draco</i>	TRACHINIDAE	164	24.8	3.11	163	24.57	3.39	92	24.65	2.97	113	25.05	3.01	73	25.79	3.88	69	25.52	3.73	674	19.51
<i>Solea vulgaris</i>	SOLEDAE	103	29.36	4.68	88	29.18	4.4	90	30.48	3.67	89	31.5	4.74	74	33.55	5.26	60	33.03	5.36	504	14.59
<i>Solea senegalensis</i>	SOLEDAE	62	30.04	2.51	57	29.68	3.56	72	30.71	1.84	64	30.02	2.97	42	31.75	2.85	40	31.66	2.25	337	9.75
<i>Sardinia pilchardus</i>	CLUPEIDAE	32	20.23	2.39	49	19.93	1.5	18	19.12	1.95	36	19.59	1.34	15	21.65	3.13	28	19.74	1.91	178	5.15
<i>Trisopterus luscus</i>	GADIDAE	43	19.71	6.89	44	20.39	6.91	28	20.18	5.25	28	18.46	5.27	13	18.57	3.83	16	21.56	5.21	172	4.98
<i>Sciaenops ocellatus</i>	SCIAENIDAE	49	29.99	4.48	47	29.06	2.51	33	28.91	4.41	18	29.94	1.8	6	28.17	5.08	7	32.29	3.36	160	4.63
<i>Trigla lucerna</i>	TRIGLIDAE	51	27.68	5.75	33	30.97	4.56	15	29.04	6.41	16	27.44	6.89	23	28.09	6.83	19	27.55	4.59	157	4.54
<i>Sepia officinalis</i>	SEPIDAE	33	15.18	1.98	17	14.41	1.16	18	15.61	1.2	21	16.55	2.79	12	16.67	0.96	14	17.39	1.76	115	3.33
<i>Trachurus trachurus</i>	CARANGIDAE	26	25.41	5.73	18	25.93	5.68	17	25.09	5.51	18	24.68	5.97	10	25.5	3.06	24	25.44	5.5	113	3.27
<i>Maja squinado</i>	MAJIDAE	19	(n.m.)	-	20	(n.m.)	-	19	(n.m.)	-	18	(n.m.)	-	20	(n.m.)	-	14	(n.m.)	-	110	3.18
<i>Raja undulata</i>	RAJIDAE	10	52.1	21.11	8	54	14.34	10	55.5	15.69	10	57.1	18.17	35	54.76	18.29	23	57.26	15.46	96	2.78
<i>Merluccius merluccius</i>	MERLUCCIIDAE	19	32.53	7.81	12	40.5	13.04	8	40.92	11.51	15	31.5	9.58	10	29.22	3.05	8	37.83	4.91	72	2.08
<i>Scorpaena porcus</i>	SCORPAENIDAE	11	25.82	2.46	13	27.63	3.51	8	27.5	3.54	10	26.44	4.13	10	28.6	3.45	8	28.94	1.64	60	1.74
<i>Aspirtigia obscura</i>	TRIGLIDAE	8	25.43	3.19	5	23.4	2.9	11	25.88	3.15	12	27.13	2.81	9	25.38	1.85	12	26.89	3.67	57	1.65
<i>Micromesistius poulassou</i>	GADIDAE	7	23.63	1.89	7	23.17	2.31	11	23.87	2.4	11	24	2.45	7	22.5	2.78	13	23.36	1.68	56	1.82
<i>Boops boops</i>	SPARIDAE	24	33.75	2.05	5	34.2	0.76	3	34.5	-	2	34.5	0.71	5	32.33	2.02	3	33.5	-	42	1.22
<i>Lophius piscatorius</i>	LOPHIDAE	6	33.08	12.74	2	31	0.71	11	29.86	4.52	4	30.5	3.76	7	29.92	6.41	10	31.35	4.92	40	1.16
<i>Pagellus erythrinus</i>	SPARIDAE	12	30.38	4.74	4	29.5	2.2	8	33.19	3.82	11	35.8	2.77	1	18.5	-	1	37	-	37	1.07
<i>Lithognathus mormyrus</i>	SPARIDAE	9	32.28	2.64	7	30.93	1.88	5	33.4	4.83	8	33	1.79	2	37.75	1.06	3	38	2	34	0.98
<i>Mola mola</i>	MOLIDAE	6	46.25	3.97	3	47.83	5.01	4	46.88	4.55	8	46.31	8.51	2	41.5	2.83	9	44.33	2.88	32	0.93
<i>Mullus surmuletus</i>	MULLIDAE	7	28	6.75	4	26.38	7.7	6	26.42	4.8	5	22.75	1.77	5	23.17	2.25	5	26.5	4.77	32	0.93
<i>Solea lascaris</i>	SOLEDAE	12	25.42	3.59	8	24.44	2.09	2	26.25	1.06	4	24.13	1.03	1	28	-	3	25.83	1.76	30	0.87
<i>Triglide spp.</i>	TRIGLIDAE	4	24.5	5.08	4	22.25	1.26	3	24	3.12	13	22.54	2	1	25	-	5	22.9	1.64	30	0.87
<i>Torpedo marmorata</i>	TORPEDINIDAE	3	(n.m.)	-	5	(n.m.)	-	3	(n.m.)	-	2	(n.m.)	-	7	(n.m.)	-	6	(n.m.)	-	26	0.75
<i>Raja montagui</i>	RAJIDAE	2	42	23.33	2	57.75	45.61	6	30.25	5.59	2	32.25	8.13	6	47.5	22.04	5	49.7	28.46	23	0.67
<i>Scorpaena notata</i>	SCORPAENIDAE	6	16.7	1.64	1	16	-	7	16.86	1.91	3	16.5	0.5	4	(n.m.)	-	4	(n.m.)	-	22	0.64
<i>Pallinurus eiephas</i>	PALINURIDAE	3	(n.m.)	-	2	(n.m.)	-	5	(n.m.)	-	1	(n.m.)	-	3	22.17	0.76	4	(n.m.)	-	19	0.55
<i>Aspirtigia cucullis</i>	TRIGLIDAE	2	22	-	5	24.6	2.19	4	24.13	2.02	3	23	-	5	34.5	-	1	(n.m.)	-	18	0.52
<i>Scorpaenopsis japonicus</i>	SCORPAENIDAE	2	35	-	4	31.17	8.84	2	25	12.73	3	23	-	5	36.2	1.96	3	35.5	3.77	17	0.49
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	1	35	-	2	41.75	3.89	5	36.13	1.93	1	34.5	-	5	36.2	1.96	3	35.5	3.77	17	0.49
<i>Psetta maxima</i>	SCOPHTHALMIDAE	2	34.5	3.54	2	36	4.24	2	31	-	2	36.5	2.12	3	35.83	2.25	4	36	3.92	15	0.43
<i>Necora puber</i>	PORTUNIDAE	1	(n.m.)	-	1	(n.m.)	-	6	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	-	4	(n.m.)	-	13	0.38
<i>Pleuronectes platessa</i>	PLEURONECTIDAE	1	(n.m.)	-	2	24.5	7.07	3	20.5	-	1	20	-	2	27	-	2	20.75	1.06	11	0.32
<i>Pagellus acarne</i>	SPARIDAE	1	(n.m.)	-	2	24.5	7.07	3	20.5	-	1	20	-	2	27	-	2	20.75	1.06	11	0.32
<i>Diplodus sargus</i>	SPARIDAE	3	28.33	4.16	3	28.33	4.16	3	28.33	4.16	3	28.17	4.04	1	30.5	-	3	31.83	4.31	10	0.29

(To be concluded in next page)

Table 3.2.1.1.4. Concluded.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total %							
		90/500		100/500		90/600		100/500		100/600		110/500			110/600						
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	s.d.	s.d.		
<i>Engraulis encrasicolus</i>	ENGRAULIDAE	2	13	0.71	2	13	2	13	0.29	3	13.17	0.29	1	(n.m.)	1	(n.m.)	1	13.5	-	9	0.26
<i>Homerus gammarus</i>	NEPHROPIDAE	2	(n.m.)	-	2	(n.m.)	2	(n.m.)	-	1	(n.m.)	-	2	(n.m.)	2	(n.m.)	1	(n.m.)	-	8	0.23
<i>Lophius budegassa</i>	LOPHIDAE	4	57.63	6.1	1	47.5	1	57.5	-	1	47.5	-	1	57.5	1	57.5	1	63.75	6.01	8	0.23
<i>Dicologlossa cuneata</i>	SOLEDAE	1	25.5	-	4	24.13	0.75	1	21.5	4	24.13	0.75	2	25	1.41	2	21.5	0.71	7	0.2	
<i>Callionymus lyra</i>	CALLIONYMIDAE	3	50.17	3.33	1	50	-	3	22.17	1	50	-	2	53	-	1	17	-	6	0.17	
<i>Galeorhinus galeus</i>	TRIAKIDAE	1	19	-	1	(n.m.)	-	1	(n.m.)	1	17	-	1	17	-	1	16.5	-	6	0.17	
<i>Pagellus centrodontus</i>	SPARIDAE	1	67	-	3	51.67	2.47	1	65.5	1	65.5	-	2	57.5	3.54	2	59.5	0.71	6	0.17	
<i>Raja haueus</i>	RAJIDAE	1	67	-	1	44	-	1	65.5	3	51.67	2.47	1	53	-	1	56	-	6	0.17	
<i>Sarda sarda</i>	SCOMBRIDAE	3	37	3.5	1	44	-	1	44	1	44	-	1	48	-	1	48	-	5	0.15	
<i>Dicentrarchus labrax</i>	MORONIDAE	2	27.5	3.54	1	26.5	-	1	26.5	1	26.5	-	1	19	-	1	17	-	5	0.15	
<i>Sparus pagrus</i>	SPARIDAE	2	27.5	3.54	1	26.5	-	1	26.5	1	26.5	-	1	40	-	2	39	0.71	4	0.12	
<i>Balistes carolinensis</i>	BALISTIDAE	2	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	1	(n.m.)	-	1	67	-	1	(n.m.)	-	4	0.12	
<i>Cancer pagurus</i>	CANCERIDAE	2	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	1	(n.m.)	-	1	67	-	1	(n.m.)	-	4	0.12	
<i>Myliobatis aquila</i>	MYLIOBATIDAE	2	(n.m.)	-	1	(n.m.)	-	2	58	1	(n.m.)	-	2	58	-	1	67	-	4	0.12	
<i>Octopus vulgaris</i>	OCTOPODIDAE	1	47	-	2	(n.m.)	-	2	(n.m.)	1	(n.m.)	-	1	54	-	1	77	-	4	0.12	
<i>Raja clavata</i>	RAJIDAE	1	47	-	1	52	-	1	52	1	54	-	1	52	-	1	50.5	-	4	0.12	
<i>Scyllorhinus canicula</i>	SCYLIORHINIDAE	2	14.5	-	1	61	-	1	61	1	61	-	1	(n.m.)	-	1	22	-	4	0.12	
<i>Senanus cabrilla</i>	SERRANIDAE	2	14.5	-	2	20	0.71	2	20	2	20	0.71	1	(n.m.)	-	1	26	-	4	0.12	
<i>Trachurus mediterraneus</i>	CARANGIDAE	2	14.5	-	2	20	0.71	2	20	2	20	0.71	1	(n.m.)	-	1	26	-	4	0.12	
<i>Mugil chelo</i>	MUGILIDAE	2	14.5	-	2	20	0.71	2	20	2	20	0.71	1	(n.m.)	-	1	26	-	4	0.12	
<i>Rajidae spp.</i>	RAJIDAE	1	23	-	1	23	-	1	23	1	23	-	1	24	-	1	24	-	2	0.06	
<i>Lepidorhombus whiffiagonis</i>	SCORTHALMIDAE	1	15	-	1	15	-	1	15	1	15	-	1	15	-	1	15	-	2	0.06	
<i>Penaeus spp.</i>	PENAEIDAE	1	28	-	1	28	-	1	28	1	28	-	1	28	-	1	28	-	1	0.03	
<i>Scomber scombrus</i>	SCOMBRIDAE	1	28	-	1	28	-	1	28	1	28	-	1	28	-	1	28	-	1	0.03	
<i>Spondilosoma cantharus</i>	SPARIDAE	1	28	-	1	28	-	1	28	1	28	-	1	28	-	1	28	-	1	0.03	
<i>Symphodus spp.</i>	LABRIDAE	1	28	-	1	28	-	1	28	1	28	-	1	28	-	1	28	-	1	0.03	
<b>Total</b>		<b>766</b>			<b>671</b>			<b>559</b>		<b>569</b>			<b>437</b>		<b>453</b>					<b>3455</b>	

**Table 3.2.1.1.5. Basque Country. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Autumn fishing trials (12 fishing trials). Note: n.m.: no measure taken.**

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%	
		90/500		90/600		100/500		100/600		110/500		110/600				
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.
<i>Trisopterus luscus</i>	GADIDAE	205	25.99	5.15	199	25.56	5.58	129	22.65	5.72	139	24.23	6.27	96	23.23	5.79
<i>Solea vulgaris</i>	SOLEDAE	122	31.01	3.13	98	31.4	3.8	133	32.87	4.12	103	32.87	3.96	89	35.86	5.11
<i>Merluccius merluccius</i>	MERLUCCIIDAE	113	33.6	13.34	107	33.03	11.14	82	33.05	11.42	80	32.92	13.17	70	32.84	8.05
<i>Trigla lucerna</i>	TRIGLIDAE	56	33.19	5.3	57	33.58	5.27	41	36.78	8.65	60	35.36	7.25	42	36.28	7.74
<i>Trachinus draco</i>	TRACHINIDAE	47	24.19	3.11	34	23.91	2.65	28	23.6	1.99	27	23.62	3.88	17	24.04	3.61
<i>Microchirus variegatus</i>	SOLEDAE	47	18.41	7.31	38	17.37	3.04	27	17.37	1.88	24	17.21	1.23	12	17.38	1.15
<i>Maja squinado</i>	MAJIDAE	18	(n.m.)	-	18	(n.m.)	-	28	(n.m.)	-	16	(n.m.)	-	22	(n.m.)	-
<i>Sepia officinalis</i>	SEPIDAE	29	20.45	2.43	10	19	2.58	14	20.79	1.39	18	24.44	13.38	31	19.47	2.91
<i>Lophius piscatorius</i>	LOPHIDAE	13	26.77	12.72	15	22.93	5.29	17	30.62	17.52	12	25.29	9.74	13	33	17.26
<i>Sciaenops ocellatus</i>	SCIAENIDAE	21	29.05	3.37	32	29.54	5.06	16	30	2.59	9	29.19	2.28	5	27.75	2.9
<i>Scyllorhinus stellaris</i>	SCYLLORHINIDAE	20	53.24	3.83	21	52.02	2.62	3	52.17	1.89	5	53.3	2.02	4	51.25	4.03
<i>Raja montagui</i>	RAJIDAE	6	43.7	17.18	5	44.6	13.39	3	45.5	25.56	5	42.88	7.72	12	42.17	13.09
<i>Aspirtigla obscura</i>	TRIGLIDAE	6	24.3	2.77	4	22.25	4.63	7	24.75	2.4	10	24.31	4.62	4	29.38	10.76
<i>Raja clavata</i>	RAJIDAE	7	46	18.85	4	49.63	24.78	11	40.55	13.62	6	44.42	16.68	3	41.17	4.75
<i>Trachurus trachurus</i>	CARANGIDAE	13	26.32	4.51	2	29.75	6.01	4	27.38	2.17	2	27	1.41	8	26.75	2.45
<i>Aspirtigla cucullus</i>	TRIGLIDAE	8	27.88	2.52	1	25	-	5	26.3	1.96	5	21.9	7.41	4	26	2.27
<i>Trisopterus minutus</i>	GADIDAE	1	29	-	5	18.7	1.68	8	18.5	1.19	3	17.33	0.29	5	20.75	2.63
<i>Sardina pilchardus</i>	CLUPEIDAE	1	29	-	13	21.93	0.79	2	21.75	1.77	5	21.33	0.58	1	21.5	-
<i>Mullus surmuletus</i>	MULLIDAE	6	29.63	5.48	3	28.5	3.54	3	23.5	0.5	4	27.5	-	1	21.5	-
<i>Micromesistius poulassou</i>	GADIDAE	3	20.17	1.76	3	20.17	1.61	9	23.58	7.24	1	21.5	-	6	27.67	3.76
<i>Pagellus acarne</i>	SPARIDAE	3	30.83	0.76	4	31.38	0.75	1	21.5	-	6	33.33	2.31	4	28.13	4.53
<i>Scomber japonicus</i>	SCOMBRIDAE	2	30	-	2	33	5.66	1	31	-	6	33.33	2.31	2	30	-
<i>Palinurus elephas</i>	PALINURIDAE	1	(n.m.)	-	1	(n.m.)	-	2	(n.m.)	-	1	(n.m.)	-	2	(n.m.)	-
<i>Spondilosoma cantharus</i>	SPARIDAE	2	31.75	4.6	1	30.5	-	2	31.25	0.35	5	31.8	5.2	2	31.75	0.35
<i>Dicentrarchus labrax</i>	MORONIDAE	1	50	-	2	75	9.9	2	49.5	0.71	1	47	-	1	47	-
<i>Scomber scombrus</i>	SCOMBRIDAE	1	128	-	3	37	-	1	45	-	1	36.5	-	3	31.67	4.16
<i>Galeorhinus galeus</i>	TRIAKIDAE	1	43	-	1	64	-	5	84.6	25.34	2	81.75	1.77	1	54.5	-
<i>Lophius budegassa</i>	LOPHIDAE	1	43	-	1	22.5	-	1	59.5	-	2	61.75	1.77	1	54.5	-
<i>Raja undulata</i>	RAJIDAE	3	67.67	22.88	3	(n.m.)	-	1	65	-	3	47.67	9	2	45.25	2.47
<i>Scorpaenopsis rhombus</i>	SCORPHALIDAE	1	43	-	1	22.5	-	1	65	-	3	47.67	9	2	45.25	2.47
<i>Cancer pagurus</i>	CANCERIDAE	3	67.67	22.88	3	(n.m.)	-	1	65	-	3	47.67	9	2	45.25	2.47
<i>Raja brachyura</i>	RAJIDAE	1	23.5	-	2	23	1.41	2	26	0.71	1	(n.m.)	-	2	(n.m.)	-
<i>Solea lascaris</i>	SOLEDAE	1	(n.m.)	-	2	23	1.41	2	26	0.71	1	(n.m.)	-	1	49.5	-
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	-	1	(n.m.)	-	2	24.5	-
<i>Diplodus vulgaris</i>	SPARIDAE	1	27	-	2	24.25	1.77	1	(n.m.)	-	1	(n.m.)	-	2	(n.m.)	-

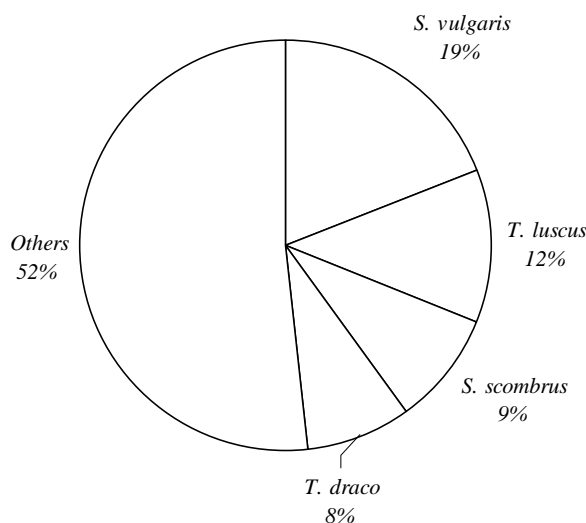
(To be concluded in next page)

Table 3.2.1.1.5. Concluded.

Species	Families	Inner panel / Outer panel mesh size (mm)												Total	%			
		90/500		90/600		100/500		100/600		110/500		110/600						
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	s.d.	s.d.	
<i>Rajidae</i> spp.	RAJIDAE	1	36	-	-	2	29.25	15.2	-	1	20	1	65.5	-	-	-	4	0.11
<i>Serranus cabrilla</i>	SERRANIDAE	1	23	-	-	1	22	-	1	(n.m.)	-	-	-	-	-	-	4	0.11
<i>Homarus gammarus</i>	NEPHROPIDAE	-	-	-	-	1	28	-	-	-	2	38	-	-	-	-	3	0.08
<i>Mustelus</i> spp.	TRIGLIDAE	1	71	-	-	1	68.5	-	1	69	-	-	-	-	-	-	3	0.08
<i>Triglide</i> spp.	TRIGLIDAE	1	(n.m.)	-	-	1	31	-	-	-	-	-	-	-	-	-	3	0.08
<i>Pagellus erythrinus</i>	SPARIDAE	1	(n.m.)	-	-	1	14.5	-	-	-	-	-	-	-	-	-	2	0.06
<i>Psetta maxima</i>	SCORPETHALMIDAE	1	43	-	-	1	44.5	-	1	44.5	-	-	-	-	-	-	2	0.06
<i>Scorpaena scrofa</i>	SCORPAENIDAE	-	-	-	-	-	-	-	-	-	1	33	-	-	-	-	2	0.06
<i>Scylorhinus canicula</i>	SCYLORHINIDAE	-	-	-	-	1	43	-	-	-	1	49.5	-	-	-	-	2	0.06
<i>Sparus aurata</i>	SPARIDAE	-	-	-	-	1	28	-	-	-	1	28	-	-	-	-	2	0.06
<i>Zeus faber</i>	ZEIDAE	-	-	-	-	2	26.75	2.47	-	-	2	26.75	2.47	-	-	-	2	0.06
<i>Belone belone</i>	BELONIDAE	-	-	-	-	1	(n.m.)	-	-	-	-	-	-	-	-	-	1	0.03
<i>Lepidorhombus whiffiagonis</i>	SCORPETHALMIDAE	1	19	-	-	-	-	-	-	-	1	48.5	-	-	-	-	1	0.03
<i>Mola mola</i>	MOLIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.03
<i>Mugil capito</i>	MUGILIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.03
<i>Necora puber</i>	PORTUNIDAE	1	(n.m.)	-	-	-	-	-	-	-	-	-	-	1	54.5	-	1	0.03
<i>Octopus vulgaris</i>	OCTOPODIDAE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.03
<i>Solea senegalensis</i>	SOLEIDAE	-	-	-	-	1	(n.m.)	-	-	-	-	-	-	-	-	-	1	0.03
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	43	-	-	-	-	-	-	-	-	-	-	1	33	-	1	0.03
Total general		767				590				573		473		505			3602	

Overall 17,041 specimens were caught, belonging to 79 species (70 fish species, 6 crustacean species and 3 cephalopod species). Twenty three species account for the 90% of the total catches in number. The number of individuals caught decreased with the increase of the mesh size in the inner panel of the trammel nets. Thus, 39% of the total specimens were fished with the combination of the 90/500 and 90/600 altogether; 33% with the combined 100/500 and 100/600 and 28% with 110/500 and 110/600. On the other hand, the increase in the mesh of the outer panel did not affect the catches in number (50,2% of the specimens caught in the three trammel nets types having 500 mm in the outer panel; 49,8% for those with 600mm).

The most abundant species were *Solea vulgaris* and *Trisopterus luscus*, 19.1 % and 12.0% of the total catches in number respectively (Figure 3.2.1.1.1), followed by *Scomber scombrus* (9.0%) and *Trachinus draco* (8.4%). Some other species caught in important numbers were *Sardina pilchardus* (5.8%) and *Merluccius merluccius* (5.7%); nevertheless, due to their pelagic or semi-pelagic habits, their appearance on the catches must be considered as accidental.

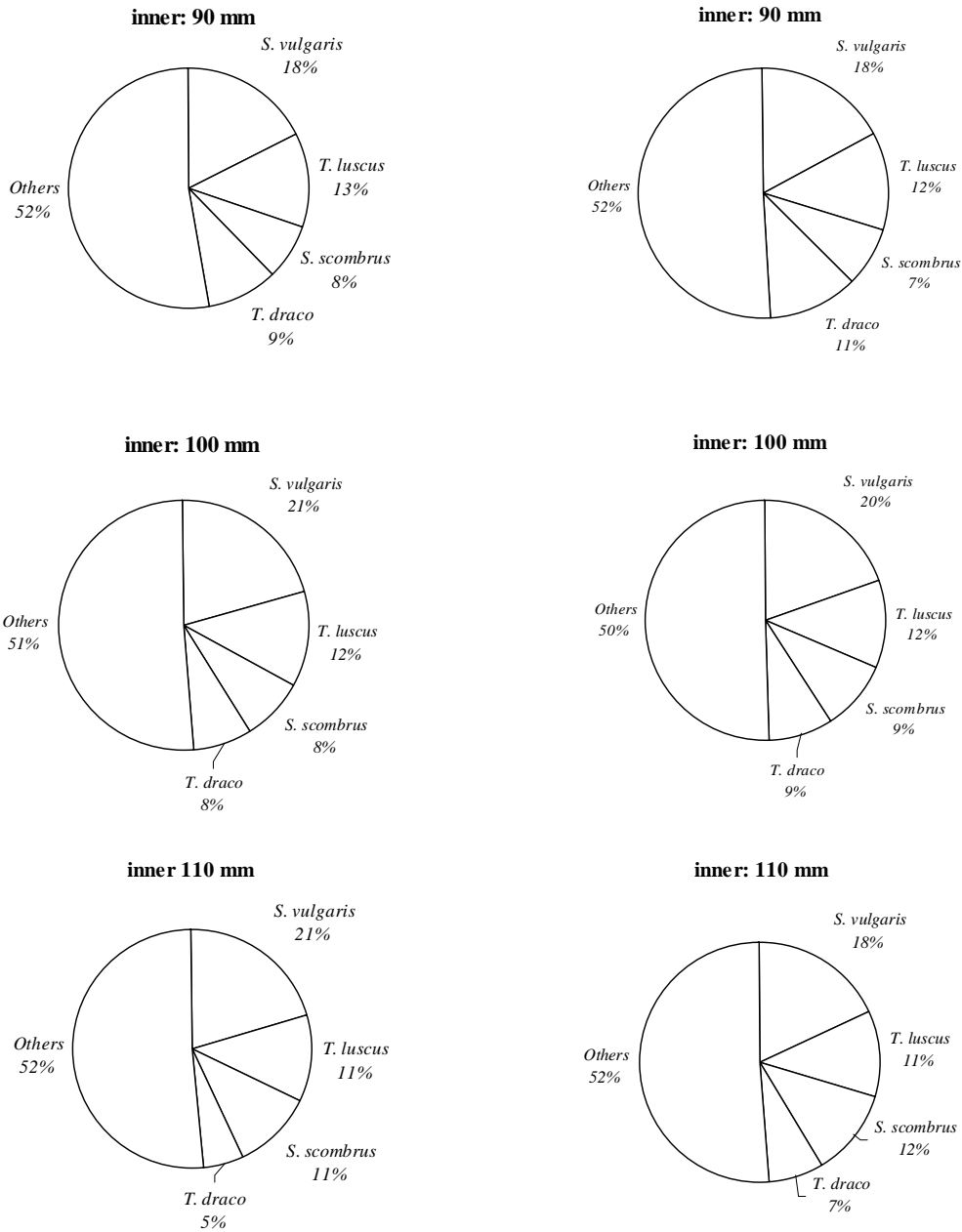


**Figure 3.2.1.1.1. Basque Country. Overall catch species composition of all inner/outer panel stretched mesh size combinations of trammel nets in terms of number.**

The dominance rank of the species was similar among the six mesh combinations of the inner and outer panels mesh size used in the trammel nets (Figure 3.2.1.1.2).

**Outer pannel mesh size: 500 mm**

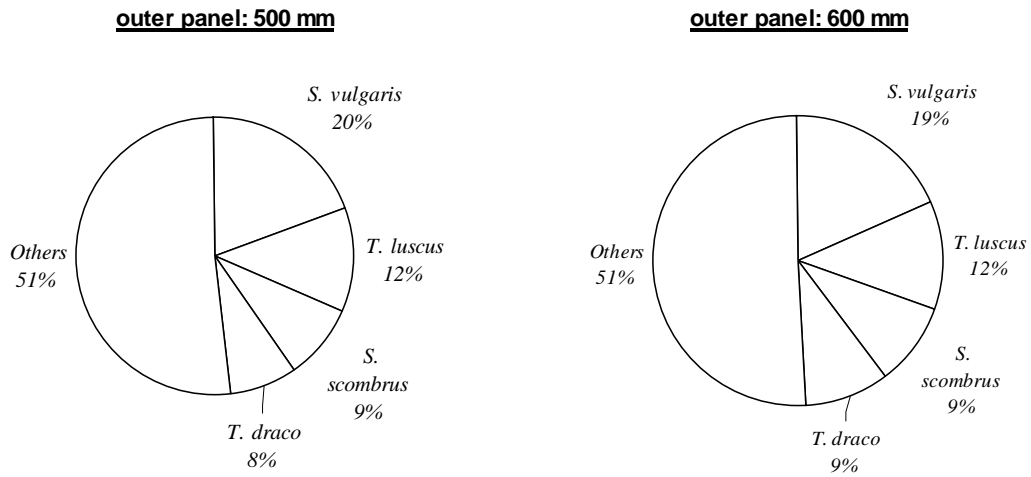
**Outer pannel mesh size: 600 mm**



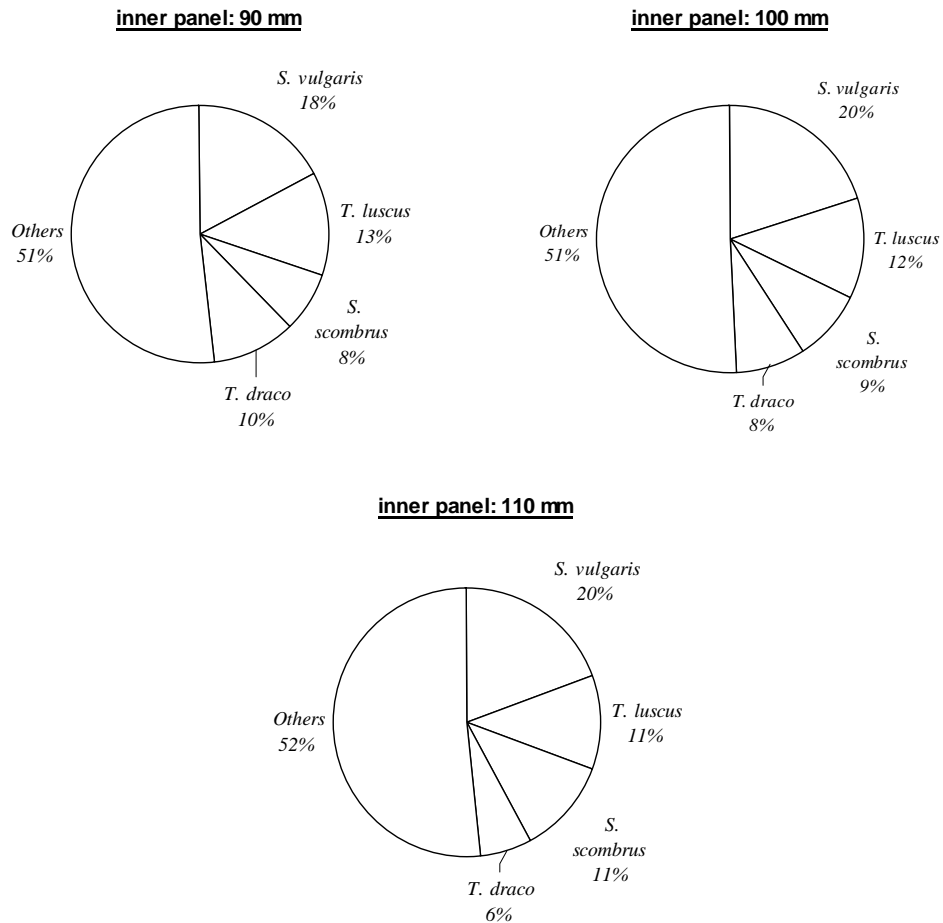
**Figure 3.2.1.1.2. Basque Country. Overall catch species composition of different outer/inner panel stretched mesh size combinations of trammel nets in terms of number.**

There were no significant differences in the proportions of the species caught depending on the mesh size in the outer panel of the trammel nets (Figure 3.2.1.1.3). Some slight differences in the proportion of species fished have been recorded between mesh sizes in the inner panel (Figure 3.2.1.1.4). Thus, small species like *Trisopterus luscus* and

*Trachinus draco* were caught in a slightly higher proportions in smaller mesh sizes of the inner panel, whereas medium size species like *Scomber scombrus* were fished in greater proportions with the bigger mesh sizes.

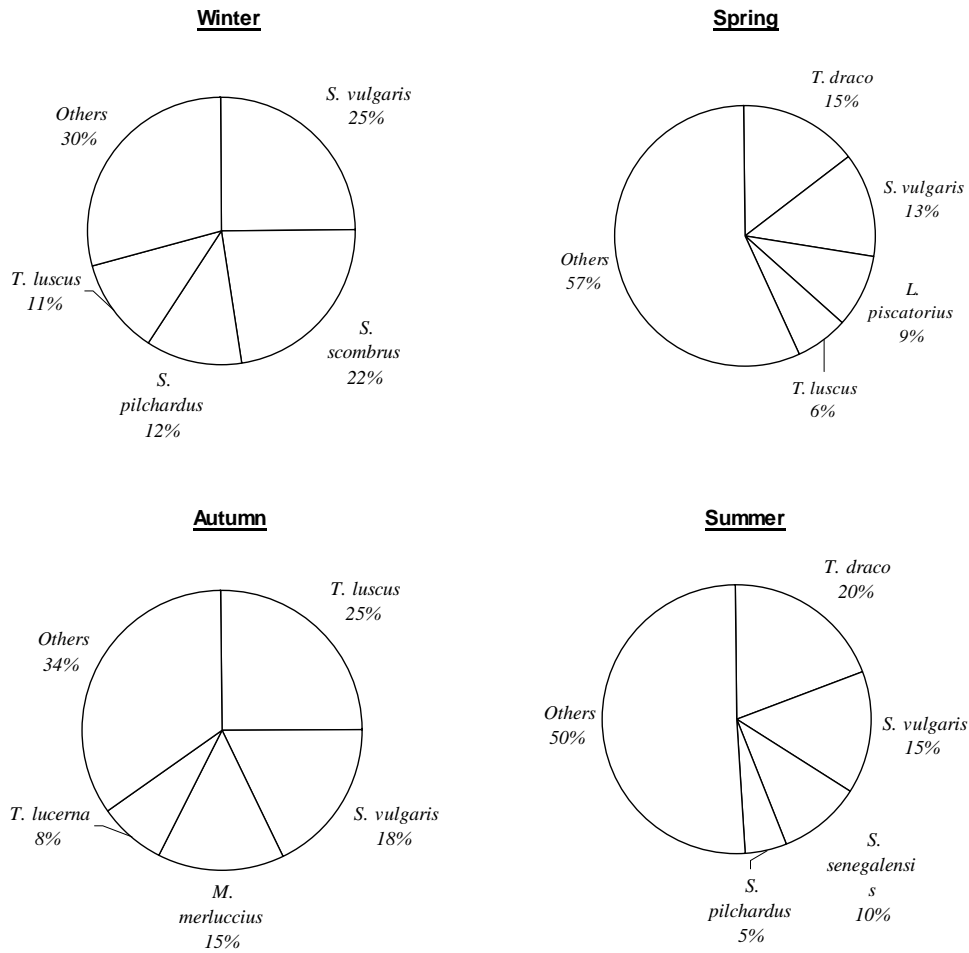


**Figure 3.2.1.1.3. Basque Country. Overall catch species composition of different outer panel stretched mesh size combinations of trammel nets in terms of number.**



**Figure 3.2.1.1.4. Basque Country. Overall catch species composition of different inner panel stretched mesh size combinations of trammel nets in terms of number.**

The catch species composition for all mesh combinations differed with season (Figure 3.2.1.1.5). The combined catches in number were dominated by *Solea vulgaris* in winter. This species remained one of the most important in all seasons (second in dominance rank in the rest of the seasons). *Trachinus draco* was the dominant species in spring and summer, whereas *Trisopterus luscus* was the main species fished in autumn. The occurrence of *Scomber scombrus* is very seasonal with abundant catches only in winter.



**Figure 3.2.1.1.5. Basque Country. Overall seasonal catch species composition of all outer/inner panel stretched mesh size combinations of trammel nets in terms of number.**

The seasonal catch rates, in terms of number of fishes caught per 1000 m of net, for the six different inner/outer panel mesh size combinations and for the seven most abundant species caught are shown in Table 3.2.1.1.6. For most of these species analysed there was a clear seasonality in the catch rate with highest values in one season (*Solea vulgaris*, *Merluccius merluccius*) or two seasons (*Trisopterus luscus*, *Sardina pilchardus*, *Trigla lucerna*). Some species were caught in significant amounts only in one season (*Scomber scombrus* in winter).

**Table 3.2.1.1.6. Basque Country. Mean seasonal catch rate (number of fishes caught per 1000 metres of net) for the main species by trammel type (inner/outer panel stretched mesh size combinations). Note: 12 fishing days were carried in each season, except in spring (13 fishing days). n: catch rate; s.d.: standard deviation.**

<i>Solea vulgaris</i>	Seasons								Average
	Winter		Spring		Summer		Autumn		
Trammel type	n	s.d.	n	s.d.	n	s.d.	n	s.d.	n
90/500	26.65	14.85	6.99	4.48	11.82	17.49	10.45	11.62	13.98
90/600	24.81	14.86	6.78	4.19	8.55	6.86	8.52	8.35	12.16
100/500	21.32	14.66	9.52	6.72	10.84	17.37	10.86	10.86	13.14
100/600	24.61	13.32	7.27	5.76	8.16	6.84	8.26	10.86	12.07
110/500	23.50	12.89	5.67	5.01	7.50	6.49	8.62	7.85	11.32
110/600	20.27	15.87	3.95	3.25	4.90	3.30	7.32	6.15	9.11
Average	23.53		6.70		8.63		9.01		11.96
<i>Trisopterus luscus</i>									
90/500	13.62	10.53	3.46	3.13	3.91	3.46	21.43	14.79	10.61
90/600	11.32	8.09	2.14	2.01	4.81	6.24	19.12	11.68	9.35
100/500	12.16	6.44	3.07	1.65	3.19	4.40	14.10	8.28	8.13
100/600	10.90	7.50	3.18	1.88	2.59	2.10	14.65	12.36	7.83
110/500	9.46	7.79	4.42	3.35	1.22	1.20	9.01	6.25	6.03
110/600	8.06	4.69	2.38	1.27	1.84	3.08	11.53	7.38	5.95
Average	10.92		3.11		2.93		14.98		7.98
<i>Scomber scombrus</i>									
90/500	23.57	22.35	-	-	0.06	0.22	-	-	5.91
90/600	20.07	24.80	0.11	0.38	-	-	0.20	0.69	5.09
100/500	19.85	21.65	-	-	-	-	0.11	0.38	4.99
100/600	21.56	24.86	0.86	2.99	-	-	0.06	0.22	5.62
110/500	22.80	22.45	-	-	-	-	0.35	1.22	5.79
110/600	22.69	26.16	-	-	-	-	-	-	5.67
Average	21.75		0.16		0.01		0.12		5.51
<i>Trachinus draco</i>									
90/500	1.68	2.37	9.87	8.30	16.12	16.92	5.54	5.23	8.30
90/600	2.89	3.37	12.56	8.65	15.49	14.94	3.83	3.31	8.69
100/500	1.42	1.83	7.08	6.42	8.15	7.30	3.23	3.10	4.97
100/600	1.19	1.83	8.98	6.13	9.63	7.30	3.02	2.37	5.70
110/500	0.47	0.59	2.48	1.52	6.43	4.16	2.08	1.61	2.87
110/600	1.02	2.16	6.70	4.80	5.72	4.16	2.05	1.43	3.87
Average	1.44		7.94		10.26		3.29		5.73

(To be concluded in next page)

**Table 3.2.1.1.6. Concluded.**

<i>Sardina pilchardus</i> Trammel type	Seasons								Average n
	Winter		Spring		Summer		Autumn		
	n	s.d.	n	s.d.	n	s.d.	n	s.d.	n
90/500	8.27	14.45	0.22	0.53	4.34	7.98	0.08	0.29	3.23
90/600	13.13	31.97	0.23	0.60	11.16	35.16	1.13	2.69	6.41
100/500	11.63	22.26	-	-	4.07	12.09	0.13	0.46	3.96
100/600	12.46	34.15	0.13	0.45	6.60	17.98	0.45	1.17	4.91
110/500	8.75	18.48	-	-	2.09	3.92	-	-	2.71
110/600	10.20	23.32	-	-	3.86	8.92	-	-	3.52
Average	10.74		0.10		5.35		0.30		4.12
<i>Merluccius merluccius</i>									
90/500	4.43	5.11	2.58	2.62	2.25	3.76	9.24	11.11	4.62
90/600	3.50	5.26	2.15	1.96	1.16	1.34	8.87	9.86	3.92
100/500	3.25	4.84	2.23	1.85	0.86	1.35	7.22	8.14	3.39
100/600	2.70	4.19	3.06	3.12	1.75	3.26	5.99	8.62	3.38
110/500	3.17	3.88	1.06	1.06	1.29	2.49	5.93	7.58	2.86
110/600	2.93	3.41	1.90	2.83	0.73	1.09	5.39	6.10	2.74
Average	3.33		2.16		1.34		7.11		3.48
<i>Trigla lucerna</i>									
90/500	2.69	4.87	1.84	1.79	4.60	2.64	5.46	4.40	3.65
90/600	2.50	4.54	2.34	3.25	4.12	7.34	5.26	4.77	3.56
100/500	2.16	3.48	1.53	1.01	1.36	1.32	4.10	3.71	2.29
100/600	1.56	3.62	1.65	1.72	2.09	4.11	5.07	5.01	2.59
110/500	2.38	6.12	1.15	1.06	3.27	6.93	4.48	4.79	2.82
110/600	1.37	3.21	0.82	0.84	1.47	1.17	2.25	2.93	1.48
Average	2.11		1.55		2.82		4.44		2.73

The catch rates of the different trammel mesh combinations for *Solea vulgaris* were highest in winter (catch rate= 23.5 individuals/1000 m). The most efficient trammel type in that season was the one mounting the mesh combination 90/500 (26.7 individuals/1000 m). The catch rate of this trammel type was the highest during all seasons except in spring when the mesh combination 100/500 showed the highest catch rate (9.5 individuals/1000 m). The trammel type using the mesh size combination 110/600 showed the smallest catch rate for *Solea vulgaris* in all seasons. In general, for both mesh sizes in the outer panel (500 and 600 mm), there was a decrease of the catch rate when the inner panel mesh size increased.

The highest *Trisopterus luscus* catch rate was recorded in autumn (15.0 individuals/1000 m). As in the previous species, the trammel net type equipped with the smaller mesh size, both in the inner and the outer panel (90/500), was the most efficient (21.4 individuals/1000 m). There was also a decline of the catch rate with the increase of the mesh in the inner panel, particularly in autumn and winter where the level of catches were

important.

For the rest of species studied the smaller mesh size in the inner panel of the trammel gear, combined with either the 500 or the 600 mm in the outer panel, had the highest catch rate. Moreover, a reduction of the catch rate of the trammel net as the mesh size in the inner panel increases was also characteristic of most species, with an exception in the case of *Scomber scombrus* which was caught most efficiently by the trammel net mounting 110 mm in the inner panel.

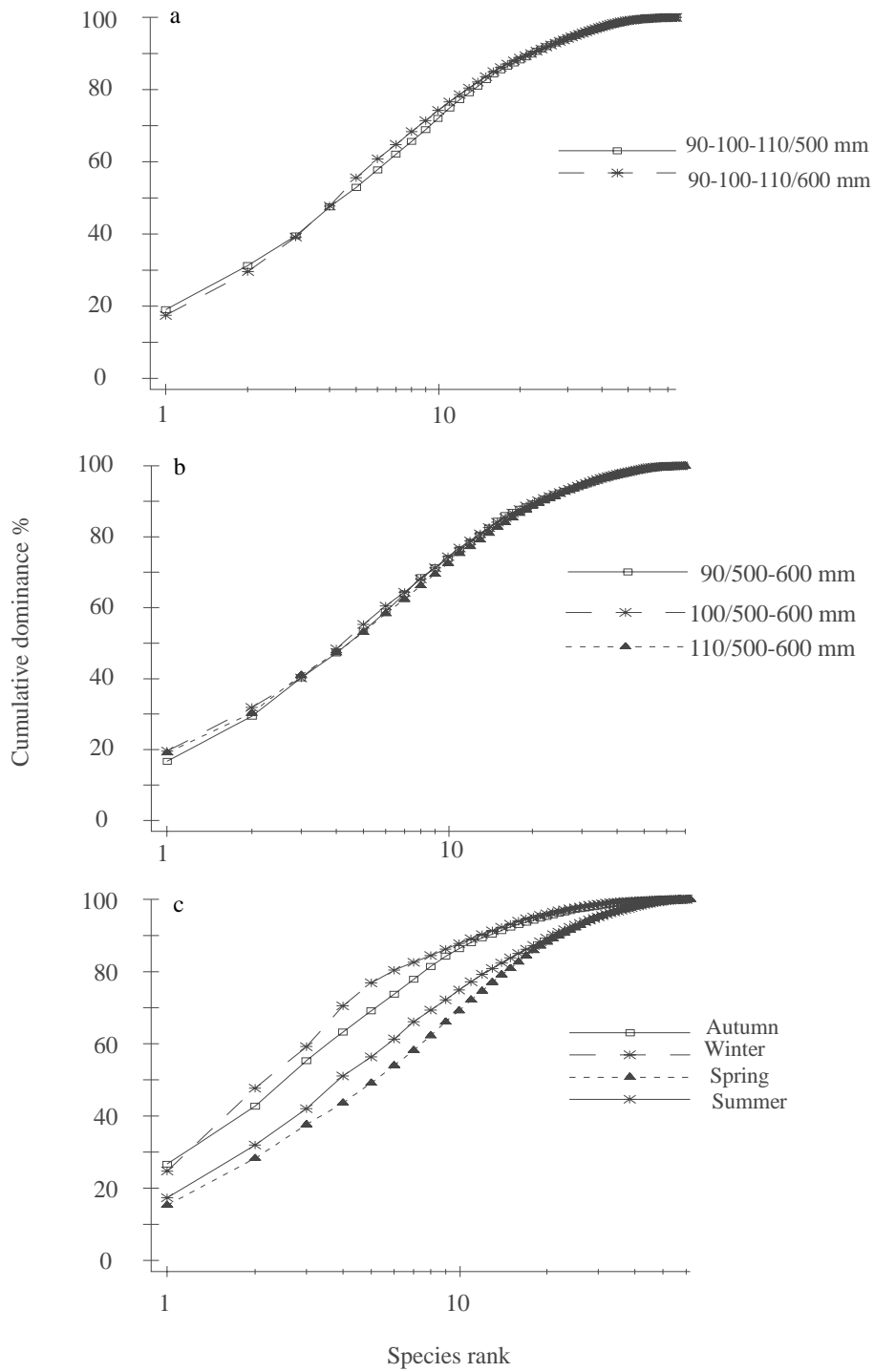
Table 3.2.1.1.7 shows the parameters used to characterize the catch diversity of the different trammel net mesh combinations. The highest values for the diversity ( $H' = 4.5$ ), number of species ( $S = 50$ ), richness ( $D = 17.4$ ) and evenness ( $J = 0.8$ ) were recorded in spring with the 90/500 mesh size combination. The lowest diversity ( $H' = 3.3$ ) occurs in winter catches with the 100/600 mesh size combination.

Statistical tests using one-way ANOVA indicate no significant differences in the mean values of the different parameters among trammel net mesh sizes combinations ( $p > 0.05$  in all the parameters tests), whereas there was a significant difference in the mean values of the parameters among seasons ( $p < 0.05$ ).

Dominance of the species in the combined catch of the trammel nets using 500 mm in the outer panel was close to that of the combined catches in the trammel nets using 600 mm (Figure 3.2.1.1.6a). The same was true when the catches were compared for the combinations of the catches by inner mesh sizes of the trammel nets (Figure 3.2.1.1.6b). Nevertheless, there was a clear difference of species dominance in the catches among seasons; thus, the dominance was more pronounced in winter and autumn than in spring and summer (Figure 3.2.1.1.6 c).

**Table 3.2.1.1.7. Basque Country. Total number of species (S), total number of individuals (N, mean seasonal catch numbers per 1000m of net), total richness (D), diversity (H') and evenness (J) for each season (Season) per different inner/outer panel stretched (in mm) mesh size combinations of trammel nets. Note: 12 fishing days were carried on each season, except on spring (13 fishing days).**

Inner/outer	Season	S	N	D	J	H'
90/500	Winter	43	1302	13.5	0.7	3.6
90/600	Winter	42	1196	13.3	0.6	3.4
100/500	Winter	41	1061	13.2	0.7	3.5
100/600	Winter	38	1144	12.1	0.6	3.3
110/500	Winter	38	987	12.4	0.6	3.4
110/600	Winter	35	1035	11.3	0.6	3.3
90/500	Spring	50	655	17.4	0.8	4.5
90/600	Spring	49	603	17.3	0.8	4.4
100/500	Spring	44	548	15.7	0.8	4.3
100/600	Spring	43	578	15.2	0.8	4.4
110/500	Spring	40	402	15.0	0.8	4.4
110/600	Spring	43	473	15.7	0.8	4.5
90/500	Summer	46	766	15.6	0.8	4.2
90/600	Summer	49	671	17.0	0.7	4.1
100/500	Summer	47	559	16.7	0.8	4.3
100/600	Summer	43	569	15.2	0.8	4.2
110/500	Summer	46	437	17.0	0.8	4.3
110/600	Summer	48	453	17.7	0.8	4.5
90/500	Autumn	39	767	13.2	0.7	3.5
90/600	Autumn	34	694	11.6	0.7	3.5
100/500	Autumn	35	590	12.3	0.7	3.6
100/600	Autumn	37	573	13.1	0.7	3.6
110/500	Autumn	38	473	13.8	0.7	3.7
110/600	Autumn	33	505	11.8	0.7	3.5
Min		33	402	11.3	0.6	3.3
Max		50	1302	17.4	0.8	4.5
Mean		41.7	721.0	14.5	0.7	3.9



**Figure 3.2.1.1.6. Basque Country. K-dominance curves based on catch numbers (per 1000 m of net) for all species caught for six combinations of inner/outer panel stretched mesh sizes (in mm): (a) and (b) for all seasons combined and (c) by season.**

### 3.2.1.2. Algarve

The numbers and weights of the individuals caught by trammel nets of the 6 different inner/outer panel mesh size combinations by season are given in Tables 3.2.1.2.1 to 3.2.1.2.8. Overall 16574 individuals were caught, with the greatest numbers caught in the winter and autumn (5384 and 5063 individuals respectively). Although it was not possible to record the weights of all species, the total weight caught not taking into account catches of some of the least important species was 6171 kg. In general, there was a decrease in numbers caught with increasing inner panel mesh size, with no apparent effect of the larger mesh outer panel (Tables 3.2.1.2.1 to 3.2.1.2.4).

The relative importance of the different species in the catch in terms of weight differed significantly from that of the catch in numbers from season to season. In the winter, *Sepia officinalis* was by far the dominant species in weight with 1938 kg, followed by four other commercially important species: *Microchirus azevia* (118 kg), *Raja undulata* (88 kg), *Solea senegalensis* (67 kg) and *Solea vulgaris* (48 kg), with *Scomber japonicus* in sixth place with 38 kg (Table 3.2.1.2.5). In the spring, *Raja undulata* (284 kg), *Sepia officinalis* (240 kg), *Solea senegalensis* (153 kg) dominated the catch, followed by *Trachinus draco* (61 kg), *Balistes carolinensis* (53 kg) and *Halobatrachus didactylus* with 46 kg (Table 3.2.1.2.6). In the summer, *Phycis phycis* (183 kg) was the most important species in terms of weight, followed by *Dentex gibbosus* (95 kg), *Sepia officinalis* (84 kg), *Prionace glauca* (75 kg), *Zeus faber* (70 kg) *Pagrus pagrus* (58 kg) and *Scomber japonicus* with 43 kg (Table 3.2.1.2.7). It is important to note that relatively few but large individuals of some of the above species such as *Dentex gibbosus*, *Prionace glauca* and *Pagrus pagrus* were caught. *Sepia officinalis* once again dominated the catches in the autumn with 765 kg, followed by *Raja undulata* (108 kg), *Scomber japonicus* (103 kg), *Raja clavata* (75 kg), *Phycis phycis* (70 kg) and *Microchirus azevia* with 66 kg (Table 3.2.1.2.8).

Of the total of 128 species caught, 68, 89, 71 and 90 were caught in the winter, spring, summer and autumn respectively (Table 3.2.1.2.9). Of the total number of species caught, 112 were caught with the 600 mm mesh outer panel while 116 were caught with the 800 mm mesh outer panel. The numbers of species caught with the six different trammel nets (100/600, 100/800, 120/600, 120/800, 140/600 and 140/800) were 91, 92, 87, 92, 82 and 82 respectively (Table 3.2.1.2.9).

**Table 3.2.1.2.1. Algarve. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Winter.**

Species	Family	Inner panel / Outer panel mesh size (mm)																		
		100/600		100/800		120/600		120/800		140/600		140/800								
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	Total			
<i>Septia offinalis</i>	SEPIIDAE	291	22.6	4.23	232	22.6	3.83	312	24.5	3.87	244	23.8	4.02	183	25.7	3.41	176	26.3	3.40	1436
<i>Scomber japonicus</i>	SCOMBRIDAE	89	25.2	1.46	92	24.8	1.84	106	25.6	1.45	117	24.9	1.25	191	24.8	1.18	177	25.0	1.48	772
<i>Microstomus aeneus</i>	SOLEIDAE	124	25.3	3.23	208	26.0	3.05	104	25.9	3.36	110	25.7	3.30	55	25.9	3.18	56	26.4	2.70	657
<i>Scorpaenopsis barbata</i>	CLUPEIDAE	109	21.0	0.63	169	19.9	1.03	133	19.6	1.05	154	20.3	1.43	39	19.5	1.27	42	19.9	0.49	646
<i>Chelidonichthys obscurus</i>	TRIGLIDAE	97	21.8	2.49	51	22.8	3.18	40	22.0	2.95	60	22.2	2.84	27	22.4	2.29	13	23.8	2.60	288
<i>Solea vulgaris</i>	SOLEIDAE	36	28.2	6.09	51	27.5	5.34	13	31.5	8.50	48	26.8	5.69	15	36.5	9.15	27	32.3	9.71	190
<i>Pagellus acarne</i>	SPARIDAE	47	18.6	2.71	53	18.7	3.38	8	19.2	1.37	15	21.3	2.46	3	23.1	2.40	2	28.7	3.71	128
<i>Solea senegalensis</i>	SOLEIDAE	11	36.8	7.88	14	31.9	9.00	15	36.6	6.36	16	40.7	4.84	27	41.8	3.49	27	42.5	4.19	110
<i>Melichthys merluccius</i>	MELUCCIIDAE	13	34.5	5.88	22	34.2	7.76	17	34.4	4.45	16	35.7	4.79	26	34.6	4.35	106	34.6	4.35	106
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	32	24.5	4.53	28	25.6	2.94	17	24.8	4.18	16	25.7	4.00	7	24.1	1.12	2	23.9	1.02	102
<i>Trachinus draco</i>	TRACHINIDAE	19	26.4	4.03	19	27.9	4.32	20	25.6	3.79	18	26.2	3.23	19	26.2	3.98	6	24.9	3.71	101
<i>Otoporus vulgaris</i>	OCTOPODIDAE	16			18	36.0	19.80	21			14			6			11			86
<i>Halobatrachus didactylus</i>	BATRACHIDAE	19	27.4	2.86	20	28.2	1.89	10	29.8	5.09	7	31.6	2.06	3	27.9	2.83	2	27.6	3.32	61
<i>Raja undulata</i>	RAJIDAE	5	65.6	11.17	3	66.5	10.11	8	61.4	5.99	7	70.1	14.62	16	67.5	8.49	15	67.7	12.24	54
<i>Scomber scombrus</i>	SCOMBRIDAE	2	33.2	0.99	11	32.6	3.18	6	32.2	5.95	8	29.7	3.44	11	29.6	4.19	9	30.7	3.79	47
<i>Frachetia trachurus</i>	CARANGIDAE	4	20.2	1.63	10	17.6	2.83	9	19.9	3.12	12	20.1	3.96	4	20.3	6.14	5	21.1	1.98	44
<i>Scorpaena notata</i>	SCORPAENIDAE	18	14.8	1.13	16	14.6	1.53	5	14.8	1.70	8	24.1	1.80	2	15.3	1.48	3	13.8	0.70	44
<i>Callionymus lyra</i>	CALLIONYMIDAE	14	24.2	1.50	13	24.4	1.84	4	23.8		7	20.7	0.42	3	22.2		1	24.3		42
<i>Boops boops</i>	SPARIDAE	9	20.5	1.69	10	19.5	1.44	7	22.1		7	20.7	0.42	3	22.2		1	24.3		37
<i>Phycis phycis</i>	GADIDAE	8	29.4	9.07	11	26.8	2.86	8	28.2	7.44	5	26.3	0.88	3	29.5	8.00	2	33.8	8.13	37
<i>Chironia lampus</i>	RANELLIDAE	4			6			5			5			10	21.0		6	26.0		36
<i>Serranus cabrilla</i>	SEFPANIDAE	11	20.6	2.28	14	20.2	2.07	2	23.3	3.18	4	21.6	0.57	3	21.0	2.59	5	24.6	2.02	34
<i>Diplodus vulgaris</i>	SPARIDAE	10	28.8	2.86	7	29.1	2.73	1	27.3	4.00	7	26.7	4.44	1	25.5	1.36	7	44.2	2.87	27
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	2	44.5	1.41	2	46.2	3.75	6	41.4	4.00	2	35.0	11.38	8	43.4	1.36	7	44.2	2.87	27
<i>Tripterygion liscus</i>	GADIDAE	8	21.6	1.68	3	20.9	0.36	5	22.5	1.76	5	14.5	0.67	1	20.3		1	23.3		18
<i>Lepidotrigla cavillone</i>	TRIGLIDAE	4	14.5	1.56	6	13.7	1.40	5	14.5	0.67	1	15.5		1	15.5		1	14.6		17
<i>Torpedo torpedo</i>	TORPEDINIDAE	2	56.2	23.83	2	62.6	0.92	1	61.0	3.91	5	53.0	8.45	3	58.8	8.57	3	57.0	5.26	16
<i>Raja asterias</i>	RAJIDAE	6	28.8	10.33	6	29.8	4.80	3	33.5	3.91	5	36.1	3.90	3	36.5		3	32.3	1.61	16
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	5	28.8	8.43	4	33.6	2.51	1	31.2	2.33	5	34.8		3	36.0		1	31.0		15
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	2	20.0	1.77	3	29.1	8.89	3	31.2	2.33	5	32.7	13.65	2	23.8		1	24.3		15
<i>Pagellus erythrinus</i>	SOLEIDAE	3	20.6	2.59	7	21.6	3.84	1	25.5		1	22.0		1	24.3		1	24.3		13
<i>Dicologlossa cuneata</i>	SOLEIDAE	3	26.3	3.54	7	26.7	4.42	1	23.4		1	21.1		1	24.3		1	24.3		12
<i>Symphycarisma carithanus</i>	RAJIDAE	2	44.3	6.72	2	55.4	9.40	3	76.0		2	63.5	2.12	1	76.0		4	56.9	8.17	12
<i>Raja clavata</i>	RAJIDAE	1			2			3			4			1			1			10
<i>Micra squinado</i>	MAJIDAE	2	32.5	1.34	3	29.8	0.26	3	29.8	0.26	3	33.4		2	33.4		2	30.4	0.85	9
<i>Zeus faber</i>	ZEIDAE																			

(To be concluded in next page)

Table 3.2.1.2.1. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		100/600			100/800			120/600			120/800				140/600			140/800		
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		n	TL (cm)	s.d.	n	TL (cm)	s.d.
<i>Topoia marmorata</i>	TOPEIDAE	1	33.2		2	27.9		1	34.5		1	19.0		2	44.0	7.78	2	42.0	11.24	9
<i>Scia laeacis</i>	SOLEIDAE	2	38.3	0.21	1	40.0		2	34.7	8.27				2	37.4	2.69	1	39.3		8
<i>Citharus linguatula</i>	CITHARIDAE	1			2	23.8														8
<i>Dicentrarchus labrax</i>	MORONIDAE	3	42.1	3.46	2	44.8	0.99	1	53.0			1	59.0	1.01	2	19.1	1.27			7
<i>Loligo vulgaris</i>	LOLIGINIDAE	2	45.0		4	42.1	9.60													6
<i>Diplodus bellotti</i>	SPARIDAE	3	17.6	1.84	1															5
<i>Halargyreus cavibianus</i>	BALISTIDAE	2	41.9	3.32	1	35.8		1									2	35.1	0.71	5
<i>Sarda sarda</i>	SCOMERIDAE	1			1			1			1	56.0								5
<i>Chelidonichthys</i> spp.	TRIGLIDAE	1			2															4
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1			1	33.4		1			2	35.9	0.92	1	36.5		1	39.5		4
<i>Raja brachyura</i>	RAJIDAE	2			2	62.8	0.35										1	68.3		4
<i>Bohlinus byrandaris</i>	MURICIDAE				1	20.1		1			1	19.5								3
<i>Mullus surmuletus</i>	MULLIDAE	1			1	19.6		1												2
<i>Arnoglossus imperialis</i>	BOTHIDAE	1			1	32.8											1			2
<i>Dentex gibbosus</i>	SPARIDAE	1			1	32.8														2
<i>Labrus bergylta</i>	LABRIDAE	2			2	33.8	1.41													2
<i>Microchirus ocellatus</i>	SOLEIDAE	1			1	15.5											1	17.4		2
<i>Hippocampus hippocampus</i>	SYNGNATHIDAE	1																		2
<i>Mola mola</i>	MOLIDAE	1	41.0														1	42.0		2
<i>Serranus atricauda</i>	SERRANIDAE	1									1	19.7								2
<i>Serranus hepatus</i>	SERRANIDAE	1							1	12.1		9.9								2
<i>Pteromytilus bournoni</i>	MYLIOBALTIDAE				1	64.0														1
<i>Pagrus auriga</i>	SPARIDAE				1	45.5		1	39.0											1
<i>Eupomus aileteratus</i>	SCOMERIDAE	1			1	20.3														1
<i>Bohlinus podas</i>	BOTHIDAE	1			1	20.3														1
<i>Pagrus pagrus</i>	SPARIDAE	1	29.1																	1
<i>Fledome cirrosa</i>	OCTOPODIDAE	1																		1
<i>Loligo</i> spp.	LOLIGINIDAE				1												1	78.0		1
<i>Argyrosomus negus</i>	SCIANIDAE																			1
<i>Palinurus elephas</i>	PALINURIDAE				1															1
<i>Lina aurata</i>	MUGILIDAE	1	59.2																	1
<i>Conger conger</i>	CONGRIDAE				1	48.0														1
Total		1046			1151			909		945		688		645						5384

**Table 3.2.1.2.2. Algarve. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Spring.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		100/600		100/800		120/600		120/800		140/600		140/800								
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.				
<i>Trachurus draco</i>	TRACHINIDAE	95	27.6	3.42	100	27.4	3.15	95	28.3	3.39	87	27.8	3.52	54	28.5	3.87	46	27.9	3.19	477
<i>Solea senegalensis</i>	SOLEIDAE	30	35.4	3.45	31	34.8	2.58	84	39.3	3.22	51	38.4	3.43	48	42.9	4.29	25	40.5	3.98	289
<i>Microstichus aeneus</i>	SOLEIDAE	50	24.9	3.66	53	25.1	3.63	31	24.0	2.92	40	24.8	3.33	33	25.8	3.72	51	27.3	5.32	258
<i>Septia officinalis</i>	SEPIIDAE	60	20.7	4.23	33	19.8	3.20	42	22.4	3.09	33	23.0	3.61	26	24.9	2.23	34	24.1	3.22	228
<i>Scorpaena notata</i>	SCORPAENIDAE	68	15.4	1.56	59	14.9	1.97	22	16.7	2.46	17	16.3	1.38	6	17.8	1.97	8	16.4	1.86	180
<i>Scorpaen japonicus</i>	SCORPAENIDAE	10	25.6	0.90	24	25.7	1.90	17	25.1	0.37	44	26.1	2.79	20	25.1	1.46	42	25.7	1.66	157
<i>Raja undulata</i>	RAJIDAE	11	65.2	12.09	8	65.7	12.49	21	66.2	12.68	26	63.0	9.52	35	61.9	13.15	42	65.2	12.85	143
<i>Haloaetrachius didactylus</i>	BATRACHOIDIDAE	32	28.5	3.08	42	28.5	3.24	16	28.8	3.61	26	28.7	3.36	7	31.7	9.70	4	28.3	5.14	127
<i>Chelidonichthys obscurus</i>	TRIGLIDAE	31	24.8	2.32	7	25.0	2.76	18	25.5	2.93	20	25.7	3.40	20	26.4	2.72	22	26.0	3.16	118
<i>Pagellus acarne</i>	SPARIDAE	34	18.6	1.62	31	18.3	1.84	12	20.8	4.08	10	20.7	3.29	5	21.4	3.75	3	21.3	1.90	95
<i>Pagellus erythrinus</i>	SPARIDAE	9	33.9	6.40	13	37.5	5.50	13	29.7	9.90	16	32.2	8.48	13	32.9	7.53	26	31.6	7.91	90
<i>Spondyliotoma cantharus</i>	SPARIDAE	19	25.9	4.50	11	27.0	4.24	10	25.4	4.94	8	23.2	3.05	9	25.9	1.65	9	24.6	3.14	66
<i>Balistes carolinensis</i>	BALISTIDAE	5	41.7	5.22	8	34.3	6.89	14	37.5	4.87	10	35.9	7.22	13	39.5	4.80	13	36.3	3.54	63
<i>Serranus cabrilla</i>	SERRANIDAE	20	20.7	2.18	15	18.4	2.71	9	22.5	1.26	12	21.7	1.80	1	21.5	2.51	12	31.9	5.97	57
<i>Solea lascaris</i>	SOLEIDAE	9	26.1	3.22	14	27.7	5.05	4	36.8	10.74	16	30.1	6.47	1	25.6	1	5	32.2	0.85	56
<i>Plycis ptycis</i>	GADIDAE	14	29.4	7.05	7	31.5	5.26	5	30.1	1.18	7	29.6	1.84	2	30.4	2.05	5	32.2	0.85	40
<i>Callionymus lyra</i>	CALLIONYMIDAE	10	24.6	2.40	14	23.5	4.25	7	23.8	3.17	5	23.3	5.89	1	23.5	5	3	26.3	3	40
<i>Saracha plicatulus</i>	CLUPEIDAE	4	19.7	0.49	6	19.2	1.59	4	20.2	1.27	11	19.8	0.72	1	18.8	1	13	19.6	1.28	39
<i>Maja squinado</i>	MAJIDAE	10	18.4	3.62	3	16.1	2.75	3	12.3	1.06	7	18.4	5.27	12	15.0	5.70	3	17.8	3.65	38
<i>Berius podas</i>	BOTHIDAE	10	20.5	0.96	11	20.6	1.84	5	20.5	0.91	5	22.7	1.92	3	22.5	1.21	5	6.8	0.67	29
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	6	24.2	2.56	10	24.7	5.57	9	25.7	1.59	3	23.9	0.64	1	22.5	1	3	24.1	1.45	31
<i>Diplodus bellianus</i>	SPARIDAE	8	17.1	2.98	6	18.7	1.18	7	16.8	2.17	7	16.9	1.52	6	7.8	1.21	5	6.8	0.67	30
<i>Palaearus elephas</i>	PALINURIDAE	10	7.1	1.62	2	5.3	3.18	3	7.3	0.64	3	7.3	0.46	3	7.8	1.21	5	6.8	0.67	29
<i>Octopus vulgaris</i>	OCTOPODIDAE	3			4			6			6			3			5			27
<i>Lithognathus morrhyrus</i>	SPARIDAE	6	34.7	4.06	5	35.3	2.28	4	29.3	2.23	1	24.9	7.73	5	34.2	5.47	4	34.3	1.03	25
<i>Diplodus vulgaris</i>	SPARIDAE	6	29.2	2.02	7	27.1	7.09	3	29.0	11.88	5	26.1	7.73	7	36.6	3.72	4	34.3	1.03	21
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	1	41.8					3	39.3	3.64	4	37.4	1.17	7	36.6	3.72	4	39.0	1.24	19
<i>Chironia lampas</i>	RANELLIDAE	4			2			4			5			3			3			18
<i>Citharus linguatula</i>	CITHARIDAE	3	18.1	6.43	5	19.6	5.39	3	21.2	1.56	2	20.5	0.14	4	20.6	3.34	1	21.1	1.56	18
<i>Scorpaena scrofa</i>	SCORPAENIDAE	3	18.3	1.40	4	23.4	3.20	3	22.5	1.57	5	25.6	5.13	1	38.9	1	2	30.7	1.56	18
<i>Pagrus pagrus</i>	SPARIDAE	7	28.6	5.20	3	33.1	3.71	3	35.3	7.21	3	29.6	3.71	3	39.2	12.80	2	26.4	2.55	18
<i>Merluccius merluccius</i>	MERLUCCIIDAE	2	27.3	4.03	1	28.5		1	31.3		6	29.6	3.71	3	28.5	4.31	3	28.7	3.39	16
<i>Torpedo torpedo</i>	TORPEDINIDAE	2	49.3	10.25				2	44.8	13.79	8	32.3	5.62	3	35.6	2.25	15			15
<i>Zeus faber</i>	ZEIDAE	3	20.9	2.32	3	22.4	2.19	4	28.3	9.07	1	34.5	4.60	2	25.0	1	1	21.4	0.14	14
<i>Psetta maxima</i>	SCOPHTHALMIDAE	1	40.0					5	39.0	2.29	2	38.9	4.60	1	37.8	1	2	42.9	0.14	11
<i>Torpedo marmorata</i>	TORPEDINIDAE	1						3	43.6	0.78	2	41.0	11.31	3	45.6	0.82	1	26.5		10
<i>Conger conger</i>	CONGRIDAE	1	122.5		2	90.0	11.31	2	91.8	26.52	1	85.0		2	98.5	57.35	2	80.0		10
<i>Boops boops</i>	SPARIDAE	3	20.5	0.99	1	25.2		3	23.4		3	23.4		1	26.3		1			9

(To be continued in next page)

Table 3.2.1.2.2. Continued.

Species	Family	Inner panel / Outer panel mesh size (mm)																									
		100/600				100/800				120/600				120/800				140/600				140/800					
		n	IL (cm)	s.d.		n	IL (cm)	s.d.		n	IL (cm)	s.d.		n	IL (cm)	s.d.		n	IL (cm)	s.d.		n	IL (cm)	s.d.	Total		
<i>Chekidonichtyus</i> spp.	TRIGLIDAE																									8	
<i>Trachurus trachurus</i>	CARANGIDAE																										7
<i>Dicologlossus cuneata</i>	SOLEIDAE	5	21.8	2.88		2	18.9	0.07		2	19.5		2	20.9		2	21.9		1	22.6		1	25.3			7	
<i>Raja asterias</i>	RAJIDAE	2	75.8	6.01		2	62.0			2	57.5	12.02					2	67.3	1.77		2	78.5	2.83			7	
<i>Pteromyxalus bovinus</i>	MYLIOBATIDAE																										6
<i>Diplodus sargus</i>	SPARIDAE	1	23.0			3	35.9	2.40									3	35.3	5.72		2	80.5	2.12			6	
<i>Solea impar</i>	SOLEIDAE	1	26.4			1	24.4										1	35.2			3	23.5				5	
<i>Pagrus auriga</i>	SPARIDAE	1	26.4			2	17.1			2	29.5	0.57		1	32.0		1	60.9			1	34.1				5	
<i>Diplodus annularis</i>	SPARIDAE	1	26.4			2	36.3			1	20.5			2	26.2	0.35	1	21.2			1					5	
<i>Uranoscopus scaber</i>	URANOSCOPIDAE																										4
<i>Chekidonichtyus lucerna</i>	TRIGLIDAE	1	31.2			2	25.0	0.78		2	31.9	7.00		2	40.5	6.93	1				1					4	
<i>Solea vulgaris</i>	SOLEIDAE					2	41.4	0.49		1	22.6			1	33.8		2	41.4	1.20		1	43.6				4	
<i>Dentex canariensis</i>	SPARIDAE					2	41.4			1	32.2			3	67.5	14.07	2	33.3	0.28		1	100.5				4	
<i>Diplodus cervinus</i>	SPARIDAE					1	36.9			1							2	58.6	10.47		1	52.5				4	
<i>Agrostomus regius</i>	SCIANIDAE																										4
<i>Scorpaenopsis</i>	SCOMBRIDAE	2	44.5	4.24		1	36.9			1							2	33.3	0.28		1	100.5				4	
<i>Dentex dentex</i>	SPARIDAE	1	66.0														1	64.0			1	51.6				4	
<i>Raja brachyura</i>	RAJIDAE	1	31.5			1	31.5			1	32.2			3	67.5	14.07	2	58.6	10.47		2	52.5				4	
<i>Sparus aurata</i>	SPARIDAE	1	31.5			1	31.5			1	32.2			1	36.4		1	36.4			1	52.5				3	
<i>Hippocampus hippocampus</i>	SYNGNATHIDAE	3																								3	
<i>Sarda sarda</i>	SCOMBRIDAE																									3	
<i>Raja myaleus</i>	RAJIDAE	1				1	56.0			1				1	56.5		2				1	55.1				3	
<i>Loligo vulgaris</i>	LOLIGINIDAE																									2	
<i>Tripterus luscus</i>	GADIDAE	1	23.0			1	22.3			1																2	
<i>Trachurus</i> sp.	CARANGIDAE	1	19.9			1	19.9			1							1	18.9								2	
<i>Apogeton imberbis</i>	APOGONIDAE	1	11.4			1	12.6			1																2	
<i>Torpedo nobiliana</i>	TORPEDINIDAE																									2	
<i>Sarpa salpa</i>	SPARIDAE	1	34.0			1	34.0																			2	
<i>Parapristipoma octobineatum</i>	HAEMULIDAE									2	35.3	0.14														2	
<i>Arnoglossus laterna</i>	BOTHIDAE	1	13.8			1	13.8			1	12.5															2	
<i>Solea</i> sp.	SOLEIDAE	1	26.5			1	19.0																			2	
<i>Homarus gammarus</i>	NEPHROPIDAE																									2	
<i>Raja nasutus</i>	RAJIDAE	1	12.8			1	12.8			1				1	65.5						1	12.5				1	
<i>Microchirus variegatus</i>	SOLEIDAE																									1	
<i>Cheleon labrovus</i>	MUGILIDAE	1	10.4			1	10.4																			1	
<i>Serranus hepatus</i>	SEFRANIDAE																									1	
<i>Myliobatis aquila</i>	MYLIOBATIDAE	1				1				1	20.0										1	54.0				1	
<i>Labrus bergylta</i>	LABRIDAE																									1	

(To be concluded in next page)

Table 3.2.1.2.2. Continued.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total			
		100/600		100/800		120/600		120/800		140/600		140/800					
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	Total
<i>Penaeus kerathurus</i>	PENAEIDAE	1															1
<i>Belone belone</i>	BELONIDAE																1
<i>Mullus barbatus</i>	MULLIDAE																1
<i>Mugil' sp.</i>	MUGILIDAE				1	47.6											1
<i>Hippocampus sp.</i>	SYNGNATHIDAE				1												1
<i>Isa ramada</i>	MUGILIDAE				1	10.4		1	56.5								1
<i>Microsternus ocellatus</i>	SOLEIDAE				1												1
<i>Loligo spp.</i>	LOLIGINIDAE				1												1
<i>Doros. gibbosus</i>	SPARIDAE	1	92.0														1
<i>Raja elanata</i>	RAJIDAE										1	49.6					1
<i>Mola mola</i>	MOLIDAE				1												1
<i>Mugil' cephalus</i>	MUGILIDAE				1												1
<i>Mullus surmuletus</i>	MULLIDAE				1												1
<b>Total</b>		<b>630</b>			<b>519</b>			<b>379</b>			<b>422</b>			<b>3054</b>			

**Table 3.2.1.2.3. Algarve. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Summer.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		100/600		100/800		120/600		120/800		140/600		140/800								
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Scorpaenopsis japonicus</i>	SCORPARIIDAE	18	28.9	0.85	26	27.4	1.72	33	27.9	1.89	208	27.6	1.44	39	27.9	1.54	207	27.3	1.57	531
<i>Phycis phycis</i>	GADIDAE	47	29.5	6.26	54	31.5	7.99	76	32.6	8.73	75	35.0	9.16	38	38.3	9.50	34	36.0	9.10	324
<i>Scorpaenopsis scorpaenoides</i>	SCORPARIIDAE	52	29.6	0.77	24	30.4	1.86	34	30.0	1.42	42	28.7	2.20	44	30.0	1.43	43	30.1	2.40	239
<i>Microstomus aeneus</i>	SOLEIDAE	55	26.9	3.37	60	26.7	4.54	33	26.2	3.21	48	26.9	2.64	24	26.3	3.74	19	27.0	2.48	239
<i>Pagellus acarne</i>	SPARIDAE	28	22.4	4.37	22	27.3	5.15	21	24.3	4.06	19	25.2	4.73	28	27.4	3.74	22	26.8	2.22	140
<i>Merluccius merluccius</i>	MERLUCCIIDAE	17	34.2	9.00	18	34.4	10.15	23	38.0	11.14	20	39.0	8.96	24	35.5	6.88	24	35.7	8.56	126
<i>Trachurus trachurus</i>	CARANGIDAE	26	24.3	2.47	28	25.3	2.80	16	24.7	2.41	5	20.8	5.62	27	24.7	2.11	11	24.9	2.40	113
<i>Trachinus draco</i>	TRACHINIDAE	18	26.6	2.34	30	27.0	3.50	21	27.4	2.25	18	26.7	2.64	13	27.3	3.88	11	28.2	0.97	111
<i>Sardina pilchardus</i>	CLUPEIDAE	3	20.0	0.64	23	19.7	2.33	29	18.0	2.22	21	19.4	0.65	9	19.2	1.33	23	19.3	0.68	108
<i>Boops boops</i>	SPARIDAE	19	21.1	2.07	34	22.1	1.29	21	22.5	1.32	12	22.9	3.21	9	22.7	1.62	11	24.2	2.71	106
<i>Scorpaena noxua</i>	SCORPARIIDAE	21	15.1	1.01	25	15.0	1.43	13	16.6	1.08	3	14.4	3.39	1	11.9	4	4	14.1	1.91	67
<i>Chelidonichthys obscurus</i>	TRIGLIDAE	15	23.5	1.49	13	23.1	1.46	12	25.4	4.38	10	24.3	2.86	5	23.8	7.19	12	23.2	3.78	67
<i>Septia officinalis</i>	SEPIIDAE	9	22.3	4.52	5	24.3	2.95	12	24.7	2.94	12	22.9	3.26	12	25.7	2.55	13	25.2	2.69	63
<i>Scyllorhinus canaliculatus</i>	SCYLLORHINIDAE	16	52.4	2.69	4	51.7	2.92	8	53.3	2.79	13	51.0	3.47	8	50.4	3.96	10	52.5	3.86	59
<i>Zeus faber</i>	ZEIDAE	4	27.7	8.40	5	44.7	6.89	9	39.0	4.20	8	38.6	7.70	10	41.4	7.34	20	44.7	6.60	56
<i>Serranus cabrilla</i>	SERRANIDAE	13	21.2	2.19	14	20.0	1.65	8	21.0	2.84	11	22.0	2.01	3	25.6	0.91	2	23.5	5.73	51
<i>Citharus linguatula</i>	CITHARIDAE	17	18.3	1.65	10	20.0	2.15	8	19.1	1.41	7	18.3	0.95	2	19.6	4	6	18.3	0.99	50
<i>Pagellus erythrinus</i>	SPARIDAE	8	33.0	8.90	11	34.5	3.80	9	36.2	4.07	13	32.9	9.99	4	39.4	4.24	1	37.5	4.4	44
<i>Diplodus vulgaris</i>	SPARIDAE	12	26.6	3.35	17	26.5	3.52	6	29.2	2.48	5	26.1	4.25	4	21.8	0.98	4	25.5	2.47	43
<i>Trisopterus luscus</i>	GADIDAE	9	19.1	3.51	9	21.8	5.19	9	25.2	1.66	7	23.3	3.35	7	24.5	1.35	2	25.5	2.47	44
<i>Halobatrachus didactylus</i>	BATRACHOIDIDAE	12	27.8	2.54	11	29.2	1.95	7	29.6	3.13	7	27.9	2.39	2	31.4	3.68	2	30.4	1.20	41
<i>Pagrus pagrus</i>	SPARIDAE	2	43.8	11.10	3	37.8	2.11	12	44.6	5.56	6	44.3	4.55	8	53.1	5.82	5	48.9	3.58	36
<i>Solea senegalensis</i>	SOLEIDAE	6	35.0	4.81	6	36.0	5.14	8	36.6	4.37	7	38.5	2.05	3	41.8	1.62	5	41.1	3.49	35
<i>Sporophyllotoma cantharus</i>	SPARIDAE	6	24.0	4.88	2	25.3	4	24.5	3.61	2	2	2	2	3	20.7	2.56	10	27.0	4.62	27
<i>Maja squinado</i>	MAJIDAE	3	15.5	1	17.7	3	16.0	3	16.0	4.60	8	30.4	3.26	2	16.8	7.42	4	2	3.92	23
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	3	34.6	5.65	4	67.6	17.43	2	29.4	4.60	8	30.4	3.26	2	34.3	3.89	7	35.4	3.92	22
<i>Raja undulata</i>	RAJIDAE	1	80.0	2	83	2	83	5	9.2	1.56	5	9.4	2.02	4	7.5	7.04	6	53.0	12.46	22
<i>Palmarus elephas</i>	PALMURIDAE	2	8.3	1.84	2	8.3	2.05	2	29.6	9.33	5	32.4	4.73	4	40.6	4.20	3	33.1	2.18	21
<i>Scorpaena scrofa</i>	SCORPARIIDAE	4	28.9	2.52	7	25.4	1.61	2	26.4	0.64	6	25.7	2.54	1	30.4	1	28.9	1	29.5	20
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	5	29.0	1.48	11	28.6	1.26	2	31.0	4.17	2	2	2	2	2	2	2	2	2	20
<i>Dentex maroccanus</i>	SPARIDAE	2	25.6	2	29.6	0.28	1	27.0	2	29.2	2.56	2	29.5	2.69	5	32.2	0.78	17	17	
<i>Osteopus vulgaris</i>	MULLIDAE	8	27.7	1.69	4	28.0	0.83	1	27.5	2	32.4	4.53	1	35.6	1	25.0	13	13		
<i>Mullus surmuletus</i>	SCORPARIIDAE	2	53.1	0.85	1	47.0	54.3	1	54.3	2.07	1	36.2	1	37.4	2	50.5	5.73	5	49.1	2.34
<i>Raja miraletus</i>	RAJIDAE	2	31.8	2.97	3	30.9	5.00	5	37.1	2.07	1	92.0	7	74.0	22.72	2	85.2	7.50	10	
<i>Dentex macrophthalmus</i>	SPARIDAE	1	75.3	1	58.3	2	67.4	0.57	4	74.6	10.02	2	85.4	17.47	10	10	10			
<i>Dentex gibbosus</i>	RAJIDAE	1	75.3	1	58.3	2	67.4	0.57	4	74.6	10.02	2	85.4	17.47	10	10				
<i>Raja asterias</i>	RAJIDAE	1	75.3	1	58.3	2	67.4	0.57	4	74.6	10.02	2	85.4	17.47	10	10				

(To be concluded in next page)

Table 3.2.1.2.3. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total				
		100/600		100/800		120/600		120/800		140/600		140/800						
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)					
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	67.0	8	24.8	1.57	2	84.3	2.47	4	62.9	13.86	1	28.4	1	28.4	9	
<i>Raja clavata</i>	RAJIDAE	1	58.5	1	35.2		1	81.0					2	78.6	0.57	2	78.6	9
<i>Lophius piscatorius</i>	LOPHIDAE	3	39.7	4.62			1	17.7		1	20.0		2	45.2	0.71	3	66.4	7
<i>Sciaenops ocellatus</i>	SCIANIDAE	2	21.0	3.18	1	18.5							1	19.3		1	46.1	7
<i>Pagellus bogarneo</i>	SPARIDAE	1					2	16.9	4.10	1	18.0		1	13.0		1		6
<i>Chanos chanos</i>	RANELLIDAE	1					2	33.3	10.96	2	34.1	1.27	1	32.4		1	54.9	6
<i>Homarus gammarus</i>	NEPHROPIDAE	1					2	17.4		1	14.5		1	16.8		1	32.7	5
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1					2	18.8	0.14	1	17.4		1	16.8		1		4
<i>Helicolenus dactylopterus</i>	SEBASTIDAE	2	16.7	0.21	1	16.6		2	82.3	3.89	1	160.0		1		1		4
<i>Micromesistius putausou</i>	GADIDAE	2					2	40.5	4.17	2	40.5	4.17				1		4
<i>Asthis anthicus</i>	SERRANIDAE	2					2	28.3		1	18.1		1	41.8		1		4
<i>Conger conger</i>	CONGRIDAE	2					2	82.3	3.89	1	160.0		1	34.9		1		3
<i>Psetta maxima</i>	SCOPHTHALMIDAE	2	88.7	6.86			1	28.3		1	18.1		1	34.9		1		3
<i>Raja brachyura</i>	RAJIDAE	1	20.8				1	39.5		1	28.3		2	25.3	3.04	1	38.3	2
<i>Pomus kuhlii</i>	TORPEDINIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Torpedo marmorata</i>	MULLIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Mullus barbatus</i>	SPARIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Lithognathus mormyrus</i>	LAMNIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Isurus paucus</i>	CENTRACANTHIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Syngnathus abaster</i>	CARCHARINIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Pristigaster scottii</i>	SCOPHTHALMIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Scophthalmus rhombus</i>	SOLEIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Solea lascaris</i>	SERRANIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Serranus hepatus</i>	SOLEIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Solea vulgaris</i>	OCTOPODIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Eledone cirrosa</i>	SPARIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Pagrus auriga</i>	SPARIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Pagellus belloni</i>	GOBIIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Gobius</i>	SPARIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Dentex canariensis</i>	TRIGLIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Chelidonichthys spp.</i>	SPARIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Dentex dentex</i>	TRIGLIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
<i>Muraena helena</i>	MURAENIDAE	1					1	39.5		1	28.3		2	25.3	3.04	1		2
Total		485			517		481			640		393		557		99.0		3073

**Table 3.2.1.2.4. Algarve. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Autumn.**

Species	Family	Inner panel / Outer panel mesh size (mm)																		
		100/600			100/800			120/600			120/800			140/600			140/800			
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	Total
<i>Scorpaenidae</i>	SCORPAENIDAE	84	29.2	1.99	194	28.1	1.59	280	29.5	1.78	138	28.5	1.35	177	28.7	1.92	265	29.1	1.43	1118
<i>Sardinia pilchardus</i>	CLUPEIDAE	152	20.2	1.01	196	20.8	0.78	119	19.6	1.02	39	20.6	0.92	104	20.7	1.07	38	20.4	0.75	648
<i>Boops boops</i>	SPARIDAE	30	19.2	1.35	154	20.4	1.58	184	21.6	1.48	10	22.6	0.66	47	21.8	1.52	25	22.9	1.82	450
<i>Sepia officinalis</i>	SEPIIDAE	40	26.8	4.92	37	28.1	4.44	69	27.6	4.64	54	27.4	4.93	72	29.9	4.47	92	28.7	3.62	364
<i>Microstomus aeneus</i>	SOLEIDAE	58	27.1	3.78	75	26.9	3.77	68	25.8	4.44	57	25.6	3.09	40	26.4	3.93	30	28.1	3.03	328
<i>Scorpaena notata</i>	SCORPAENIDAE	74	15.3	1.36	100	14.8	1.32	28	15.6	1.62	46	15.3	1.29	5	16.4	0.40	5	14.9	1.85	258
<i>Pagellus acaris</i>	SPARIDAE	27	22.2	4.43	48	24.1	4.05	26	22.8	4.00	34	23.5	3.81	23	26.9	3.09	16	24.6	2.35	174
<i>Oelmonichthys lastoviza</i>	TRIGLIDAE	67	24.1	2.16	34	23.7	1.91	22	24.1	2.42	31	23.9	1.62	7	25.7	3.14	3	24.8	2.63	164
<i>Phycis phycis</i>	GADIDAE	23	32.4	6.79	25	36.1	5.59	23	33.0	3.43	40	34.4	5.46	29	32.8	4.00	14	33.1	2.22	154
<i>Trachurus trachurus</i>	CARANGIDAE	5	20.6	2.45	41	21.9	2.21	46	22.1	2.14	5	23.1	2.33	19	22.1	1.22	8	22.1	1.66	124
<i>Megia squinado</i>	MAJIDAE	10	16.4	2.95	15	17.2	3.73	23	17.9	4.20	23	16.1	3.19	18	19.2	4.30	17	17.5	3.50	106
<i>Merluccius merluccius</i>	MERLUCCIIDAE	20	34.9	9.36	13	31.4	3.92	15	35.0	8.73	14	34.5	6.90	13	37.7	11.43	23	35.9	5.56	98
<i>Oelmonichthys obscurus</i>	TRIGLIDAE	9	25.1	2.53	15	23.2	2.22	12	23.6	4.96	26	24.2	2.09	6	24.6	1.66	9	25.3	3.36	77
<i>Serranus cabrilla</i>	SERRANIDAE	21	20.7	1.25	18	20.2	1.67	14	21.4	1.78	10	21.3	1.20	4	20.2	1.32	5	22.0	2.04	72
<i>Charenia lampus</i>	RANELLIDAE	9	22.5		6	27.5		7			14			4	22.4	1.49	19	25.6	3.54	59
<i>Scorpaenidae</i>	SCORPAENIDAE	3	29.1	0.99	34	26.8	4.14	7	27.9	2.51	3	28.6	7.64	2	27.7		5	27.0	4.95	54
<i>Raja undulata</i>	RAJIDAE	5	80.6	2.95	4	76.4	5.79	5	74.7	5.94	5	70.4	10.70	16	69.4	10.62	6	72.2	10.28	41
<i>Pagellus ephippinus</i>	SPARIDAE	5	40.5	5.09	11	30.7	8.51	11	34.2	9.61	2	37.3	7.42	4	37.2	11.74	8	34.8	10.32	41
<i>Raja brachyura</i>	RAJIDAE	2	41.5	9.90	4	52.2	24.78	11	62.6	19.15	8	53.9	15.37	2	76.0		12	55.7	12.19	39
<i>Labrus bergylla</i>	LABRIDAE	8	35.0	2.72	5	34.0	3.28	5	32.5	8.50	14	34.5	7.24	4	27.1	12.07	2	32.0	11.74	38
<i>Raja clavata</i>	RAJIDAE	3	67.8	15.14	10	65.6	13.30	1	85.5		2	80.0		8	72.0	10.01	9	64.5	11.91	33
<i>Solea vulgaris</i>	SOLEIDAE	10	36.2	8.33	3	44.5	8.23	5	43.4	1.75	2	43.3	1.27	4	44.6	3.91	4	47.5	6.15	28
<i>Citharus linguatula</i>	CITHARIDAE	10	18.6	1.26	9	18.0	3.19	5	17.9	0.81	1			2	19.4	0.92				27
<i>Diplodus vulgaris</i>	SPARIDAE	8	27.9	2.42	14	27.0	1.32	2	28.3	3.25	1	17.9		7	31.0	5.71	1	40.0		26
<i>Zeus faber</i>	ZEIDAE	4	26.7	3.01	2	34.5	4.88	3	35.1	8.65	9	29.0	6.15	5	20.9	2.99	2	17.2	6.79	24
<i>Trisopterus luscus</i>	GADIDAE	2	19.0		4	23.2	6.90	3	23.2	6.93	8	23.4	4.74	5	28.8	8.49	5	24.2	4.04	24
<i>Spondylioterna cantharus</i>	SPARIDAE	1	33.9		10	24.4	3.96	4	20.2	2.19	2	28.7	5.80	2	28.8	8.49	5	24.2	4.04	24
<i>Hexaplex trunculus</i>	MURICIDAE	12						7			2			2			1			24
<i>Trachinus draco</i>	TRACHINIDAE	7	25.3	2.93	6	26.8	3.83	3	25.0	1.65	2	22.5		2	29.2		2	25.7	2.12	22
<i>Scorpaena porcus</i>	SCORPAENIDAE	9	19.2	5.90	4	19.3	3.84	4	22.4	5.73	4	16.7	4.67				1	30.6		22
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	2	35.9	3.32	3	32.8	3.11	4	34.1	1.86	6	32.4	4.18	3	33.0	5.90	3	30.6	5.44	21
<i>Liza aurata</i>	MUGILIDAE	7	43.2	2.30	5	44.0	2.53	5	43.8	14.22	3	48.5	1.40				1			21
<i>Raja aserata</i>	RAJIDAE	1	56.3		2	60.6	4.10	2	69.8	2.47	5	57.5	5.97	5	62.4	17.65	5	56.8	4.23	20
<i>Sparus aurata</i>	SPARIDAE	1			2	38.1	6.51	4	40.2	2.17	5	43.0	12.97	3	42.4	4.92	4	42.6	2.64	19
<i>Scorpaena scrofa</i>	SCORPAENIDAE	7	27.8	6.00	2	23.4	2.62				6	25.6	4.98	2	29.5	7.85	1	33.0		18
<i>Pagrus auriga</i>	SPARIDAE	3	31.1	8.28	5	33.5	6.81	3	38.6	7.23	2	35.4	5.37	3	45.2	6.91	2	50.5	1.06	18
<i>Pagrus pagrus</i>	SPARIDAE	5	36.5	7.37	5	31.2	1.75	2	46.3	8.20				2	36.0	11.95	3	40.5	8.74	17
<i>Palmarius elephas</i>	PALMURIDAE	4	9.6	0.55	1	11.0		3	7.5	4.50	3	9.4	2.36	2	14.8	1.77	3	8.8	3.55	16

(To be continued in next page)

Table 3.2.1.2.4. Continued.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total								
		100/600			100/800			120/600			120/800				140/600			140/800				
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		n	TL (cm)	s.d.	n	TL (cm)	s.d.		
<i>Balistes carolinensis</i>	BALESTIDAE	2	36.1	4.10	1	37.6	8.33	2	42.8	8.34	2	25.6	8.34	6	38.4	8.33	2	42.8	8.34	4	35.3	1.60
<i>Raja miralestus</i>	RAJIDAE	2	26.9	8.27	3	41.5	11.69	1	55.0		2	25.6	8.34	2	55.0		2	25.6	8.34	1	56.1	
<i>Octopus vulgaris</i>	OCTOPODIDAE	7	26.2	2.36	2	29.0	8.96	2	32.1	19.98	3	44.3	8.80	2	26.1	10.06	2	26.1	10.06	1	27.5	
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	59.0		2	32.7	8.56	5	43.3	5.41	2	40.2	1.63	2	40.3	10.96	3	41.8	16.75	3	45.2	0.30
<i>Solea senegalensis</i>	SOLEIDAE	2	38.6	0.35	2	38.6	0.35	1	36.0		1	46.0		3	37.0	2.38	5	36.8	1.61	11		
<i>Mola mola</i>	MOLIDAE	2	40.5		4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10
<i>Chelidonichthys spp.</i>	TRIGLIDAE	2	40.5		4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10
<i>Conger conger</i>	CONGRIDAE	2	65.1	40.87	3	85.0		3	85.0		3	85.0		3	85.0		3	85.0		3	85.0	
<i>Diplodus sargus</i>	SPARIDAE	3	28.7	5.09	3	28.7	5.09	3	28.7	5.09	3	28.7	5.09	3	28.7	5.09	3	28.7	5.09	3	28.7	5.09
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	1	43.8		1	41.6		1	41.6		1	39.5		1	41.6		1	39.5		1	41.6	
<i>Sarda sarda</i>	SCOMBRIDAE	1	57.5		3	58.9	0.68	2	59.1	0.35	2	59.1	0.35	2	49.0	10.54	5	42.1	2.51	5	42.1	2.51
<i>Lophius piscatorius</i>	LOPHIDAE	1	43.0		3	57.0	7.81	1	38.5		1	45.0		2	49.0	10.54	2	49.0	10.54	1	40.0	
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1	40.5		4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10	4	33.4	7.10
<i>Microcoelus ocellatus</i>	SOLEIDAE	5	15.6	1.08	2	16.0	0.64	2	16.0	0.64	2	16.0	0.64	2	16.0	0.64	2	16.0	0.64	2	16.0	0.64
<i>Dentex dentex</i>	SPARIDAE	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01
<i>Dentex gibbosus</i>	SPARIDAE	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01
<i>Halobatrachus diacephalus</i>	BATRACHOIDIDAE	1	46.1		1	41.1		1	41.1		1	32.9		1	30.5		1	32.9		1	30.5	
<i>Dicentrarchus labrax</i>	MORONIDAE	1	46.1		1	41.1		1	41.1		1	32.9		1	30.5		1	32.9		1	30.5	
<i>Bolus bryandarsi</i>	MURCIDAE	1	46.1		1	41.1		1	41.1		1	32.9		1	30.5		1	32.9		1	30.5	
<i>Bothus podas</i>	BOTHIDAE	1	46.1		1	41.1		1	41.1		1	32.9		1	30.5		1	32.9		1	30.5	
<i>Necora puber</i>	PORTUNIDAE	1	46.1		1	41.1		1	41.1		1	32.9		1	30.5		1	32.9		1	30.5	
<i>Dentex macrocephalus</i>	SPARIDAE	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01
<i>Liza ramada</i>	MUGILIDAE	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01	2	44.7	6.01
<i>Raja oxyrinchus</i>	RAJIDAE	1	37.4		1	36.2		1	36.2		1	155.0		1	155.0		1	155.0		1	155.0	
<i>Sarpa salpa</i>	SPARIDAE	1	37.4		1	36.2		1	36.2		1	155.0		1	155.0		1	155.0		1	155.0	
<i>Diplodus bellissimus</i>	SPARIDAE	1	16.2		1	16.2		1	16.2		1	16.2		1	16.2		1	16.2		1	16.2	
<i>Callionymus lyra</i>	CALLIONYMIDAE	1	19.9		1	19.9		1	19.9		1	19.3		1	19.3		1	19.3		1	19.3	
<i>Merlangius merlangus</i>	GADIDAE	2	26.5	7.78	2	26.5	7.78	2	26.5	7.78	2	26.5	7.78	2	26.5	7.78	2	26.5	7.78	2	26.5	7.78
<i>Torpedo torpedo</i>	TORPEDINIDAE	1	15.2		1	15.2		1	15.2		1	16.8		1	16.8		1	16.8		1	16.8	
<i>Symphodus bailloni</i>	LAERIDAE	1	21.4		1	15.2		1	15.2		1	16.8		1	16.8		1	16.8		1	16.8	
<i>Spicara maena</i>	CENTRACANTHIDAE	1	21.4		1	15.2		1	15.2		1	16.8		1	16.8		1	16.8		1	16.8	
<i>Diplodus cervinus</i>	SPARIDAE	2	39.9		2	39.9		2	39.9		2	39.9		2	39.9		2	39.9		2	39.9	
<i>Muracana helena</i>	MURAEINIDAE	2	39.9		2	39.9		2	39.9		2	39.9		2	39.9		2	39.9		2	39.9	
<i>Loligo vulgaris</i>	LOLIGINIDAE	1	49.5		1	49.5		1	49.5		1	49.0		1	49.0		1	49.0		1	49.0	
<i>Scyliorhinus canicula</i>	SCYLIORHINIDAE	1	49.5		1	49.5		1	49.5		1	49.0		1	49.0		1	49.0		1	49.0	
<i>Solea lascaris</i>	SOLEIDAE	1	35.7	6.72	1	35.7	6.72	1	35.7	6.72	1	32.0		1	32.0		1	32.0		1	32.0	
<i>Diplodus puntazzo</i>	SPARIDAE	2	35.7	6.72	2	35.7	6.72	2	35.7	6.72	2	32.0		2	32.0		2	32.0		2	32.0	

(To be concluded in next page)

Table 3.2.1.2.4. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total	
		100/600		100/800		120/600		120/800		140/600		140/800			
		n	IL (cm)	n	IL (cm)	n	IL (cm)	n	IL (cm)	n	IL (cm)	n	IL (cm)	s.d.	s.d.
<i>Argemone regalis</i>	SCIANIDAE											1	68.8		1
<i>Serranus scriba</i>	SEERANIDAE			1	19.8										1
<i>Dentex sp.</i>	SPARIDAE			1	28.9										1
<i>Raja sp.</i>	RAJIDAE	1													1
<i>Loligo spp.</i>	LOLIGINIDAE														1
<i>Ameghinoanus imperialis</i>	BOTHIDAE					1	17.9								1
<i>Galeorhinus galeus</i>	TRIAKIDAE			1	137.5										1
<i>Prionace glauca</i>	CARCHARINIDAE											1	112.0		1
<i>Mullus barbatus</i>	MULLIDAE									1	22.0				1
<i>Plecotrichichthys mediterraneus</i>	HAEMULIDAE									1	65.0				1
<i>Psetta maxima</i>	SCOPHTHALMIDAE									1	41.3				1
<i>Acanthaluteres palloni</i>	LABRIDAE	1	18.5												1
<i>Euthynnus sp.</i>	SCOMBRIDAE									1	49.7				1
<i>Lithognathus merryrus</i>	SPARIDAE			1											1
Total		784		1172		1060		679		684		684			5063

**Table 3.2.1.2.5. Algarve. Number of specimens (n), mean total wight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Winter.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total								
		100/600			100/800			120/600			120/800				140/600			140/800				
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.
<i>Septia officinalis</i>	SEPIIDAE	291	1224.1	654.97	232	1197.6	544.17	312	1479.3	675.71	244	1380.4	729.54	183	1657.1	612.35	176	1749.7	661.90	193	1930.8	661.90
<i>Microcoelus aspinus</i>	SOLEIDAE	124	185.3	63.59	208	196.3	62.79	104	196.3	68.65	110	192.3	68.75	55	196.3	67.47	56	205.5	58.38	117	205.5	58.38
<i>Raja undulata</i>	RAIIDAE	5	2081.5	1054.71	3	2068.4	1008.16	8	1581.5	482.73	7	2637.0	1570.99	16	2226.1	948.88	15	2362.9	1291.78	89	2362.9	1291.78
<i>Solea senegalensis</i>	SOLEIDAE	11	552.9	337.81	14	392.6	368.26	15	517.2	208.24	16	692.8	208.41	27	736.7	193.00	27	781.5	205.40	67	781.5	205.40
<i>Solea vulgaris</i>	SOLEIDAE	36	227.8	216.18	51	203.8	162.94	13	343.9	330.36	48	193.6	166.47	15	527.7	395.09	27	391.7	348.27	48	391.7	348.27
<i>Scorpaenopsis rhombus</i>	SCORPAENIDAE	89	121.9	23.94	92	116.8	25.42	106	128.5	23.67	117	117.6	20.34	191	114.7	19.05	177	119.0	23.12	383	119.0	23.12
<i>Scorpaenopsis rhombus</i>	SCOPHTHALMIDAE	2	1326.4	135.90	2	1508.9	391.08	6	1078.5	329.26	2	722.9	653.81	8	1226.1	123.52	7	1316.3	269.44	20	1316.3	269.44
<i>Merluccius merluccius</i>	MERLUCCIIDAE	13	261.8	140.77	22	275.9	264.57	10	173.1	94.47	19	252.7	110.04	16	283.4	117.70	26	255.0	92.64	73	255.0	92.64
<i>Halobarananus didactylus</i>	BATRACHOIDIDAE	19	340.0	100.26	20	364.3	67.02	10	458.6	238.86	7	512.1	104.07	3	355.5	104.80	2	344.6	120.01	61	344.6	120.01
<i>Raja clavata</i>	RAIIDAE	2	592.6	277.25	2	1222.0	634.48	1	3198.5			1806.5	192.19	1	3198.5		4	1338.1	567.27	19	1338.1	567.27
<i>Raja asterias</i>	RAIIDAE	2	1262.3	1366.80	2	1346.2	64.67	1	1239.7			841.7	445.43	3	1153.1	480.39	3	1012.0	297.37	8	1012.0	297.37
<i>Cheilodactylus lastoviza</i>	TRIGLIDAE	32	184.0	124.06	28	196.7	67.27	17	186.2	83.95	16	204.4	93.32	7	160.0	22.21	2	155.4		89	155.4	
<i>Ptyxias ptyxias</i>	GADIDAE	8	408.9	390.13	11	241.8	70.55	8	346.6	393.25	5	222.5	23.02	3	374.5	321.09	2	538.0	378.15	32	538.0	378.15
<i>Trachinus draco</i>	TRACHINIDAE	19	134.4	59.18	19	159.2	75.28	20	122.5	53.08	18	129.4	44.60	19	132.3	63.40	6	113.3	53.44	106	113.3	53.44
<i>Pagellus acarne</i>	SPARIDAE	47	95.1	49.90	53	99.8	79.62	8	99.1	21.35	15	138.0	51.06	3	172.3	49.34	2	323.1		113	323.1	
<i>Scorpaenopsis scorpaenoides</i>	SCORPAENIDAE	2	262.1	24.08	11	253.1	75.06	6	260.2	143.75	8	192.5	71.25	11	194.2	95.64	9	213.5	84.05	61	213.5	84.05
<i>Diplodus vulgaris</i>	SPARIDAE	10	396.7	111.83	7	409.1	115.23	1				331.2	166.61	1	405.48		5	245.2	61.99	22	245.2	61.99
<i>Mola mola</i>	MOLIDAE	1	3767.4																	1		
<i>Dicentrarchus labrax</i>	MORONIDAE	3	722.4	179.26	2	867.4	58.22	1	1444.6		1	2001.3		1	406.4		1	2386.9		7	2386.9	
<i>Raja brachyura</i>	RAIIDAE	2	106.1	27.30	3	373.8	267.65	3	390.7	85.25	5	616.4	509.36	1	406.4		1	2386.9		11	2386.9	
<i>Pagellus erythrinus</i>	SPARIDAE	2	106.1	27.30	3	373.8	267.65	3	390.7	85.25	5	616.4	509.36	1	406.4		1	2386.9		11	2386.9	
<i>Argyrosomus regius</i>	SCIANIDAE	2	591.5	10.22	1	679.9		2	475.5	327.08				2	556.1	123.61	1	643.5		5	643.5	
<i>Solea lascaris</i>	SOLEIDAE	2	1166.4	243.91	1	765.8								2	556.1	123.61	1	643.5		5	643.5	
<i>Balistes carolinensis</i>	BALISTIDAE	2	1166.4	243.91	1	765.8								2	556.1	123.61	1	643.5		5	643.5	
<i>Cheilodactylus lucerna</i>	TRIGLIDAE	6	319.3	308.08	6	283.1	173.83	1	150.5		2	1053.1	89.01	1	116.0		2	727.1	36.80	14	727.1	36.80
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1			2	588.5	68.83	3	441.9	11.54				1	116.0		2	468.9	36.32	6	468.9	36.32
<i>Zeus faber</i>	ZEIDAE	1	3417.4					3	441.9	11.54				1	116.0		2	468.9	36.32	4	468.9	36.32
<i>Lasa curata</i>	MUGILIDAE	3	281.1	108.90	7	305.7	129.97	1	194.2		1	143.1		3	113.0	34.91	1	2386.9		14	2386.9	
<i>Spondyliotoma cantharus</i>	SPARIDAE	11	108.0	31.07	14	101.6	28.68	2	147.9	52.86	4	119.2	8.30	3	113.0	34.91	1	2386.9		32	2386.9	
<i>Serranus cabrilla</i>	SERRANIDAE	14	94.2	11.57	13	96.1	13.31	4	90.5		8	93.5	14.54	2	96.3		1	2746		49	2746	
<i>Callionymus lyra</i>	CALLIONYMIDAE	109	69.1	6.53	169	58.6	9.43	133	56.7	9.38	154	62.7	13.49	39	55.4	11.05	42	58.3	4.39	615	58.3	4.39
<i>Sarotia pichardus</i>	CLUPEIDAE	5	196.5	162.26	4	267.7	57.34	1	212.6		1	295.0		3	326.6		1	208.5		20	208.5	
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	8	134.6	32.73	3	120.6	6.06	5	151.1	33.04				1	110.7		1	165.8		24	165.8	
<i>Trisopterus luscus</i>	GADIDAE	18	66.6	16.35	16	64.9	17.96	5	66.4	22.44	12	71.9	43.21	4	79.2	65.27	5	76.5	20.25	89	76.5	20.25
<i>Scorpaena notata</i>	SCORPAENIDAE	4	66.9	15.27	10	47.7	20.01	9	67.3	32.84	1	1848.5		1	100.6		1	132.4		25	132.4	
<i>Trachurus trachurus</i>	CARANGIDAE	1			10	68.3	15.43	7	99.3		7	81.4	5.07	3	100.6		1	132.4		25	132.4	
<i>Sarda sarda</i>	SCOMBRIDAE	9	80.3	21.69	10	68.3	15.43	7	99.3		7	81.4	5.07	3	100.6		1	132.4		25	132.4	
<i>Boops boops</i>	SPARIDAE	1			10	68.3	15.43	7	99.3		7	81.4	5.07	3	100.6		1	132.4		25	132.4	

(To be concluded in next page)

Table 3.2.1.2.5. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total			
		100/600		100/800		120/600		120/800		140/600		140/800					
		n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)				
<i>Eutymnus alletteratus</i>	SCOMBRIDAE															1486	
<i>Lobus bergylla</i>	LABRIDAE															1123	
<i>Dicologlossa cuneata</i>	SOLEIDAE	3	59.7	23.17	2	561.4	70.30	1	109.8	1	70.5	1	95.0			888	
<i>Dentex gibbosus</i>	SPARIDAE	1	610.5	42.15	7	72.3	42.15	6	30.2	9.88	5	35.7	5.22	1	36.2	610	
<i>Lepidotrigla cavillone</i>	TRIGLIDAE	4	36.2	12.43	4	36.2	12.43	1	116.7	1	116.7	1	44.0	1	44.0	422	
<i>Pagrus pagrus</i>	SPARIDAE	3	401.9	29.22	1	104.7		1	30.4	1	17.6	3	49.8	8.42	2	51.1	395
<i>Citharus belloni</i>	SPARIDAE	3	92.6		2	104.7		1	30.4	1	17.6	3	49.8	8.42	2	51.1	356
<i>Citharus linguatula</i>	CITHARIDAE	1			1	98.7		1	30.4	1	17.6	1	90.2		1	90.2	190
<i>Mullus surmuletus</i>	MULLIDAE	1			1	163.9		1	114.5	1	114.5	1	90.2		1	90.2	164
<i>Conger conger</i>	CONGRIDAE	1			1	114.5		1	58.0	1	58.0	1	90.2		1	90.2	115
<i>Echius podas</i>	BOTHIDAE	1			1	58.0		1	30.4	1	17.6	1	90.2		1	90.2	56
<i>Arnoglossus imperialis</i>	BOTHIDAE	1			1	58.0		1	30.4	1	17.6	1	90.2		1	90.2	48
<i>Serranus hepatus</i>	SERRANIDAE	1			1	58.0		1	30.4	1	17.6	1	90.2		1	90.2	
<i>Loligo spp.</i>	LOLIGINIDAE	1			1			1									
<i>Eledone cirrosa</i>	OCTOPODIDAE	1			1			1									
<i>Maia squinado</i>	MAIIDAE	1			1			3									
<i>Cheikimichthys spp.</i>	TRIGLIDAE	1			2			1									
<i>Echius brandaris</i>	MURICIDAE	2			2			1									
<i>Hippocampus hippocampus</i>	SYNGNATHIDAE	1			1			1									
<i>Palaemonetes pugio</i>	PALINURIDAE	16			18			21									
<i>Octopus vulgaris</i>	OCTOPODIDAE	4			6			5									
<i>Chironia lampas</i>	RANELLIDAE	4			6			1									
<i>Pagrus auriga</i>	SPARIDAE	1			1			1									
<i>Serranus atricauda</i>	SERRANIDAE	1			1			1									
<i>Torpedo marmorata</i>	TORPEDINIDAE	1			2			1									
<i>Torpedo torpedo</i>	TORPEDINIDAE	2			2			3									
<i>Microcetrus ocellatus</i>	SOLEIDAE	1			1			1									
<i>Peromylaeus bovinus</i>	MYLIOBATIDAE	1			1			1									
<i>Loligo vulgaris</i>	LOLIGINIDAE	2			4			4									
<i>Cheikimichthys obscurus</i>	TRIGLIDAE	97			51			40									
<b>Total</b>		<b>1046</b>			<b>1151</b>			<b>909</b>									<b>2556395</b>

**Table 3.2.1.2.6. Algarve. Number of specimens (n), mean total wight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Spring.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total									
		100/600			100/800			120/600			120/800				140/600			140/800					
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	Total
<i>Raja unibulata</i>	RAJIDAE	11	2094.2	1063.71	8	2141.4	983.36	21	2218.5	1087.69	26	1814.9	776.89	35	1841.0	1072.75	42	2140.2	1145.94	283988			
<i>Septia offinalis</i>	SEPIIDAE	60	984.0	566.84	33	845.0	376.97	42	1151.9	456.62	33	1243.5	514.22	26	1495.6	371.04	34	1397.3	495.96	240148			
<i>Sokeia senegalensis</i>	SOLEIIDAE	30	445.4	125.62	31	414.5	97.04	84	608.3	155.68	51	571.2	170.34	48	806.1	230.18	25	673.7	197.16	153410			
<i>Trachinus draco</i>	TRACHINIDAE	95	149.8	53.79	100	146.7	48.59	95	160.5	52.05	87	153.3	59.23	54	166.1	67.81	46	154.2	52.25	61247			
<i>Balistes carolinensis</i>	BALISTIDAE	5	1173.6	402.37	8	729.5	322.75	14	896.4	314.36	10	837.5	497.93	13	1024.1	326.70	13	812.5	207.98	53005			
<i>Halobotrachus didactylus</i>	BATRACHOIIDAE	32	384.3	113.27	42	385.0	130.19	16	402.4	141.30	26	395.3	134.70	7	636.6	597.85	4	391.1	221.06	45740			
<i>Microchirus azevia</i>	SOLEIIDAE	50	176.4	69.80	53	183.4	67.13	31	160.4	53.69	40	176.2	75.85	33	195.9	62.00	51	238.9	145.03	37071			
<i>Pagellus ephippium</i>	SPARIDAE	9	544.9	340.93	13	702.4	298.15	13	436.2	403.16	16	505.1	340.32	13	519.5	362.99	26	472.7	337.01	36301			
<i>Argyrosomus regius</i>	SCIANIDAE	1	3887.5		2	1415.1	585.14	2	1709.9	1462.19	1	1130.6		3	3599.4		1	11109.8		21908			
<i>Conger conger</i>	CONGRIDAE	19	282.8	142.74	11	313.7	124.35	10	273.9	169.95	8	198.3	77.93	9	285.4	51.60	9	235.0	86.45	16212			
<i>Symphysionema cantharus</i>	SCOPHTHALMIDAE	1	1081.7		3	905.0	281.78	4	755.7	77.06	7	728.7	210.37	4	867.1	85.92	15389		15389				
<i>Sokeia lancearis</i>	SOLEIIDAE	9	186.1	70.80	14	239.6	157.82	4	619.1	427.14	16	321.0	214.18	1	169.2	189.2	12	371.4	211.39	14195			
<i>Psetta maxima</i>	SCOPHTHALMIDAE	1	1272.1		5	1187.1	225.03	2	1187.8	436.61	1	1063.1		2	1588.5	16.62	13623		13623				
<i>Dentex gibbosus</i>	SPARIDAE	14	377.8	301.21	7	425.1	263.73	5	341.7	42.61	7	326.3	64.37	2	352.1	74.89	5	421.9	35.21	12712			
<i>Plytes ptyvis</i>	GADIDAE	6	593.0	201.35	5	611.6	111.87	4	357.0	79.95	1	219.5		5	579.4	237.99	4	555.1	48.66	12247			
<i>Lithognathus mionectes</i>	SPARIDAE	2	2546.2	654.00	1	1307.4		2	1104.8	705.88				2	1707.6	146.62			12025				
<i>Raja asterias</i>	RAJIDAE	68	75.0	23.40	59	69.8	28.41	22	99.5	36.66	17	89.2	23.74	6	117.1	35.71	8	91.6	29.24	11773			
<i>Scorpaena nozua</i>	SCORPAENIDAE	7	410.6	208.22	3	592.4	176.01	3	752.2	393.86				3	1075.0	894.06	2	307.8	84.13	9263			
<i>Pagrus pagrus</i>	SPARIDAE	2	1234.7	355.70										1	3700.9		1	1914.7		8085			
<i>Dentex dentex</i>	SPARIDAE	10	253.0	112.12	2	144.9	177.34	3	250.3	65.50	3	248.6	46.62	6	314.0	156.54	5	208.3	58.54	7242			
<i>Palaemonetes pallas</i>	PALINURIDAE	34	91.1	25.73	31	87.6	27.93	12	135.7	85.06	10	130.8	60.32	5	140.2	70.30	3	135.3	36.56	7106			
<i>Pagellus acarne</i>	SPARIDAE	10	127.6	14.39	24	130.2	31.15	17	118.3	5.75	44	140.6	59.44	20	120.0	23.36	42	129.5	26.45	7103			
<i>Scomber japonicus</i>	SCOMBRIDAE	3	115.3	29.07	4	269.9	112.32	3	228.8	50.01	5	388.6	238.16	1	1377.0		2	633.5	105.49	6699			
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	2136.7											2	1538.5	846.04	1	1019.6		6233			
<i>Diplodus vulgaris</i>	SPARIDAE	6	410.0	83.01	7	366.5	186.62	3	494.0	497.29	5	335.1	221.96				3	161.0	28.58	5886			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	6	164.7	52.04	10	193.0	96.05	9	194.5	34.04	3	156.2	12.25				1	1848.3		5260			
<i>Dentex canariensis</i>	SPARIDAE	20	108.8	33.57	15	81.5	29.93	9	133.6	20.29	12	122.1	27.48	1	117.7	126.46	2	1951.4	192.56	4477			
<i>Serranus cabrilla</i>	SERRANIDAE							1	631.5		1	735.3		2	1387.0					4141			
<i>Diplodus cervinus</i>	SPARIDAE	10	118.7	16.00	11	122.2	32.97	5	117.5	15.52	5	161.7	43.22	3	800.6	358.22	1	221.8		3903			
<i>Torpedo nobiliana</i>	TORPEDINIDAE	1			1	802.4								3	800.6					3810			
<i>Bohus pedas</i>	BOTHIDAE	3	160.6	52.35	3	192.7	54.73	4	455.9	410.06	2	264.0		2	264.0		1	167.4		3386			
<i>Diplodus sargus</i>	SOLEIIDAE	10	96.3	20.01	14	91.2	29.75	7	92.1	25.54	5	91.9	39.48	1	88.1	111.9	3	111.9		3345			
<i>Liza namada</i>	MUGILIDAE													1	88.1		3	111.9		2995			
<i>Zenopsis maculata</i>	CALLIONYMIDAE													1	2754.7					2755			

(To be continued in next page)

Table 3.2.1.2.6. Continued

Species	Family	Inner panel / Outer panel mesh size (mm)												Total			
		100/600		100/800		120/600		120/800		140/600		140/800					
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	
<i>Raja mitsukurina</i>	RAJIDAE	8	90.4	57.46	1	864.7	22.61	7	81.4	27.55	7	80.9	21.82	1	820.4		2575
<i>Diplodus bellotti</i>	SPARIDAE				6	110.0		2	345.7	226.56	2	723.0	379.09	1	75.9		2210
<i>Chelidonichthys luserna</i>	TRIGLIDAE	2	121.4	53.48	1	134.6		1	179.5		6	156.4	56.13	3	140.6	50.07	2137
<i>Merluccius merluccius</i>	MERLUCCIIDAE				4	56.4	4.32	6	52.1	12.82	4	61.7	11.89	1	49.1		1887
<i>Chelon labrovus</i>	MUGILIDAE	4	452.8		1	452.8		1	452.8		1	694.7		13	56.5	10.92	1591
<i>Sordana pilchardus</i>	SPARIDAE	3	52.2	51.00	5	66.1	42.85	3	72.5	18.26	2	64.0	1.46	4	69.6	41.43	1300
<i>Citharus linguatula</i>	CITHARIDAE	1			1	362.6		1			2	125.2	5.08	2	264.2	6.92	1063
<i>Scomber scomberus</i>	SCOMBRIDAE	3	79.3	11.59	1	147.9		3	118.1		2			1	277.6		891
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	1			1	334.8		1			2			1			863
<i>Raja elasmata</i>	RAJIDAE	3	79.3	11.59	1	147.9		3	118.1		2			1	819.9		820
<i>Boops boops</i>	SPARIDAE	1	266.2		2	131.1	12.96				1			1	168.4		593
<i>Solea vulgaris</i>	SOLEIDAE	5	71.5	27.62	1	43.3		1	189.6		1			1	107.2		528
<i>Dicoblageglossa cuneata</i>	SOLEIDAE	1			2	108.1		1			1			1	210.3		508
<i>Diplodus annularis</i>	SPARIDAE	1			2	108.1		1			1			1	486.7		487
<i>Belone belone</i>	BELONIDAE	1	159.6		2	54.8	0.59	1	60.4		2	73.6		1	92.0		420
<i>Trachurus trachurus</i>	CARANGIDAE	1			1	145.6		1			1			1			305
<i>Tripterus luscus</i>	GADIDAE	1			1	145.6		1			1			2			282
<i>Mullus barbatus</i>	MULLIDAE	1			1	145.6		1			1	282.0		1	136.5		136
<i>Mullus surmuletus</i>	MULLIDAE	1			1	145.6		1			1	136.5		1			116
<i>Labrus bergylli</i>	LABRIDAE	1			1	145.6		1	116.0		1			1			37
<i>Brachyosteus laevis</i>	BOTHIDAE	1	21.6		1	21.4		1	15.2		1			1			22
<i>Microstichus variegatus</i>	SOLEIDAE	1	20.1		1	20.1		1			1			1			20
<i>Serranus hepatus</i>	SERRANIDAE	1			1	20.1		1			1			2			20
<i>Loligo spp.</i>	LOLIGINIDAE	1			1	20.1		1			1			2			20
<i>Sarda sarda</i>	SCOMBRIDAE	1			1	20.1		1			1			2			20
<i>Penaeus kerathurus</i>	PENAEIDAE	1			1	20.1		1			1			2			20
<i>Hippocampus sp.</i>	SYNGNATHIDAE	1			1	20.1		1			1			2			20
<i>Loligo vulgaris</i>	LOLIGINIDAE	1			1	20.1		1			1			2			20
<i>Chelidonichthys spp.</i>	TRIGLIDAE	4			3			2			2			1			37
<i>Chironia lampas</i>	RANELLIDAE	3			2			4			5			3			22
<i>Ocotopus vulgaris</i>	OCTOPODIDAE	3			4			6			6			5			22
<i>Hippocampus hippocampus</i>	SYNGNATHIDAE	3			4			6			6			5			22
<i>Mugil sp.</i>	MUGILIDAE	1			1			1			1			1			22
<i>Pagrus auriga</i>	SPARIDAE	1			2			2			1			1			22
<i>Apogeton imberbis</i>	APOGONIDAE	1			1			1			1			1			22
<i>Solea impar</i>	SOLEIDAE	1			3			1			1			1			22
<i>Chelidonichthys obscurus</i>	TRIGLIDAE	31			7			18			20			22			22

(To be concluded in next page)

Table 3.2.1.2.6. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total		
		100/600		100/800		120/600		120/800		140/600		140/800				
		n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)			
<i>Raja nasus</i>	RAJIDAE															
<i>Solea sp</i>	SOLEIDAE	1		1												
<i>Microcoelus ovalis</i>	SOLEIDAE					1										
<i>Aphichatis apala</i>	MYLIOBATIDAE															1
<i>Mugil cephalus</i>	MUGILIDAE							1								
<i>Torpedo marmorata</i>	TORPEDINIDAE	1		3				2								
<i>Maja squinado</i>	MAJIDAE	10		3				7								
<i>Torpedo torpedo</i>	TORPEDINIDAE	2						2								
<i>Homarus gammarus</i>	NEPHROPIDAE															
<i>Trachurus sp.</i>	CARANGIDAE	1														
<i>Sarpa salpa</i>	SPARIDAE	1														
<i>Paromplazus bonnus</i>	MYLIOBATIDAE															2
<i>Parapristipoma octolobatum</i>	HAEMULIDAE															
Total		630		573		519		531		379		422				1194137

**Table 3.2.1.2.7. Algarve. Number of specimens (n), mean total wight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Summer.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total											
		100/600			100/800			120/600			120/800				140/600			140/800							
n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	Total	
<i>Pipys pipys</i>	GADIDAE	47	372.0	307.64	54	491.7	497.57	76	560.2	554.63	75	685.6	590.81	38	884.3	685.29	34	742.1	665.11	182755					
<i>Dentes gibbosus</i>	SPARIDAE																								
<i>Septia officinalis</i>	SEPIIDAE	9	1176.7	515.95	5	1409.7	428.34	12	1469.8	419.78	1	13471.3		7	8615.2	5659.75	2	10923.7	2827.47	95425					
<i>Prionace glauca</i>	CARCHARHINIDAE																								
<i>Zeu, faber</i>	ZEIDAE	4	432.7	413.08	5	1527.2	749.49	9	1003.0	315.77	8	1036.8	614.38	10	1256.4	710.18	20	1533.8	662.24	69929					
<i>Pagrus pagrus</i>	SPARIDAE	2	1404.6	948.80	3	840.4	136.16	12	1422.4	520.77	6	1372.4	414.41	8	2321.7	734.39	5	1795.3	366.31	58183					
<i>Scorpaenidae</i>	SCORPAENIDAE	18	187.5	18.17	26	159.8	32.66	33	169.7	39.50	208	163.8	26.39	39	168.5	30.46	207	157.1	31.05	43492					
<i>Microstomus aeneus</i>	SOLEIDAE	55	218.0	69.78	60	219.6	116.31	33	203.3	66.13	48	215.1	56.75	24	206.3	69.95	19	217.2	51.91	42142					
<i>Morone chrysops</i>	MERLUCCIIDAE	17	286.7	242.81	18	307.5	282.25	23	417.9	416.30	20	411.4	297.96	24	296.8	187.96	24	317.7	228.78	40391					
<i>Scorpaenidae</i>	SCORPAENIDAE	52	184.6	15.15	24	202.1	42.22	34	191.4	24.32	42	169.6	38.78	44	192.0	29.61	43	197.1	53.89	36994					
<i>Lophius piscatorius</i>	LOPHIIDAE	1	2728.1		1	642.7		1	6887.9					1	3523.1		3	7344.9	11043.18	35817					
<i>Raja undulata</i>	RAJIDAE	1	3686.2		4	2446.5	1557.63				3	3109.0	1042.13	8	1343.3	550.09	6	1125.9	1010.17	35385					
<i>Pagellus acarne</i>	SPARIDAE	28	171.5	114.62	22	304.6	146.86	21	212.8	113.25	19	240.9	130.68	28	297.3	109.43	22	267.9	65.42	30848					
<i>Scyliorhinus canicula</i>	SCYLIORHINIDAE	16	502.1	79.33	4	481.5	84.42	8	528.0	86.40	13	464.1	95.23	8	449.3	98.04	10	508.6	114.64	28425					
<i>Raja clavata</i>	RAJIDAE	1	2139.6					2	4450.1	416.46	4	1972.0	1231.42							26050					
<i>Scorpaenidae</i>	SCORPAENIDAE	4	1018.6	908.05	3	882.6	176.01	2	664.6	596.02	5	801.0	383.93	4	1627.6	542.62	3	819.9	180.59	21026					
<i>Pagellus erythrinus</i>	SPARIDAE	8	536.1	346.53	11	538.7	158.17	9	725.6	208.56	13	569.6	515.60	4	784.9	244.30	1	668.0	20352						
<i>Raja asterias</i>	RAJIDAE							1	1069.1		2	1718.1	47.15	4	2509.5	1018.45	2	1069.1	953.10	19149					
<i>Scorpaenidae</i>	SCORPAENIDAE	6	437.2	179.92	6	565.0	232.63	8	584.7	189.18	7	564.1	97.36	3	723.0	87.49	5	698.2	170.79	18566					
<i>Solea senegalensis</i>	SOLEIDAE	12	355.8	92.22	11	404.5	77.39	7	427.1	121.77	7	356.4	84.81	2	505.7	171.11	2	449.8	52.27	15331					
<i>Halicartrachus didactylus</i>	BATRACHOIDIDAE	12	319.6	116.54	17	316.3	122.91	6	426.5	99.04	5	306.1	139.64	4	169.4	21.84			13233						
<i>Diplodus vulgaris</i>	SPARIDAE	26	116.1	32.07	28	130.5	34.45	16	120.8	33.04	5	82.8	58.38	27	120.4	29.91	11	123.6	31.06	13184					
<i>Trachurus trachurus</i>	CARANGIDAE																								
<i>Conger conger</i>	CONGRIDAE																								
<i>Raja brachyura</i>	RAJIDAE	2	5606.2	1389.26				2	1016.2	161.75	1	9585.4													
<i>Trachinus draco</i>	TRACHINIDAE	18	131.9	33.30	30	141.8	53.12	21	144.3	34.06	18	134.2	36.51	13	146.5	55.67	11	153.3	15.10	10963					
<i>Dentes macroceus</i>	SPARIDAE	5	516.8	78.69	11	494.3	63.77	2	642.6	253.73				1	592.8					10441					
<i>Boops boops</i>	SPARIDAE	19	88.5	24.19	34	100.9	16.67	21	106.3	18.75	12	117.7	60.48	9	109.6	21.96	11	134.8	48.55	9636					
<i>Dentes macrocephalus</i>	SPARIDAE	2	616.4	167.39	3	587.3	267.05	5	967.7	155.51	1	891.2		1	980.8					9705					
<i>Raja miraletus</i>	RAJIDAE	2	727.8	37.78	1	489.3		1	782.3		2	610.1	251.66	2	630.5	227.97	5	567.0	89.42	7433					
<i>Scorpaenidae</i>	SCORPAENIDAE	8	375.7	70.46	4	385.0	33.47	1	366.0		2	616.1	251.66	1	794.1		1	275.0	721.3						
<i>Palaemonetes puerus</i>	PALINURIDAE	2	385.3	231.36	2	361.5		5	516.5	258.04	5	556.7	325.74	4	270.3		4	291.5	72.23	7086					
<i>Trisopterus luscus</i>	GADIDAE	9	100.7	60.39	9	154.2	93.16	9	211.1	40.77	7	173.5	58.52	7	194.5	32.62	2	217.6	61.27	6418					
<i>Spondycisoma cantharus</i>	SPARIDAE	6	229.6	149.16	2	244.4		4	232.4	93.55	2	244.4		3	139.8	46.47	10	319.6	200.50	5615					
<i>Serranus cabrilla</i>	SERRANIDAE	13	116.0	35.15	14	98.1	23.11	8	114.0	36.19	11	127.0	30.76	3	186.2	17.82	2	158.0	96.88	5585					
<i>Mullus surmuletus</i>	MULLIDAE	2	221.9	132.88	2	359.8	11.34	1	264.7		5	349.5	100.11	2	360.4	107.13	5	476.0	37.29	5576					
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	3	304.2	132.88				2	183.5	83.48	8	201.9	73.89	2	286.7	96.01	7	320.5	97.58	5510					
<i>Psetta maxima</i>	SCOPHTHALMIDAE	4	277.3	67.56	7	186.6	36.05	2	207.7	14.85	6	196.2	58.09	1	1462.8		1	272.8	4147	4098					
<i>Chelidonichthys lamorini</i>	TRIGLIDAE																								

(To be concluded in next page)

Table 3.2.1.2.7. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		100/600			100/800			120/600			120/800				140/600			140/800		
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.		n	W (g)	s.d.	n	W (g)	s.d.
<i>Scorpaena noxza</i>	SCORPAENIDAE	21	70.1	14.45	25	70.1	19.19	13	93.0	17.57	3	66.4	37.85	1	33.6		4	57.2	23.00	4058
<i>Dentex dentex</i>	SPARIDAE														3665.6		1			3666
<i>Sardina pilchardus</i>	CLUPEIDAE	3	59.1	5.79	23	59.8	30.48	29	44.6	15.20	21	54.4	5.95	9	53.3	11.54	23	53.1	5.83	3361
<i>Chelidonichthys lucerna</i>	TRIGLIDAE				1	132.2		2	435.7	395.09				1	336.5		1	1821.0		3161
<i>Citharus linguatula</i>	CITHARIDAE	17	44.9	13.88	10	60.9	23.06	8	51.5	11.88	7	44.2	7.57	2	55.2		6	44.2	7.86	1798
<i>Scopelogadus rhombus</i>	SCOPHTHALMIDAE														1473.6		1			1474
<i>Solea lascaris</i>	SOLEIDAE				1	173.6					1	669.4								669
<i>Mullus barbatus</i>	MULLIDAE										1	453.6								627
<i>Pagellus bellotti</i>	SPARIDAE										1	528.7								529
<i>Dentex canariensis</i>	SPARIDAE							1	510.8											511
<i>Lithognathus mermyrus</i>	SPARIDAE																2	233.1	80.00	466
<i>Solea vulgaris</i>	SOLEIDAE				1	363.4														363
<i>Gobidae</i>	GOBIDAE																			
<i>Octopus vulgaris</i>	OCTOPODIDAE	2			1			5			2									
<i>Syncaja masena</i>	CENTRACANTHIDAE							1												
<i>Chelidonichthys spp.</i>	TRIGLIDAE	1																		
<i>Serranus hepatus</i>	SERRANIDAE																			
<i>Eledone cirrosa</i>	OCTOPODIDAE																			
<i>Chironia lampas</i>	RANELLIDAE	1			1			2			1									
<i>Chelidonichthys obscurus</i>	TRIGLIDAE	15			13			12			10									
<i>Pagellus bogaraveo</i>	SPARIDAE	2			1			1			1									
<i>Homarus gammarus</i>	NEPHROPIDAE							2			1									
<i>Larus oxyrinchus</i>	LAMNIDAE										1									
<i>Helicolenus dactylopterus</i>	SEBASTIDAE				1			2			1									
<i>Muraena helena</i>	MURAENIDAE																			
<i>Amblyraja orientalis</i>	SERRANIDAE				2			1			1									
<i>Micromesistius poutassou</i>	GADIDAE				1															
<i>Torpedo marmorata</i>	TORPEDINIDAE				1															
<i>Pomphus kishinouyei</i>	SCORPAENIDAE				1			1												
<i>Trachurus mediterraneus</i>	CARANGIDAE				8			1												
<i>Sciaenops ocellatus</i>	SCIANIDAE	3						1												
<i>Maja squinado</i>	MAJIDAE	3			1			3			5									
<i>Pagrus auratus</i>	SPARIDAE										1									
Total		485			517			481			640			393			557			1148380

**Table 3.2.1.2.8. Algarve. Number of specimens (n), mean total wight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Autumn.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		100/600			100/800			120/600			120/800				140/600			140/800		
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.		n	W (g)	s.d.	n	W (g)	s.d.
<i>Sepia officinalis</i>	SEPIIDAE	40	1902.1	821.46	37	2117.0	834.83	69	2050.8	829.85	54	2029.1	935.87	72	2491.4	951.04	92	2205.8	717.43	765329
<i>Raja undulata</i>	RAJIDAE	5	3793.2	459.93	4	3216.3	816.84	5	2995.8	709.40	5	2583.2	1052.76	16	2488.0	1074.08	6	2778.3	1009.42	107942
<i>Scorpaenopsis</i>	SCORPAENIDAE	84	195.7	37.19	194	194.6	35.31	260	201.7	39.49	138	180.8	27.67	177	186.1	40.26	265	193.0	31.08	103127
<i>Raja clavata</i>	RAJIDAE	3	2489.1	1718.29	10	2258.3	1380.59	1	4657.2		2	3767.1		8	2853.6	1340.53	9	2097.5	1178.12	75230
<i>Plyxiplyx</i>	GADIDAE	23	488.3	247.39	25	653.5	337.86	23	471.4	145.79	40	564.0	323.96	29	469.7	168.46	14	466.5	98.08	70408
<i>Microstichus asstia</i>	SOLEIDAE	58	224.2	81.86	75	220.6	81.05	68	201.2	97.78	57	189.8	61.72	40	209.4	84.49	30	244.0	67.83	65564
<i>Raja brachyura</i>	RAJIDAE	2	525.8	372.49	4	1590.7	2076.74	11	2349.2	1933.43	8	1408.3	1300.59	2	3371.5		12	1432.2	979.21	62080
<i>Pronotaca glauca</i>	CARCHARINIDAE																1	47290.0		47290
<i>Méla méla</i>	MOLIDAE				2	3122.4	87.33	1	2533.8		1	5351.4		3	2778.2	524.29	5	2731.4	363.09	36122
<i>Pagellus acarne</i>	SPARIDAE	27	168.8	111.67	48	207.0	101.79	26	177.3	98.30	34	192.2	98.90	23	276.9	89.41	16	209.5	61.20	30314
<i>Liza aurata</i>	MUGILIDAE	7	1366.6	211.85	5	1436.8	246.46	5	1696.9	922.02	3	1901.0	161.88	5	1694.2	1816.93	5	997.7	233.02	29521
<i>Raja asterias</i>	RAJIDAE	1	953.8		2	1233.6	268.80	2	1926.1	223.02	5	1052.4	348.36	5	1694.2	1816.93	5	997.7	233.02	24922
<i>Chelonicichthys lanterna</i>	TRIGLIDAE	67	162.6	45.32	34	155.3	40.14	22	163.5	51.22	31	157.3	32.48	7	200.4	70.51	3	177.2	57.59	24793
<i>Pagellus ephippium</i>	SPARIDAE	5	862.7	275.25	11	442.5	305.41	11	608.4	398.52	2	691.9	385.21	4	784.9	581.70	8	646.9	493.27	21922
<i>Merluccius merluccius</i>	MERLUCCIIDAE	20	307.5	282.10	13	189.4	70.02	15	302.2	293.23	14	270.6	194.25	13	409.8	404.56	23	293.8	157.93	19828
<i>Spirax aurata</i>	SPARIDAE	1			2	828.8	403.77	4	935.1	151.06	5	1401.3	1438.78	3	1119.4	359.50	4	1115.8	195.64	19291
<i>Solea vulgaris</i>	SOLEIDAE	10	503.3	407.69	3	883.9	433.83	5	762.2	93.36	2	754.6	70.34	4	842.7	243.58	4	1053.8	437.50	18986
<i>Lobus bergylla</i>	LABRIDAE	8	632.2	149.82	5	593.0	163.38	5	588.9	305.46	14	661.9	284.46	4	411.7	508.96	2	571.0	534.58	18691
<i>Scorpaena notata</i>	SCORPAENIDAE	74	74.0	19.70	100	66.9	18.06	28	78.9	26.20	46	73.9	19.08	5	89.6	6.64	5	68.8	23.35	17133
<i>Sarda sarda</i>	SCOMERIDAE	1	2010.5					3	2175.0	80.32	2	2188.1	41.66	2	1301.8	832.96				15515
<i>Pagrus pagrus</i>	SPARIDAE	5	836.2	506.18	5	494.0	78.34	2	1585.1	775.76				2	845.4	712.31	3	1119.8	581.96	14035
<i>Zeus faber</i>	ZEIDAE	4	326.6	104.38	2	694.9	281.35	3	795.5	565.17	9	457.3	304.08	7	538.4	282.97	4	741.7	91.74	13231
<i>Baltes carolinensis</i>	BALESTIDAE	2	794.0	236.00	1	872.2		6	1000.0	563.98	2	1239.4		1	3625.8		2	2628.9	177.59	12299
<i>Dentex gibbosus</i>	SPARIDAE							2	1251.5	108.24	1	912.3		1			1	924.7		12029
<i>Lepidus piscatorius</i>	LOPHIDAE	1	1136.0		3	2615.2	922.20	1	829.4		1	1293.0		3	1440.4	425.19	2	1521.5	116.86	11920
<i>Palmarus elephas</i>	PALINURIDAE	4	567.6	88.35	1	811.3		3	425.9	401.37	3	576.4	411.38	2	1919.1	648.90	3	552.8	478.83	10988
<i>Solea senegalensis</i>	SOLEIDAE				2	373.2	276.57	5	837.5	310.97	2	639.3	80.18	5	1120.0	209.18	3	921.0	18.97	8976
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	1	1257.9					1	1065.1		1	901.1		5	1120.0	209.18	1	800.2		8824
<i>Scorpaena scrofa</i>	SCORPAENIDAE	7	525.1	348.77	2	261.6	94.78	1	2685.3		6	383.6	199.52	2	623.8	491.96	1	800.2		8165
<i>Dentex maroccanus</i>	SPARIDAE							1	2685.3		3	1705.1	835.07							7801
<i>Boops boops</i>	SPARIDAE	30	65.9	15.18	154	78.9	17.92	184	93.5	19.35	10	105.7	9.42	47	96.5	19.39	25	112.4	29.11	7234
<i>Seranus cabrilla</i>	SERANIDAE	21	107.5	17.50	18	101.6	23.94	14	117.3	25.31	10	115.2	17.72	4	99.9	17.58	5	127.6	31.02	6761
<i>Diplodus vulgaris</i>	SPARIDAE	8	357.0	88.83	14	319.7	44.33	2	374.9	126.52	1	93.6					2	233.2		6416
<i>Sardinia pilchardus</i>	CLUPEIDAE	152	62.1	9.59	196	67.5	7.91	119	56.7	8.43	39	65.3	8.94	104	66.9	11.28	38	63.6	7.25	5274
<i>Spraxylucoma cantharus</i>	SPARIDAE	1	579.2		10	235.6	115.02	4	127.1	40.15	2	375.3	212.45	2	402.8	315.22	5	227.2	104.59	5183
<i>Dicentrarchus labrax</i>	MORONIDAE	1	945.4		1	686.9		1	1484.9		2	2053.3		2			1	28.5		5161
<i>Conger conger</i>	CONGRIDAE				2	825.9	1078.64	3	1130.8		4	780.1	216.81	1			1			5092

(To be continued in next page)

Table 3.2.1.2.8. Continued.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total			
		100/600		100/800		120/600		120/800		140/600		140/800					
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	
<i>Liza varada</i>	MUGILIDAE	2	1742.5	671.90													5006
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	2	326.7	89.83	3	250.3	70.40	4	278.8	42.90	6	246.9	98.66	3	213.5	115.20	4951
<i>Trachurus trachurus</i>	CARANGIDAE	5	72.6	24.53	41	86.6	24.93	46	87.8	25.00	5	98.6	28.12	19	86.5	14.23	4419
<i>Raja mitsakus</i>	RAJIDAE	2	93.1	81.19	3	394.1	364.86	1	815.6		2	81.1	73.75	6	196.3	203.95	4394
<i>Plectrohinchus mediterraneus</i>	HAEMULIDAE													1	4318.3		4318
<i>Scomber scombrus</i>	SCOMBERIDAE	3	174.7	18.29	34	144.7	65.59	7	156.6	38.62	3	184.2	137.91	2	149.7	89.30	4298
<i>Scorpaena porcus</i>	SCORPAENIDAE	9	157.2	145.59	4	136.2	83.34	4	226.1	158.35	4	97.4	81.72				3622
<i>Argyrosomus regius</i>	SCIANTIDAE													1	236.6		3484
<i>Mullus surmuletus</i>	MULLIDAE	10	245.0	70.19	3	410.2	300.31							1	236.6		3464
<i>Diplodus sargus</i>	SPARIDAE	2	91.2		3	434.0	241.67				4	490.1	61.66	1			3262
<i>Triopterus luscus</i>	GADIDAE	1	687.5		4	197.4	184.86	3	184.3	145.20	8	185.0	121.76	5	125.3	54.34	2801
<i>Cheilodactylus luserna</i>	TRACHIDAE	7	115.9	35.41	6	139.4	63.66	3	108.9	20.65	2	80.0		2	170.0		2788
<i>Halocharachius diadactylus</i>	BATRACHOIDIDAE				2	569.1	21.57	2	455.3		1	569.9		1			2162
<i>Syngnathus camilla</i>	SCYLOHINIDAE				1	1414.0					1	431.3		1	1408.0		1845
<i>Psetta maxima</i>	SCOPHTHALMIDAE													1			1408
<i>Diplodus cervinus</i>	SPARIDAE				2	1238.1								2	53.1	8.29	1238
<i>Chirus linguatula</i>	CITHARIDAE	10	47.4	10.01	9	45.7	23.75	5	41.3	5.94	1						1021
<i>Diplodus puntazzo</i>	SPARIDAE	2	318.6	169.44										3	147.0	3.40	637
<i>Bohus podas</i>	BOTHIDAE													1	104.6		568
<i>Soletia lascaris</i>	SOLEIDAE				1									1	339.2		339
<i>Syngnathus macrura</i>	CENTRACANTHIDAE	1	106.1														211
<i>Mullus barbatus</i>	MULLIDAE													1	206.8		207
<i>Callionymus lyra</i>	CALLIONYMIDAE	1	62.0											1			120
<i>Diplodus bellotti</i>	SPARIDAE	1	68.8		1						1	58.1					69
<i>Ameglossus imperialis</i>	BOTHIDAE							1	42.8								43
<i>Equi sp.</i>	RAJIDAE	1															
<i>Loligo spp.</i>	LOLIGINIDAE																
<i>Merlangius merlangus</i>	GADIDAE	2															
<i>Bohus brandaris</i>	MURCIDAE	1			4												
<i>Octopus vulgaris</i>	OCTOPODIDAE	7			2									2			
<i>Halargyreus franciscus</i>	MURCIDAE				7									2			
<i>Lithognathus moryrhynchus</i>	SPARIDAE	1			1									1			
<i>Loligo vulgaris</i>	LOLIGINIDAE																
<i>Muraena helena</i>	MURAENIDAE																
<i>Dentex sp.</i>	SPARIDAE	1															
<i>Acanthaluteres pallasi</i>	LABRIDAE	1															
<i>Maja squinado</i>	MAJIDAE	10			15			23			23			18			17

(To be concluded in next page)

Table 3.2.1.2.8. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total
		100/600		100/800		120/600		120/800		140/600		140/800		
		n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	
<i>Serranus scriba</i>	SERRANIDAE	9		1		12		26		6		9		
<i>Chelidonichthys obscurus</i>	TRIGLIDAE			15										
<i>Gobionellus gulosus</i>	TRIGLIDAE	2		1		2		3						
<i>Chelidonichthys</i> spp.	TRIGLIDAE			4				1				19		
<i>Eupomus</i> sp.	SCOMBRIDAE	9		6		7		14		4		1		
<i>Chironia lonyx</i>	FANELLIDAE	1		1		1		1				1		
<i>Sarpa salpa</i>	SPARIDAE			1		1		1				3		
<i>Symphodus bailloni</i>	LABRIDAE	1		1		3		3		2				
<i>Torpedo marmorata</i>	TORPEDINIDAE			2										
<i>Torpedo torpedo</i>	TORPEDINIDAE	5		2		1		3				2		
<i>Necora puber</i>	PORTUNIDAE			2										
<i>Microdeutopus ocellatus</i>	SOLEIDAE	3		5		3		1				2		
<i>Raja oxyrinchus</i>	RAJIDAE							2				2		
<i>Pagrus auratus</i>	SPARIDAE	784		1172		1060		684		679		684		
<b>Total</b>													1795034	

**Table 3.2.1.2.9. Algarve. Species caught per different inner / outer panel combinations of trammel net, species overlap between trammel nets with different outer panel mesh size and use of species (C = commercial nad D = discard).**

Species	600			600 Total	800			800 Total	Overlap	Use
	100	120	140		100	120	140			
<i>Scomber japonicus</i>	0	0	0	0	0	0	0	0	X	D
<i>Sardina pilchardus</i>	0	0	0	0	0	0	0	0	X	D
<i>Boops boops</i>	0	0	0	0	0	0	0	0	X	D
<i>Scorpaena notata</i>	0	0	0	0	0	0	0	0	X	D
<i>Trachinus draco</i>	0	0	0	0	0	0	0	0	X	D
<i>Microchirus azevia</i>	0	0	0	0	0	0	0	0	X	C
<i>Chelidonichthys obscurus</i>	0	0	0	0	0	0	0	0	X	D
<i>Pagellus acarne</i>	0	0	0	0	0	0	0	0	X	D
<i>Trachurus trachurus</i>	0	0	0	0	0	0	0	0	X	D
<i>Serranus cabrilla</i>	0	0	0	0	0	0	0	0	X	D
<i>Sepia officinalis</i>	0	0	0	0	0	0	0	0	X	C
<i>Merluccius merluccius</i>	0	0	0	0	0	0	0	0	X	D
<i>Citharus linguatula</i>	0	0	0	0	0	0	0	0	X	D
<i>Phycis phycis</i>	0	0	0	0	0	0	0	0	X	C
<i>Pagellus erythrinus</i>	0	0	0	0	0	0	0	0	X	D
<i>Callionymus lyra</i>	0	0	0	0	0	0	0	0	X	D
<i>Chelidonichthys lastoviza</i>	0	0	0	0	0	0	0	0	X	D
<i>Scomber scombrus</i>	0	0	0	0	0	0	0	0	X	D
<i>Solea senegalensis</i>	0	0	0	0	0	0	0	0	X	C
<i>Halobatrachus didactylus</i>	0	0	0	0	0	0	0	0	X	D
<i>Spondyliosoma cantharus</i>	0	0	0	0	0	0	0	0	X	D
<i>Diplodus vulgaris</i>	0	0	0	0	0	0	0	0	X	D
<i>Bothus podas</i>	0	0	0	0	0	0	0	0	X	D
<i>Trisopterus luscus</i>	0	0	0	0	0	0	0	0	X	D
<i>Acantholabrus palloni</i>	0			0						D
<i>Anthias anthias</i>		0		0	0			0	X	D
<i>Apogon imberbis</i>	0			0	0			0	X	D
<i>Argyrosomus regius</i>			0	0		0	0	0	X	D
<i>Arnoglossus imperialis</i>		0		0	0			0	X	D
<i>Arnoglossus laterna</i>		0		0	0			0	X	D
<i>Balistes carolinensis</i>	0	0	0	0	0	0	0	0	X	D
<i>Belone belone</i>							0	0		D
<i>Bolinus brandaris</i>	0			0	0	0		0	X	D
<i>Charonia lampas</i>	0	0	0	0	0	0	0	0	X	C
<i>Chelidonichthys lucerna</i>	0	0	0	0	0	0	0	0	X	D
<i>Chelidonichthys spp.</i>	0	0	0	0	0	0	0	0	X	D
<i>Chelon labrosus</i>							0	0		D
<i>Conger conger</i>	0	0	0	0	0	0	0	0	X	D
<i>Dentex canariensis</i>		0		0	0			0	X	D
<i>Dentex dentex</i>	0		0	0		0	0	0	X	D
<i>Dentex gibbosus</i>	0	0	0	0	0	0	0	0	X	D
<i>Dentex macrophthalmus</i>	0	0	0	0	0	0	0	0	X	D
<i>Dentex maroccanus</i>	0	0	0	0	0	0	0	0	X	C
<i>Dentex sp.</i>					0			0		D
<i>Dicentrarchus labrax</i>	0	0		0	0	0		0	X	D
<i>Dicologlossa cuneata</i>	0	0	0	0	0	0	0	0	X	D
<i>Diplodus annularis</i>	0	0	0	0	0			0	X	D
<i>Diplodus bellottii</i>	0	0	0	0	0	0	0	0	X	D
<i>Diplodus cervinus</i>		0	0	0		0		0	X	D
<i>Diplodus puntazzo</i>	0			0						D
<i>Diplodus sargus</i>	0		0	0	0	0	0	0	X	D
<i>Eledone cirrosa</i>	0			0		0		0	X	D
<i>Euthynnus alleteratus</i>					0			0		D
<i>Euthynnus sp.</i>						0		0		D

(To be continued in next page)

**Table 3.2.1.2.9. Continued.**

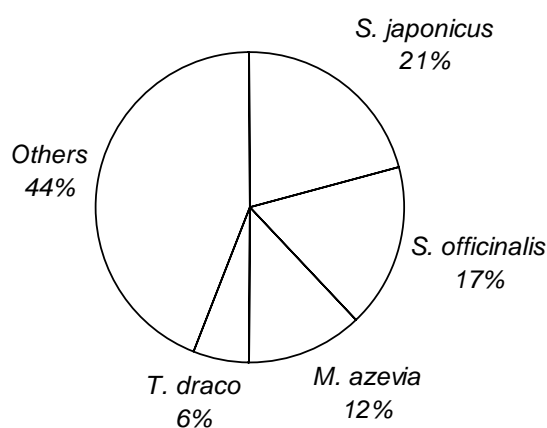
Species	600			600 Total	800			800 Total	Overlap	Use
	100	120	140		100	120	140			
<i>Galeorhinus galeus</i>				0				0		D
<i>Gobideo</i>			0	0						D
<i>Helicolenus dactylopterus</i>		0		0	0		0	0	X	D
<i>Hexaplex trunculus</i>		0	0	0	0	0	0	0	X	D
<i>Hippocampus hippocampus</i>	0			0			0	0	X	D
<i>Hippocampus sp</i>		0		0						D
<i>Homarus gammarus</i>		0	0	0	0	0	0	0	X	D
<i>Isurus oxyrinchus</i>						0	0	0		D
<i>Labrus bergylta</i>	0	0	0	0	0	0	0	0	X	C
<i>Lepidotrigla cavillone</i>		0	0	0	0	0	0	0	X	D
<i>Lithognathus mormyrus</i>	0	0	0	0	0	0	0	0	X	C
<i>Liza aurata</i>	0	0		0	0	0	0	0	X	C
<i>Liza ramada</i>	0		0	0		0		0	X	D
<i>Loligo spp.</i>		0		0	0			0	X	D
<i>Loligo vulgaris</i>	0			0	0	0		0	X	D
<i>Lophius piscatorius</i>	0	0	0	0	0	0	0	0	X	C
<i>Maja squinado</i>	0	0	0	0	0	0	0	0	X	C
<i>Merlangius merlangus</i>	0			0						D
<i>Microchirus ocellatus</i>	0	0	0	0	0			0	X	D
<i>Microchirus variegatus</i>	0			0						D
<i>Micromesistius poutassou</i>	0		0	0	0			0	X	D
<i>Mola mola</i>	0	0	0	0	0	0	0	0	X	D
<i>Mugil cephalus</i>						0		0		D
<i>Mugil sp.</i>		0		0						D
<i>Mullus barbatus</i>	0		0	0		0		0	X	D
<i>Mullus surmuletus</i>	0	0	0	0	0	0	0	0	X	C
<i>Muraena helena</i>						0	0	0		D
<i>Myliobatis aquila</i>							0	0		D
<i>Necora puber</i>		0		0		0		0	X	D
<i>Octopus vulgaris</i>	0	0	0	0	0	0	0	0	X	C
<i>Pagellus bellottii</i>						0		0		D
<i>Pagellus bogaraveo</i>	0	0	0	0	0	0		0	X	D
<i>Pagrus auriga</i>	0	0	0	0	0	0	0	0	X	C
<i>Pagrus pagrus</i>	0	0	0	0	0	0	0	0	X	C
<i>Palinurus elephas</i>	0	0	0	0	0	0	0	0	X	C
<i>Parapristipoma octolineatum</i>		0		0						D
<i>Penaeus kerathurus</i>	0			0						D
<i>Plectorhinchus mediterraneus</i>			0	0						D
<i>Pontinus kuhlii</i>		0	0	0	0			0	X	C
<i>Prionace glauca</i>		0		0		0	0	0	X	D
<i>Psetta maxima</i>	0	0	0	0	0	0	0	0	X	C
<i>Pteromylaeus bovinus</i>			0	0	0	0	0	0	X	D
<i>Raja asterias</i>	0	0	0	0	0	0	0	0	X	C
<i>Raja brachyura</i>	0	0	0	0	0	0	0	0	X	C
<i>Raja clavata</i>	0	0	0	0	0	0	0	0	X	C
<i>Raja miraletus</i>	0	0	0	0	0	0	0	0	X	C
<i>Raja naevus</i>						0		0		D
<i>Raja oxyrinchus</i>						0	0	0		C
<i>Raja sp.</i>	0			0						D
<i>Raja undulata</i>	0	0	0	0	0	0	0	0	X	C
<i>Sarda sarda</i>	0	0	0	0	0	0		0	X	C
<i>Sarpa salpa</i>	0			0	0		0	0	X	D
<i>Sciaena umbra</i>	0	0	0	0			0	0	X	C
<i>Scophthalmus rhombus</i>	0	0	0	0	0	0	0	0	X	C

(To be concluded in next page)

**Table 3.2.1.2.9. Concluded.**

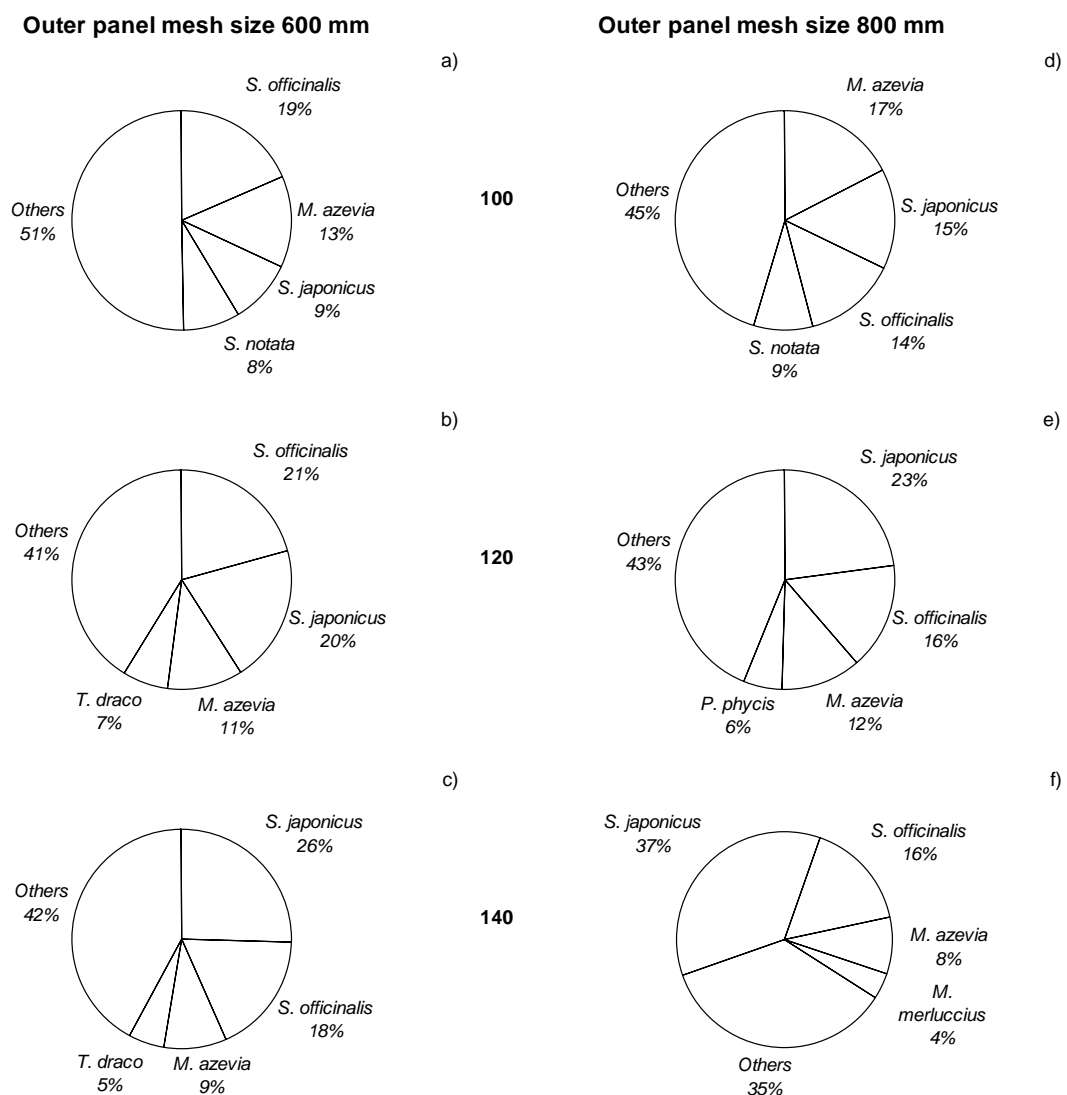
Species	600			600 Total	800			800 Total	Overlap	Use
	100	120	140		100	120	140			
<i>Scorpaena porcus</i>	0	0	0	0	0	0	0	0	X	C
<i>Scorpaena scrofa</i>	0	0	0	0	0	0	0	0	X	C
<i>Scyliorhinus canicula</i>	0	0	0	0	0	0	0	0	X	C
<i>Serranus atricauda</i>	0			0		0		0	X	D
<i>Serranus hepatus</i>	0	0	0	0		0		0	X	D
<i>Serranus scriba</i>					0			0		D
<i>Solea impar</i>	0			0	0	0		0	X	C
<i>Solea lascaris</i>	0	0	0	0	0	0	0	0	X	C
<i>Solea sp</i>	0			0	0			0	X	D
<i>Solea vulgaris</i>	0	0	0	0	0	0	0	0	X	C
<i>Sparus aurata</i>	0	0	0	0	0	0	0	0	X	C
<i>Spicara maena</i>	0	0	0	0		0		0	X	C
<i>Symphodus bailloni</i>		0		0	0			0	X	C
<i>Torpedo marmorata</i>	0	0	0	0	0	0	0	0	X	C
<i>Torpedo nobiliana</i>							0	0		C
<i>Torpedo torpedo</i>	0	0	0	0	0	0	0	0	X	C
<i>Trachurus mediterraneus</i>					0		0	0		D
<i>Trachurus sp.</i>	0		0	0						D
<i>Uranoscopus scaber</i>	0	0	0	0	0	0	0	0	X	C
<i>Zeus faber</i>	0	0	0	0	0	0	0	0	X	C
Total	91	87	82	112	92	92	82	116	100	

Overall, for all trammel nets and seasons, four species (*Scomber japonicus*, *Sepia officinalis*, *Microchirus azevia* and *Trachinus draco*) accounted for 56% of the catch in numbers (Figure 3.2.1.2.1). It should be noted that the two commercial species, *Sepia officinalis* and *Microchirus azevia* accounted for 29% of the total catch in numbers.



**Figure 3.2.1.2.1. Algarve. Overall catch species composition of all inner / outer panel mesh size combinations of trammel nets in numbers.**

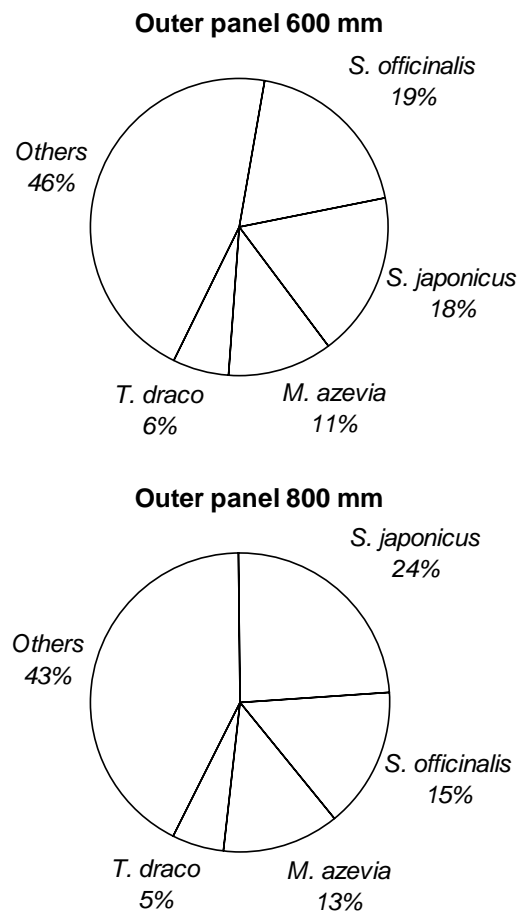
A comparison of the two larger mesh outer panel mesh sizes show that for the same inner panel mesh size, the same three species (*Scomber japonicus*, *Sepia officinalis* and *Microchirus azevia*) dominated the catches in numbers (Figure 3.2.1.2.2). The only differences between the 600 and the 800 mm trammel nets are in terms of the species ranked fourth and in the “others” category. For the six different trammel nets used in the study, the fourth most abundant species were *Scorpaena notata* (100/600 and 100/800 nets), *Trachinus draco* (120/600 and 140/600 nets), *Phycis phycis* (120/800 net) and *Merluccius merluccius* (140/800 net), with the “others” category accounting for 35% (140/800 net) to 51% (100/600 net).



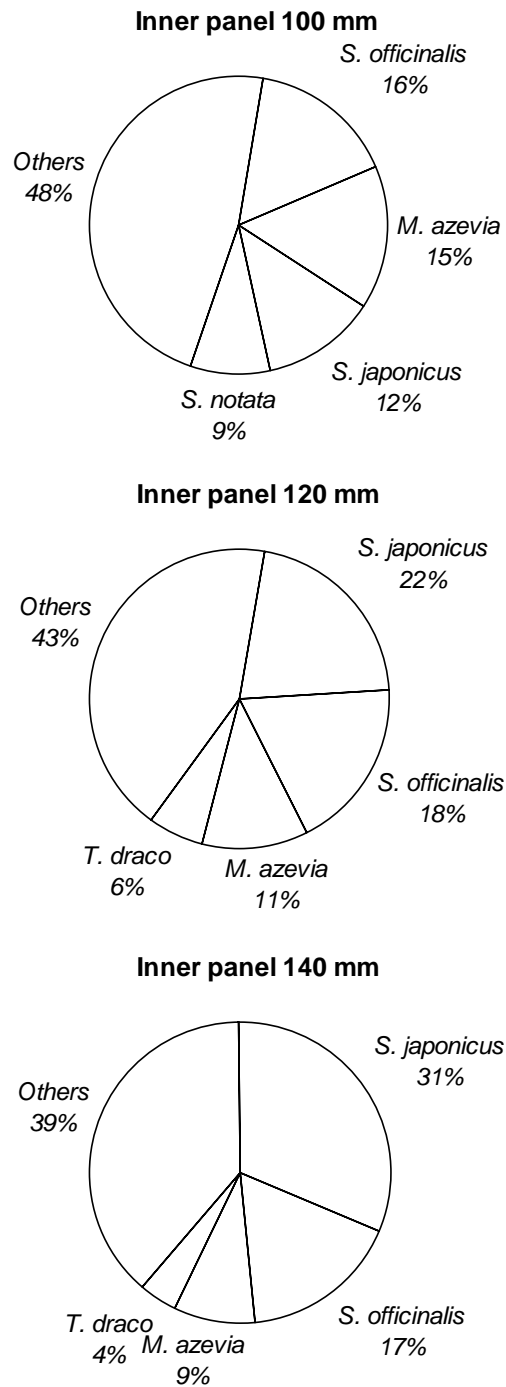
**Figure 3.2.1.2.2. Algarve. Overall catch species composition in number for the six different inner / outer panel combinations of trammel nets.**

A comparison of the pooled data for the two outer mesh panel sizes shows that there is

practically no difference in terms of species composition in numbers (Figure 3.2.1.2.3). For the three small mesh inner panels, the same three species dominated the catches (*Scomber japonicus*, *Sepia officinalis* and *Microchirus azevia*), with *Scorpaena notata* replacing *Trachinus draco* in fourth place in the 100 mm mesh size trammel nets (Figure 3.2.1.2.4). There is an increase in the relative importance of *Scomber japonicus* with increasing inner panel mesh size, while the opposite is true for *Microchirus azevia* and essentially not difference for *Sepia officinalis* (Figure 3.2.1.2.4).



**Figure 3.2.1.2.3. Algarve. Species composition in numbers for the two outer panel mesh sizes.**



**Figure 3.2.1.2.4. Algae. Species composition in numbers for the three inner panel mesh sizes**

The seasonal species composition by numbers is summarised in Figure 3.2.1.2.5 . As can be seen, there are significant differences between seasons in terms of the dominant species. In the winter, the cuttlefish dominated the catches in numbers (33%), with the “others” category accounting for only 27% of the total catch. In the spring, the “others” category accounted for 51% of the catch in numbers, with only 9% of the catch consisting of

cuttlefish. The most abundant species in the catches was the greater weever (19%), followed by the Senegal (11%) and bastard (10%) soles. Summer catches were dominated by the chub mackerel (24%), followed by the fork-beard (15%), the bastard sole (11%) and the axillary sea bream (6%). Large numbers of chub mackerel were caught in the autumn (34%), with cuttlefish (11%) and the bastard sole (10%) the numerically most important commercial species.

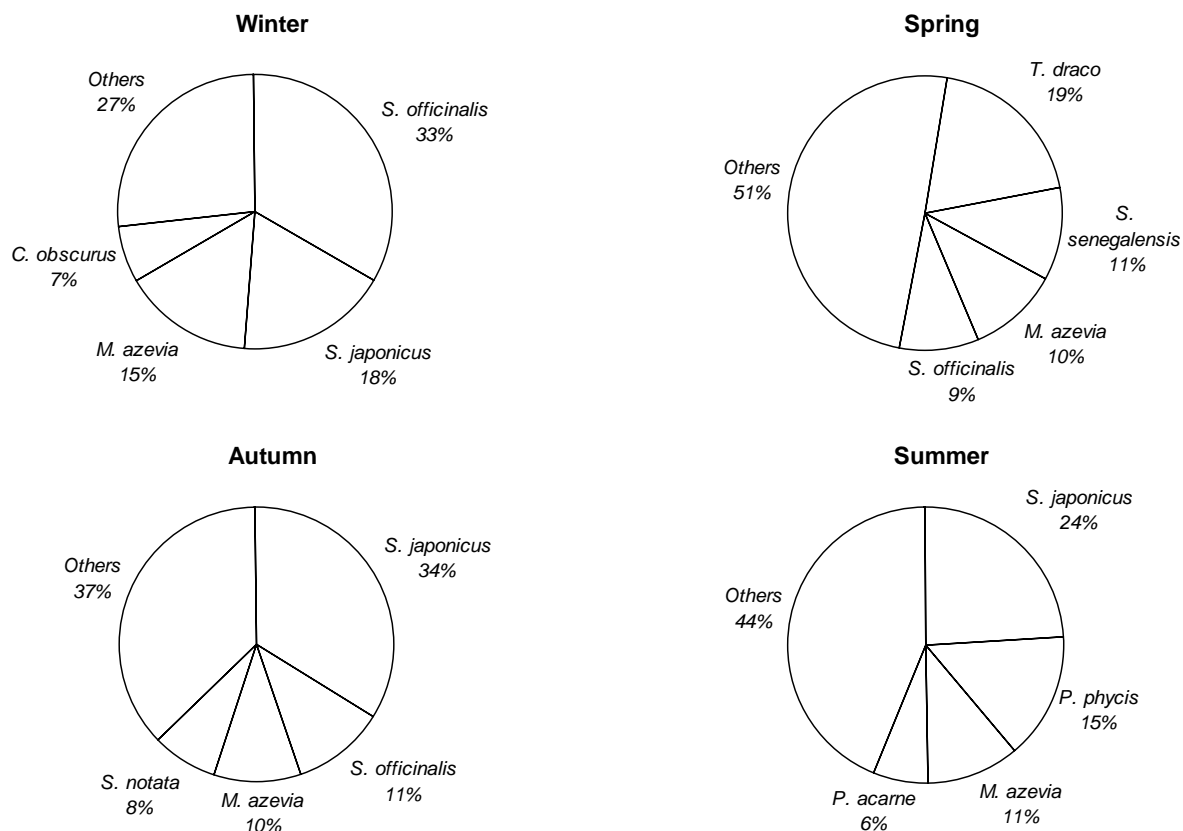


Figure 3.2.1.2.5. Algarve. Species composition by numbers by season.

The catch rates in numbers of individuals caught per 1000 m of trammel net for the six different combinations of inner/outer panel and by season are given in Table 3.2.1.2.10. For *Sepia officinalis*, catch rates were clearly highest in the winter, followed by the fall. It is interesting to note that catch rates for the 800 mm mesh outer panel are generally lower than those for the corresponding 600 mm mesh trammel nets. Highest catch rates for *Microchirus azevia* were obtained in the winter and the fall, with especially good results in all seasons for the 100/800 trammel nets. *Scomber japonicus* catch rates were highest in the fall, followed by the winter, with particularly high catch rates for the trammel nets with the 140 mm mesh inner panel. *Trachinus draco* catch rates were highest in the spring, with a decreasing catch rate with increasing inner panel mesh size. *Phycis phycis* catch rates were highest in the summer, while those of *Scorpaena nota* peaked in the fall and spring and were highest for the smallest inner panel mesh size (100 mm). *Pagellus acarne* catch rates were highest in the fall and in the winter and also decreased with increasing inner panel mesh size. *Chelidonichthys obscurus* had the highest catch rates in the winter and for the 100/600 trammel net. The highest catch rates of *Solea senegalensis* were in the spring with no clear pattern due to inner and/or outer panel combination. For *Chelidonichthys lastoviza* highest catch rates were in the fall and the winter with a sharp decrease with increasing inner mesh size. *Merluccius merluccius* catch rates were highest in the summer and especially for the 100/600 and 100/800 trammel nets.

The total number of species caught and the different diversity indices for the six inner/outer panel mesh combinations used are given in Table 3.2.1.2.11. Overall, the smallest number of species (37) was caught with the 140/800 trammel net in summer and the largest number (62) caught in autumn with the 120/800 trammel net. The mean number of individuals caught per 1000 m of net ranged from 30.3 for the 140/600 trammel net in winter to 93.8 for the 100/800 trammel net in autumn. Total richness and diversity were lowest in the summer, while evenness was highest in the winter and spring (Table 3.2.1.2.11).

**Table 3.2.1.2.10. Catch rates in numbers of individuals caught per 1000 m of trammel net for the six different combinations of inner/outer panel and by season.**

Species	Trammel types		Seasons				Average
			Winter	Spring	Summer	Fall	
<i>Sepia officinalis</i>	100	600	22.53 ± 14.94	4.80 ± 3.81	0.72 ± 1.10	3.20 ± 2.10	7.81 ± 5.49
	100	800	17.79 ± 6.79	2.64 ± 2.03	0.40 ± 0.57	2.96 ± 2.10	5.95 ± 2.87
	120	600	20.13 ± 9.77	2.80 ± 1.63	0.80 ± 1.03	4.60 ± 2.87	7.08 ± 3.82
	120	800	15.76 ± 9.99	2.20 ± 1.96	0.80 ± 1.25	3.60 ± 2.46	5.59 ± 3.92
	140	600	10.39 ± 7.15	1.53 ± 1.62	0.71 ± 0.87	4.24 ± 2.38	4.22 ± 3.00
	140	800	9.98 ± 4.03	2.00 ± 2.08	0.76 ± 1.08	5.41 ± 3.47	4.54 ± 2.66
	Average		16.10 ± 3.73	2.66 ± 0.82	0.70 ± 0.24	4.00 ± 0.53	5.86 ± 8.08
<i>Microchirus azevia</i>	100	600	9.37 ± 6.01	4.00 ± 8.37	4.40 ± 9.95	4.64 ± 5.08	5.60 ± 7.35
	100	800	16.41 ± 13.40	4.24 ± 9.14	4.80 ± 10.42	6.00 ± 6.30	7.86 ± 9.81
	120	600	6.68 ± 4.86	2.07 ± 3.72	2.20 ± 4.53	4.53 ± 5.58	3.87 ± 4.67
	120	800	7.08 ± 3.53	2.67 ± 5.10	3.20 ± 6.80	3.80 ± 5.05	4.19 ± 5.12
	140	600	3.11 ± 2.09	1.94 ± 4.41	1.41 ± 3.18	2.35 ± 2.67	2.20 ± 3.09
	140	800	3.23 ± 2.66	3.00 ± 5.91	1.12 ± 2.46	1.76 ± 2.40	2.28 ± 3.36
	Average		7.65 ± 4.16	2.99 ± 2.19	2.85 ± 3.41	3.85 ± 1.60	4.33 ± 6.74
<i>Scomber japonicus</i>	100	600	7.05 ± 10.62	0.80 ± 1.36	1.44 ± 2.02	6.72 ± 9.67	4.00 ± 5.92
	100	800	7.13 ± 6.83	1.92 ± 2.54	2.08 ± 2.65	15.52 ± 23.23	6.66 ± 8.81
	120	600	6.97 ± 10.25	1.13 ± 1.44	2.20 ± 2.83	17.33 ± 28.57	6.91 ± 10.77
	120	800	7.60 ± 6.24	2.93 ± 4.35	13.87 ± 29.11	9.20 ± 15.20	8.40 ± 13.72
	140	600	11.02 ± 14.05	1.18 ± 1.30	2.29 ± 2.86	10.41 ± 15.10	6.23 ± 8.33
	140	800	10.07 ± 10.42	2.47 ± 3.53	12.18 ± 22.45	15.59 ± 24.52	10.08 ± 15.23
	Average		8.31 ± 2.86	1.74 ± 1.29	5.68 ± 12.16	12.46 ± 7.15	7.05 ± 14.06
<i>Trachinus draco</i>	100	600	1.49 ± 1.48	7.60 ± 5.99	1.44 ± 4.02	0.56 ± 0.66	2.77 ± 3.04
	100	800	1.51 ± 0.97	8.00 ± 6.03	2.40 ± 6.54	0.48 ± 0.86	3.10 ± 3.60
	120	600	1.33 ± 1.69	6.33 ± 4.50	1.40 ± 3.05	0.20 ± 0.32	2.32 ± 2.39
	120	800	1.18 ± 1.18	5.80 ± 3.80	1.20 ± 3.16	0.13 ± 0.42	2.08 ± 2.14
	140	600	1.12 ± 1.60	3.18 ± 3.15	0.76 ± 2.22	0.12 ± 0.25	1.29 ± 1.81
	140	800	0.35 ± 0.57	2.71 ± 2.10	0.65 ± 1.67	0.12 ± 0.25	0.96 ± 1.15
	Average		1.16 ± 0.43	5.60 ± 1.57	1.31 ± 1.72	0.27 ± 0.25	2.09 ± 3.70
<i>Phycis phycis</i>	100	600	0.63 ± 0.82	1.12 ± 3.27	3.76 ± 3.35	1.84 ± 1.85	1.84 ± 2.32
	100	800	0.87 ± 1.33	0.56 ± 1.51	4.32 ± 3.50	2.00 ± 1.15	1.94 ± 1.87
	120	600	0.52 ± 1.08	0.33 ± 0.65	5.07 ± 3.89	1.53 ± 2.37	1.86 ± 2.00
	120	800	0.32 ± 0.56	0.47 ± 1.04	5.00 ± 3.25	2.67 ± 3.06	2.11 ± 1.98
	140	600	0.17 ± 0.27	0.12 ± 0.37	2.24 ± 2.57	1.71 ± 1.50	1.06 ± 1.18
	140	800	0.11 ± 0.23	0.29 ± 0.93	2.00 ± 1.52	0.82 ± 0.84	0.81 ± 0.88
	Average		0.44 ± 0.44	0.48 ± 1.04	3.73 ± 0.85	1.76 ± 0.82	1.60 ± 2.46
<i>Scorpaena notata</i>	100	600	1.37 ± 2.31	5.44 ± 7.30	1.68 ± 1.94	5.92 ± 3.27	3.60 ± 3.70
	100	800	1.23 ± 1.34	4.72 ± 6.50	2.00 ± 2.33	8.00 ± 4.48	3.99 ± 3.66
	120	600	0.31 ± 0.53	1.47 ± 1.50	0.87 ± 1.86	1.87 ± 1.88	1.13 ± 1.44
	120	800	0.00 ± 0.00	1.13 ± 1.18	0.20 ± 0.32	3.07 ± 2.25	1.10 ± 0.94
	140	600	0.12 ± 0.37	0.35 ± 0.41	0.06 ± 0.19	0.29 ± 0.42	0.21 ± 0.35
	140	800	0.20 ± 0.63	0.47 ± 0.91	0.24 ± 0.30	0.29 ± 0.50	0.30 ± 0.59
	Average		0.54 ± 0.83	2.26 ± 3.08	0.84 ± 0.99	3.24 ± 1.58	1.72 ± 3.25
<i>Pagellus acarne</i>	100	600	3.68 ± 2.30	2.72 ± 1.56	2.24 ± 1.55	2.16 ± 1.31	2.70 ± 1.68
	100	800	4.13 ± 2.31	2.48 ± 2.01	1.76 ± 1.76	3.84 ± 3.51	3.05 ± 2.40
	120	600	0.51 ± 0.66	0.80 ± 0.82	1.40 ± 1.15	1.73 ± 1.38	1.11 ± 1.00
	120	800	0.94 ± 0.76	0.67 ± 0.89	1.27 ± 0.86	2.27 ± 1.92	1.29 ± 1.11
	140	600	0.18 ± 0.40	0.29 ± 0.31	1.65 ± 2.00	1.35 ± 1.52	0.87 ± 1.06
	140	800	0.12 ± 0.37	0.18 ± 0.28	1.29 ± 1.29	0.94 ± 0.89	0.63 ± 0.71
	Average		1.59 ± 0.92	1.19 ± 0.69	1.60 ± 0.42	2.05 ± 0.92	1.61 ± 1.84

(To be continued in next page)

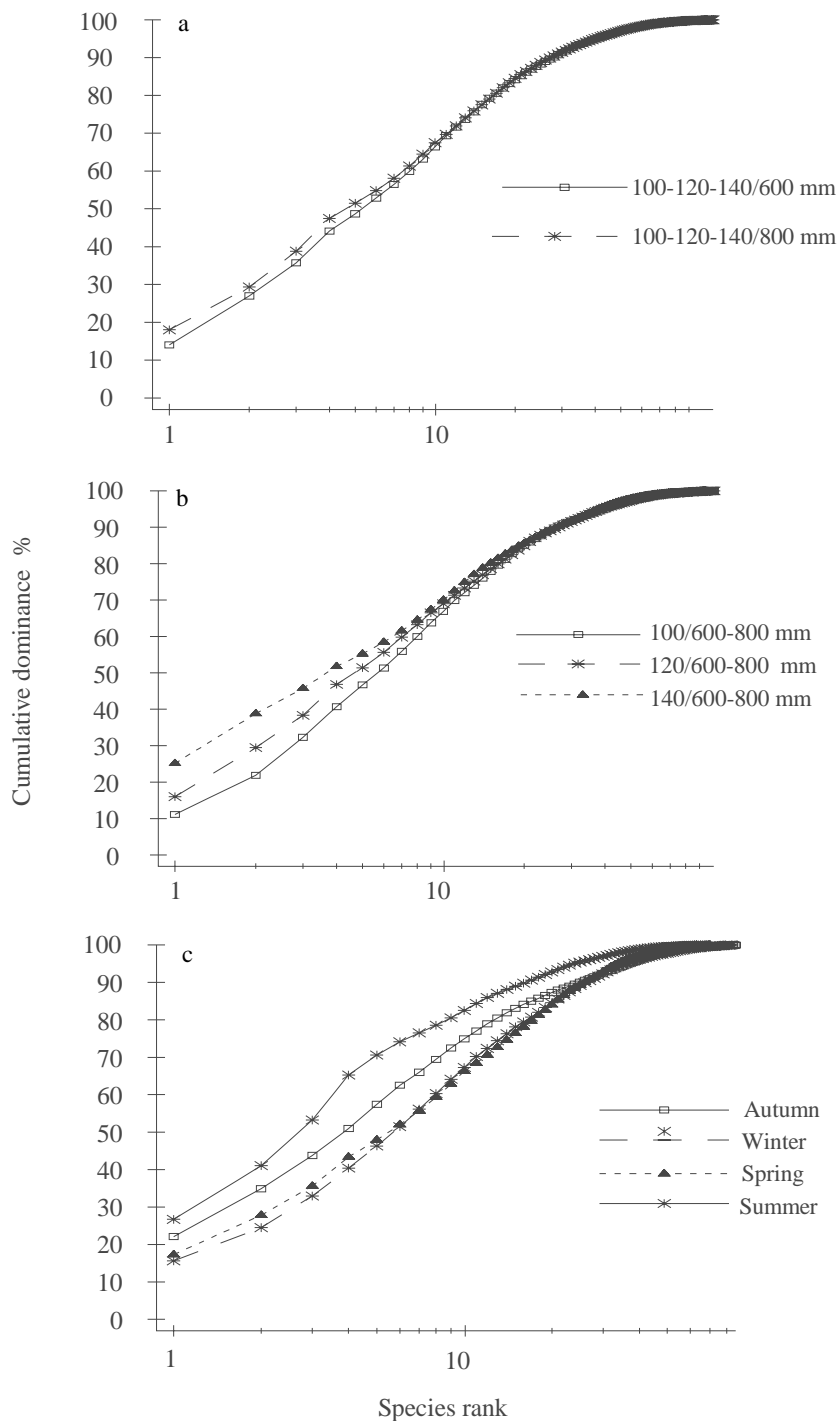
**Table 3.2.1.2.10. Continued.**

Species	Trammel types		Seasons				Average
			Winter	Spring	Summer	Fall	
<i>Chelidonichthys obscurus</i>	100	600	7.72 ± 10.93	2.48 ± 1.90	1.20 ± 3.79	0.72 ± 1.03	3.03 ± 4.42
	100	800	4.03 ± 5.17	0.56 ± 0.93	1.04 ± 2.30	1.20 ± 1.21	1.71 ± 2.40
	120	600	2.64 ± 3.83	1.20 ± 1.21	0.80 ± 2.10	0.80 ± 0.69	1.36 ± 1.96
	120	800	3.97 ± 7.36	1.33 ± 1.30	0.67 ± 1.89	1.73 ± 2.27	1.93 ± 3.20
	140	600	1.57 ± 2.86	1.18 ± 1.00	0.29 ± 0.93	0.35 ± 0.41	0.85 ± 1.30
	140	800	0.75 ± 1.18	1.29 ± 0.72	0.71 ± 1.84	0.53 ± 0.43	0.82 ± 1.04
	Average		3.45 ± 3.49	1.34 ± 0.41	0.78 ± 0.94	0.89 ± 0.70	1.62 ± 3.59
<i>Solea senegalensis</i>	100	600	0.85 ± 1.08	2.40 ± 2.47	0.48 ± 1.26	0.00 ± 0.00	0.93 ± 1.20
	100	800	1.11 ± 2.21	2.48 ± 2.05	0.48 ± 1.08	0.16 ± 0.34	1.06 ± 1.42
	120	600	0.99 ± 1.19	5.60 ± 3.94	0.53 ± 1.29	0.33 ± 0.47	1.86 ± 1.72
	120	800	1.01 ± 1.03	3.40 ± 2.89	0.47 ± 1.09	0.13 ± 0.42	1.25 ± 1.36
	140	600	1.56 ± 1.77	2.82 ± 1.77	0.18 ± 0.40	0.00 ± 0.00	1.14 ± 0.98
	140	800	1.55 ± 0.98	1.47 ± 1.18	0.29 ± 0.64	0.18 ± 0.40	0.87 ± 0.80
	Average		1.18 ± 0.50	3.03 ± 0.96	0.41 ± 0.36	0.13 ± 0.21	1.19 ± 1.98
<i>Chelidonichthys lastoviza</i>	100	600	2.44 ± 3.08	0.48 ± 1.01	0.64 ± 1.05	5.36 ± 5.95	2.23 ± 2.77
	100	800	2.19 ± 2.07	0.59 ± 1.86	1.12 ± 1.65	2.72 ± 3.54	1.65 ± 2.28
	120	600	1.11 ± 1.09	0.60 ± 1.68	0.27 ± 0.47	1.47 ± 1.88	0.86 ± 1.28
	120	800	1.01 ± 0.97	0.24 ± 0.76	0.80 ± 1.21	2.07 ± 2.67	1.03 ± 1.40
	140	600	0.40 ± 0.48	0.00 ± 0.00	0.00 ± 0.00	0.41 ± 0.56	0.20 ± 0.26
	140	800	0.11 ± 0.23	0.20 ± 0.63	0.12 ± 0.25	0.18 ± 0.40	0.15 ± 0.38
	Average		1.21 ± 1.07	0.35 ± 0.69	0.49 ± 0.63	2.03 ± 2.08	1.02 ± 2.19
<i>Merluccius merluccius</i>	100	600	0.99 ± 0.96	0.16 ± 0.34	1.36 ± 1.13	1.60 ± 4.51	1.03 ± 1.73
	100	800	1.69 ± 2.10	0.08 ± 0.25	1.44 ± 2.06	1.04 ± 2.75	1.06 ± 1.79
	120	600	0.64 ± 0.68	0.07 ± 0.21	1.53 ± 1.91	1.00 ± 2.71	0.81 ± 1.38
	120	800	1.24 ± 1.15	0.40 ± 1.05	1.33 ± 1.99	0.93 ± 2.52	0.98 ± 1.68
	140	600	0.87 ± 1.09	0.18 ± 0.28	1.41 ± 1.36	0.76 ± 2.22	0.81 ± 1.24
	140	800	1.50 ± 1.17	0.18 ± 0.40	1.41 ± 1.31	1.35 ± 3.68	1.11 ± 1.64
	Average		1.16 ± 0.48	0.18 ± 0.32	1.42 ± 0.40	1.12 ± 0.86	0.97 ± 1.89

**Table 3.2.1.2.11. Algarve. Total number of species (S), total number of individuals (N, mean seasonal catch numbers per 1000m of net), total richness (D), diversity (H') and evenness (J) for each season (Season) per different inner/outer panel stretched (in mm) mesh size combinations of trammel nets.**

Inner/outer	Season	S	N	D	J	H'
100/600	Autumn	58	62.7	13.8	0.8	3.1
120/600	Autumn	58	84.8	12.8	0.7	2.8
140/600	Autumn	50	54.3	12.3	0.7	2.8
100/800	Autumn	60	93.8	13.0	0.7	2.9
120/800	Autumn	62	54.7	15.2	0.8	3.2
140/800	Autumn	54	54.7	13.2	0.7	2.6
100/600	Winter	58	50.4	14.5	0.8	3.2
120/600	Winter	52	41.5	13.7	0.8	3.1
140/600	Winter	47	30.3	13.5	0.8	3.1
100/800	Winter	52	45.8	13.3	0.8	3.1
120/800	Winter	54	42.5	14.1	0.8	3.2
140/800	Winter	50	33.8	13.9	0.8	3.1
100/600	Spring	44	38.8	11.8	0.9	3.2
120/600	Spring	50	38.5	13.4	0.8	3.3
140/600	Spring	52	31.4	14.8	0.8	3.3
100/800	Spring	49	41.4	12.9	0.8	3.3
120/800	Spring	48	51.2	11.9	0.7	2.8
140/800	Spring	48	44.6	12.4	0.7	2.7
100/600	Summer	48	83.7	10.6	0.7	2.7
120/600	Summer	45	72.7	10.3	0.6	2.4
140/600	Summer	45	55.0	11.0	0.6	2.4
100/800	Summer	53	92.1	11.5	0.7	2.7
120/800	Summer	42	75.6	9.5	0.7	2.5
140/800	Summer	37	51.6	9.1	0.6	2.3
Min		37	30.3	9.1	0.6	2.3
Max		62	93.8	15.2	0.9	3.3
Mean		51	55.2	12.6	0.7	2.9

Dominance did not differ significantly between the 600 and 800 mm mesh outer panel trammel nets (Figure 3.2.1.2.6a). However, there are differences in dominance between trammel nets of different inner panel mesh size (Figure 3.2.1.2.6b). Seasonal differences in dominance can also be seen in Figure 3.2.1.2.6c. While there is little difference in dominance between the spring and the summer, the winter and the autumn are clearly different from each other and the spring/summer.



**Figure 3.2.1.2.6. Algarve. K-dominance curves based on catch numbers (per 1000 m of net) for all species caught for six combinations of inner/outer panel stretched mesh sizes (in mm): (a) and (b) for all seasons combined and (c) by season.**

### 3.2.1.3. Gulf of Cádiz

The data on abundance and weight of the specimens caught per 500 m of the various combinations of trammel net inner and outer panels of different mesh sizes are presented in

Tables 3.2.1.3.1 to 3.2.1.3.6. The total catch in the Gulf of Cádiz amounted to a total of 8178 specimens comprising a total biomass of 2831.83 Kg. (Tables 3.2.1.3.5 and 3.2.1.3.6); the catch consisted of 63 distinct species (49 species of fishes, 8 of Chondrichthyes, 3 of crustaceans, and 3 of cephalopods) covering 30 different families (Table 3.2.1.3.5). Of the total of 63 species caught, 51 were taken using trammel nets with outer panels of the smaller mesh size, and 56 were taken using trammel nets with outer panels of the larger mesh size. There were 44 species in common with the two sizes of mesh in the outer panels (Table 3.2.1.3.7).

Within the total catch, the species of cephalopods formed the largest proportion (43.53 % in abundance and 61.07 % in biomass), with *Sepia officinalis* being the predominant species caught. The other main group are the fishes (42.53 % in numbers and 27.64 % in weight, of the total). The elasmobranchs represented 13.85% in abundance and 11.15% in biomass, and the crustaceans 0.39% and 0.14%, respectively (Tables 3.2.1.3.1 to 3.2.1.3.6).

**Table 3.2.1.3.1. Gulf of Cádiz. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Spring (to be concluded).**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		80/300			90/300			100/300			80/400				90/400			100/400		
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		n	TL (cm)	s.d.	n	TL (cm)	s.d.
<i>Septa officinalis</i>	SEPIDAE	659	148.5	27.52	467	161.2	30.51	225	183.4	33.82	1020	151.7	31.37	500	158.04	32.57	249	178.8	30.96	3120
<i>Solea senegalensis</i>	SOLEDAE	54	299.5	46.77	38	309.8	32.25	35	332.0	43.94	46	291.1	37.38	47	289.21	25.67	40	333.43	29.94	260
<i>Syngnathus lusitanica</i>	SOLEDAE	47	329.9	32.32	43	328.9	39.18	19	361.3	50.31	49	322.4	36.48	46	335.98	31.26	33	347.0	47.96	237
<i>Sardina pilchardus</i>	CLUPEIDAE	31	190.6	12.4	31	190.3	10.23	24	193.7	12.59	42	189.0	16.38	39	188.21	12.54	50	189.48	10.8	217
<i>Diplodus bellotti</i>	SPARIDAE	9	171.6	42.56	8	156.1	20.7	13	167.9	13.78	21	160.0	19.5	19	157.74	23.14	24	164.33	16.87	94
<i>Torpedo marmorata</i>	TORPEDINIDAE	10	211.0	73.35	9	232.6	64.39	5	279.6	81.46	19	228.3	88.99	15	193.13	45.05	21	287.86	85.99	79
<i>Torpedo torpedo</i>	TORPEDINIDAE	6	173.8	21.76	5	248.0	55.59	8	257.9	39.53	9	230.2	91.61	5	266.2	97.52	19	308.0	179.04	52
<i>Trachinus draco</i>	TRACHINIDAE	6	221.5	27.03	1	273.0		8	232.6	39.1	19	214.6	48.95	3	184.33	46.01	13	219.38	35.82	50
<i>Faja asterias</i>	RAJIDAE	8	312.2	43.06	8	308.1	33.21	6	348.7	34.8	5	296.0	59.39	7	319.71	45.05	14	343.5	83.11	48
<i>Raja undulata</i>	RAJIDAE	5	332.2	126.45	3	344.7	72.43	2	436.0	45.25	11	491.1	154.05	5	429.8	124.8	20	431.45	109.76	46
<i>Halieutrochus didactylus</i>	BATROCHIDAE	5	240.0	17.2	4	256.5	37.00	1	300.0		13	230.8	49.7	15	308.67	131.21	3	273.33	72.97	41
<i>Dicologlossa cuneata</i>	SOLEDAE	11	161.1	10.03	2	160.0	5.66				14	155.86	9.83	3	162.0	14.00	1	162.0		31
<i>Fagellus acarne</i>	SPARIDAE	6	182.0	37.00	6	173.8	3.19	5	165.4	11.33	5	168.2	12.21	3	154.0	22.11	4	172.5	9.95	29
<i>Fomadaya tatus</i>	HAEMULIDAE	1	201.0		4	148.5	23.1	2	211.5	12.02	8	181.63	51.04	4	182.5	30.82	8	169.88	28.98	27
<i>Milicernus kerathurus</i>	PENAIIDAE	7	67.8	16.11	2	71.1	2.21	1	42.32		11	60.56	7.64	2	68.0					23
<i>Alosa alosa</i>	CLUPEIDAE	2	320.5	14.85				5	331.8	13.94	3	324.33	13.65	1	323.0		9	324.89	13.51	20
<i>Triglo luseerna</i>	TRIGLIDAE	1	155.0					4	191.5	11.73	8	174.38	22.5	3	189.67	30.17	3	190.0	26.66	19
<i>Osteopus vulgaris</i>	OCTOPODIDAE	2			2			3			3			2			6			18
<i>Balistes carolinensis</i>	BALISTIDAE							2	350.5	2.12	1	423.0		4	362.25	52.31	7	338.43	57.36	14
<i>Istiogobius mormyrus</i>	SPARIDAE	3	309.0	17.69	1	170.0		1	189.0		5	260.0	42.05	2	312.5	10.61	1	145.0		13
<i>Ergasilus encrasicholus</i>	ENGRaulIDAE	4	121.7	16.32				4	127.75	8.62	1	132.0		1	132.0		1	157.0		10
<i>Scomber japonicus</i>	SCOMBERIDAE	2	249.5	2.12	1	236.0		1	230.0		3	250.33	27.43				3	243.67	24.42	10
<i>Mugil cephalus</i>	MUGILIDAE	1	481.0					2	499.5	24.75	5	450.0	30.89				1	442.0		9

(To be concluded in next page)

Table 3.2.1.3.1. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total				
		80/300		90/300		100/300		80/400		90/400		100/400						
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)		s.d.			
<i>Raja montagu</i>	RAJIDAE	1	372.0	1	326.0	1	260.0	1	259.0	1	240.0	1	240.0	1	315.0	1	320.75	158.57
<i>Solea lascaris</i>	SOLEDAE	3	261.7	13.5				1	259.0	1	240.0	1	240.0	1	315.0	1	307.0	
<i>Aegonostomus regius</i>	SCIAENIDAE																	
<i>Pagellus erythrinus</i>	SPARDAE	1	264.0	3.54				1	259.0	1	240.0	1	240.0	1	315.0	1	266.5	113.84
<i>Plectrothorax mediterraneus</i>	HAEMULIDAE	3	362.3	17.5				1	143.0	1	143.0	1	143.0	1	143.0	1	578.0	135.76
<i>Spondylisoma cantharus</i>	SPARDAE	1	126.0					1	203.0	1	203.0	1	203.0	1	203.0	1	266.5	113.84
<i>Maja squinado</i>	MAJIDAE	1	85.0					1	98.19	1	98.19	1	98.19	1	98.19	1	266.5	113.84
<i>Raja brachyura</i>	RAJIDAE							1	98.19	1	98.19	1	98.19	1	98.19	1	266.5	113.84
<i>Scorpaeniformis rhombus</i>	SCORPALTALMIDAE							2	146.0	4.24	1	352.0	1	352.0	1	123.0		
<i>Chelax labrosus</i>	MUGILIDAE	3	440.3	23.8				1	110.0									
<i>Dentex canariensis</i>	SPARDAE	1	199.0					1	110.0									
<i>Scorpaeniformis maximus</i>	SCORPALTALMIDAE							1	353.0									
<i>Seniella dumerilii</i>	CARANGIDAE	1	329.0					1	315.0									
<i>Solea lewini</i>	SOLEDAE	1	489.0					1	315.0									
<i>Dicentrarchus labrax</i>	MORONIDAE	1	489.0					1	315.0									
<i>Diplodus sargus</i>	SPARDAE							2	269.5	0.71								
<i>Alota fallax</i>	CLUPEDAE							1	320.0									
<i>Caranx rhonchus</i>	CARANGIDAE	1	142.0					1	320.0									
<i>Dentex gibbosus</i>	SPARDAE																	
<i>Lisa aurata</i>	MUGILIDAE																	
<i>Lotigo vulgaris</i>	LOLIGNIDAE	1	387.0															
<i>Saipa saipa</i>	SPARDAE																	
<i>Scorpaeniformis</i>	SCORPALTALMIDAE																	
<i>Scorpaena scrofa</i>	SCORPALTALMIDAE	1	222.0															
<i>Sparus aurata</i>	SPARDAE	1	329.0															

**Table 3.2.1.3.2. Gulf of Cádiz. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during the Autumn.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total
		80/300		90/300		100/300		80/400		90/400		100/400		
		n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	n	TL (cm) s.d.	
<i>Torpedo torpedo</i>	TORPEDINIDAE	84	184.75 26.6	80	197.13 35.53	68	218.87 45.46	89	197.54 53.69	72	203.94 56.66	90	233.27 57.89	483
<i>Solea senegalensis</i>	SOLEIDAE	84	262.0 30.13	57	280.89 33.24	32	314.97 26.89	121	264.49 25.02	51	271.16 30.18	44	317.75 32.6	389
<i>Sardina pilchardus</i>	CLUPEIDAE	65	196.80 14.86	36	196.86 21.49	61	198.41 17.46	80	198.15 11.57	39	200.54 10.08	101	197.26 9.18	383
<i>Septia officinalis</i>	SEPIIDAE	80	138.18 20.25	62	144.55 21.39	18	161.06 26.14	114	131.05 14.15	66	141.52 18.94	21	150.86 15.52	361
<i>Solea lascaris</i>	SOLEIDAE	74	234.0 23.95	47	234.39 25.69	12	226.3 52.26	105	235.13 20.66	53	237.32 19.63	21	243.2 24.12	312
<i>Halobatrachus didactylus</i>	BATROCHIDAE	52	279.88 47.87	35	294.09 48.42	27	329.48 52.4	68	273.56 41.61	46	278.87 51.77	25	323.68 48.52	253
<i>Synaptura lusitania</i>	SOLEIDAE	49	292.82 40.7	30	308.93 52.28	10	272.3 18.98	58	295.48 38.61	30	304.9 48.42	21	314.9 54.58	198
<i>Raja undulata</i>	RAJIDAE	12	394.33 128.7	38	330.89 83.00	34	329.18 76.51	22	380.27 99.26	18	384.24 108.71	42	418.17 134.9	166
<i>Raja asterias</i>	RAJIDAE	19	350.0 78.81	35	323.6 77.29	34	357.41 58.63	19	298.26 84.53	22	311.59 74.33	35	371.29 80.16	164
<i>Argyrosomus regius</i>	SCIAENIDAE	20	275.6 108.6	27	272.0 90.57	18	258.67 109.71	36	276.61 115.51	24	227.25 73.21	34	228.79 60.05	159
<i>Mugil cephalus</i>	MUGILIDAE	22	433.23 40.69	19	445.47 37.17	17	482.35 25.2	35	435.46 36.91	16	459.25 30.69	24	474.58 17.76	133
<i>Scophthalmus rhombus</i>	SCOPHTALMIDAE	12	281.17 14.89	15	285.53 29.33	17	293.65 26.05	25	281.96 15.3	14	277.71 21.86	24	282.79 17.26	107
<i>Torpedo marmorata</i>	TORPEDINIDAE	12	202.42 55.6	10	204.0 61.65	7	242.29 56.93	22	178.91 33.54	14	192.64 47.9	15	209.2 32.18	80
<i>Diplodus sargus</i>	SPARIDAE	7	217.86 15.66	25	222.56 17.29	2	254.0 2.83	20	233.55 45.37	17	243.59 46.86	5	265.8 17.66	76
<i>Dicoblo glosa aeneata</i>	SOLEIDAE	13	159.83 17.81	9	177.67 32.43	2	180.5 24.75	13	160.38 11.58	4	162.75 12.95	3	173.33 18.93	44
<i>Octopus vulgaris</i>	OCTOPODIDAE	10		8		3		8		5		5		34
<i>Diplodus bellotti</i>	SPARIDAE	9	156.22 22.1	4	156.5 6.14	5	154.2 7.46	9	167.56 9.67	1	166.0	5	163.8 14.57	33
<i>Scomber japonicus</i>	SCOMERIDAE	9	260.89 11.07	6	268.33 10.97	1	267.0	5	245.4 43.39	3	267.0 7.21	4	274.0 11.11	28
<i>Dicentrarchus labrax</i>	MORONIDAE	1	397.0	6	425.17 33.76	3	484.0 23.43	6	461.5 57.42	3	377.67 34.99	7	473.43 37.3	26
<i>Aloia fallax</i>	CLUPEIDAE	4	304.5 84.39	1	327.0	2	260.0 115.97	8	328.0 33.95	4	326.5 42.65	5	307.2 34.81	24
<i>Frigia luserna</i>	TRIGLIDAE	2	249.5 17.68	5	249.2 28.67	3	215.67 43.02	6	256.5 31.85	4	271.0 31.38	4	233.75 15.82	24
<i>Aloia aloia</i>	CLUPEIDAE	2	331.5 10.61	3	332.0 26.51	3	342.0 9.85			4	329.75 7.09	11	311.0 30.96	23
<i>Dicentrarchus punctatus</i>	MORONIDAE	2	275.5 200.11	5	289.0 63.76	1	227.0	10	287.8 48.98	3	312.33 69.24	2	275.5 13.44	23

(To be concluded in next page)

Table 3.2.1.3.2. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		80/300		90/300		100/300		80/400		90/400		100/400								
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)		s.d.					
<i>Lithognathus diacepius</i>	SPARIDAE	2	270.5	7.78	3	312.67	35.57	1	202.0	5	278.2	81.4	1	281.0	3	311.33	18.5	12		
<i>Scopelogadus maximus</i>	SCOPHTALMIDAE	2	259.0	52.33	3	308.67	26.73	2	302.0	7.07	2	277.5	7.78	2	169.0	2.83	1	177.0	10	
<i>Sciaenops umbra</i>	SCIAENIDAE	3	164.33	22.3	1	145.0		1	173.0		4	274.0	33.3	1	298.0	3	320.0	61.02	10	
<i>Solea vulgaris</i>	SOLEIDAE	2	255.0	8.49				1	161.0		3	182.33	61.86	4	155.5	7.85	2	148.0	18.38	10
<i>Umbra canariensis</i>	SCIAENIDAE							2	159.0	11.31				2	153.5	0.71	2	139.5	0.71	9
<i>Seriola dumerili</i>	CARANGIDAE	2	161.0	8.49	1	167.0		1	276.0		3	228.67	31.13							7
<i>Trachinus draco</i>	TRACHINIDAE	2	274.5	20.51	1	305.0		1	276.0		3	238.0	20.88	1	243.0		1	256.0		6
<i>Sparus aurata</i>	SPARIDAE	1	289.0					1	176.0		1	176.0					2	233.0	114.55	5
<i>Stromateus fiatela</i>	STROMATEIDAE	1	182.0		1	207.0		2	48.73	2.49	1	67.22								4
<i>Melibeetus kerathurus</i>	PENAIIDAE	1	75.92		2	48.73	2.49	1	67.22		3	174.67	28.18				1	200.0		4
<i>Mullus surmuletus</i>	MULLIDAE							2	663.0	173.95							2	859.5	0.71	4
<i>Pteromylaeus bovinus</i>	HAEMULIDAE	2	396.0	25.46	1	363.0		1	535.0		1	127.0		1	406.0		1	460.0		3
<i>Balistes carolinensis</i>	BALISTIDAE																			3
<i>Belone belone</i>	BELONIDAE																			3
<i>Engraulis encrinetolus</i>	ENGRAULIDAE	2	108.5	9.19				1	162.0		1	127.0					1	166.0		3
<i>Dentex canariensis</i>	SPARIDAE							1	136.0		1	156.0		1	103.0					2
<i>Pomadasys inatus</i>	HAEMULIDAE							1	136.0		1	156.0		1	103.0					2
<i>Bohus pedas</i>	BOTHIDAE																			1
<i>Conger conger</i>	CONGRIDAE																			1
<i>Galeorhinus galeus</i>	TRIAKIDAE				1	795.0														1
<i>Liza saliens</i>	MUGILIDAE	1	465.0																	1
<i>Loligo vulgaris</i>	LOLIGINIDAE							1	285.0											1
<i>Mullus barbatus</i>	MULLIDAE							1	285.0											1
<i>Pagellus acarne</i>	SPARIDAE							1	159.0											1
<i>Pagellus epyrinus</i>	SPARIDAE				1	407.0														1
<i>Squilla mantis</i>	SQUILLIDAE							1	46.0											1
<i>Trachinotus ovatus</i>	TRACHINIDAE							1	288.0											1

**Table 3.2.1.3.3. Gulf of Cádiz. Number of specimens (n), mean total weight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Spring.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total (Kg)						
		80/300			90/300			100/300			80/400				90/400			100/400		
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.		n	W (g)	s.d.	n	W (g)	s.d.
<i>Septia officinalis</i>	SEPIIDAE	659	403.2	281.94	467	519.4	376.34	225	729.7	477.11	1020	440.2	325.47	500	496.0	386.45	249	699.6	384.32	1525.601
<i>Symphora lusitanica</i>	SOLEIDAE	47	305.4	125.9	43	316.7	96.93	43	434.1	194.63	49	283.6	101.45	46	310.6	100.98	33	388.1	192.76	76.121
<i>Solea senegalensis</i>	SOLEIDAE	54	266.3	121.62	38	271.6	90.52	35	346.5	129.01	46	230.6	82.93	47	223.6	61.62	40	345.9	74.74	71.507
<i>Ocotopus vulgaris</i>	OCTOPODIDAE	2	2735.5	96.87	2	1937.0	951.77	3	1918.0	825.96	3	2596.7	493.83	2	1854.0	57.98	6	1757.8	436.6	37.184
<i>Torpedo marmorata</i>	TORREDINIDAE	10	300.6	404.6	9	392.2	285.25	5	421.4	382.16	19	406.3	539.69	15	198.1	156.21	21	630.4	566.06	32.802
<i>Raja undulata</i>	RAJIDAE	5	314.4	330.57	3	283.3	151.99	2	499.0	186.68	11	1020.9	1040.36	5	629.8	423.13	20	662.6	491.11	31.051
<i>Torpedo torpedo</i>	TORREDINIDAE	6	107.2	38.69	5	312.8	294.34	8	284.8	127.98	9	309.6	476.23	5	371.8	412.71	19	444.1	471.39	17.461
<i>Halobotanus diadactylus</i>	BATROCHIDAE	5	225.4	71.19	4	274.5	101.9	1	486.0	81.58	5	169.2	103.46	7	203.1	102.61	14	322.4	247.18	12.646
<i>Raja asterias</i>	RAJIDAE	8	227.8	88.3	8	179.1	63.97	6	270.2	73.54	1	1196.0		4	726.0	200.71	7	740.3	301.15	10.556
<i>Balistes carolinensis</i>	BALISTIDAE	31	51.4	10.31	31	50.6	11.2	24	53.5	13.76	42	53.4	14.45	39	49.3	9.89	50	49.6	11.00	9.764
<i>Sardinia pilchardus</i>	SCIAENIDAE	1	796.0					2	1005.0	185.26	5	676.4	140.73	2	1716.0	1077.63	2	1740.5	622.96	8.176
<i>Argyrosomus regius</i>	MUGILIDAE	9	69.8	30.95	8	64.6	23.62	13	76.8	20.94	21	67.0	28.51	19	61.9	26.81	24	70.9	34.01	6.298
<i>Mugil cephalus</i>	SPARIDAE	2	242.0	33.94				5	277.8	27.94	3	243.7	73.28	1	274.0		9	257.6	32.22	4.403
<i>Diplodus bellotti</i>	TRACHINIDAE	6	73.7	25.64	1	137.0		8	87.1	45.69	19	96.8	87.84	3	42.3	26.41	13	86.5	38.96	4.269
<i>Alona alona</i>	SPARIDAE	3	388.0	79.00	1	64.0		1	89.0		5	266.5	122.09	2	415.0	42.43	1	50.0		3.263
<i>Inthegonatus mormyrus</i>	CARANGIDAE	1	479.0								1	1687.0		1	653.0					2.819
<i>Plectrobranchius mediterraneus</i>	HAEMULIDAE	3	696.7	122.9				1	2030.0		1	211.0		8	85.5	43.25	4	393.5	472.06	2.735
<i>Maja squinado</i>	MAJIDAE	1	144.0		1	120.0		1	2030.0		1	384.0		4	85.5	43.25	8	76.4	36.28	2.678
<i>Pomadourus macrus</i>	HAEMULIDAE	1	115.0		4	45.5	20.57	2	144.0	16.97	8	109.5	86.75	4	85.5	43.25	4	393.5	472.06	2.119
<i>Raja montagui</i>	RAJIDAE	1	304.0		1	241.0		2	144.0	16.97	8	109.5	86.75	4	85.5	43.25	4	393.5	472.06	1.84
<i>Chelom labrovus</i>	MUGILIDAE	3	613.3	10.41	3	613.3	10.41	5	59.8	10.13	5	61.0	13.04	3	43.7	21.36	4	62.7	10.26	1.763
<i>Pagellus acarne</i>	SPARIDAE	6	86.3	66.36	6	64.4	6.54	5	59.8	10.13	5	61.0	13.04	3	43.7	21.36	4	62.7	10.26	1.714
<i>Dicentrarchus labrax</i>	MORONIDAE	1	1067.0		1	745.0		1	2030.0		1	647.0		1	647.0		1	286.0		1.426
<i>Scophthalmus maximus</i>	SCOPHTHALMIDAE																			1.271
<i>Raja brachyura</i>	RAJIDAE	3	170.0	25.24	1	98.0		1	183.0		1	395.0	82.73	2	359.5	82.73	2	276.0	41.01	1.152
<i>Solea lascaris</i>	SOLEIDAE	2	114.5	3.54	1	98.0		1	94.0		1	181.0		3	124.3	50.82	3	114.7	35.85	1.138
<i>Scomber japonicus</i>	SCOMBRIDAE	1	27.0		1	43.0		1	43.0		11	40.0	14.29	2	27.5	16.26	2	276.0	41.01	1.01
<i>Symphysodon caenthorus</i>	PENAUDAE	7	56.0	24.12	2	53.5	3.54	1	16.0		2	40.0	14.29	2	27.5	16.26	2	276.0	41.01	0.988
<i>Melibertes kerathurus</i>	SPARIDAE	1	247.0		2	54.5	2.12	4	68.0	13.23	8	49.5	17.89	3	66.3	28.88	3	68.5	20.51	0.969
<i>Pagellus erythrinus</i>	TRIGLIDAE	1	33.0		1	934.0		1	934.0		14	25.9	4.51	3	29.0	4.58	1	37.0		0.934
<i>Trigla lucerna</i>	LOLIGINIDAE	11	29.0	5.73	2	29.0	7.07	1	537.0		14	25.9	4.51	3	29.0	4.58	1	37.0		0.864
<i>Loligo vulgaris</i>	SOLEIDAE	2	30.0	1.41	2	30.0	1.41	2	301.5	9.19	1	522.0		1	21.0		1	22.0		0.618
<i>Dicologlossa cuneata</i>	SCOPHTHALMIDAE																			0.603
<i>Scophthalmus rhombus</i>	SPARIDAE	1	496.0		1	496.0		1	298.0		1	376.0		2	199.0	29.7	2	169.0		0.522
<i>Diplodus sargus</i>	MUGILIDAE																			0.496
<i>Isa aurata</i>	SOLEIDAE																			0.398
<i>Sparus aurata</i>	SOLEIDAE																			0.376
<i>Solea klemii</i>	SOLEIDAE																			0.298
<i>Alona fallax</i>	SOLEIDAE																			0.185
<i>Caranx rhombus</i>	CARANGIDAE																			0.169
<i>Scorpaena scrofa</i>	SCORPAENIDAE																			0.141
<i>Scomber scomber</i>	SCOMBRIDAE																			0.092
<i>Engraulis encrasicolus</i>	ENGRAULIDAE	4	12.0	2.83	4	12.0	2.83	1	15.0		4	14.0	5.35	1	15.0		1	22.0		
<i>Salpa salpa</i>	SPARIDAE	1	92.0		1	92.0		1	92.0		1	92.0		1	92.0		1	92.0		

**Table 3.2.1.3.4. Gulf of Cádiz. Number of specimens (n), mean total weight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during the Autumn.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total (Kg)						
		80/300			90/300			100/300			80/400			90/400			100/400			
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	
<i>Septia officinalis</i>	SEPIIDAE	80	305.7	92.17	62	357.8	151.17	18	539.4	276.30	114	281.1	87.28	66	343.3	125.13	21	433.0	140.31	117.76
<i>Halobatrachus didactylus</i>	BATROCHIDAE	52	374.8	213.51	35	453.6	273.45	27	584.4	266.77	68	333.0	165.71	46	381.3	241.36	25	598.4	272.97	105.66
<i>Mugil cephalus</i>	MUGILIDAE	22	636.2	186.41	19	713.2	123.87	17	837.8	128.90	35	629.8	167.15	16	710.9	135.20	24	813.2	103.70	94.73
<i>Solea senegalensis</i>	SOLEIDAE	84	169.1	48.44	57	212.3	64.97	32	291.9	71.82	121	171.3	48.18	51	192.2	50.74	44	299.3	95.55	78.71
<i>Torpedo torpedo</i>	TORPEDINIDAE	84	107.4	57.62	80	133.4	84.03	68	192.1	135.26	89	147.5	169.99	72	168.8	201.48	90	241.0	230.34	78.48
<i>Raja undulata</i>	RAJIDAE	12	532.7	591.63	38	292.3	212.97	34	294.6	199.89	22	402.8	320.96	18	458.8	413.44	42	670.7	782.39	72.14
<i>Octopus vulgaris</i>	OCTOPODIDAE	10	1461.1	346.39	8	1279.1	339.89	3	1693.7	821.92	8	1401.9	441.71	5	1259.2	522.01				47.44
<i>Raja asterias</i>	RAJIDAE	19	292.2	150.51	35	245.9	160.06	34	315.6	115.70	19	220.5	160.93	22	216.3	144.79	35	374.4	296.26	46.94
<i>Syngnathus lusitanica</i>	SOLEIDAE	49	197.4	83.33	30	231.0	129.39	10	150.0	35.08	58	200.9	79.99	30	232.4	88.83	21	276.6	149.14	42.10
<i>Argyrosomus regius</i>	SCIAENIDAE	20	368.1	478.20	27	262.9	269.75	18	287.2	441.99	36	315.3	420.69	24	160.9	257.99	34	165.7	215.30	40.16
<i>Solea lascaris</i>	SOLEIDAE	74	120.8	41.82	47	123.2	40.50	12	140.9	45.36	105	119.2	27.37	53	124.7	32.86	21	139.8	54.70	37.86
<i>Scophthalmus rhombus</i>	SCOPHTHALMIDAE	12	296.9	48.33	15	309.4	122.07	17	357.7	102.31	25	278.5	64.16	14	281.0	71.33	24	295.5	42.33	31.64
<i>Dicentrarchus labrax</i>	MORONIDAE	1	720.0		6	819.7	202.36	3	1192.7	187.62	6	1145.5	470.43	3	553.0	146.43	7	1108.7	156.43	25.51
<i>Sardina pilchardus</i>	CLUPPIDAE	66	58.2	12.02	36	51.2	10.81	61	58.8	11.41	80	54.7	10.57	39	59.1	10.67	101	56.3	8.17	20.31
<i>Diplodus sargus</i>	SPARIDAE	7	169.7	39.19	25	174.4	46.93	2	258.0	11.31	20	226.6	229.66	17	253.7	204.64	5	241.0	73.74	16.11
<i>Torpedo marmorata</i>	TORPEDINIDAE	12	204.8	181.30	10	225.7	230.30	7	343.3	254.01	22	134.8	108.11	14	174.6	147.44	15	201.4	101.00	15.53
<i>Dicentrarchus punctatus</i>	MORONIDAE	2	382.5	507.00	5	305.2	256.30	1	123.0		10	270.3	144.16	3	363.3	190.74	2	198.5	16.26	6.60
<i>Scophthalmus maximus</i>	SCOPHTHALMIDAE	2	509.5	91.22	3	511.0	117.58	2	480.5	17.68	2	359.5	12.02				3	552.0	130.93	5.89
<i>Alosa alosa</i>	CLUPPIDAE	2	237.0		3	310.7	87.56	3	285.7	67.26				4	263.3	7.02	11	279.1	88.79	5.89
<i>Alosa fallax</i>	CLUPPIDAE	4	266.7	189.87	1	279.0		2	180.5	181.73	8	309.5	90.17	4	298.3	97.27	5	245.3	100.20	5.47
<i>Parerythrinus bovinus</i>	HAEMULIDAE										2	762.5	406.39				2	1566.0	234.76	4.66
<i>Scomber japonicus</i>	SCOMBERIDAE	9	157.3	23.34	6	170.0	22.60	1	173.0		5	157.0	11.90	3	168.3	17.47	4	187.3	43.71	4.65
<i>Lobogobius mormyrus</i>	SPARIDAE	2	259.5	7.78	3	439.0	91.28	1	107.0		5	346.4	215.25	1	310.0					3.99

(To be concluded in next page)

Table 3.2.1.3.4. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total (kg)						
		80/300		90/300		100/300		80/400		90/400		100/400								
		n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)							
<i>Trigla lucerna</i>	TRIGLIDAE	2	150.0	5	149.2	49.61	3	99.0	56.20	6	171.5	53.16	4	184.5	60.51	4	112.3	13.58	3.30	
<i>Balistes carolinensis</i>	BALISTIDAE	2	905.5	132.23	1	604.0													2.42	
<i>Solea vulgaris</i>	SOLEIDAE	2	165.0	31.11															2.23	
<i>Diplodus belloni</i>	SPARIDAE	9	61.1	28.25	4	65.0	5.89	5	64.2	10.03	9	73.8	12.45	1	71.0		5	72.2	18.14	2.23
<i>Galerhinus galeus</i>	TRIAKIDAE			1	1579.0														1.58	
<i>Dicologlossa cuneata</i>	SOLEIDAE	13	32.7	9.57	9	44.9	35.78	2	47.0	22.63	13	30.4	8.03	4	35.3	10.69	3	42.3	18.01	1.51
<i>Syngnathus aurata</i>	SPARIDAE	1	345.0														1	234.0	1.36	
<i>Pagellus epyritrinus</i>	SPARIDAE			1	817.0														0.82	
<i>Sciaenops ocellatus</i>	SCIAENIDAE	3	60.7	26.63	1	39.0		1	67.0		2	131.0	107.48	2	65.0	1.41	1	70.0	0.75	
<i>Liza richeni</i>	MUGILIDAE	1	673.0																0.67	
<i>Stromateus fiatola</i>	STROMATEIDAE	1	103.0		1	136.0		1	105.0		1	82.0		3	65.3	24.11	2	175.0	152.74	0.67
<i>Trachurus draco</i>	TRACHINIDAE	2	108.0	19.80	1	147.0		1	67.0		3	101.3	106.61	4	49.8	11.44	2	43.0	15.56	0.66
<i>Umbra canariensis</i>	SCIAENIDAE							1	160.0		1	616.0		1	69.0		1	96.0	0.62	
<i>Loligo vulgaris</i>	LOLIGINIDAE							2	40.5	9.19				2	32.5	2.12	2	25.0	1.41	0.32
<i>Belone belone</i>	BELONIDAE							1	46.0					1	220.0				0.22	
<i>Seriola dumerilii</i>	CARANGIDAE	2	40.0	5.66	1	46.0													0.20	
<i>Trachinotus ovatus</i>	TRACHINIDAE																		0.17	
<i>Mullus surmuletus</i>	MULLIDAE																		0.16	
<i>Conger conger</i>	CONGRIDAE																		0.13	
<i>Mullus barbatus</i>	MULLIDAE																		0.11	
<i>Dentex canariensis</i>	SPARIDAE							1	59.0										0.10	
<i>Squilla mantis</i>	SQUILLIDAE																		0.05	
<i>Melicertus kerathurus</i>	PENALIDAE	1	81.0	2	10.5	2.12													0.05	
<i>Pagellus acarne</i>	SPARIDAE																		0.04	
<i>Bohus podas</i>	BOTHIDAE																		0.02	
<i>Pomadourus hispidus</i>	HAEMULIDAE																			
<i>Ergasilus encrasicholus</i>	ENGRULIDAE																			

**Table 3.2.1.3.5. Gulf of Cádiz. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during all sampling periods.**

Species	Family	Innery panel / Outer panel mesh size (mm)																								
		80/300				90/300				100/300				80/400				90/400				100/400				Total
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.		
<i>Sepia officinalis</i>	SEPIDAE	739	147.43	27.01	529	159.27	30.06	243	181.27	33.78	1134	149.60	30.72	566	156.11	31.72	270	176.63	30.95	3481						
<i>Solea senegalensis</i>	SOLEIDAE	138	276.79	41.69	95	292.46	35.64	67	323.85	37.51	167	271.83	31.20	98	279.82	29.40	84	325.21	32.15	649						
<i>Sardinia pilchardus</i>	CLUPEIDAE	96	194.80	14.42	67	193.85	17.41	85	197.06	16.30	122	195.02	14.04	79	194.44	12.83	151	194.68	10.38	600						
<i>Torpedo torpedo</i>	TORPEDINIDAE	90	184.02	26.35	85	200.12	38.46	76	222.97	46.23	98	207.54	38.29	77	207.99	61.14	109	246.29	94.42	535						
<i>Symphura lusitana</i>	SOLEIDAE	96	310.99	41.12	73	321.01	45.52	29	330.59	59.96	107	300.83	39.83	76	323.71	41.56	54	334.52	52.56	435						
<i>Solea lascaris</i>	SOLEIDAE	77	235.09	24.18	47	234.39	25.69	13	229.36	50.61	106	235.36	20.69	53	237.32	19.63	22	246.24	27.33	318						
<i>Halobotarichus chidactylus</i>	BATROCHIDAE	57	276.39	47.30	39	290.23	48.37	28	328.43	51.72	81	266.69	45.50	61	286.20	78.71	28	318.29	52.33	294						
<i>Raja asterias</i>	RAJIDAE	27	338.38	71.12	43	330.72	71.11	40	356.10	55.44	24	297.75	78.78	29	313.55	67.76	49	363.35	81.14	212						
<i>Raja undulata</i>	RAJIDAE	17	376.06	127.42	41	331.90	81.53	36	335.11	78.70	33	417.21	129.21	23	394.39	111.15	62	422.52	126.44	212						
<i>Aegrotomus regius</i>	SCIAENIDAE	20	275.60	106.60	27	272.00	90.57	18	238.67	109.71	37	283.05	120.45	26	254.23	121.46	36	248.31	100.83	164						
<i>Torpedo marmorata</i>	TORPEDINIDAE	22	206.32	62.80	19	227.00	66.06	12	257.83	67.46	41	201.80	69.11	29	192.90	45.61	36	255.08	78.66	159						
<i>Mullus cephalus</i>	MUGILIDAE	23	435.30	40.98	19	445.47	37.17	19	484.16	25.05	40	437.28	36.18	16	439.25	30.69	25	473.28	18.57	142						
<i>Diplodus bellotti</i>	SPARIDAE	18	163.94	33.84	12	156.25	16.82	18	164.11	13.68	30	162.30	17.33	20	158.15	22.60	29	164.24	16.25	127						
<i>Scopelogadus rhombus</i>	SCOPHTALMIDAE	12	281.17	14.89	17	269.12	53.86	18	296.89	28.77	25	281.96	15.30	15	267.40	45.16	24	282.79	17.26	111						
<i>Diplodus sargus</i>	SPARIDAE	7	217.86	15.66	25	222.56	17.29	4	261.75	9.11	20	233.55	45.37	17	243.59	46.86	5	265.80	17.66	78						
<i>Dicely go gliosa canenta</i>	SOLEIDAE	24	160.46	14.48	11	174.45	29.93	2	180.50	24.75	27	158.04	10.75	7	162.43	12.22	4	170.50	16.46	75						
<i>Fraxinus draco</i>	TRACHINIDAE	8	234.75	34.41	2	289.00	22.63	9	237.44	39.33	22	216.50	46.59	3	184.33	46.01	13	219.38	35.82	57						
<i>Octopus vulgaris</i>	OCTOPODIDAE	12			10			6			11			7			6			52						
<i>Alia alosa</i>	CLUPEIDAE	4	326	12.30	3	332	26.51	8	335.63	12.91	3	324.33	13.65	5	328.4	6.84	20	317.25	25.13	43						
<i>Trigla luerna</i>	TRIGLIDAE	3	218.00	55.97	5	249.20	28.67	7	201.86	29.20	14	209.57	49.41	7	236.14	51.82	7	215.00	30.15	43						
<i>Scomber japonicus</i>	SCOMBRIDAE	11	258.82	10.94	7	263.71	15.80	2	248.50	26.16	8	247.25	36.02	3	267.00	7.21	7	261.00	22.88	38						
<i>Pagellus acaris</i>	SPARIDAE	6	182.00	37.00	6	173.83	3.19	5	165.40	11.33	5	168.20	12.21	4	155.25	18.23	4	172.50	9.95	30						
<i>Pomadasys incisus</i>	HAEMULIDAE	1	201.00		5	146.00	20.77	2	211.50	12.02	8	181.63	51.04	5	166.60	44.46	8	169.88	28.98	29						
<i>Dicentrarchus labrax</i>	MORONIDAE	2	443.00	65.05	6	425.17	33.76	3	484.00	23.43	7	455.86	54.50	3	377.67	34.99	7	473.43	37.30	28						
<i>Melicerus kerathurus</i>	PENIDAE	8	69.15	14.78	4	59.93	13.07	2	60.00	115.97	9	328.78	31.85	4	326.50	42.65	5	307.20	34.81	25						
<i>Alia fallax</i>	CLUPEIDAE	4	304.50	84.39	1	327.00		2	260.00		11	60.56	7.64	2	68.00		5	307.20	34.81	25						
<i>Lithognathus mionectes</i>	SPARIDAE	5	293.60	24.83	4	277.00	77.02	2	195.50	9.19	10	269.10	61.83	3	302.00	19.67	1	145.00		25						
<i>Dicentrarchus puntatatus</i>	MORONIDAE	2	275.50	200.11	5	289.00	63.76	1	227.00		10	287.80	48.98	3	312.33	65.24	2	275.50	13.44	23						
<i>Balistes carolinensis</i>	BALESTIDAE	2	396.00	25.46	1	363.00		2	330.50	2.12	1	423.00		4	362.25	52.31	7	338.43	57.36	17						
<i>Scopelogadus maximus</i>	SCOPHTALMIDAE	2	259.00	52.33	4	319.75	31.11	2	302.00	7.07	3	281.67	9.07				4	299.75	27.66	15						
<i>Engraulis encrinetochilus</i>	ENGRAULIDAE	6	117.33	14.95				5	127.60	7.47	5	127.60	7.47	1	132.00		1	157.00		13						
<i>Seriola dumerilii</i>	CARANGIDAE	3	217.00	97.18	1	167.00		2	159.00	11.31	1	556.00		3	244.33	157.33	2	139.50	0.71	12						
<i>Sciaenops ocellatus</i>	SCIAENIDAE	3	164.33	22.30	1	145.00		1	173.00		2	202.50	62.93	2	169.00	2.83	1	177.00		10						
<i>Solea vulgaris</i>	SOLEIDAE	2	255.00	8.49				4	274.00	33.30	4	274.00	33.30	1	298.00		3	320.00	61.02	10						
<i>Umbra canariensis</i>	SCIAENIDAE							1	161.00		3	182.33	61.86	4	155.50	7.85	2	148.00	18.38	10						
<i>Sparus aurata</i>	SPARIDAE	2	309.00	28.28							3	238.00	20.88	1	243.00		1	256.00		7						
<i>Pagellus epyritus</i>	SPARIDAE	1	264.00		3	244.67	140.61							2	266.50	113.84				6						
<i>Raja montagui</i>	RAJIDAE	1	372.00		1	326.00											4	320.75	158.57	6						

(To be concluded in next page)

Table 3.2.1.3.5. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total						
		80/300			90/300			100/300			80/400				90/400			100/400		
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.		n	TL (cm)	s.d.	n	TL (cm)	s.d.
<i>Dentex canariensis</i>	SPARDAE	1	199.00		2	136.00	36.77	1	240.00		2	154.00	16.97	2	154.00	16.97	2	154.00	16.97	5
<i>Plectrohinchus mediteraneus</i>	HAEMULIDAE	3	362.33	17.50																5
<i>Spondylionoma cantharus</i>	SPARDAE	1	126.00		1	143.00														5
<i>Stromateus fiabola</i>	STROMATEIDAE	1	182.00		1	207.00		1	176.00		3	298.33	44.52	2	233.00	114.55	2	233.00	114.55	5
<i>Maja squinado</i>	MAJIDAE	1	85.00		1	98.19		1	125.00		1	203.00		1	176.00		1	176.00		4
<i>Mullus surmuletus</i>	MULLIDAE							3	174.67	28.18							1	200.00		4
<i>Pteromyliaster bovinus</i>	HAEMULIDAE							2	663.00	173.95							2	859.50	0.71	4
<i>Raja brachyura</i>	RAJIDAE							2	378.00	25.46							2	351.00	8.49	4
<i>Belone belone</i>	BELONIDAE							1	535.00								1	406.00		3
<i>Cheilom labrovus</i>	MUGILIDAE							3	440.33	23.80										3
<i>Sokea kleinii</i>	SOLEIDAE	1	315.00		1	315.00		1	285.00								2	284.30	6.36	3
<i>Loligo vulgaris</i>	LOLIGINIDAE							1	387.00								1	156.00		2
<i>Bothus podas</i>	BOTHIDAE																			1
<i>Caranx rhonchus</i>	CARANGIDAE							1	320.00											1
<i>Conger conger</i>	CONGRIDAE																			1
<i>Dentex gibbosus</i>	SPARDAE	1	142.00														1	499.00		1
<i>Galeorhinus galeus</i>	TELEAKIDAE							1	795.00											1
<i>Liza aurata</i>	MUGILIDAE																			1
<i>Liza saliens</i>	MUGILIDAE	1	465.00																	1
<i>Mullus barbatus</i>	MULLIDAE																			1
<i>Salpa salpa</i>	SPARDAE																			1
<i>Scomber scomber</i>	SCOMERIDAE																			1
<i>Scorpaena scorpa</i>	SCORPAENIDAE	1	222.00																	1
<i>Squilla mantis</i>	SQUILLIDAE																			1
<i>Trachinotus ovatus</i>	TRACHINIDAE																			1

**Table 3.2.1.3.6. Gulf of Cádiz. Number of specimens (n), mean total weight (W, in g) and standard deviation (s.d.) for all species caught with trammel nets during all sampling periods.**

Species	Family	Inner panel / Outer panel mesh size (mm)												Total (kg)						
		80/300		90/300		100/300		80/400		90/400		100/400								
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.				
<i>Sepia officinalis</i>	SEPIIDAE	739	392.6	269.80	529	500.6	361.15	243	715.6	467.30	1134	423.9	313.38	566	479.2	369.95	270	678.7	377.77	1643.36
<i>Solea senegalensis</i>	SOLEIDAE	138	207.7	97.46	95	235.6	81.00	67	320.4	108.40	167	187.6	65.18	98	207.3	58.10	84	321.8	88.78	150.213
<i>Sardinia pilchardus</i>	CLUPEIDAE	96	56.1	11.94	67	50.9	10.92	85	57.4	12.18	122	54.3	11.93	79	54.6	11.29	151	54.2	10.82	30.072
<i>Torpedo torpedo</i>	TORPEDINIDAE	90	107.4	56.55	85	144.0	112.11	76	202.2	136.77	98	162.5	217.33	77	182.2	222.57	109	276.7	295.05	95.945
<i>Symphurus lusitanica</i>	SOLEIDAE	96	250.8	119.06	73	281.4	118.43	29	336.1	208.89	107	238.8	99.06	76	280.0	103.21	54	343.1	183.40	118.223
<i>Solea lascaris</i>	SOLEIDAE	77	122.8	42.30	47	123.2	40.50	13	144.2	44.97	106	119.7	33.70	61	124.7	32.86	22	146.3	61.26	39.009
<i>Halobatrachus didactylus</i>	BATROCHIDAE	57	361.7	209.04	39	435.2	266.00	28	580.9	262.45	81	324.7	158.37	61	373.4	215.89	28	575.4	274.44	118.306
<i>Raja asterias</i>	RAJIDAE	27	273.1	136.68	43	233.5	148.70	40	308.8	111.38	24	209.8	150.27	29	213.1	134.21	49	359.5	295.06	58.598
<i>Raja undulata</i>	RAJIDAE	17	468.5	527.70	41	291.6	207.63	36	305.9	202.29	33	608.9	702.41	23	496.0	412.12	62	688.1	696.20	103.186
<i>Aegrotomus regius</i>	SCIAENIDAE	20	368.1	478.20	27	262.9	269.75	18	287.2	441.99	37	341.7	443.70	26	280.5	535.04	36	253.1	434.43	48.333
<i>Torpedo marmorata</i>	TORPEDINIDAE	22	248.4	299.66	19	303.5	264.96	12	375.8	299.86	41	260.8	395.02	29	186.4	149.53	36	463.3	487.43	48.331
<i>Megast cephalus</i>	MUGILIDAE	23	643.1	185.14	19	713.2	123.87	19	855.4	139.48	40	635.7	163.19	16	710.9	135.20	25	802.9	113.80	101.469
<i>Diplodus bellotti</i>	SPARIDAE	18	65.4	29.09	12	64.8	19.09	18	73.3	19.15	30	69.1	24.62	20	62.4	26.14	29	71.1	22.82	8.525
<i>Diplodus sargus</i>	SPARIDAE	7	169.7	39.19	25	174.4	46.93	4	279.8	26.49	20	226.6	229.66	17	253.7	204.64	5	241.0	73.74	16.716
<i>Dicoblogolepis cuneata</i>	SOLEIDAE	24	31.0	8.10	11	41.7	32.34	2	47.0	22.63	27	28.0	6.65	7	32.6	8.68	4	41.0	14.94	2.975
<i>Franchinus draco</i>	TRACHINIDAE	8	82.3	27.90	2	142.0	7.07	9	89.1	43.15	22	92.3	82.12	3	42.3	26.41	13	86.5	38.96	4.933
<i>Octopus vulgaris</i>	OCTOPODIDAE	12	1673.5	587.35	10	1414.7	521.62	6	1805.8	747.08	11	1727.7	704.85	7	1429.1	516.20	6	1757.8	456.60	84.62
<i>Aloia aloia</i>	CLUPEIDAE	4	240.3	24.17	3	310.7	87.56	8	281.1	43.78	3	243.7	73.28	5	266.0	7.83	20	270.7	71.55	10.289
<i>Trigla luerna</i>	TRIGLIDAE	3	91.5	82.73	5	149.2	49.61	7	83.5	40.27	14	101.8	72.00	7	133.9	78.09	7	94.8	27.82	4.266
<i>Scomber japonicus</i>	SCOMBRIDAE	11	149.6	27.15	7	159.7	34.15	2	133.5	55.86	8	144.8	33.23	3	168.3	17.47	7	156.1	53.75	5.786
<i>Pogeltus acaris</i>	SPARIDAE	6	86.3	66.36	6	64.4	6.54	5	59.8	10.13	5	61.0	13.04	4	45.5	17.82	4	62.7	10.26	1.814
<i>Pomadasys incanus</i>	HAEMULIDAE	1	115.0		5	42.4	19.11	2	144.0	16.97	8	109.5	86.75	5	71.2	49.25	8	76.4	36.28	2.382
<i>Dicentrarchus labrax</i>	MORONIDAE	2	893.5	245.37	6	819.7	202.36	3	1192.7	187.62	7	1074.3	468.95	3	533.0	146.22	7	1108.7	156.43	27.223
<i>Melissurus kerathurus</i>	PENAIIDAE	8	59.1	24.02	4	32.0	24.94	2	16.0		11	40.0	14.29	2	27.5	16.26	5	245.3	100.20	5.847
<i>Aloia fallax</i>	CLUPEIDAE	4	266.7	189.87	1	279.0		2	180.5	181.73	9	319.0	86.07	4	298.3	97.27	5	245.3	100.20	5.847
<i>Lithognathus mionectes</i>	SPARIDAE	5	336.6	89.94	4	345.3	201.77	2	98.0	12.73	10	310.9	174.72	3	380.0	67.64	1	50.0	7.248	6.604
<i>Dicentrarchus punctatus</i>	MORONIDAE	2	382.5	507.00	5	305.2	256.30	1	123.0		10	270.3	144.16	3	363.3	190.74	2	198.5	16.26	6.604
<i>Bolites corobrensis</i>	BALESTIDAE	2	905.5	132.23	1	604.0		2	637.0	73.54	1	1196.0		4	726.0	200.71	7	740.3	301.15	12.971
<i>Scophthalmus maximus</i>	SCOPHTALMIDAE	2	509.5	91.22	4	569.5	151.35	2	480.5	17.68	3	371.3	22.19	4	485.5	170.64	4	485.5	170.64	7.314
<i>Ergasilus encrasicolus</i>	ENGRULIDAE	6	12.0	2.83				5	14.2	4.66	1	15.0		1	15.0		1	22.0		0.156
<i>Seriola dumerilii</i>	CARANGIDAE	3	186.3	253.49	1	46.0		2	40.5	9.19	1	1687.0		3	239.3	338.25	2	25.0	1.41	3.141
<i>Solea umbra</i>	SCIAENIDAE	3	60.7	26.63	1	39.0		1	67.0		2	131.0	107.48	2	65.0	1.41	1	70.0		0.75
<i>Solea vulgaris</i>	SOLEIDAE	2	165.0	31.11				4	174.5	62.13	1	220.0		1	220.0		3	328.7	188.15	2.234
<i>Umbra cananensis</i>	SCIAENIDAE							3	101.3	106.61	4	49.8	11.44	2	43.0	15.56	1	234.0		1.855
<i>Sparus aurata</i>	SPARIDAE	2	420.5	106.77				3	184.7	37.68	2	226.0		2	316.0	335.17	4	393.5	472.06	2.119
<i>Pogeltus erythrinus</i>	SPARIDAE	1	247.0		3	308.7	440.23													
<i>Raja mentega</i>	RAJIDAE	1	304.0		1	241.0														

(To be concluded in next page)

Table 3.2.1.3.6. Concluded.

Species	Family	Inner panel / Outer panel mesh size (mm)												Total (kg)
		80/300		90/300		100/300		80/400		90/400		100/400		
		n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	n	W (g)	
<i>Dentex canariensis</i>	SPARIDAE	3	696.7	3	122.90	2	59.0	1	211.0	1	57.0	2	24.04	0.173
<i>Plectrohinchus mediterraneus</i>	HAEMULIDAE	1	27.0			1	43.0				1	434.0	1	2.735
<i>Symphysionoma cantharus</i>	SPARIDAE	1	103.0	1	136.0	1	2030.0	1	82.0	3	317.3	2	152.74	1.022
<i>Stromateus fiacola</i>	STROMATEIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Maja squinado</i>	MAJIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Mullus surmuletus</i>	MULLIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Paromysiaeus bovinus</i>	HAEMULIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Raja brachyura</i>	RAJIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Belone belone</i>	BELONIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Chelom labronus</i>	MUGILIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Seiwa klanni</i>	SOLEIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Leiigo vulgaris</i>	LOLIGINIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Echius podas</i>	BOTHIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Caranx rhoncus</i>	CARANGIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Conger conger</i>	CONGRIDAE	1	144.0	1	120.0	1	2030.0	1	364.0	1	82.0	2	234.76	0.671
<i>Dentex gibbosus</i>	SPARIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Galeinthus galeus</i>	TRIAKIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Liza aurata</i>	MUGILIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Liza saliens</i>	MUGILIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Mullus barbatus</i>	MULLIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Salpa salpa</i>	SPARIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Scorpaenidae</i>	SCORPAENIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Scorpaena scorpa</i>	SCORPAENIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Squilla mantis</i>	SCORPAENIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174
<i>Trachinus ovatus</i>	TRACHINIDAE	1	41.0	1	1579.0	1	298.0	1	46.0	1	174.0	1	174.0	0.174

**Table 3.2.1.3.7 . Gulf of Cádiz. Species caught per different inner/outer panel mesh combination of trammel nets, species overlap between the two sets of trammel nets mounted with different outer panel mesh sizes, and use of species( C = commercial, D = discarded, SC = self consumption, DSC = discarded or self consumption according to TL).**

Species	Inner/outer panel (mm)			Total	Inner/outer panel (mm)			Total	Overlap	Use
	80/300	90/300	100/300		80/400	90/400	100/400			
<i>Balistes carolinensis</i>	x	x	x	x	x	x	x	x	x	SC
<i>Halobatrachus didactylus</i>	x	x	x	x	x	x	x	x	x	D
<i>Belone belone</i>			x			x	x	x		D
<i>Bothus podas</i>					x					D
<i>Caranx rhonchus</i>			x	x						D
<i>Seriola dumerili</i>	x	x	x	x	x	x	x	x	x	C
<i>Trachinotus ovatus</i>						x		x		D
<i>Alosa alosa</i>	x	x	x	x	x	x	x	x	x	D
<i>Alosa fallax</i>	x	x	x	x	x	x	x	x	x	D
<i>Sardina pilchardus</i>	x	x	x	x	x	x	x	x	x	D
<i>Conger conger</i>							x	x		D
<i>Engraulis encrasicolus</i>	x			x	x	x	x	x	x	D
<i>Plectorhinchus mediterraneus</i>	x			x	x		x	x	x	DSC
<i>Pomadasys incisus</i>	x	x	x	x	x	x	x	x	x	D
<i>Loligo vulgaris</i>		x		x	x			x	x	C
<i>Maja squinado</i>	x	x		x	x			x	x	C
<i>Dicentrarchus labrax</i>	x	x	x	x	x	x	x	x	x	C
<i>Dicentrarchus punctatus</i>	x	x	x	x	x	x	x	x	x	C
<i>Chelon labrosus</i>		x		x						D
<i>Liza aurata</i>					x			x		D
<i>Mugil cephalus</i>	x	x	x	x	x	x	x	x	x	D
<i>Liza saliens</i>	x			x						D
<i>Mullus surmuletus</i>					x		x	x		SC
<i>Mullus barbatus</i>							x	x		SC
<i>Pteromylaeus bovinus</i>					x		x	x		D
<i>Octopus vulgaris</i>	x	x	x	x	x	x	x	x	x	C
<i>Melicertus kerathurus</i>	x	x	x	x	x	x		x	x	SC
<i>Raja asterias</i>	x	x	x	x	x	x	x	x	x	D
<i>Raja brachyura</i>					x		x	x		D
<i>Raja montagui</i>	x	x		x			x	x	x	D
<i>Raja undulata</i>	x	x	x	x	x	x	x	x		D
<i>Scorpaena scrofa</i>	x			x						D
<i>Argyrosomus regius</i>	x	x	x	x	x	x	x	x	x	C

(To be concluded in next page)

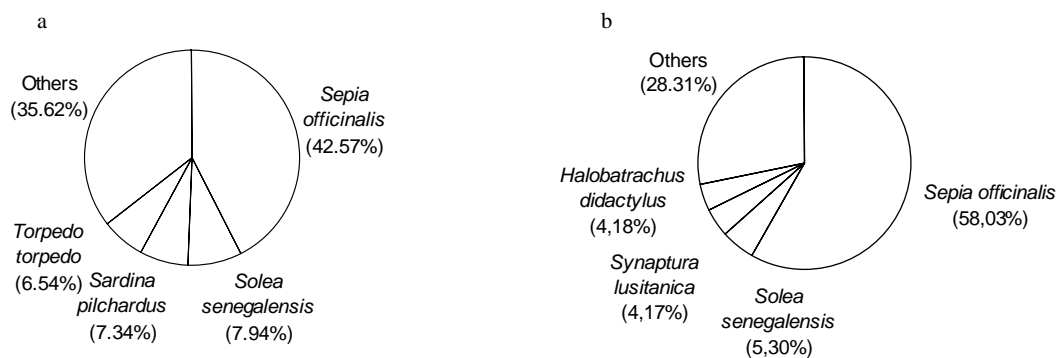
**Table 3.2.1.3.7. Concluded.**

Species	Inner/outer panel (mm)			Total	Inner/outer panel (mm)			Total	Overlap	Use
	80/300	90/300	100/300		80/400	90/400	100/400			
<i>Umbrina canariensis</i>			X	X	X	X	X	X	X	DSC
<i>Sciaena umbra</i>	X	X	X	X	X	X	X	X	X	DSC
<i>Scomber japonicus</i>	X	X	X	X	X	X	X	X	X	DSC
<i>Scomber scomber</i>							X	X		D
<i>Scophthalmus rhombus</i>	X	X	X	X	X	X	X	X	X	C
<i>Scophthalmus maximus</i>	X	X	X	X	X		X	X	X	C
<i>Sepia officinalis</i>	X	X	X	X	X	X	X	X	X	C
<i>Dicologlossa cuneata</i>	X	X	X	X	X	X	X	X	X	C
<i>Solea kleinii</i>		X		X		X		X	X	C
<i>Solea lascaris</i>	X	X	X	X	X	X	X	X	X	C
<i>Solea senegalensis</i>	X	X	X	X	X	X	X	X	X	C
<i>Synaptura lusitanica</i>	X	X	X	X	X	X	X	X	X	C
<i>Solea vulgaris</i>	X			X	X	X	X	X	X	C
<i>Dentex canariensis</i>	X		X	X			X	X	X	C
<i>Dentex gibbosus</i>	X			X						C
<i>Diplodus bellottii</i>	X	X	X	X	X	X	X	X	X	DSC
<i>Diplodus sargus</i>	X	X	X	X	X	X	X	X	X	C
<i>Lithognathus mormyrus</i>	X	X	X	X	X	X	X	X	X	DSC
<i>Pagellus acarne</i>	X	X	X	X	X	X	X	X	X	C
<i>Pagellus erythrinus</i>	X	X		X		X		X	X	C
<i>Salpa salpa</i>					X			X		D
<i>Sparus aurata</i>	X			X	X	X	X	X	X	C
<i>Spondyliosoma cantharus</i>	X		X	X		X		X	X	SC
<i>Squilla mantis</i>					X			X		D
<i>Stromateus fiatola</i>	X	X		X	X		X	X	X	DSC
<i>Torpedo marmorata</i>	X	X	X	X	X	X	X	X	X	D
<i>Torpedo torpedo</i>	X	X	X	X	X	X	X	X	X	D
<i>Trachinus draco</i>	X	X	X	X	X	X	X	X	X	D
<i>Galeorhinus galeus</i>		X		X						C
<i>Trigla lucerna</i>	X	X	X	X	X	X	X	X	X	DSC
<b>Total</b>	<b>45</b>	<b>40</b>	<b>37</b>	<b>51</b>	<b>47</b>	<b>40</b>	<b>46</b>	<b>56</b>	<b>44</b>	

Considering the total catch by species, it can be seen that there are two predominant species in terms of both abundance and biomass. Notable in first place is *Sepia officinalis*, with 42.57 % and 58.03%, respectively, of the total catch, followed by *Solea senegalensis* as the second most important species but considerably less predominant, with 7.94 % and 5.30 %, respectively, of the total (Figure 3.2.1.3.1).

In terms of abundance *Sardina pilchardus* and *Torpedo torpedo* are also significant,

with 7.34% and 6.54%, respectively, of the total. In the other groups, that account for 35.62 % of the total, are included the rest of the species, none of which exceeds 6%. Whereas *Sepia officinalis* and *Solea senegalensis* are also found to be the most important two species in biomass, as well as in abundance, *Sardina pilchardus* and *Torpedo torpedo* are substituted as the next most important species in biomass by *Halobatrachus didactylus* (4.18%) and *Synaptura lusitanica* (4.17%). The rest of the species are included in the “others” group, and account together for 28.31% of the biomass of the total catch (Figure 3.2.1.3.1.).

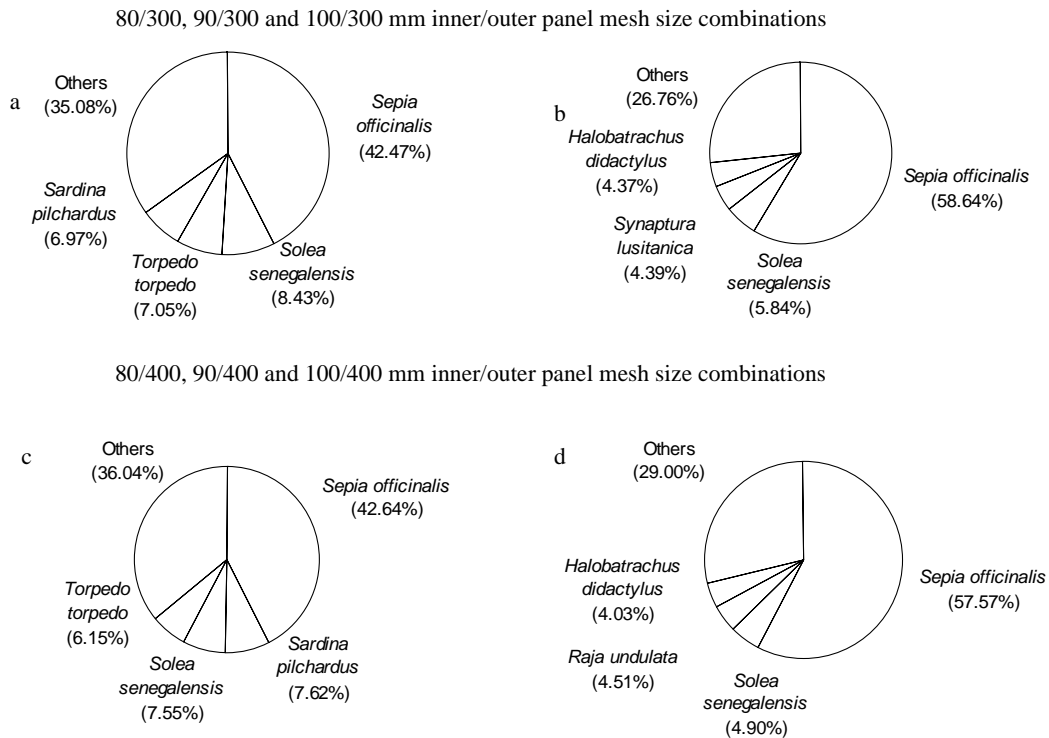


**Figure 3.2.1.3.1. Gulf of Cádiz. Overall catch species composition of all inner/outer panel stretched mesh size combinations of trammel nets in terms of (a) number and (b) weight.**

The relatively high proportions of specimens of discarded species, such as *Sardina pilchardus* and *Torpedo torpedo*, in abundance, and *Halobatrachus didactylus* in biomass, mask the importance of the catches of target commercial species on which this study was focused.

The species composition of the combined catches of the 80/300, 90/300 and 100/300 mm trammel nets is very similar to that of the 80/400, 90/400 and 100/400 mm trammel nets, in both abundance and biomass. In terms of abundance, *Sepia officinalis*, *Solea senegalensis*, *Torpedo torpedo* and *Sardina pilchardus* dominate the combined catch of the trammel nets with outer panels of smaller mesh size, and *Sepia officinalis*, *Sardina pilchardus*, *Solea senegalensis* and *Torpedo torpedo* dominate the catch of nets with outer panels of larger mesh size. In biomass, *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Halobatrachus didactylus* dominate in trammel nets with outer panels of 300 mm mesh,

whereas in those of 400 mm mesh size, *Raja undulata* takes the place of *Synaptura lusitanica* in the ranking of most important species (Figure 3.2.1.3.2).



**Figure 3.2.1.3.2. Gulf of Cádiz. Overall catch species composition of different inner/outer panel stretched mesh size combinations of nets in terms of number (a, c) and weight (b, d).**

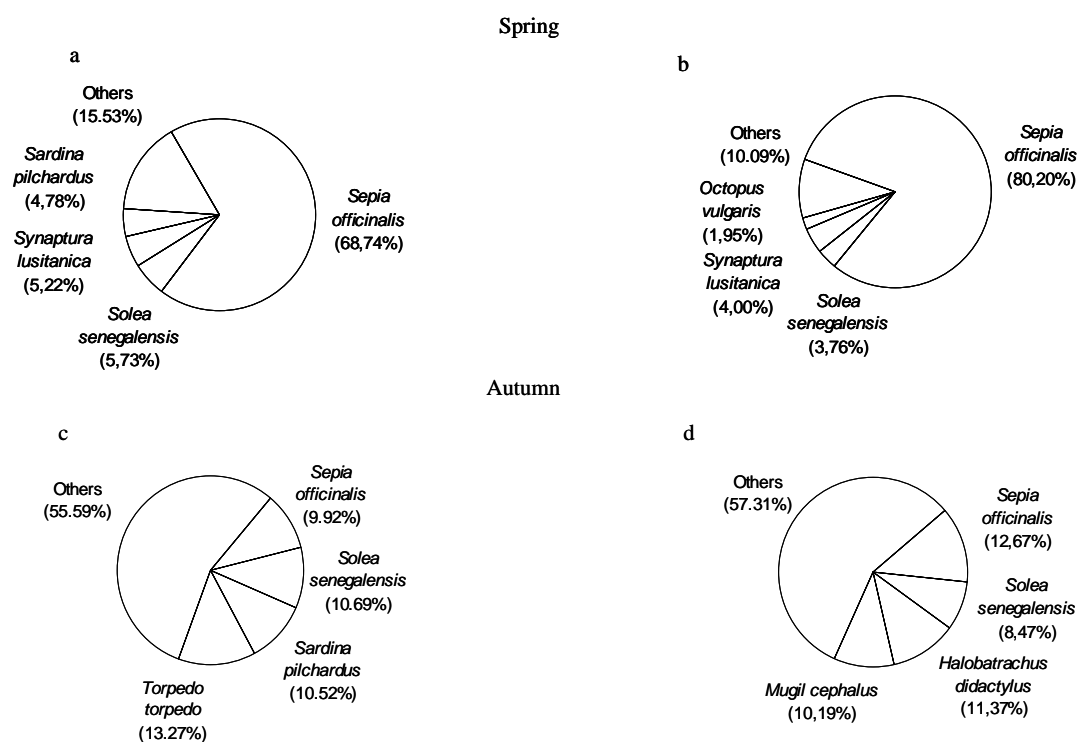
The species composition varies between seasons of the year. In the spring, *Sepia officinalis* was clearly the most important species in the total catch, with 68.74 % in abundance and 80.20% in weight. Much less significant but coming second in the ranking of species in the spring catch are *Solea senegalensis* (with 5.73 % and 3.76 %, respectively, in abundance and weight), *Synaptura lusitanica* (5.22 % and 4.00 %), followed by *Sardina pilchardus* in abundance (4.78 %) and *Octopus vulgaris* in biomass (1.95 %). The “others” group in which the rest of the species are included, accounts for 15.53 % in abundance and 10.09 % in biomass, in the spring fishing campaign.

An alternation of predominant group in the total catch is observed in the autumn. In this season, the group accounting for the largest proportion of the total catch is that of the fish species (58.54% in abundance and 64.41% in biomass). The most important single species

caught was *Solea senegalensis*, with 10.69 % in abundance and representing 8.47% of the total biomass. *Sepia officinalis* still figures as another of the more important species, accounting for 9.92 % of total abundance and 12.67 % of total biomass. Elasmobranchs also accounted for an increased proportion of the total catch in autumn, reaching 24.68% and 23.59% in terms of numbers and weight, respectively (Figure 3.2.1.3.3).

The discarded species also show changes in relative abundance and biomass from one season to the other. Whereas in spring only *Sardina pilchardus* (4.78% in abundance) was significant, in autumn *Sardina pilchardus* (10.52%) and *Torpedo torpedo* (13.27%) were more significant in abundance, and another two species, *Halobatrachus didactylus* (11.37%) and *Mugil cephalus* (10.19%), accounted for considerable proportions of total biomass (Figure 3.2.1.3.3).

The comparison between seasons of the total catch shows spring to be notably more productive than autumn, with 52% more in terms of total weight of catch and 20% more in numbers caught.



**Figure 3.2.1.3.3. Gulf of Cádiz. Overall seasonal species catch composition for all inner / outer stretched mesh sizes combinations of trammel nets in terms of number (a, c) and weight (b, d).**

The species composition of the catch by type of net does not show much variation between types. *Sepia officinalis* was the most abundant species caught using all net types,

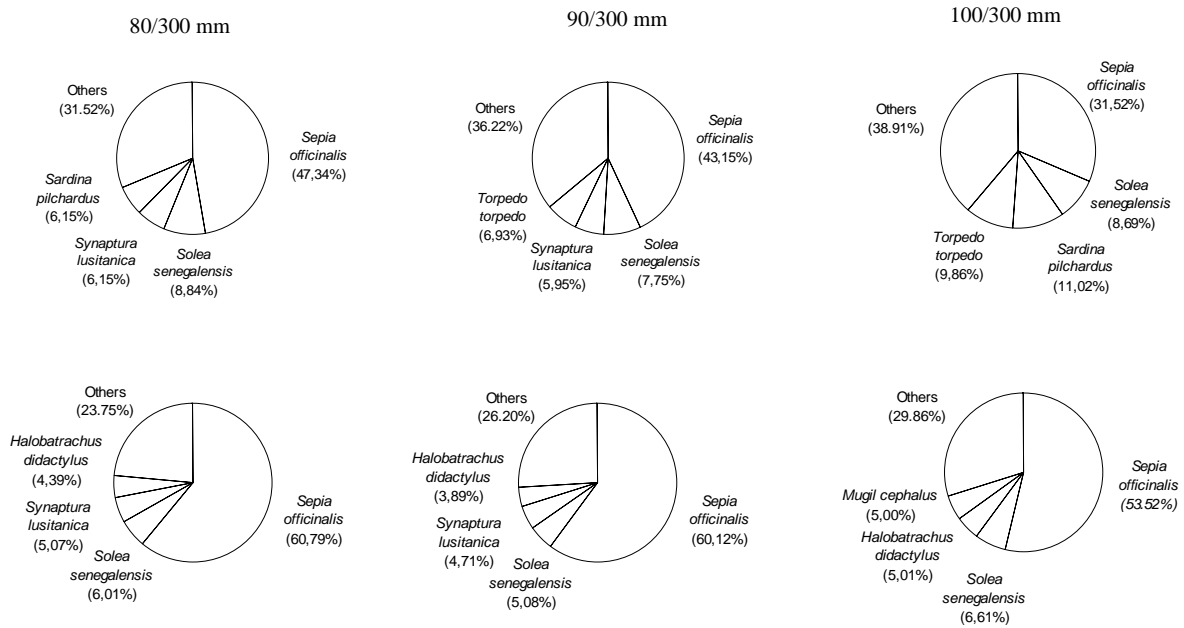
with values between 24% and 51% in abundance and between 41% and 62% in biomass (Figures 3.2.1.3.4 and 3.2.1.3.5). In terms of relative abundance, for the net combinations of 80/300, 80/400, 90/300 and 90/400, *Solea senegalensis* was the second most important species caught, with its proportion by number ranging from 7% to 9%, followed by *Synaptura lusitanica*, *Sardina pilchardus* and *Torpedo torpedo*. In the net combinations of 100/300 and 100/400, *Sardina pilchardus*, with 11.02% and 13.64%, respectively, and *Torpedo torpedo*, with 9.86% and 9.85%, ranked second and third in relative importance, but were all significantly less abundant than *Sepia officinalis* (Figures 3.2.1.3.4 and 3.2.1.3.5).

In terms of biomass, in the net combinations of 80/300, 90/300, 100/300, 80/400 and 90/400, the next most important species caught, after *Sepia officinalis*, are: *Solea senegalensis* (6.01%, 5.08%, 6.61%, 4.29% and 4.74% respectively by net type), then *Synaptura lusitanica* and *Halobatrachus didactylus*; with these latter two species alternating between third and fourth place in the ranking except for net type 90/400 where *Halobatrachus didactylus* appears in second place with 5.14% of total biomass.

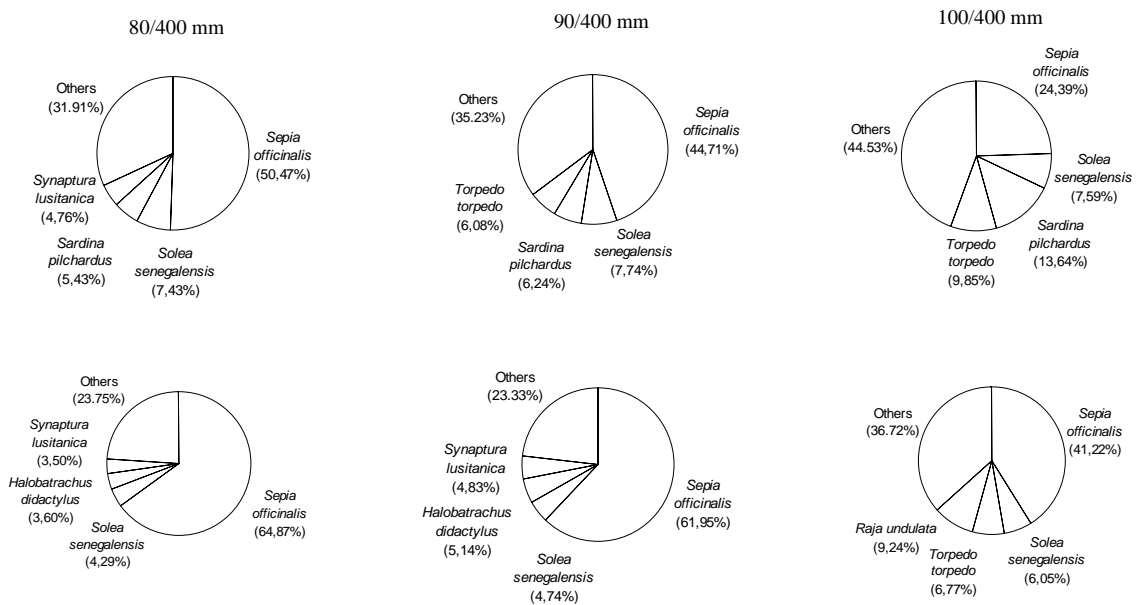
In the nets with inner panels of 100 mm mesh size, the discarded species are again seen to be more significant. In the 100/400 combination, *Raja undulata* (9.24%) and *Torpedo torpedo* (6.77%) were ranked second and third in biomass, and in the 100/300 combination, *Mugil cephalus* (5%) and *Halobatrachus didactylus* (5.01%) were relatively important (Figures 3.2.1.3.4 and 3.2.1.3.5).

Adding together the proportions accounted for by all the discarded species caught using nets with inner panel mesh size of 100 mm, it can be seen that, in terms of total abundance, discards represent between 20% and 20.5%, and, in total biomass, between 10% and 16%. The comparative proportions of discards for the other net combinations are less than 13% of total abundance and less than 6% of total biomass caught (Figures 3.2.1.3.4 and 3.2.1.3.5).

The 80/400 mm trammel net produced the largest catches, both in terms of abundance (between 25% and 30% of the total) and biomass (between 22% and 28%). In contrast, the 100/300 mm net contributed the smallest proportion of total catches, both in terms of abundance (9.4%) and biomass (12.4%) (Figures 3.2.1.3.4 and 3.2.1.3.5).



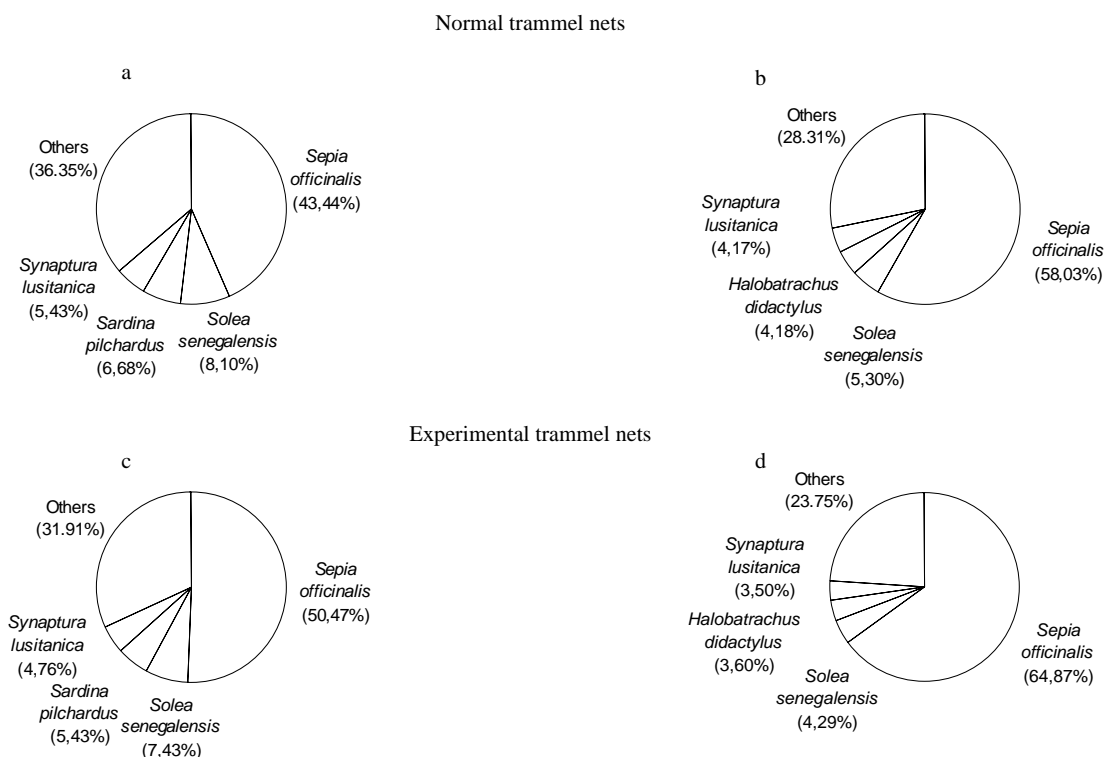
**Figure 3.2.1.3.4. Gulf of Cádiz. Overall catch species composition of different inner/outer panel stretched mesh size combinations of trammel nets in terms of number (upper) and weight (lower).**



**Figure 3.2.1.3.5. Gulf of Cádiz. Overall catch species composition of different inner/outer panel stretched mesh size combinations of trammel nets in terms of number (upper) and weight (lower).**

The species composition of the catch obtained using the 80/400 mm net, considered as

the type normally employed by the fishermen of the zone, is identical to that of the total catch obtained using nets of all combinations, for both numbers and biomass (Figure 3.2.1.3.6).



**Figure 3.3.1.3.6. Gulf of Cádiz. Overall catch species composition of normal, total catches, and experimental trammel nets (80/400 mm) in terms of number (a, c) and weight (b, d).**

The seasonal catch rates, in terms of abundance and biomass per 1000 m. length of net, for the various combinations of mesh size of inner and outer panels and for the 4 species studied that accounted for most of the total catch: *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*, are presented in Tables 3.2.1.3.8 and 3.2.1.3.9, for abundance and biomass respectively.

The highest catch rate in abundance for *Sepia officinalis* was 66.28 specimens/1000 m using the 80/400 net, in spring; that for *Solea senegalensis* was 7.86 specimens/1000 m using the 80/400 net, in autumn; that for *Synaptura lusitanica* was 3.77 specimens/1000 m using the 80/400 net in autumn; and that for *Torpedo torpedo* was 5.85 specimens/1000 m using the 100/400 net in autumn (Table 3.2.1.3.8).

**Table 3.2.1.3.8. Gulf of Cádiz. Catch rate (number per 1000 m of net) for the most abundant species by season and inner/outer panel mesh size combinations of trammel nets.**

Trammel type	Season					
	Spring		Autumn		Average	s.d.
<i>Sepia officinalis</i>	N	s.d.	N	s.d.	Average	s.d.
80/300	42.49	23.33	5.16	4.50	23.82	26.40
90/300	30.11	15.20	4.00	5.56	17.05	18.46
100/300	14.51	13.82	1.16	1.73	7.83	9.44
80/400	66.28	35.16	7.41	6.42	36.84	41.63
90/400	32.49	27.80	4.29	7.23	18.39	19.94
100/400	36.18	13.77	1.36	2.30	8.77	10.48
Average	33.67		3.90		18.78	
<i>Solea senegalensis</i>	N	s.d.	N	s.d.	Average	s.d.
80/300	3.48	2.80	5.42	7.46	4.45	1.37
90/300	2.45	2.21	3.68	5.21	3.06	0.87
100/300	2.26	2.44	2.06	2.68	2.16	0.14
80/400	2.99	2.70	7.86	9.21	5.43	3.45
90/400	3.05	3.57	3.31	4.91	3.18	0.18
100/400	2.60	3.25	2.86	3.46	2.73	0.18
Average	2.81		4.20		3.50	
<i>Synaptura lusitanica</i>	N	s.d.	N	s.d.	Average	s.d.
80/300	3.03	3.36	3.16	3.19	3.09	0.09
90/300	2.77	3.79	1.93	2.16	2.35	0.59
100/300	1.23	1.56	0.64	1.17	0.93	0.41
80/400	3.18	3.81	3.77	3.07	3.48	0.41
90/400	2.99	4.31	1.95	1.85	2.47	0.74
100/400	2.14	3.25	1.36	2.06	1.75	0.55
Average	2.56		2.14		2.35	
<i>Torpedo torpedo</i>	N	s.d.	N	s.d.	Average	s.d.
80/300	0.39	1.07	5.42	7.88	2.90	3.56
90/300	0.32	0.73	5.16	7.04	2.74	3.42
100/300	0.52	1.07	4.38	6.14	2.45	2.74
80/400	0.58	1.16	5.78	7.62	3.18	3.68
90/400	0.32	0.74	4.68	7.05	2.50	3.08
100/400	1.23	2.37	5.85	8.57	3.54	3.26
Average	0.56		5.21		2.89	

The highest catch rate in biomass for *Sepia officinalis* was 28.7 kg/1000 m, also using the 80/400 net in spring; that for *Solea senegalensis* was 1.3 kg/1000 m, also using the 80/400 in autumn; that for *Synaptura lusitanica* was 9.2 kg/1000 m, but using the 80/300 in spring; while that for *Torpedo torpedo* was 1.3 kg/1000 m, also using the 100/400 net in autumn (Table 3.2.1.3.9).

**Table 3.2.1.3.9. Gulf of Cádiz. Catch rate (weight, in g. per 1000 m of net) for the most abundant species by season and inner/outer panel mesh size combinations of trammel nets.**

Trammel type	Season					
	Spring		Autumn		Average	s.d.
	W	s.d.	W	s.d.		
<i>Sepia officinalis</i>						
80/300	16871.63	10484.02	1556.87	1418.03	9214.25	10829.17
90/300	15506.13	9306.74	1407.03	1855.94	8456.58	9969.57
100/300	10585.69	11748.49	626.05	983.12	5605.87	7042.53
80/400	28714.81	19045.59	2082.39	1958.95	15398.60	18831.97
90/400	15887.91	17562.87	1360.56	2042.26	8624.24	10272.39
100/400	11228.20	11292.30	590.77	1072.12	5909.49	7521.80
Average	16465.73		1270.61		8868.17	
<i>Solea senegalensis</i>						
80/300	927.27	864.74	893.75	1343.74	910.51	23.71
90/300	647.84	643.42	780.27	1134.36	714.06	93.64
100/300	781.82	956.90	602.19	768.77	692.01	127.01
80/400	689.21	696.97	1346.78	1544.67	1018.00	464.97
90/400	682.85	855.13	637.04	936.57	659.94	32.39
100/400	898.96	1174.75	836.32	992.22	867.64	44.29
Average	771.33		849.39		810.36	
<i>Synaptura lusitanica</i>						
80/300	925.34	1144.86	610.77	683.95	768.05	222.44
90/300	877.89	1220.40	446.74	555.65	662.31	304.86
100/300	531.79	660.33	96.71	180.60	314.25	307.64
80/400	902.79	1000.51	757.18	608.45	829.99	102.96
90/400	908.32	1296.43	437.88	466.75	673.10	332.65
100/400	781.81	1119.29	377.39	539.14	579.60	285.97
Average	821.32		454.45		637.88	
<i>Torpedo torpedo</i>						
80/300	34.56	101.00	574.85	877.41	304.71	382.05
90/300	100.84	311.93	688.14	956.73	394.49	415.28
100/300	146.87	307.23	804.96	1113.73	475.92	465.34
80/400	181.03	594.33	843.14	1059.05	512.09	468.19
90/400	120.79	405.88	778.75	1289.57	449.77	465.25
100/400	548.28	1531.99	1393.70	2485.02	970.99	597.80
Average	188.73		847.26		517.99	

In the spring, *Sepia officinalis* had the highest catch rates, in terms of numbers, of all the species caught (ranging from 14.51 specimens with the 100/300 net, to 66.28 in the 80/400 net). The catch rates of *Solea senegalensis* were highest in autumn, with a maximum value, in this season, of 7.86 specimens with the 80/400 net; the mean values ranging between 2.16

specimens using the 100/300 net, to 5.43 using the 80/400 combination. *Synaptura lusitanica* had a mean catch rate value that was slightly higher in the spring than in the autumn; the mean values range from 0.93 specimens with the 100/300 net, to 3.48 with the 80/400 combination.

In general terms, it was observed that the catch rates in abundance for the 3 target species accounting for the highest proportions of the total catch (*Sepia officinalis*, *Solea senegalensis* and *Synaptura lusitanica*) tended to decrease as the mesh size of the inner panel increased. This tendency is also seen for the two mesh sizes of outer panel used, 300 and 400 mm, although it is seen that the values are slightly less in the nets with outer panels of 300 mm mesh size than in those of 400 mm mesh. Normally, the higher values correspond to nets with inner panels of smaller mesh size, and in particular, to the 80/400 mm combination, and the lower values correspond to nets with inner panels of larger mesh size, with the lowest values always being obtained with the 100/300 mm combination (Table 3.2.1.3.8).

In terms of biomass, the trends described for abundance are very similar, for both *Sepia officinalis* and *Synaptura lusitanica*. However, for *Solea senegalensis*, it was found that the pattern was different, with the catch rates using nets with the inner panel mesh of 100 mm showing increases over the rest of the net combinations. In the spring, the value for the 100/400 net was greater than that for the 90/400 net, and greater even than that for the 80/400 net; while the catch rate with the 100/300 net was greater than that with the 90/300 net. In autumn, the 100/400 mm net had a higher value than that of the 90/400 mm combination. This difference could be explained by the increases of TL and mean W obtained with increased mesh sizes of inner panels; fewer specimens are caught but these are considerably larger and heavier, hence the values of catch rate by weight are higher.

The values corresponding to *Torpedo torpedo* are differentiated from the general behaviour with regards net types already described, in terms of both abundance and biomass. With regards abundance, according to the mean values, this species conforms to the tendency of catch rates using the group of nets with outer panels of 300 mm mesh size, but not to those using an outer panel mesh of 400 mm. In this latter group of nets, the highest values of catch rate are for the 100/400 mm combination, both in spring and in autumn (1.23 and 5.85 specimens, respectively). In terms of biomass, for the nets with outer panels of 300 mm mesh size, it was observed that the tendency was for higher catch rates to be obtained with inner panels of larger mesh size. This tendency changes in both seasons for the group of nets with outer panels of 400 mm mesh size, particularly the 80/400 net. The catches are higher in autumn than in spring, and in all combinations of net, the rates are fairly similar, in comparison with the catch rates of the other three species.

This observation is supported by the results obtained from studying the species composition of the catches obtained using the different net combinations (see preceding section). The percentage of the total catch accounted for by discarded species using the net combinations with outer panels of 100 mm mesh size is higher than with the rest of the combinations; and *Torpedo torpedo* is very significant among the group of discarded species.

Table 3.2.1.3.10 shows the number of species caught, together with the different indices of diversity, for the different net combinations of inner and outer mesh sizes, and for the two seasons of the year. In general, the lowest number of species (26) was caught using the trammel net of 90/300 mm mesh sizes, in spring, whereas the highest number of species (36) was caught using the net 80/400 mm in autumn.

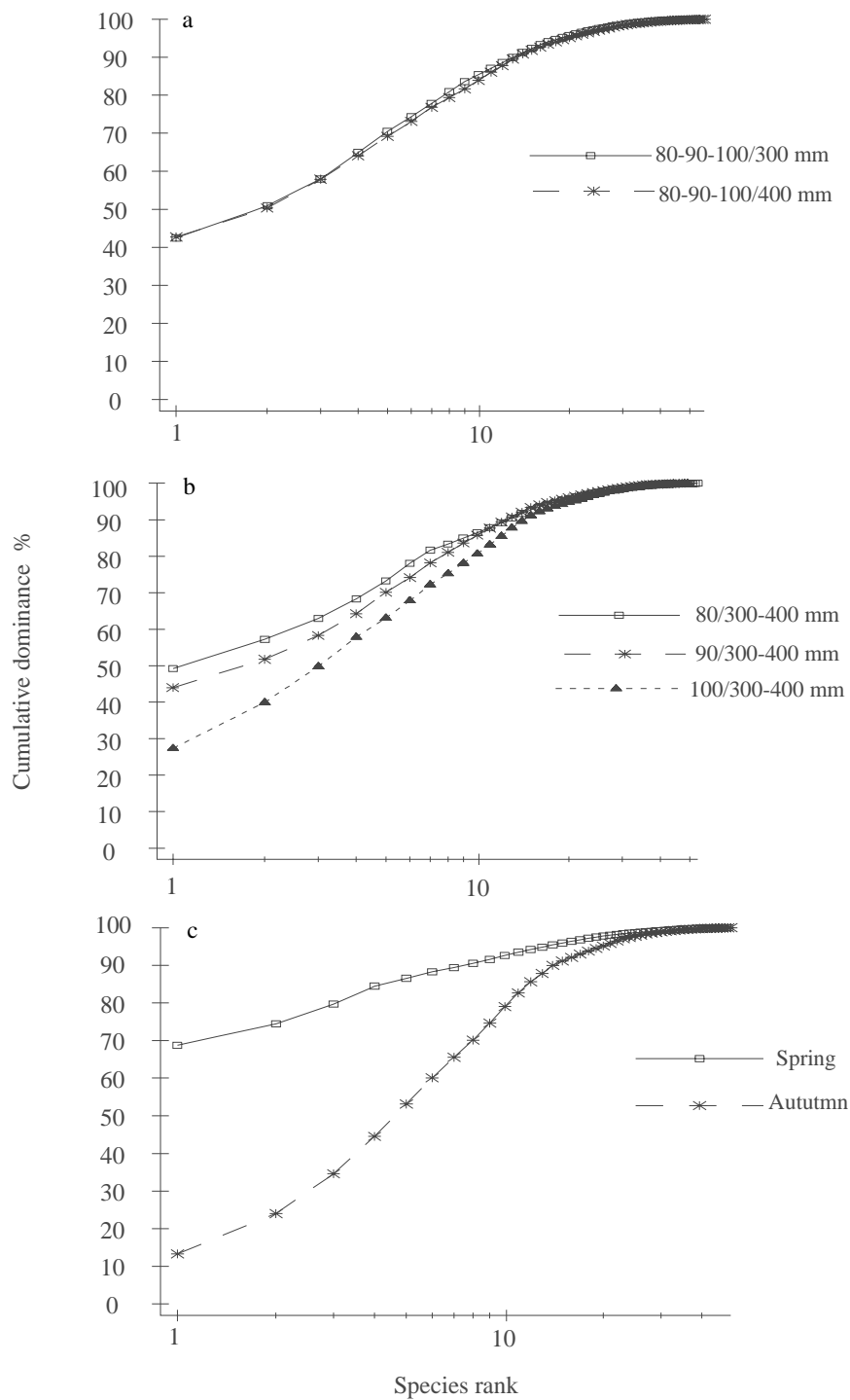
On comparing the different results for the various mesh sizes of outer panels, the t-test did not reveal significant differences in the mean of the numbers of species and of specimens, the mean richness, the mean uniformity nor in the mean diversity of Shannon-Wiener, between the two sizes used (in all the cases:  $|t| < 0.66$ ,  $p > 0.26$ ). When the results of the different mesh sizes of the inner panels were compared, utilising the one-way ANOVA, the findings were similar. In fact, the only significant differences found were in the number of specimens ( $F = 7.62$ ,  $p = 0.01$ ), the other variables being equal for the three mesh sizes of inner panel used (for these cases:  $F < 2.6$ ,  $p > 0.12$ ). In terms of the number of specimens caught, the mesh size of inner panel giving the highest mean value (61.3) was the 80 mm size.

However, on comparing the results of the two fishing seasons with a t-test, significant differences appeared in the mean number of species, mean richness, mean uniformity and mean diversity of Shannon-Wiener (for all these cases:  $|t| > 2.98$ ,  $p < 0.015$ ), with only the mean number of specimens caught being considered similar ( $t = 0.97$ ,  $p = 0.35$ ) in both seasons.

The dominance of the combined catch using the trammel nets of 80/300, 90/300 and 100/300 mm showed no difference from that of the nets of 80/400, 90/400 and 100/400 mm (Figure 3.2.1.3.7a). In terms of mesh sizes of inner panel, the k-dominance curves showed that the dominance is different, being more pronounced in the 80 mm mesh size and becoming more uniform with increasing mesh sizes (Figure 3.2.1.3.7b). The difference in dominance is more evident when the season of sampling is considered, being more pronounced in spring and less in autumn (Figure 3.2.1.3.7c).

**Table 3.2.1.3.10. Gulf of Cádiz. Total number of species (S), total number of individuals (N, mean seasonal catch numbers per 1000m of net), total richness (D), diversity (H') and evenness (J) for each season (Season) per different inner/outer panel stretched (in mm) mesh size combinations of trammel nets.**

<b>Inner/outer</b>	<b>Season</b>	<b>S</b>	<b>N</b>	<b>D</b>	<b>J</b>	<b>H'</b>
80/300	Spring	34	57.8	22.4	0.4	1.3
90/300	Spring	26	41.7	18.7	0.4	1.3
100/300	Spring	28	24.5	24.5	0.5	1.7
80/400	Spring	34	86.1	20.0	0.3	1.2
90/400	Spring	27	47.5	18.7	0.4	1.4
100/400	Spring	30	35.0	23.1	0.6	2.2
80/300	Autumn	35	42.9	25.3	0.8	2.8
90/300	Autumn	34	37.3	25.7	0.8	2.9
100/300	Autumn	33	25.2	28.7	0.8	2.7
80/400	Autumn	36	58.7	23.6	0.8	2.8
90/400	Autumn	33	34.1	25.7	0.8	2.8
100/400	Autumn	35	36.4	26.7	0.8	2.8
<b>Min</b>		26	24.5	18.7	0.3	1.2
<b>Max</b>		36	86.1	28.7	0.8	2.9
<b>Mean</b>		32	43.9	23.6	0.6	2.2



**Figure 3.2.1.3.7. Gulf of Cádiz. K-dominance curves based on catch numbers (per 1000 m of net) for all species caught for six combinations of inner/outer panel stretched mesh sizes (in mm): (a) and (b) for all seasons combined and (c) by season.**

#### **3.2.1.4. Cyclades**

The numbers and weight of the individuals caught per 750 m of different inner/outer panel mesh size combinations of trammel nets as well as the mean length and mean weight of the individuals caught for each sampling season are presented in Tables 3.2.1.4.1 to 3.2.1.4.20. Overall, 9619 specimens were caught weighing 971 kg (Tables 3.2.1.4.1 to 3.2.1.4.20), belonging to 79 species (72 fish species, 3 crustacean species and 4 cephalopod species: Table 3.2.1.4.21).

Table 3.2.1.4.16. Number of specimens (N), mean weight (W, in g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during all trials, autumn 1999, Cyclades (8 trials, 750m / mesh size). (To be concluded).

Of the total 79 species caught, 68 species were caught by the trammel nets with the smaller outer panel meshes and 69 with those mounting the larger outer meshes whereas 58 species were caught by both sets of trammel nets (Table 3.2.1.4.21). Fishes made up the major part of the catch (all inner/outer panel mesh size combinations, all seasons combined; numerically: fishes 97.5%, cephalopods 2.2%, crustaceans 0.3%; by weight: fishes 91.3%, cephalopods 7.5%, crustaceans 1.2%) (Tables 3.2.1.4.1 to 3.2.1.4.20).

**Table 3.2.1.4.1. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Autumn 1999 trials (8 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220				48/240				56/280			
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.	
<i>Mullus surmuletus</i>	MULLIDAE	138	17.2	2.57	73	21.2	2.49	29	25.0	2.54	240	30.26	
<i>Diplodus annularis</i>	SPARIDAE	40	11.5	1.19	20	12.8	0.94	13	14.4	1.06	73	9.21	
<i>Diplodus vulgaris</i>	SPARIDAE	2	15.4	5.80	3	17.5	5.00	64	20.1	3.07	69	8.70	
<i>Serranus cabrilla</i>	SERRANIDAE	46	16.0	1.02	4	19.8	1.97	1	28.8		50	6.31	
<i>Trachurus mediterraneus</i>	CARANGIDAE	34	24.1	1.47	3	25.7	2.53	12	19.2	4.16	38	4.79	
<i>Boops boops</i>	SPARIDAE	13	18.0	1.81	8	19.7	2.64	9	17.8	2.49	28	3.53	
<i>Scorpaena porcus</i>	SCORPAENIDAE	4	14.5	5.14	15	15.8	3.29	3	19.3	2.14	28	3.53	
<i>Pagellus erythrinus</i>	SPARIDAE	14	17.3	2.70	11	18.7	4.03	14	18.6	2.77	25	3.15	
<i>Spicara maena</i>	CENTRACANTHIDAE	9	16.2	2.35	2	19.4	0.25	14	17.6	1.42	19	2.40	
<i>Spondyliosoma cantharus</i>	SPARIDAE	4	15.3	1.68	5	14.1	0.48	14	17.6	1.42	19	2.40	
<i>Symphodus tinca</i>	LABRIDAE	4	15.3	1.68	9	17.2	1.35	5	19.9	2.02	18	2.27	
<i>Symphodus tinca</i>	LABRIDAE	15	23.7	0.96	1	27.5		8			16	2.02	
<i>Sepia officinalis</i>	SEPIIDAE	2			5			2	24.4	3.25	15	1.89	
<i>Sparisoma cretense</i>	SPARIDAE	11	12.4	0.60	12	16.0	0.44	13	15.5		13	1.64	
<i>Sarpa salpa</i>	SPARIDAE	5			5			2			13	1.64	
<i>Octopus vulgaris</i>	OCTOPODIDAE	5			8	60.4	3.42	4	59.4	0.94	12	1.51	
<i>Galeorhinus galeus</i>	TRIAKIDAE	2	21.0	0.28	4	18.2	2.05	5	26.8	2.05	11	1.39	
<i>Dentex dentex</i>	SPARIDAE	3	16.3	2.00	4	16.6	1.10	3	17.8	0.70	10	1.26	
<i>Xyrichtys novacula</i>	LABRIDAE	8	24.8	1.27	2	14.1	0.14	1	29.1		8	1.01	
<i>Scomber japonicus</i>	SCOMBRIDAE	4	16.3	3.59	3	18.0	3.44	3	20.4	4.90	6	0.76	
<i>Pagrus pagrus</i>	SPARIDAE	2	15.6	0.57	1	17.2		2	21.0	2.33	5	0.63	
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	1	22.6		2	19.8	0.92	2	23.7	0.85	5	0.63	
<i>Serranus scriba</i>	SERRANIDAE	3	25.9	3.21	1	27.6		2	17.8	3.96	4	0.50	
<i>Labrus viridis</i>	LABRIDAE	3	25.9	3.21	2	17.8		2	21.1	8.77	4	0.50	
<i>Synodus saurus</i>	SYNODONTIDAE	3	16.6	2.46	2	46.8	2.19	1	22.1		4	0.50	
<i>Oblada melanura</i>	SPARIDAE	3	16.6	2.46	2	46.8	2.19	1	22.1		4	0.50	
<i>Lithognathus mormyrus</i>	SPARIDAE	2	46.8	2.19	1	47.2		1	47.2		3	0.38	
<i>Raja radula</i>	RAJIDAE	2	46.8	2.19	1	47.2		1	47.2		3	0.38	

(To be concluded in next page)

Table 3.2.1.4.1. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/220				48/240				56/280				Total	% N
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Phycis phycis</i>	PHYCIDAE					1	26.6			2	31.9	3.39	3	0.38	
<i>Microchirus ocellatus</i>	SOLEIDAE					3	12.9	0.76					3	0.38	
<i>Loligo vulgaris</i>	LOLIGINIDAE					3							3	0.38	
<i>Bothus podas</i>	BOTHIDAE									1	12.7		3	0.38	
<i>Pagellus acarne</i>	SPARIDAE	2	13.4	1.77		1	13.4			1	19.2		2	0.25	
<i>Chromis chromis</i>	POMACENTRIDAE	2	12.2	0.21									2	0.25	
<i>Auxis rochei</i>	SCOMBRIDAE	2	37.6	0.78									2	0.25	
<i>Zeus faber</i>	ZEIDAE					1	21.6						1	0.13	
<i>Trachinus arianeus</i>	TRACHINIDAE					1	24.6						1	0.13	
<i>Torpedo marmorata</i>	TORPEDINIDAE					1	20.8						1	0.13	
<i>Symphodus mediterraneus</i>	LABRIDAE	1	9.8										1	0.13	
<i>Coris julis</i>	LABRIDAE					1	18.9						1	0.13	
<i>Chelidonicichthys lastoviza</i>	TRIGLIDAE									1	21.1		1	0.13	
<b>Total</b>		372				215				206			793	100.00	

**Table 3.2.1.4.2. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Winter 2000 trials (7 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)						Total	% N			
		40/220		48/240		56/280						
		n	TL (cm)	s.d.	n	TL (cm)	s.d.			n	TL (cm)	s.d.
<i>Mullus surmuletus</i>	MULLIDAE	74	18.4	2.55	34	21.4	4.58	8	20.9	3.77	116	21.76
<i>Spicara maena</i>	CENTRACANTHIDAE	25	16.7	1.14	54	17.9	1.25	5	18.8	2.64	84	15.76
<i>Diplodus annularis</i>	SPARIDAE	10	11.7	0.81	38	13.0	1.21	15	15.2	1.39	63	11.82
<i>Scorpaena porcus</i>	SCORPAENIDAE	15	13.5	3.09	25	15.3	3.27	5	20.2	2.78	45	8.44
<i>Serranus cabrilla</i>	SERRANIDAE	29	17.1	1.22	1	17.4		1	18.1		31	5.82
<i>Sepia officinalis</i>	SEPIIDAE	4			11			11			26	4.88
<i>Symphodus tinca</i>	LABRIDAE	2	17.3	2.48	19	18.4	3.97	2	19.1	1.77	23	4.32
<i>Mullus barbatus</i>	MULLIDAE	21	17.8	1.01							21	3.94
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	27.8		14	23.8	0.82	1	33.3		16	3.00
<i>Boops boops</i>	SPARIDAE	12	21.6	3.21	1	22.0		2	24.3	0.21	15	2.81
<i>Pagellus erythrinus</i>	SPARIDAE	4	16.9	1.72	6	18.5	1.91	1	19.6		11	2.06
<i>Pagellus acarne</i>	SPARIDAE	10	15.6	1.01							10	1.88
<i>Diplodus vulgaris</i>	SPARIDAE	3	11.8	2.08	2	14.3	2.76	2	17.9	1.56	7	1.31
<i>Dentex dentex</i>	SPARIDAE	4	28.4	2.17	7	27.9	2.09	1	30.7		7	1.31
<i>Synodus saurus</i>	SYNODONTIDAE	4	28.4	2.17	1	31.1		1			6	1.13
<i>Octopus vulgaris</i>	OCTOPODIDAE	3			2			1			6	1.13
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	2	15.1	1.34				3	29.2	7.62	5	0.94
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	2	17.9	5.30	3	18.4	0.80				5	0.94
<i>Spondyliosoma cantharus</i>	SPARIDAE	2	13.9	1.19	3	13.9	1.19	1	16.3		4	0.75
<i>Serranus scriba</i>	SERRANIDAE	2	16.6	0.64	2	19.1	0.64				4	0.75
<i>Loligo vulgaris</i>	LOLIGINIDAE							3			3	0.56
<i>Zeus faber</i>	ZEIDAE							2	33.2	5.52	2	0.38
<i>Xyrichtys novacula</i>	LABRIDAE	2	15.8	1.84							2	0.38
<i>Labrus viridis</i>	LABRIDAE				1	18.6					2	0.38
<i>Labrus merula</i>	LABRIDAE	1	25.3								2	0.38
<i>Diplodus puntazzo</i>	SPARIDAE							2	27.5	0.85	2	0.38
<i>Conger conger</i>	CONGRIDAE				1	84.3					2	0.38
<i>Trachinus draco</i>	TRACHINIDAE							1	16.1		1	0.19

(To be concluded in next page)

Table 3.2.1.4.2. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220			48/240			56/280			Total	% N	
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.			
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	15.1		1	27.6		1	27.6		1	0.19	
<i>Symphodus mediterraneus</i>	LABRIDAE				1	38.9					1	0.19	
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE				1	30.9					1	0.19	
<i>Scomber japonicus</i>	SCOMBRIDAE				1	51.3					1	0.19	
<i>Raja radula</i>	RAJIDAE				1	23.5					1	0.19	
<i>Peristedion cataphractum</i>	PERISTEDIIDAE				1	16.6					1	0.19	
<i>Pagrus pagrus</i>	SPARIDAE				1	21.6					1	0.19	
<i>Lithognathus mormyrus</i>	SPARIDAE				1	17.1					1	0.19	
<i>Coris julis</i>	LABRIDAE				1	31.4					1	0.19	
<i>Caranx rhonchus</i>	CARANGIDAE				1	11.6					1	0.19	
<i>Bothus podas</i>	BOTHIDAE				1	47.8					1	0.19	
<i>Auxis rochei</i>	SCOMBRIDAE				1	47.8					1	0.19	
<b>Total</b>		230			227			76			533	100.00	

**Table 3.2.1.4.3. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Spring 2000 trials (11 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/220				48/240				56/280					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Spicara maena</i>	CENTRACANTHIDAE	50	16.0	1.49	60	17.6	1.65	28	20.0	3.10	138	10.63			
<i>Mullus surmuletus</i>	MULLIDAE	71	19.0	3.23	43	21.0	3.56	20	22.5	2.57	134	10.32			
<i>Mullus barbatus</i>	MULLIDAE	45	18.0	1.42	77	18.7	1.49	11	16.3	1.81	133	10.25			
<i>Diplodus annularis</i>	SPARIDAE	35	11.4	1.14	51	12.9	0.93	42	15.1	1.48	128	9.86			
<i>Serranus cabrilla</i>	SERRANIDAE	74	16.2	1.14	40	18.2	0.95	10	18.9	0.71	124	9.55			
<i>Pagellus erythrinus</i>	SPARIDAE	37	16.9	2.44	34	18.9	3.50	52	19.9	1.87	123	9.48			
<i>Scorpaena porcus</i>	SCORPAENIDAE	30	18.6	8.80	31	16.6	5.19	34	18.7	5.47	95	7.32			
<i>Pagellus acarne</i>	SPARIDAE	36	15.8	1.15	17	17.8	0.65	8	17.7	2.26	61	4.70			
<i>Trachurus mediterraneus</i>	CARANGIDAE	26	23.5	1.68	24	23.0	1.57	9	24.1	2.56	59	4.55			
<i>Boops boops</i>	SPARIDAE	46	19.0	1.27	7	18.7	2.56	4	14.8	1.27	57	4.39			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	12	24.2	1.89	33	26.9	4.33	6	29.6	4.92	51	3.93			
<i>Synodus saurus</i>	SYNODONTIDAE	16	26.3	3.59	5	27.4	6.26				21	1.62			
<i>Trachinus draco</i>	TRACHINIDAE	8	19.6	3.93	9	24.3	2.32				17	1.31			
<i>Sardinella aurita</i>	CLUPEIDAE	14	20.0	1.62	3	24.1	0.42				17	1.31			
<i>Serranus scriba</i>	SERRANIDAE	14	17.0	2.04	1	21.4					15	1.16			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	3	15.4	3.61	9	19.6	3.76				12	0.92			
<i>Chromis chromis</i>	POMACENTRIDAE	12	11.7	0.72							12	0.92			
<i>Sparisoma cretense</i>	SCARIDAE	9	21.9	2.93				1	23.1		10	0.77			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	4	13.4	2.12	2	13.1	2.12	3	14.4	0.51	9	0.69			
<i>Symphodus tinca</i>	LABRIDAE	7	17.9	3.60	1	17.3					8	0.62			
<i>Sepia officinalis</i>	SEPIIDAE	3			2			1			6	0.46			
<i>Scomber japonicus</i>	SCOMBRIDAE	3	28.9	0.71	1	30.5		2	31.1	3.89	6	0.46			
<i>Labrus viridis</i>	LABRIDAE	2	19.9	0.78				4	27.1	1.70	6	0.46			
<i>Trachinus araneus</i>	TRACHINIDAE	4	27.1	6.16	1	26.1					5	0.39			
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE	3	31.5	1.91	2	35.7	1.20				5	0.39			
<i>Phycis phycis</i>	PHYCIDAE	4	23.7	0.58				1	25.1		5	0.39			
<i>Diplodus vulgaris</i>	SPARIDAE	2	17.5	0.42				3	18.3	1.90	5	0.39			
<i>Lithognathus mormyrus</i>	SPARIDAE	4	14.6	0.78							4	0.31			

(To be concluded in next page)

Table 3.2.1.4.3. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220			48/240			56/280			Total	% N	
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.			
<i>Bothus podas</i>	BOTHIDAE	2	12.8	3.04	2	16.7	1.84	2	40.4	4.03	4	0.31	
<i>Raja radula</i>	RAJIDAE	1	33.1								3	0.23	
<i>Octopus vulgaris</i>	OCTOPODIDAE	3									3	0.23	
<i>Monochirus hispidus</i>	SOLEIDAE				3	14.5					3	0.23	
<i>Zeus faber</i>	ZEIDAE				1	13.6		1	22.1		2	0.15	
<i>Xyrichthys novacula</i>	LABRIDAE	1	13.8		1	17.0					2	0.15	
<i>Microchirus ocellatus</i>	SOLEIDAE	1	12.1		1	12.5					2	0.15	
<i>Eledone chiosa</i>	SEPIIDAE				2						2	0.15	
<i>Citharus linguatula</i>	CITHARIDAE	2	15.9	2.76							2	0.15	
<i>Torpedo marmorata</i>	TORPEDINIDAE				1	22.1					1	0.08	
<i>Symphodus mediterraneus</i>	LABRIDAE							1	11.2		1	0.08	
<i>Scyliorhinus canicula</i>	SCYLORHINIDAE							1	38.0		1	0.08	
<i>Scorpaena scrofa</i>	SCORPAENIDAE				1	18.6					1	0.08	
<i>Sarda sarda</i>	SCOMBRIDAE				1	43.0					1	0.08	
<i>Raja clavata</i>	RAJIDAE				1	57.7					1	0.08	
<i>Platichthys flesus</i>	PLEURONECTIDAE				1	36.6					1	0.08	
<i>Parablennius gattorugine</i>	BLENNIIDAE	1	9.2								1	0.08	
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1	33.6								1	0.08	
<b>Total</b>		586			468			244			1298	100.00	

**Table 3.2.1.4.4. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Summer 2000 trials (15 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/220				48/240				56/280				Total	% N
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Pageillus erythrinus</i>	SPARIDAE	225	16.4	3.04	109	17.9	2.31	83	20.5	2.59	417	20.31			
<i>Scorpaena porcus</i>	SCORPAENIDAE	96	15.1	3.35	84	16.8	5.05	64	18.1	4.44	244	11.89			
<i>Diplodus annularis</i>	SPARIDAE	78	11.4	1.23	118	12.9	0.71	22	13.5	1.36	218	10.62			
<i>Mullus surmuletus</i>	MULLIDAE	113	18.3	1.87	47	20.3	2.06	30	21.2	2.56	190	9.25			
<i>Pageillus acarne</i>	SPARIDAE	151	16.4	2.07	13	16.4	3.00	17	12.8	2.63	181	8.82			
<i>Serranus cabrilla</i>	SERRANIDAE	107	17.0	1.19	37	19.0	1.29	8	19.3	1.69	152	7.40			
<i>Boops boops</i>	SPARIDAE	79	19.3	1.37	32	21.9	1.83	1	21.2		112	5.46			
<i>Spicara maena</i>	CENTRACANTHIDAE	32	16.2	1.36	43	18.5	1.31	21	19.5	1.90	96	4.68			
<i>Trachurus mediterraneus</i>	CARANGIDAE	22	22.4	1.55	29	23.9	1.89	8	24.9	2.30	59	2.87			
<i>Diplodus vulgaris</i>	SPARIDAE	7	17.2	2.82	24	16.9	2.68	27	19.9	2.46	58	2.83			
<i>Symphodus tinca</i>	LABRIDAE	9	15.4	0.99	23	17.7	1.65	8	20.4	1.73	40	1.95			
<i>Synodus saurus</i>	SYNODONTIDAE	22	25.9	3.20	2	29.3	0.00	2	35.3	3.47	26	1.27			
<i>Serranus scirba</i>	SERRANIDAE	3	16.2	1.67	15	17.9	1.34	8	21.0	2.45	26	1.27			
<i>Sparisoma cretense</i>	SCARIDAE	13	16.9	3.13	4	24.0	5.00	6	21.7	1.15	23	1.12			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	1	20.4		7	16.1	1.85	8	20.3	4.78	16	0.78			
<i>Sepia officinalis</i>	SEPIIDAE	4			2			9			15	0.73			
<i>Zeus faber</i>	ZEIDAE	1	16		2	14.6	4.95	11	18.8	4.00	14	0.68			
<i>Spondyllosoma cartharus</i>	SPARIDAE				14	14.2	0.58				14	0.68			
<i>Raja radula</i>	RAJIDAE				9	36.7	10.29	5	37.9	12.22	14	0.68			
<i>Octopus vulgaris</i>	OCTOPODIDAE	3			5			5			13	0.63			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	12	16.0	1.50				1	12.6		13	0.63			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	2	21.7	0.14	4	27.1	2.34	5	33.6	4.68	11	0.54			
<i>Sardinella aurita</i>	CLUPEIDAE	7	21.4	1.52	2	24.2	0.50				9	0.44			
<i>Phycis phycis</i>	PHYCIDAE	2	28.3	7.35	1	19.1		6	29.6	4.58	9	0.44			
<i>Liocarcinus depurator</i>	PORTUNIDAE				3			6			9	0.44			
<i>Trachinus dtaco</i>	TRACHINIDAE	3	19.2	0.21	4	22.6	1.67	1	17.4		8	0.39			
<i>Mullus barbatus</i>	MULLIDAE				5	20.4	1.34	2	20.0	1.20	7	0.34			
<i>Bothus podas</i>	BOTHIDAE	4	12.5	2.35				3	16.3	2.04	7	0.34			
<i>Palinurus elephas</i>	PALINURIDAE	1			3			2			6	0.29			
<i>Dentex dentex</i>	SPARIDAE				5	34.2	8.26				5	0.24			

(To be concluded in next page)

Table 3.2.1.4.4. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/220				48/240				56/280					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Pagrus pagrus</i>	SPARIDAE	2	12.5	0.71	2	18.0	6.93		2	26.1	2.97		4	0.19	
<i>Labrus viridis</i>	LABRIDAE				2	21.4	4.17						4	0.19	
<i>Trachinus araneus</i>	TRACHINIDAE	1	27.0		1	21.5			1	28.2			3	0.15	
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE				3	38.5	7.90						3	0.15	
<i>Scomber japonicus</i>	SCOMBRIDAE	2	27.1	1.84	1	26.9							3	0.15	
<i>Solea solea</i>	SOLEIDAE				1	30.8			1	23.1			2	0.10	
<i>Scorpaena scrofa</i>	SCORPAENIDAE								2	33.1	9.19		2	0.10	
<i>Sciaena umbra</i>	SCIAENIDAE				1	15.2			1	18.9			2	0.10	
<i>Nephrops norvegicus</i>	NEPHROPIDAE				2								2	0.10	
<i>Monochirus hispidus</i>	SOLEIDAE	2	14.4	0.50									2	0.10	
<i>Lithognathus mormyrus</i>	SPARIDAE	2	14.4	1.41									2	0.10	
<i>Citharus linguatula</i>	CITHARIDAE	1	15.0		1	15.1							2	0.10	
<i>Torpedo marmorata</i>	TORPEDINIDAE				1	25.3							1	0.05	
<i>Oblada melanura</i>	SPARIDAE				1	19.8							1	0.05	
<i>Microchirus ocellatus</i>	SOLEIDAE	1	10.0										1	0.05	
<i>Loligo vulgaris</i>	LOLIGINIDAE								1				1	0.05	
<i>Eledone chitosa</i>	SEPIIDAE				1								1	0.05	
<i>Dasyatis pastinaca</i>	DASYATIDAE								1	34.0			1	0.05	
<i>Dasyatis centroura</i>	DASYATIDAE	1	33.0										1	0.05	
<i>Conger conger</i>	CONGRIDAE				1	39.9							1	0.05	
<i>Auxis rochei</i>	SCOMBRIDAE								1	41.8			1	0.05	
<i>Ariosoma balearicum</i>	CONGRIDAE	1	37.1										1	0.05	
<b>Total</b>		1010			664				379				2053	100.00	

**Table 3.2.1.4.5. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during all trials, 1999-2000 (41 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/220				48/240				56/280					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	396	18.1	2.60	197	21.0	3.11	87	22.7	3.14	680	14.54			
<i>Pagellus erythrinus</i>	SPARIDAE	280	16.5	2.94	160	18.2	2.74	139	20.3	2.34	579	12.38			
<i>Diplodus annularis</i>	SPARIDAE	163	11.5	1.17	227	12.9	0.88	92	14.6	1.52	482	10.31			
<i>Scorpaena porcus</i>	SCORPAENIDAE	145	15.7	5.20	155	16.4	4.69	112	18.3	4.59	412	8.81			
<i>Serranus cabrilla</i>	SERRANIDAE	256	16.6	1.24	82	18.7	1.24	19	19.0	1.20	357	7.63			
<i>Spicara maena</i>	CENTRACANTHIDAE	116	16.2	1.47	159	18.0	1.46	68	19.4	2.68	343	7.33			
<i>Pagellus acarne</i>	SPARIDAE	197	16.2	1.91	31	17.1	2.20	26	14.5	3.46	254	5.43			
<i>Boops boops</i>	SPARIDAE	150	19.3	1.76	48	21.1	2.39	19	18.9	4.26	217	4.64			
<i>Trachurus mediterraneus</i>	CARANGIDAE	83	23.5	1.74	70	23.6	1.72	19	25.2	3.16	172	3.68			
<i>Mullus barbatus</i>	MULLIDAE	66	17.9	1.30	82	18.8	1.53	13	16.8	2.18	161	3.44			
<i>Diplodus vulgaris</i>	SPARIDAE	14	15.8	3.49	29	16.8	2.91	96	19.9	2.86	139	2.97			
<i>Symphodus tinca</i>	LABRIDAE	22	16.4	2.50	52	17.9	2.69	15	20.1	1.77	89	1.90			
<i>Sepia officinalis</i>	SEPIIDAE	13			20			29			62	1.33			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	14	23.8	1.96	37	26.9	4.14	11	31.4	5.04	62	1.33			
<i>Synodus saurus</i>	SYNODONTIDAE	45	26.3	3.30	9	28.3	4.62	3	33.7	3.59	57	1.22			
<i>Serranus scriba</i>	SERRANIDAE	21	16.7	1.80	19	18.2	1.47	10	21.0	2.30	50	1.07			
<i>Sparisoma cretense</i>	SCARIDAE	33	16.8	4.43	4	24.0	5.00	9	22.5	1.89	46	0.98			
<i>Sardinella aurita</i>	CLUPEIDAE	36	21.8	2.13	6	24.7	1.41				42	0.90			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	6	16.1	3.16	19	18.0	3.38	14	22.2	6.26	39	0.83			
<i>Spondylosoma cantharus</i>	SPARIDAE				22	14.1	0.63	15	17.5	1.41	37	0.79			
<i>Octopus vulgaris</i>	OCTOPODIDAE	14			12			8			34	0.73			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	18	15.6	2.40	5	16.3	3.14	5	15.4	3.32	28	0.60			
<i>Trachinus draco</i>	TRACHINIDAE	11	19.5	3.29	13	23.8	2.22	2	16.8	0.92	26	0.56			
<i>Dentex dentex</i>	SPARIDAE	2	21.0	0.28	16	27.4	7.70	5	26.7	2.05	23	0.49			
<i>Raja radula</i>	RAJIDAE	4	44.5	7.98	9	36.7	10.29	8	39.7	9.91	21	0.45			
<i>Zeus faber</i>	ZEIDAE	1	16.0		4	16.1	4.67	14	21.1	6.47	19	0.41			
<i>Scomber japonicus</i>	SCOMBRIDAE	13	26.1	2.15	2	28.4	3.04	3	31.0	2.75	18	0.38			
<i>Phycis phycis</i>	PHYCIDAE	6	25.2	4.10	2	22.9	5.30	9	29.6	4.29	17	0.36			

(To be continued in next page)

Table 3.2.1.4.5. Continued

Species	Families	Trammelnet inner/outer panel mesh size (mm)											
		40/220				48/240				56/280			
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.	
<i>Labrus viridis</i>	LABRIDAE	3	20.8	1.68	5	20.2	2.44	9	25.6	2.33	17	0.36	
<i>Bothus podas</i>	BOTHIDAE	9	12.6	1.97	2	16.7	1.84	4	15.4	2.44	15	0.32	
<i>Xyrichtys novacula</i>	LABRIDAE	6	15.7	3.58	5	16.6	0.97	3	17.8	0.70	14	0.30	
<i>Chromis chromis</i>	POMACENTRIDAE	14	11.8	0.68							14	0.30	
<i>Sarpa salpa</i>	SPARIDAE				12	16.0	0.44	1	15.5		13	0.28	
<i>Pagrus pagrus</i>	SPARIDAE	6	15.0	3.42	4	16.1	4.59	2	22.9	8.84	12	0.26	
<i>Galeorhinus galeus</i>	TRIAKIDAE				8	60.4	3.42	4	59.4	0.94	12	0.26	
<i>Lithognathus mormyrus</i>	SPARIDAE	9	15.2	1.76				2	21.9	0.35	11	0.24	
<i>Trachinus aeneus</i>	TRACHINIDAE	5	27.1	5.33	3	24.1	2.35	1	28.2		9	0.19	
<i>Sphyaena sphyraena</i>	SPHYRAENIDAE	3	31.5	1.91	6	37.6	5.25				9	0.19	
<i>Liocarcinus depurator</i>	PORTUNIDAE				3			6			9	0.19	
<i>Loligo vulgaris</i>	LOLIGINIDAE				3			4			7	0.15	
<i>Palinurus elephas</i>	PALINURIDAE	1			3			2			6	0.13	
<i>Microchirus ocellatus</i>	SOLEIDAE	2	11.0	1.63	4	12.8	0.66				6	0.13	
<i>Oblada melanura</i>	SPARIDAE				3	18.5	3.03	2	21.1	8.77	5	0.11	
<i>Monochirus hispidus</i>	SOLEIDAE	2	14.4	0.50	3	14.5	2.11				5	0.11	
<i>Torpedo marmorata</i>	TORPEDINIDAE				3	22.7	2.32	1	27.6		4	0.09	
<i>Citharus linguatula</i>	CITHARIDAE	3	15.6	2.01	1	15.1					4	0.09	
<i>Auxis rochei</i>	SCOMBRIDAE	2	37.6	0.78				2	44.8	4.24	4	0.09	
<i>Symphodus mediterraneus</i>	LABRIDAE	2	12.5	3.75				1	11.2		3	0.06	
<i>Scopaeena scrofa</i>	SCORPAENIDAE				1	18.6		2	33.1	9.19	3	0.06	
<i>Eledone chitosa</i>	SEPIIDAE				3						3	0.06	
<i>Conger conger</i>	CONGRIDAE				2	62.1	31.40	1	50.6		3	0.06	
<i>Solea solea</i>	SOLEIDAE				1	30.8		1	23.1		2	0.04	
<i>Sciaena umbra</i>	SCIAENIDAE				1	15.2		1	18.9		2	0.04	
<i>Nephtrops norvegicus</i>	NEPHROPIDAE				2						2	0.04	
<i>Labrus merula</i>	LABRIDAE	1	25.3					1	23.5		2	0.04	
<i>Diplodus puntazzo</i>	SPARIDAE							2	27.5	0.85	2	0.04	

(To be concluded in next page)

Table 3.2.1.4.5. Continued

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/220			48/240			56/280			Total	% N			
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.					
<i>Coris julis</i>	LABRIDAE	1	17.1		1	18.9		1	38.0		2	0.04			
<i>Scyllorhinus canicula</i>	SCYLORHINIDAE										1	0.02			
<i>Sarda sarda</i>	SCOMBRIDAE				1	43.0					1	0.02			
<i>Raja clavata</i>	RAJIDAE				1	57.7					1	0.02			
<i>Platichthys flesus</i>	PLEURONECTIDAE				1	36.6					1	0.02			
<i>Peristedion cataphractum</i>	PERISTEDIIDAE							1	23.5		1	0.02			
<i>Parablennius gattorugine</i>	BLENNIIDAE	1	9.2								1	0.02			
<i>Dasyatis pastinaca</i>	DASYATIDAE							1	34.0		1	0.02			
<i>Dasyatis centroura</i>	DASYATIDAE	1	33.3								1	0.02			
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1	33.6								1	0.02			
<i>Caranx thonchus</i>	CARANGIDAE							1	31.4		1	0.02			
<i>Arisoma balearicum</i>	CONGRIDAE	1	37.1								1	0.02			
<b>Total</b>		2198			1574			905			4677	100.00			

**Table 3.2.1.4.6. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Autumn 1999 (8 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/240				48/260				56/300				Total	% N
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	109	17.5	3.00	40	22.1	3.30	20	22.0	2.80	169	23.50			
<i>Diplodus annularis</i>	SPARIDAE	40	11.6	1.22	24	13.3	0.77	15	14.1	0.99	79	10.99			
<i>Boops boops</i>	SPARIDAE	47	19.7	1.28	8	22.2	1.72	5	21.6	1.96	60	8.34			
<i>Scorpaena porcus</i>	SCORPAENIDAE	16	17.3	4.25	18	16.7	2.80	19	17.9	2.69	53	7.37			
<i>Spicara maena</i>	CENTRACANTHIDAE	10	16.8	1.56	22	19.1	0.78	19	19.6	0.94	51	7.09			
<i>Serranus cabrilla</i>	SERRANIDAE	35	15.9	1.57	3	16.6	1.93	2	17.5	0.14	40	5.56			
<i>Symphodus tinca</i>	LABRIDAE	7	16.2	2.82	6	19.2	1.57	15	19.9	1.89	28	3.89			
<i>Spondyliosoma cantharus</i>	SPARIDAE	1	11.8		20	14.8	1.39	5	17.0	1.54	26	3.62			
<i>Trachurus mediterraneus</i>	CARANGIDAE	18	24.7	1.20	2	26.6	0.00	1	31.5		21	2.92			
<i>Sardinella aurita</i>	CLUPEIDAE	16	22.2	2.09	1	24.7					17	2.36			
<i>Diplodus vulgaris</i>	SPARIDAE				5	16.0	1.67	10	20.6	3.85	15	2.09			
<i>Zeus faber</i>	ZEIDAE	1	15.0		5	14.8	3.84	6	21.0	6.91	12	1.67			
<i>Synodus saurus</i>	SYNODONTIDAE	12	25.3	2.80							12	1.67			
<i>Sepia officinalis</i>	SEPIIDAE	3			6			2			11	1.53			
<i>Pagellus erythrinus</i>	SPARIDAE	5	25.1	10.15	5	17.6	1.82	1	20.6		11	1.53			
<i>Serranus scriba</i>	SERRANIDAE	10	16.5	2.10							10	1.39			
<i>Octopus vulgaris</i>	OCTOPODIDAE	1			8			1			10	1.39			
<i>Sarpa salpa</i>	SPARIDAE				2	15.9	0.28	7	25.2	5.14	9	1.25			
<i>Labrus viridis</i>	LABRIDAE	1	17.7		2	20.1	0.64	5	22.7	1.87	8	1.11			
<i>Pagrus pagrus</i>	SPARIDAE	3	16.8	3.93	4	23.8	18.87				7	0.97			
<i>Chromis chromis</i>	POMACENTRIDAE	7	11.9	0.38							7	0.97			
<i>Sparisoma cretense</i>	SCARIDAE	4	14.4	0.81				2	21.3	0.42	6	0.83			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	1	27.3		4	23.4	1.87				5	0.70			
<i>Parablennius gattorugine</i>	BLENNIIDAE	3	15.7	1.00	2	21.3	6.08				5	0.70			
<i>Dentex dentex</i>	SPARIDAE	1	18.8		1	23.8		3	24.8	1.82	5	0.70			
<i>Xyrichtys novacula</i>	LABRIDAE	4	14.1	0.42							4	0.56			
<i>Trachinus draco</i>	TRACHINIDAE	3	21.4	2.08	1	17.2					4	0.56			
<i>Oblada melanura</i>	SPARIDAE				1	17.2		3	21.2	2.17	4	0.56			

(To be concluded in next page)

Table 3.2.1.4.6. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/240			48/260			56/300			Total	% N	
		n	TL (cm)	s.d.	n	TL (cm)	s.d.	n	TL (cm)	s.d.			
<i>Trachinus araneus</i>	TRACHINIDAE	2	26.7	9.97	1	31.6		1	24.9		3	0.42	
<i>Scomber japonicus</i>	SCOMBRIDAE	2	24.5	1.98							3	0.42	
<i>Lithognathus mormyrus</i>	SPARIDAE	1	19.1					2	19.8	0.35	3	0.42	
<i>Coris julis</i>	LABRIDAE	3	15.8	3.45							3	0.42	
<i>Microchirus ocellatus</i>	SOLEIDAE				2	13.5	2.05				2	0.28	
<i>Loligo vulgaris</i>	LOLIGINIDAE				1			1			2	0.28	
<i>Galeorhinus galeus</i>	TRIAKIDAE				2	57.1	5.66				2	0.28	
<i>Chelidonicichthys lasbiviza</i>	TRIGLIDAE	1	15.9		1	26.3					2	0.28	
<i>Bothus podas</i>	BOTHIDAE	1	13.2		1	10.3					2	0.28	
<i>Stephanolepis diaspros</i>	MONACANTHIDAE				1	26.0					1	0.14	
<i>Sphyraena sphyraena</i>	SPHYRAENIDAE				1	50.5					1	0.14	
<i>Sciaena umbra</i>	SCIAENIDAE							1	22.1		1	0.14	
<i>Phycis phycis</i>	PHYCIDAE							1	27.0		1	0.14	
<i>Mullus barbatus</i>	MULLIDAE	1	16.2								1	0.14	
<i>Liza aurata</i>	MUGILIDAE							1	44.5		1	0.14	
<i>Diplodus sargus</i>	SPARIDAE							1	20.5		1	0.14	
<i>Auxis rochei</i>	SCOMBRIDAE				1	34.8					1	0.14	
<b>Total</b>		369			200			150			719	100.00	

**Table 3.2.1.4.7. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Winter 2000 (7 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/240				48/260				56/300				Total	% N
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	71	18.1	2.85	27	21.2	2.53	6	22.0	2.72	104	20.19			
<i>Spicara maena</i>	CENTRACANTHIDAE	46	15.8	1.16	40	18.2	0.65	4	20.1	1.09	90	17.48			
<i>Diplodus annularis</i>	SPARIDAE	15	11.2	1.79	33	13.3	0.73	12	15.3	1.47	60	11.65			
<i>Scorpaena porcus</i>	SCORPAENIDAE	12	15.4	4.72	10	17.5	5.38	14	18.4	3.46	36	6.99			
<i>Pagellus acarne</i>	SPARIDAE	29	15.0	1.05				1	21.2		30	5.83			
<i>Serranus cabrilla</i>	SERRANIDAE	24	17.4	1.59	4	18.2	0.63				28	5.44			
<i>Symphodus tinca</i>	LABRIDAE	14	15.9	3.07	11	18.4	1.73	1	18.8		26	5.05			
<i>Septa officinalis</i>	SEPIIDAE	6			6			10			22	4.27			
<i>Boops boops</i>	SPARIDAE	11	18.9	2.74	3	22.2	1.06	5	24.4	1.09	19	3.69			
<i>Pagellus erythrinus</i>	SPARIDAE	4	16.8	2.63	5	18.2	0.98	1	23.0		10	1.94			
<i>Chelidonicichthys lastoviza</i>	TRIGLIDAE	8	14.9	1.88	2	20.4	1.13				10	1.94			
<i>Pagrus pagrus</i>	SPARIDAE	1			3	17.1	2.00	5	17.9	1.29	8	1.55			
<i>Diplodus vulgaris</i>	SPARIDAE	6	27.2	3.18	4	21.7	4.51	3	18.0	4.62	8	1.55			
<i>Synodus saurus</i>	SYNODONTIDAE	2			1	27.1					7	1.36			
<i>Octopus vulgaris</i>	OCTOPODIDAE	1			5						7	1.36			
<i>Labrus viridis</i>	LABRIDAE	1	31.6		3	21.4	2.70	3	25.5	1.16	7	1.36			
<i>Sarda sarda</i>	SCOMBRIDAE	5	52.5	13.70							5	0.97			
<i>Xyrichtys novacula</i>	LABRIDAE	4	15.5	2.15							4	0.78			
<i>Trachurus mediterraneus</i>	CARANGIDAE	3	20.0	2.21	3	24.6	1.61	1	31.8		4	0.78			
<i>Trachinus draco</i>	TRACHINIDAE	3									3	0.58			
<i>Phycis phycis</i>	PHYCIDAE	3	17.4	3.99							3	0.58			
<i>Zeus faber</i>	ZEIDAE	1			1	29.8		1	33.8		2	0.39			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	1	18.1		1	16.0		1	18.1		2	0.39			
<i>Spondylosoma cantharus</i>	SPARIDAE	2	16.2	0.92	1	15.3		1			2	0.39			
<i>Parablennius gattorugine</i>	BLENNIIDAE							2			2	0.39			
<i>Loligo vulgaris</i>	LOLIGINIDAE				1	26.6					2	0.39			
<i>Trachurus trachurus</i>	CARANGIDAE				1						1	0.19			

(To be concluded in next page)

Table 3.2.1.4.7. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N	
		40/240				48/260				56/300						
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.				
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	26.5											1	0.19	
<i>Synaptura kleinii</i>	SOLEIDAE	1	25.0											1	0.19	
<i>Symphodus mediterraneus</i>	LABRIDAE	1	13.6											1	0.19	
<i>Sparisoma cretense</i>	SCARIDAE	1	16.9											1	0.19	
<i>Sarpa salpa</i>	SPARIDAE	1	19.8											1	0.19	
<i>Oblada melanura</i>	SPARIDAE	1	14.5											1	0.19	
<i>Mullus barbatus</i>	MULLIDAE	1	16.3											1	0.19	
<i>Labrus merula</i>	LABRIDAE	1	28.0											1	0.19	
<i>Diplodus saurus</i>	SPARIDAE								1	18.6				1	0.19	
<i>Coris julis</i>	LABRIDAE	1	19.8											1	0.19	
<i>Citharus linguatula</i>	CITHARIDAE	1	10.5											1	0.19	
<i>Bothus podas</i>	BOTHIDAE	1	17.5											1	0.19	
<i>Auxis rochei</i>	SCOMBRIDAE													1	0.19	
<b>Total</b>		279							164					72	515	100.00

**Table 3.2.1.4.8. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Spring 2000 (11 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/240				48/260				56/300					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	82	15.4	3.11	73	19.1	2.62	129	19.9	1.88	284	17.76			
<i>Mullus surmuletus</i>	MULLIDAE	135	18.4	2.44	34	21.0	2.77	15	23.9	2.89	184	11.51			
<i>Spicara maena</i>	CENTRACANTHIDAE	51	16.5	2.08	50	18.4	1.64	28	19.3	1.89	129	8.07			
<i>Diplodus annularis</i>	SPARIDAE	50	11.7	1.34	49	13.0	0.78	20	14.4	1.57	119	7.44			
<i>Serranus cabrilla</i>	SERRANIDAE	75	16.4	1.19	25	18.3	1.14	15	19.6	2.94	115	7.19			
<i>Scorpaena porcus</i>	SCORPAENIDAE	71	15.7	5.12	19	17.2	6.79	19	19.5	6.52	109	6.82			
<i>Trachurus mediterraneus</i>	CARANGIDAE	45	23.1	2.41	28	24.3	3.07	23	25.6	2.89	96	6.00			
<i>Lithognathus moirmyrus</i>	SPARIDAE	96	14.3	1.46							96	6.00			
<i>Boops boops</i>	SPARIDAE	65	19.3	1.38	6	15.9	3.04	6	16.0	1.07	77	4.82			
<i>Pagellus acarne</i>	SPARIDAE	30	15.2	0.99	23	18.6	1.43	20	19.5	1.76	73	4.57			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	13	23.8	2.24	45	27.7	3.59	13	30.1	4.60	71	4.44			
<i>Synodus saurus</i>	SYNODONTIDAE	23	27.6	4.34	2	30.5	1.56				25	1.56			
<i>Mullus barbatus</i>	MULLIDAE	9	17.8	1.41	7	20.1	0.73	5	18.3	0.69	21	1.31			
<i>Symphodus tinca</i>	LABRIDAE	7	17.6	4.04	10	18.3	2.44	3	19.0	1.15	20	1.25			
<i>Scomber japonicus</i>	SCOMBRIDAE	6	28.3	0.99	1	24.7		12	28.7	1.87	19	1.19			
<i>Serranus scriba</i>	SERRANIDAE	10	16.7	1.38	2	18.6	1.27	2	21.8	1.13	14	0.88			
<i>Trachinus draco</i>	TRACHINIDAE	7	19.6	3.19	4	24.0	3.39	1	18.2		12	0.75			
<i>Sardinella aurita</i>	CLUPEIDAE	12	21.6	2.22							12	0.75			
<i>Phycis phycis</i>	PHYCIDAE	1	21.8		7	27.8	8.25	4	28.2	4.01	12	0.75			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	3	17.8	3.94	2	22.5	0.14	6	18.8	5.26	11	0.69			
<i>Raja clavata</i>	RAJIDAE				10	62.0	4.40	1	55.2		11	0.69			
<i>Chromis chromis</i>	POMACENTRIDAE	11	11.7	0.62							11	0.69			
<i>Sparisoma cretense</i>	SCARIDAE	8	20.5	2.26	1	19.8		1	21.4		10	0.63			
<i>Sepia officinalis</i>	SEPIIDAE	4			2			3			9	0.56			
<i>Diplodus vulgaris</i>	SPARIDAE	6	14.4	3.72	1	13.0		1	26.5		8	0.50			
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE	7	33.9	2.31							7	0.44			
<i>Labrus viridis</i>	LABRIDAE	1	21.5		4	21.7	3.68	2	23.9	1.98	7	0.44			
<i>Raja radula</i>	RAJIDAE	1	48.6		2	36.3	3.75	3	36.0	3.35	6	0.38			

(To be concluded in next page)

Table 3.2.1.4.8. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/240		48/260		56/300		40/240		48/260		56/300			
		n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)		
<i>Octopus vulgaris</i>	OCTOPODIDAE	3		2		1								6	0.38
<i>Citharus linguatula</i>	CITHARIDAE			3	14.2			2	15.6					5	0.31
<i>Chelidonicichthys lasbiviza</i>	TRIGLIDAE	2	16.4	2	16.9	1	16.4							5	0.31
<i>Torpedo marmorata</i>	TORPEDINIDAE		6.58			2	27.2							2	0.13
<i>Spondyliosoma cantharus</i>	SPARIDAE	1	10.5			1	14.7							2	0.13
<i>Oblada melanura</i>	SPARIDAE	2	13.4											2	0.13
<i>Trachurus trachurus</i>	CARANGIDAE	1	22.6											1	0.06
<i>Sarda sarda</i>	SCOMBRIDAE			1	64.3									1	0.06
<i>Nephtrops norvegicus</i>	NEPHROPIDAE	1												1	0.06
<i>Muraena helena</i>	MURAENIDAE							1	69.7					1	0.06
<i>Lophius budegassa</i>	LOPHIIDAE	1	53.4											1	0.06
<i>Loligo vulgaris</i>	LOLIGINIDAE							1						1	0.06
<i>Coris julis</i>	LABRIDAE	1	18.1											1	0.06
<i>Apogon imberbis</i>	APOGONIDAE	1	11.3											1	0.06
<i>Anthias anthias</i>	SERRANIDAE	1	15.6											1	0.06
<b>Total</b>		843		415		341								1599	100.00

**Table 3.2.1.4.9. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during Summer 2000 (15 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/240				48/260				56/300					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	251	16.8	3.47	157	18.0	1.65	65	21.7	2.84	473	22.43			
<i>Mullus surmuletus</i>	MULLIDAE	143	18.7	1.80	86	21.0	1.67	29	23.5	2.16	258	12.23			
<i>Scorpaena porcus</i>	SCORPAENIDAE	62	16.8	4.02	86	16.5	3.82	100	19.6	6.18	248	11.76			
<i>Diplodus annularis</i>	SPARIDAE	106	11.8	1.07	47	13.2	0.61	18	15.5	1.33	171	8.11			
<i>Serranus cabrilla</i>	SERRANIDAE	107	16.7	1.29	20	20.0	1.44	22	20.6	1.96	149	7.06			
<i>Boops boops</i>	SPARIDAE	90	19.7	1.44	45	21.7	1.55	14	22.1	2.36	149	7.06			
<i>Pagellus acarne</i>	SPARIDAE	93	15.0	1.57	7	15.7	3.50	21	15.8	4.14	121	5.74			
<i>Spicara maena</i>	CENTRACANTHIDAE	25	18.2	2.31	27	18.4	0.94	32	20.2	1.29	84	3.98			
<i>Trachurus mediterraneus</i>	CARANGIDAE	10	23.0	1.14	48	24.6	1.39	4	27.8	1.53	62	2.94			
<i>Symphodus tinca</i>	LABRIDAE	18	16.9	1.89	8	18.6	1.33	16	20.8	1.68	42	1.99			
<i>Synodus saurus</i>	SYNODONTIDAE	12	25.1	2.53	9	28.5	4.68	17	25.8	4.25	38	1.80			
<i>Diplodus vulgaris</i>	SPARIDAE	3	15.2	0.38	15	16.0	3.02	17	19.4	4.05	35	1.66			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	8	19.1	5.33	11	17.1	4.26	6	19.3	2.32	25	1.19			
<i>Spondylisoma cantharus</i>	SPARIDAE	1	17.1		13	14.7	0.40	4	18.3	5.44	18	0.85			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	3	26.4	0.15	5	32.3	5.19	10	34.3	4.11	18	0.85			
<i>Sepia officinalis</i>	SEPIIDAE	4			6			7			17	0.81			
<i>Serranus scriba</i>	SERRANIDAE	4	17.2	2.07	11	18.5	1.99				15	0.71			
<i>Octopus vulgaris</i>	OCTOPODIDAE	7			4			4			15	0.71			
<i>Chromis chromis</i>	POMACENTRIDAE	15	12.6	0.83							15	0.71			
<i>Zeus faber</i>	ZEIDAE	5	14.7	1.59	1	23.8		8	19.3	5.25	14	0.66			
<i>Scomber japonicus</i>	SCOMBRIDAE	8	28.7	2.03	4	29.0	0.59	2	28.1	1.20	14	0.66			
<i>Sparisoma cretense</i>	SCARIDAE	4	17.7	1.99	5	20.9	9.91	4	22.8	2.15	13	0.62			
<i>Raja radula</i>	RAJIDAE	6	40.6	8.07	4	34.9	10.91	3	37.1	1.15	13	0.62			
<i>Sarpa salpa</i>	SPARIDAE							10	20.5	1.17	10	0.47			
<i>Palinurus elephas</i>	PALINURIDAE				4			5			9	0.43			
<i>Trachinus dtaco</i>	TRACHINIDAE	1	29.3		3	23.7	3.55	3	19.9	0.10	7	0.33			
<i>Monochirus hispidus</i>	SOLEIDAE	6	11.8	1.71				1	10.2		7	0.33			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	1	15.3		1	16.8		5	16.1	4.29	7	0.33			

(To be concluded in next page)

Table 3.2.1.4.9. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/240				48/260				56/300					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Phycis phycis</i>	PHYCIDAE	3	25.3	7.95	1	15.4			2	32.4	0.35		6	0.28	
<i>Scophthalmus maximus</i>	SCOPHTHALMIDAE								5	12.4	0.78		5	0.24	
<i>Trachinus araneus</i>	TRACHINIDAE				4	23.7	5.29						4	0.19	
<i>Bothus podas</i>	BOTHIDAE				1	15.1							4	0.19	
<i>Anthias anthias</i>	SERRANIDAE	3	17.0	1.53	1	17.8			2	20.7	1.63		4	0.19	
<i>Sciaenops ocellatus</i>	SCIAENIDAE				1	14.8			1	19.9			3	0.14	
<i>Oblada melanura</i>	SPARIDAE				2	19.9			1	21.8			3	0.14	
<i>Loligo vulgaris</i>	LOLIGINIDAE				1				2				3	0.14	
<i>Liocarcinus depurator</i>	PORTUNIDAE	2			1								3	0.14	
<i>Labrus viridis</i>	LABRIDAE	1	20.1		2	20.8	0.85						3	0.14	
<i>Citharus linguatula</i>	CITHARIDAE				3	13.7	2.21						3	0.14	
<i>Xyrichtys novacula</i>	LABRIDAE	1	14.9						1	18.8			2	0.09	
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	13.4						1	32.4			2	0.09	
<i>Sardinella aurita</i>	CLUPEIDAE	1	23.7		1	25.2							2	0.09	
<i>Nephrops norvegicus</i>	NEPHROPIDAE				2								2	0.09	
<i>Diplodus sargus</i>	SPARIDAE				1	20.7			1	34.3			2	0.09	
<i>Dentex dentex</i>	SPARIDAE				1	35.3			1	38.0			2	0.09	
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	30.1										1	0.05	
<i>Symphodus ocellatus</i>	LABRIDAE				1	8.8							1	0.05	
<i>Symphodus mediterraneus</i>	LABRIDAE	1	12.7										1	0.05	
<i>Sarda sarda</i>	SCOMBRIDAE	1	57.1										1	0.05	
<i>Microchirus ocellatus</i>	SOLEIDAE				1	13.4							1	0.05	
<i>Lophius budegassa</i>	LOPHIIDAE								1	16.5			1	0.05	
<i>Galeorhinus galeus</i>	TRIAKIDAE				1	62.1							1	0.05	
<i>Dasysatis pastinaca</i>	DASYATIDAE								1	70.0			1	0.05	
<i>Conger conger</i>	CONGRIDAE				1	30.1							1	0.05	
<b>Total</b>		1008			653				448				2109	100.00	

**Table 3.2.1.4.10. Cyclades. Number of specimens (n), mean total length (TL, in cm) and standard deviation (s.d.) for all species caught with trammel nets during all trials 1999-2000 (41 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/240				48/260				56/300				Total	% N
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	342	16.6	3.72	240	18.3	2.05	196	20.5	2.40	778	15.74			
<i>Mullus surmuletus</i>	MULLIDAE	458	18.2	2.52	187	21.3	2.45	70	23.0	2.63	715	14.47			
<i>Scorpaena porcus</i>	SCORPAENIDAE	161	16.3	4.61	133	16.7	4.34	152	19.3	5.68	446	9.02			
<i>Diplodus annularis</i>	SPARIDAE	211	11.7	1.23	153	13.2	0.72	65	14.8	1.46	429	8.68			
<i>Spicara maena</i>	CENTRACANTHIDAE	132	16.6	2.00	139	18.4	1.19	83	19.8	1.49	354	7.16			
<i>Serranus cabrilla</i>	SERRANIDAE	241	16.6	1.39	52	18.8	1.59	39	20.1	2.44	332	6.72			
<i>Boops boops</i>	SPARIDAE	213	19.4	1.48	62	21.2	2.45	30	21.2	3.34	305	6.17			
<i>Pagellus acarne</i>	SPARIDAE	152	15.1	1.38	30	17.9	2.38	42	17.7	3.68	224	4.53			
<i>Trachurus mediterraneus</i>	CARANGIDAE	73	23.5	2.13	81	24.5	2.12	29	26.3	3.10	183	3.70			
<i>Symphodus tinca</i>	LABRIDAE	46	16.6	2.78	35	18.5	1.81	35	20.2	1.79	116	2.35			
<i>Lithognathus mormyrus</i>	SPARIDAE	97	14.3	1.54				2	19.8	0.35	99	2.00			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	16	24.3	2.25	50	28.2	3.96	23	31.9	4.80	89	1.80			
<i>Synodus saurus</i>	SYNODONTIDAE	53	26.5	3.65	12	28.7	4.13	17	25.8	4.25	82	1.66			
<i>Diplodus vulgaris</i>	SPARIDAE	10	14.2	3.18	25	16.8	3.67	31	19.9	4.09	66	1.34			
<i>Sepia officinalis</i>	SEPIIDAE	17			20			22			59	1.19			
<i>Spondyliosoma cartharus</i>	SPARIDAE	3	13.1	3.50	34	14.8	1.08	11	17.4	1.45	48	0.97			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	13	19.3	5.02	18	19.0	4.50	12	19.0	3.82	43	0.87			
<i>Serranus scriba</i>	SERRANIDAE	24	16.7	1.76	13	18.5	1.86	2	21.8	1.13	39	0.79			
<i>Octopus vulgaris</i>	OCTOPODIDAE	13			19			6			38	0.77			
<i>Scomber japonicus</i>	SCOMBRIDAE	16	28.0	2.11	6	28.7	2.27	14	28.6	1.77	36	0.73			
<i>Chromis chromis</i>	POMACENTRIDAE	33	12.2	0.78							33	0.67			
<i>Sardinella aurita</i>	CLUPEIDAE	29	22.0	2.12	2	25.0	0.35				31	0.63			
<i>Sparisoma cretense</i>	SCARIDAE	17	18.2	3.09	6	20.7	4.46	7	22.1	1.71	30	0.61			
<i>Zeus faber</i>	ZEIDAE	6	14.7	1.43	7	18.3	6.85	15	20.9	6.65	28	0.57			
<i>Trachinus draco</i>	TRACHINIDAE	14	20.7	3.57	7	23.9	3.16	5	19.0	1.22	26	0.53			
<i>Labrus viridis</i>	LABRIDAE	4	22.7	6.12	11	21.2	2.46	10	23.8	2.02	25	0.51			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	12	15.3	2.55	6	19.6	4.38	6	16.2	3.84	24	0.49			
<i>Mullus barbatus</i>	MULLIDAE	11	17.5	1.40	7	20.1	0.73	5	18.3	0.69	23	0.47			

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Table 3.2.1.4.10. Continued.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% N
		40/240				48/260				56/300					
		n	TL (cm)	s.d.		n	TL (cm)	s.d.		n	TL (cm)	s.d.			
<i>Phycis phycis</i>	PHYCIDAE	7	21.4	6.49	8	26.3	8.81	7	29.2	3.59	22	0.45			
<i>Sarpa salpa</i>	SPARIDAE	1	19.8		2	15.9	0.28	17	22.5	4.04	20	0.40			
<i>Raja radula</i>	RAJIDAE	7	41.7	7.97	6	35.4	8.65	6	36.6	2.32	19	0.38			
<i>Pagrus pagrus</i>	SPARIDAE	3	16.8	3.93	7	20.9	13.87	5	17.9	1.29	15	0.30			
<i>Raja clavata</i>	RAJIDAE				10	62.0	4.40	1	55.2		11	0.22			
<i>Xyrichtys novacula</i>	LABRIDAE	9	14.8	12.89				1	18.8		10	0.20			
<i>Oblada melanura</i>	SPARIDAE	3	13.8	0.81	3	19.0	1.56	4	21.4	1.79	10	0.20			
<i>Palinurus elephas</i>	PALINURIDAE				4			5			9	0.18			
<i>Citharus linguatula</i>	CITHARIDAE	1	10.5		6	14.0	1.44	2	15.6	1.06	9	0.18			
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE	7	33.9	2.31	1	50.5					8	0.16			
<i>Loligo vulgaris</i>	LOLIGINIDAE				2			6			8	0.16			
<i>Trachinus aeneus</i>	TRACHINIDAE	2	26.7	9.97	4	23.7	5.29	1	24.9		7	0.14			
<i>Sarda sarda</i>	SCOMBRIDAE	6	53.3	6.42	1	64.3					7	0.14			
<i>Parablennius gattorugine</i>	BLENNIIDAE	5	15.9	0.88	2	21.3	6.08				7	0.14			
<i>Monochirus hispidus</i>	SOLEIDAE	6	11.8	1.71				1	10.2		7	0.14			
<i>Dentex dentex</i>	SPARIDAE	1	18.8		2	29.6	8.13	4	28.0	6.78	7	0.14			
<i>Bothus podas</i>	BOTHIDAE	2	15.4	3.04	2	12.7	3.39	3	15.7	2.22	7	0.14			
<i>Scophthalmus maximus</i>	SCOPHTHALMIDAE							5	12.4	0.78	5	0.10			
<i>Coris julis</i>	LABRIDAE	5	17.0	3.06							5	0.10			
<i>Anthias anthias</i>	SERRANIDAE	4	16.9	0.30	1	17.8					5	0.10			
<i>Torpedo marmorata</i>	TORPEDINIDAE	2	28.3	2.55				2	27.2	3.39	4	0.08			
<i>Sciaena umbra</i>	SCIAENIDAE				1	14.8		3	21.1	1.42	4	0.08			
<i>Diplodus saurus</i>	SPARIDAE				1	20.7		3	24.5	8.57	4	0.08			
<i>Nephtrops norvegicus</i>	NEPHROPIDAE	1			2						3	0.06			
<i>Microchirus ocellatus</i>	SOLEIDAE				3	13.4	1.45				3	0.06			
<i>Liocarcinus depurator</i>	PORTUNIDAE	2			1						3	0.06			
<i>Galeorhinus galeus</i>	TRIAKIDAE				3	58.8	4.93				3	0.06			
<i>Trachurus trachurus</i>	CARANGIDAE	1	22.6		1	26.6					2	0.04			

(To be concluded in next page)

Table 3.2.1.4.10. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/240		48/260		56/300		Total	% N				
n	TL (cm)	n	TL (cm)	n	TL (cm)	n	TL (cm)			n	TL (cm)	n	TL (cm)
<i>Symphodus mediterraneus</i>	LABRIDAE	2	13.2	0.64								2	0.04
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	13.4				1	32.4				2	0.04
<i>Lophius budgassa</i>	LOPHIIDAE	1	53.4				1	16.5				2	0.04
<i>Auxis rochei</i>	SCOMBRIDAE						1	34.8				2	0.04
<i>Synaptura kleinii</i>	SOLEIDAE	1	25.0									1	0.02
<i>Symphodus ocellatus</i>	LABRIDAE						1	8.8				1	0.02
<i>Stephanolepis diaspros</i>	MONACANTHIDAE						1	26.0				1	0.02
<i>Muraena helena</i>	MURAENIDAE											1	0.02
<i>Liza aurata</i>	MUGILIDAE											1	0.02
<i>Labrus merula</i>	LABRIDAE	1	28.0									1	0.02
<i>Dasyatis pastinaca</i>	DASYATIDAE											1	0.02
<i>Conger conger</i>	CONGRIDAE											1	0.02
<i>Apogon imberbis</i>	APOGONIDAE	1	11.3				1	30.1				1	0.02
<b>Total</b>		2499					1432					4942	100.00
												1011	

**Table 3.2.1.4.11. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Autumn 1999 (8 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/220				48/240				56/280				Total	% W
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.		
<i>Mullus surmuletus</i>	MULLIDAE	138	68.6	41.62	73	123.2	51.35	29	209.2	59.00	24527.2	27.59			
<i>Diplodus vulgaris</i>	SPARIDAE	2	66.4	64.49	3	100.3	55.31	64	136.3	56.05	9156.9	10.30			
<i>Galeorhinus galeus</i>	TRIAKIDAE	5	470.0	99.75	8	716.3	133.52	4	670.0	50.30	8410.4	9.46			
<i>Octopus vulgaris</i>	OCTOPODIDAE	34	110.7	24.78	5	712.0	119.88	2	665.0	162.64	7240.0	8.14			
<i>Trachurus mediterraneus</i>	CARANGIDAE	46	49.3	9.50	3	130.4	40.74	1	182.0		4337.0	4.88			
<i>Serranus cabrilla</i>	SERRANIDAE	2	86.5	23.30	4	84.4	9.90	8	195.3	263.04	2605.4	2.93			
<i>Sepia officinalis</i>	SEPIIDAE	40	25.3	9.07	5	169.8	39.54	13	53.7	13.03	2584.4	2.91			
<i>Diplodus annularis</i>	SPARIDAE	13	60.7	18.40	20	35.2	8.46	12	79.9	43.85	2414.1	2.72			
<i>Boops boops</i>	SPARIDAE	4	66.8	76.40	8	80.0	26.87	9	104.0	53.05	2387.9	2.69			
<i>Scorpaena porcus</i>	SCORPAENIDAE	2	740.0	84.85	15	77.8	50.74	1	750.0		2370.2	2.67			
<i>Raja radula</i>	RAJIDAE	14	71.1	40.79	11	88.0	54.24	3	88.0	20.08	2230.0	2.51			
<i>Pagellus erythrinus</i>	SPARIDAE	9	51.2	27.26	2	89.6	8.91	14	85.6	36.21	2227.4	2.51			
<i>Spicara maena</i>	CENTRACANTHIDAE	2	121.5	12.09	4	77.5	25.48	5	245.8	49.47	1838.4	2.07			
<i>Dentex dentex</i>	SPARIDAE	15	106.7	13.12	1	154.0		5	1782.0	2.00	1782.0	2.00			
<i>Sardinella aurita</i>	CLUPEIDAE	4	47.0	16.04	5	39.7	2.78	14	83.2	22.93	1754.5	1.97			
<i>Spondyliosoma cantharus</i>	SPARIDAE	2	610.0	84.85	9	66.3	17.54	5	98.2	26.22	1363.3	1.53			
<i>Symphodus tinca</i>	LABRIDAE	8	132.4	19.07	1	176.0		2	358.0	154.15	1220.0	1.37			
<i>Auxis rochei</i>	SCOMBRIDAE	11	31.3	5.04	2	46.5	2.12	2	222.0	23.34	1059.2	1.19			
<i>Scomber japonicus</i>	SCOMBRIDAE	4	75.0	49.65	2	100.1	19.45	3	133.3	97.70	892.0	1.00			
<i>Phycis phycis</i>	PHYCIDAE	3	148.3	44.60	1	163.0		2	73.0	8.72	788.3	0.89			
<i>Sparisoma cretense</i>	SPARIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		785.0	0.88			
<i>Pagrus pagrus</i>	LABRIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		752.1	0.85			
<i>Labrus viridis</i>	LABRIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		702.0	0.79			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		607.9	0.68			
<i>Synodus saurus</i>	SYNODONTIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		606.3	0.68			
<i>Xyrichtys novacula</i>	LABRIDAE	3	54.7	18.91	4	55.8	14.18	3	45.0		594.6	0.67			
<i>Sarpa salpa</i>	SPARIDAE	2	77.5	53.03	2	77.5	53.03	2	135.5	142.13	426.0	0.48			
<i>Oblada melanura</i>	SPARIDAE	2	77.5	53.03	2	77.5	53.03	2	135.5	142.13	426.0	0.48			

(To be concluded in next page)

Table 3.2.1.4.11. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220		48/240		56/280		Total	% W				
n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)			s.d.	Total	% W	
<i>Serranus scriba</i>	SERRANIDAE	2	49.0	2.90	1	62.0	2	117.5	33.23	395.0	0.44		
<i>Loligo vulgaris</i>	LOLIGINIDAE				3	104.7				314.1	0.35		
<i>Lithognathus mormyrus</i>	SPARIDAE	3	53.7	21.89			1	108.0		269.1	0.30		
<i>Torpedo marmorata</i>	TORPEDINIDAE				1	197.0				197.0	0.22		
<i>Trachinus araneus</i>	TRACHINIDAE				1	143.0				143.0	0.16		
<i>Zeus faber</i>	ZEIDAE				1	131.0				131.0	0.15		
<i>Chelidonichthys lastbviza</i>	TRIGLIDAE						1	118.0		118.0	0.13		
<i>Pagellus acarne</i>	SPARIDAE				1	28.0	1	88.0		116.0	0.13		
<i>Coris julis</i>	LABRIDAE				1	74.0				74.0	0.08		
<i>Microchirus ocellatus</i>	SOLEIDAE				3	22.7	3	3.79		68.1	0.08		
<i>Bothus podas</i>	BOTHIDAE	2	23.0	8.98			1	22.0		68.0	0.08		
<i>Chromis chromis</i>	POMACENTRIDAE	2	30.5	0.71						61.0	0.07		
<i>Symphodus mediterraneus</i>	LABRIDAE	1	11.2							11.2	0.01		
<b>Total</b>		372	29265.8		215	27959.4	206	31678.4		88903.6	100.00		

**Table 3.2.1.4.12. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Winter 2000 (7 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/220				48/240				56/280					
		n	W (g)	s.d.		n	W (g)	s.d.		n	W (g)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	74	79.4	37.10	34	138.3	126.53		8	120.9	57.86		11545.0	19.47	
<i>Sepia officinalis</i>	SEPIIDAE	4	436.3	187.03	11	313.6	131.93		11	283.6	193.26		8314.4	14.02	
<i>Spicara maena</i>	CENTRACANTHIDAE	25	49.2	17.43	54	72.0	17.46		5	88.2	29.55		5559.0	9.37	
<i>Octopus vulgaris</i>	OCTOPODIDAE	3	806.7	352.33	2	534.3	6.36		1	740.0			4228.7	7.13	
<i>Scorpaena porcus</i>	SCORPAENIDAE	15	53.9	53.08	25	75.0	72.49		5	144.8	51.11		3407.5	5.75	
<i>Diplodus annularis</i>	SPARIDAE	10	25.0	6.11	38	35.71	11.59		15	55.6	13.95		2441.0	4.12	
<i>Symphodus thca</i>	LABRIDAE	2	66.5	29.00	19	88.2	66.12		2	81.0	11.31		1970.8	3.32	
<i>Trachurus mediterraneus</i>	CARANGIDAE	1	179.0		14	107.2	15.91		1	288.0			1967.8	3.32	
<i>Dentex denlex</i>	SPARIDAE				7	254.6	57.61						1782.2	3.01	
<i>Serranus cabrilla</i>	SERRANIDAE	29	56.4	16.28	1	68.0			1	73.0			1776.6	3.00	
<i>Boops boops</i>	SPARIDAE	12	106.9	55.92	1	109.0			2	147.0	1.41		1685.8	2.84	
<i>Conger conger</i>	CONGRIDAE				1	1280.0			1	161.0			1441.0	2.43	
<i>Mullus barbatus</i>	MULLIDAE	21	63.6	10.72									1335.6	2.25	
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	2	50.5	20.51					3	371.7	216.93		1216.1	2.05	
<i>Auxis rochei</i>	SCOMBRIDAE								1	1200.0			1200.0	2.02	
<i>Loligo vulgaris</i>	LOLIGINIDAE								3	378.0	204.19		1134.0	1.91	
<i>Synodus saurus</i>	SYNODONTIDAE	4	174.8	46.69	1	213.0			1	212.0			1124.2	1.90	
<i>Zeus faber</i>	ZEIDAE								2	477.0	230.52		954.0	1.61	
<i>Raja radula</i>	RAJIDAE	1	920.0										920.0	1.55	
<i>Pagellus erythrinus</i>	SPARIDAE	4	61.5	23.13	6	83.2	25.50		1	86.0			831.2	1.40	
<i>Diplodus puntazzo</i>	SPARIDAE								2	322.0	35.56		644.0	1.09	
<i>Torpedo marmorata</i>	TORPEDINIDAE								1	485.0			485.0	0.82	
<i>Pagellus acarne</i>	SPARIDAE	10	45.3	9.58									453.0	0.76	
<i>Labrus merula</i>	LABRIDAE	1	214.0						1	162.0			376.0	0.63	
<i>Chelidonichthys lasbiviza</i>	TRIGLIDAE	2	58.5	41.72	3	69.7	13.58		3	69.7			326.1	0.55	
<i>Diplodus vulgaris</i>	SPARIDAE	3	25.0	13.08	2	46.0	31.11		2	79.5	1.56		326.0	0.55	
<i>Serranus scriba</i>	SERRANIDAE	2	58.0	1.41	2	87.0	9.90		2	87.0			290.0	0.49	
<i>Caranx rhonchus</i>	CARANGIDAE				1	252.0			1	252.0			252.0	0.42	

(To be concluded in next page)

Table 3.2.1.4.12. Concluded

Species	Families	Trammel net inner /outer panel mesh size (mm)											
		40/220			48/240			56/280			Total	% W	
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.			
<i>Scomber japonicus</i>	SCOMBRIDAE						1	227.0				227.0	0.38
<i>Labrus viridis</i>	LABRIDAE				1	78.0		1	144.0			222.0	0.37
<i>Sphyraena sphyraena</i>	SPHYRAENIDAE				1	198.0						198.0	0.33
<i>Spondyllosoma cantharus</i>	SPARIDAE				3	42.3	11.02	1	65.0			191.9	0.32
<i>Lithognathus mormyrus</i>	SPARIDAE							1	108.0			108.0	0.18
<i>Xyrichtys novacula</i>	LABRIDAE	2	48.5	17.68								97.0	0.16
<i>Pagrus pagrus</i>	SPARIDAE							1	67.0			67.0	0.11
<i>Peristegion cataphractum</i>	PERISTEGIIDAE							1	66.0			66.0	0.11
<i>Coris julis</i>	LABRIDAE	1	50.0									50.0	0.08
<i>Symphodus mediterraneus</i>	LABRIDAE	1	46.0									46.0	0.08
<i>Trachinus draco</i>	TRACHINIDAE							1	24.0			24.0	0.04
<i>Bothus podas</i>	BOTHIDAE	1	15.0									15.0	0.03
<b>Total</b>		230	20044.6		227	24598.4		76	14655.9			59298.9	100.00

**Table 3.2.1.4.13. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Spring 2000 (11 trials, 750m / mesh size).**

Species	Trammel net inner/outer panel mesh size (mm)												Total	% W
	40/220				48/240				56/280					
	n	W (g)	s.d.		n	W (g)	s.d.		n	W (g)	s.d.			
<i>Mullus surmuletus</i>	71	93.3	54.79	43	117.8	75.22		20	141.3	49.35		14515.7	12.35	
<i>Scorpaena porcus</i>	30	188.1	239.70	31	117.9	105.58		34	153.4	147.40		14513.5	12.35	
<i>Pagellus erythrinus</i>	37	67.1	30.81	34	81.0	74.82		52	102.1	29.72		10545.9	8.97	
<i>Spicara maena</i>	50	47.3	17.74	60	66.5	14.09		28	117.8	50.15		9651.4	8.21	
<i>Mullus barbatus</i>	45	64.9	17.18	77	74.6	16.90		11	48.3	16.04		9196.0	7.82	
<i>Serranus cabrilla</i>	74	49.0	9.82	40	72.9	7.95		10	79.9	6.47		7341.0	6.24	
<i>Merluccius merluccius</i>	12	101.3	27.83	33	145.5	88.63		6	204.8	109.34		7245.9	6.16	
<i>Trachurus mediterraneus</i>	26	116.2	25.46	24	94.2	19.08		9	118.6	28.22		6349.4	5.40	
<i>Diplodus annularis</i>	35	27.1	9.83	51	35.3	7.86		42	57.8	15.51		5176.4	4.40	
<i>Boops boops</i>	46	70.7	15.52	7	62.6	29.40		4	33.3	8.47		3823.6	3.25	
<i>Pagellus acarne</i>	36	49.1	12.43	17	71.2	9.96		8	71.9	28.54		3553.2	3.02	
<i>Synodus saurus</i>	16	138.5	41.62	5	176.8	102.42						3100.0	2.64	
<i>Octopus vulgaris</i>	3	840.0	134.54									2520.0	2.14	
<i>Sparisoma cretense</i>	9	157.0	55.27									1587.0	1.35	
<i>Scorpaenopsis japonicus</i>	3	229.0	9.17	1	249.0			1	174.0			1510.0	1.28	
<i>Raja clavata</i>				1	1450.0			2	287.0	106.07		1450.0	1.23	
<i>Trachinus draco</i>	8	54.8	31.14	9	99.2	27.23						1331.2	1.13	
<i>Sardinella aurita</i>	14	68.5	16.78	3	108.7	12.63						1285.1	1.09	
<i>Labrus viridis</i>	2	102.5	6.36					4	262.3	27.45		1254.2	1.07	
<i>Sepia officinalis</i>	3	213.3	115.47	2	215.0	7.07		1	176.0			1245.9	1.06	
<i>Uranoscopus scaber</i>	3	65.0	37.27	9	105.4	57.77						1143.6	0.97	
<i>Raja radula</i>	1	197.0						2	410.0	141.42		1017.0	0.87	
<i>Serranus scriba</i>	14	63.4	25.53	1	121.0							1008.6	0.86	
<i>Trachinus araneus</i>	4	194.0	110.14	1	169.0							945.0	0.80	
<i>Sarda sarda</i>				1	720.0							720.0	0.61	
<i>Sphyraena sphyraena</i>	3	117.7	19.40	2	165.5	20.51						684.1	0.58	
<i>Phycis phycis</i>	4	126.8	4.65					1	125.0			632.2	0.54	
<i>Symphodus tinca</i>	7	78.7	43.53	1	71.0							621.9	0.53	

(To be concluded in next page)

Table 3.2.1.4.13

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W	
		40/220			48/240			56/280			n	W (g)	s.d.			
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.						
<i>Eledone chirose</i>	SEPIIDAE				2	281.0	63.64					3	101.0	26.85	562.0	0.48
<i>Diplodus vulgaris</i>	SPARIDAE	2	84.0	4.67											471.0	0.40
<i>Chromis chromis</i>	POMACENTRIDAE	12	28.6	4.36											343.2	0.29
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1	325.0												325.0	0.28
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	4	28.0	13.01								3	37.3	6.66	282.9	0.24
<i>Platichthys flesus</i>	PLEURONECTIDAE				2	29.5	7.78								250.0	0.21
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	250.0		1	230.0									230.0	0.20
<i>Scyliorhinus canicula</i>	SCYLORHINIDAE				1	37.0						1	210.0		210.0	0.18
<i>Zeus faber</i>	ZEIDAE				1	37.0						1	140.0		177.0	0.15
<i>Lithognathus mormyrus</i>	SPARIDAE	4	36.0	7.65											144.0	0.12
<i>Bothus podas</i>	BOTHIDAE	2	23.0	15.56								2	45.5	10.61	137.0	0.12
<i>Monochirus hispidus</i>	SOLEIDAE				3	44.7	19.35								134.1	0.11
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	31.0		1	101.0									101.0	0.09
<i>Xyrichtys novacula</i>	LABRIDAE	1	31.0		1	62.0									93.0	0.08
<i>Citharus linguatula</i>	CITHARIDAE	2	30.0	14.14											60.0	0.05
<i>Microchirus ocellatus</i>	SOLEIDAE	1	19.0		1	21.0						1	19.0		40.0	0.03
<i>Symphodus mediterraneus</i>	LABRIDAE														19.0	0.02
<i>Parablennius gattorugine</i>	BLENNIIDAE	1	8.0												8.0	0.01
<b>Total</b>		586	47665.9		468	42775.3						244	27113.8		117555.0	100.00

**Table 3.2.1.4.14. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Summer 2000 (15 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/220				48/240				56/280					
		n	W (g)	s.d.		n	W (g)	s.d.		n	W (g)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	225	64.2	51.22	109	82.7	45.02	83	117.5	62.80	33212	17.85			
<i>Scorpaena porcus</i>	SCORPAENIDAE	96	82.7	59.22	84	113.8	128.09	64	133.0	105.79	26010	13.98			
<i>Mullus surmuletus</i>	MULLIDAE	113	88.8	27.66	47	115.0	38.02	30	126.7	55.76	19240	10.34			
<i>Serranus cabrilla</i>	SERRANIDAE	107	62.7	14.98	37	85.5	17.44	8	84.6	17.80	10550	5.67			
<i>Pagellus acarne</i>	SPARIDAE	151	54.9	19.77	13	57.3	25.83	17	21.2	6.28	9395	5.05			
<i>Boops boops</i>	SPARIDAE	79	71.6	12.55	32	97.2	26.70	1	95.0		8862	4.76			
<i>Diplodus annularis</i>	SPARIDAE	78	30.5	11.99	118	41.4	7.65	22	45.5	12.91	8285	4.44			
<i>Spicara maena</i>	CENTRACANTHIDAE	32	47.8	12.67	43	74.4	12.94	21	104.1	18.43	6915	3.72			
<i>Trachurus mediterraneus</i>	CARANGIDAE	22	95.3	21.96	29	111.2	29.43	8	126.3	32.00	6332	3.40			
<i>Raja radula</i>	RAJIDAE	7	82.3	37.79	24	74.8	34.88	5	466.8	393.19	5703	3.07			
<i>Diplodus vulgaris</i>	SPARIDAE	3	501.3	348.6	5	370.0	289.48	5	397.0	181.51	5339	2.87			
<i>Octopus vulgaris</i>	OCTOPODIDAE	22	132.1	45.02	2	176.5	13.44	2	321.5	54.45	3902	2.10			
<i>Synodus saurus</i>	SYNODONTIDAE	1	130.0		3	876.7	283.08	2	170.0	133.57	3100	1.67			
<i>Palinurus elephas</i>	PALINURIDAE	4	243.3	72.59	2	240.0	14.14	9	170.0	68.01	2983	1.60			
<i>Sepia officinalis</i>	SEPIIDAE	9	82.3	37.79	24	74.8	34.88	27	121.7	53.48	5657	3.04			
<i>Dentex dentex</i>	SPARIDAE	9	48.9	9.32	23	68.6	17.51	8	101.9	23.74	2833	1.52			
<i>Symphodus tinca</i>	LABRIDAE	13	83.2	37.84	4	192.8	93.95	6	151.5	19.66	2762	1.48			
<i>Spansoma cretense</i>	SCARIDAE	2	275.0	224.86	1	60.0		6	339.0	265.98	2644	1.42			
<i>Phycis phycis</i>	PHYCIDAE	3	57.7	16.86	15	71.8	17.00	8	119.6	38.82	2207	1.19			
<i>Serranus scriba</i>	SERRANIDAE	2	67.5	3.54	4	146.0	37.43	5	288.8	131.69	2163	1.16			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	1	141.0		7	62.6	25.27	8	137.9	95.94	1682	0.90			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	1	60.0		2	55.5	50.21	2	723.0	574.31	1446	0.78			
<i>Scorpaena scrofa</i>	SCORPAENIDAE	1	60.0		2	55.5	50.21	11	104.5	48.14	1321	0.71			
<i>Zeus faber</i>	ZEIDAE	7	82.0	17.46	2	112.0	5.66	1	830.0		830	0.45			
<i>Auxis rochei</i>	SCOMBRIDAE	3	113.3	32.15	6	80.0	43.21	6	820		820	0.44			
<i>Liocarcinus depurator</i>	PORTUNIDAE	7	82.0	17.46	2	112.0	5.66	1	780.0		780	0.42			
<i>Sardinella aurita</i>	CLUPEIDAE														
<i>Dasyatis pastinaca</i>	DASYATIDAE														

(To be concluded in next page)

Table 3.2.1.4.14. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W	
		40/220				48/240				56/280						
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.			
<i>Labrus viridis</i>	LABRIDAE				2	132.0	73.54					2	223.0	69.30	710	0.38
<i>Mullus barbatus</i>	MULLIDAE				5	95.2	20.25					2	85.0	15.86	646	0.35
<i>Sphyræna sphyraena</i>	SPHYRAENIDAE				3	200.0	93.54								600	0.32
<i>Spondyllosoma cantharus</i>	SPARIDAE				14	42.5	5.43								595	0.32
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	12	46.4	12.82								1	23.0		580	0.31
<i>Scorber japonicus</i>	SCOMBRIDAE	2	175.5	30.41	1	174.0									525	0.28
<i>Trachinus draco</i>	TRACHINIDAE	3	45.3	1.53	4	77.8	17.91					1	34.0		481	0.26
<i>Trachinus araneus</i>	TRACHINIDAE	1	178.0		1	88.0						1	195.0		461	0.25
<i>Nephrops norvegicus</i>	NEPHROPIDAE				2	200.0	113.14								400	0.21
<i>Torpedo marmorata</i>	TORPEDINIDAE				1	340.0									340	0.18
<i>Solea solea</i>	SOLEIDAE				1	209.0						1	88.0		297	0.16
<i>Pagrus pagrus</i>	SPARIDAE	2	31.0	5.66	2	110.0	106.07								282	0.15
<i>Dasyatis centroura</i>	DASYATIDAE	1	250.0												250	0.13
<i>Loligo vulgaris</i>	LOLIGINIDAE											1	230.0		230	0.12
<i>Bothus podas</i>	BOTHIDAE	4	19.5	10.79								3	40.8	15.33	200.4	0.11
<i>Eledone chirosa</i>	SEPIIDAE				1	150.0									150	0.08
<i>Sciaena umbra</i>	SCIAENIDAE				1	42.0						1	76.0		118	0.06
<i>Ariosoma balearicum</i>	CONGRIDAE	1	110.0												110	0.06
<i>Conger conger</i>	CONGRIDAE				1	92.0									92	0.05
<i>Oblada melanura</i>	SPARIDAE				1	90.0									90	0.05
<i>Monochirus hispidus</i>	SOLEIDAE	2	41.5	4.95											83	0.04
<i>Lithognathus mormyrus</i>	SPARIDAE	2	34.5	12.02											69	0.04
<i>Citharus linguatula</i>	CITHARIDAE	1	25.0		1	26.0									51	0.03
<i>Microchirus ocellatus</i>	SOLEIDAE	1	10.0												10	0.01
<b>Total</b>		1010	70231.9		664	64981.2						379	50845.2		186058.3	100.00

**Table 3.2.1.4.15. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during all trials 1999-2000 (41 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220			48/240			56/280			Total	% W	
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	396	80.8	41.26	197	122.6	72.65	87	157.0	66.40	69808.0	15.451	
<i>Pagellus erythrinus</i>	SPARIDAE	280	64.9	48.12	160	82.7	52.42	139	110.9	52.42	46819.1	10.363	
<i>Scorpaena porcus</i>	SCORPAENIDAE	145	101.1	127.66	155	104.9	111.18	112	137.4	115.28	46307.8	10.250	
<i>Spicara maena</i>	CENTRACANTHIDAE	116	48.1	15.88	159	70.8	15.40	68	104.8	39.87	23963.2	5.304	
<i>Serranus cabrilla</i>	SERRANIDAE	256	55.6	14.38	82	79.1	14.66	19	81.5	12.41	22268.3	4.929	
<i>Octopus vulgaris</i>	OCTOPODIDAE	14	628.1		12	539.9		8	506.9		19327.6	4.278	
<i>Trachurus mediterraneus</i>	CARANGIDAE	83	109.2	26.38	70	105.4	25.57	19	134.1	48.40	18989.5	4.203	
<i>Diplodus annularis</i>	SPARIDAE	163	28.2	10.78	227	38.5	9.01	92	53.9	14.93	18294.9	4.049	
<i>Boops boops</i>	SPARIDAE	150	73.2	22.77	48	89.5	29.32	19	77.9	46.69	16756.1	3.709	
<i>Diplodus vulgaris</i>	SPARIDAE	14	68.0	39.79	29	75.4	38.31	96	129.9	54.90	15609.0	3.455	
<i>Septa officinalis</i>	SEPIIDAE	13	271.6		20	260.4		29	220.3		15127.4	3.348	
<i>Pagellus acarne</i>	SPARIDAE	197	53.4	18.42	31	64.0	20.11	26	39.3	30.18	13525.6	2.994	
<i>Mullus barbatus</i>	MULLIDAE	66	64.5	15.36	82	75.9	17.65	13	53.9	20.63	11181.5	2.475	
<i>Raja radula</i>	RAJIDAE	4	649.3	317.02	9	374.3	246.92	8	488.0	321.04	9869.9	2.185	
<i>Merluccius merluccius</i>	MERLUCCIIDAE	14	96.4	28.40	37	145.5	87.88	11	243.0	121.81	9406.1	2.082	
<i>Synodus saurus</i>	SYNODONTIDAE	45	139.2	44.08	9	179.2	73.82	3	285.0	74.02	8731.8	1.933	
<i>Galeorhinus galeus</i>	TRIAKIDAE	22	59.6	29.27	52	716.3	135.52	4	670.0	50.33	8410.4	1.862	
<i>Symphodus tinca</i>	LABRIDAE	2	121.5	12.09	16	314.3	332.42	5	245.8	49.47	6700.5	1.483	
<i>Dentex dentex</i>	SPARIDAE	33	86.0	61.31	4	192.8	93.95	9	169.7	47.59	6500.8	1.439	
<i>Spansoma cretense</i>	SCARIDAE	6	72.8	42.49	19	88.9	54.18	14	187.0	153.89	5136.5	1.137	
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	6	176.2	126.44	2	118.0	82.02	9	319.4	229.28	4743.9	1.050	
<i>Phycis phycis</i>	PHYCIDAE	21	60.7	21.76	19	75.5	19.52	10	119.2	35.99	4167.8	0.922	
<i>Serranus scriba</i>	SERRANIDAE	36	87.1	23.12	6	117.4	19.87				3901.2	0.863	
<i>Sardinella aurita</i>	CLUPEIDAE	13	161.3	45.17	2	211.5	53.03	3	267.0	82.61	3840.0	0.850	
<i>Scomber japonicus</i>	SCOMBRIDAE	2	610.0	84.85				2	1015.0	261.63	3320.9	0.735	
<i>Auxis rochei</i>	SCOMBRIDAE	1	130.0		3	876.7	283.08	2	170.0	133.57	3250.0	0.719	
<i>Palinurus elephas</i>	PALINURIDAE	3	123.6	36.88	5	108.4	44.62	9	225.0	51.92	3100.1	0.686	
<i>Labrus viridis</i>	LABRIDAE										2937.8	0.650	

(To be continued in next page)

Table 3.2.1.4.15. Continued.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/220				48/240				56/280					
		n	W (g)	s.d.		n	W (g)	s.d.		n	W (g)	s.d.			
<i>Zeus faber</i>	ZEIDAE	1	60.0		4	69.8	50.83		14	160.2	154.83		2582.0	0.571	
<i>Spondyliosoma cantharus</i>	SPARIDAE				22	41.8	5.72		15	82.0	22.59		2149.6	0.476	
<i>Trachinus draco</i>	TRACHINIDAE	11	52.2	26.43	13	92.6	26.10		2	29.0	7.07		1836.0	0.406	
<i>Loligo vulgaris</i>	LOLIGINIDAE				3	104.7	65.49		4	341.0			1678.1	0.371	
<i>Trachinus araneus</i>	TRACHINIDAE	5	190.8	95.65	3	133.3	41.36		1	195.0			1548.9	0.343	
<i>Scorpaena scrofa</i>	SCORPAENIDAE				1	101.0			2	723.0	547.30		1547.0	0.342	
<i>Conger conger</i>	CONGRIDAE				2	686.0	840.04		1	161.0			1533.0	0.339	
<i>Sphyaena sphyraena</i>	SPHYRAENIDAE	3	117.7	19.40	6	188.2	62.39						1482.3	0.328	
<i>Raja clavata</i>	RAJIDAE				1	1450.0							1450.0	0.321	
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	18	43.7	18.25	5	53.6	24.32		5	50.6	38.48		1307.6	0.289	
<i>Torpedo marmorata</i>	TORPEDINIDAE				3	255.7	74.88		1	485.0			1252.1	0.277	
<i>Pagrus pagrus</i>	SPARIDAE	6	60.3	44.74	4	78.3	71.38		2	229.5	229.81		1134.0	0.251	
<i>Liocarcinus depurator</i>	PORTUNIDAE				3	113.3	32.15		6	80.0	43.21		819.9	0.181	
<i>Xyrichtys novacula</i>	LABRIDAE	6	48.7	17.15	5	57.0	12.59		3	73.0	8.72		796.2	0.176	
<i>Dasyatis pastinaca</i>	DASYATIDAE								1	780.0			780.0	0.173	
<i>Sarda sarda</i>	SCOMBRIDAE				1	720.0							720.0	0.159	
<i>Eledone chirosa</i>	SEPIIDAE				3	237.3							712.0	0.158	
<i>Diplodus puntazzo</i>	SPARIDAE				12	45.8	6.21		2	322.0	35.36		644.0	0.143	
<i>Sarpa salpa</i>	SPARIDAE				9	41.6	15.57		1	45.0			594.6	0.132	
<i>Lithognathus molmyrus</i>	SPARIDAE				3	81.7	38.19		2	108.0	0.00		590.4	0.131	
<i>Oblada melanura</i>	SPARIDAE	9	20.6	9.50	2	45.5	10.61		2	135.5	142.13		516.1	0.114	
<i>Bothus podas</i>	BOTHIDAE	14	28.9	4.07	2	200.0	113.14		4	36.1	15.67		420.8	0.093	
<i>Chromis chromis</i>	POMACENTRIDAE				2	200.0	113.14						404.6	0.090	
<i>Nephtys norvegicus</i>	NEPHROPIDAE								1	162.0			400.0	0.089	
<i>Labrus merula</i>	LABRIDAE	1	214.0										376.0	0.083	
<i>Chelidonichthys lucerna</i>	TRIGLIDAE	1	325.0										325.0	0.072	
<i>Solea solea</i>	SOLEIDAE				1	209.0			1	88.0			297.0	0.066	
<i>Caranx rhonchus</i>	CARANGIDAE				1	252.0							252.0	0.056	

(To be concluded in next page)

Table 3.2.1.4.15. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/220			48/240			56/280			Total	% W	
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.			
<i>Platichthys flesus</i>	PLEURONECTIDAE	1	250.0		1	250.0						250.0	0.055
<i>Dasyatis centroura</i>	DASYATIDAE	2	41.5	4.95	3	44.7	19.35					250.0	0.055
<i>Monochirus hispidus</i>	SOLEIDAE											217.1	0.048
<i>Scyliorhinus canicula</i>	SCYLIORHINIDAE							1	210.0			210.0	0.046
<i>Coris julis</i>	LABRIDAE	1	50.0		1	74.0						124.0	0.027
<i>Microchirus ocellatus</i>	SOLEIDAE	2	14.5	6.36	4	22.3	3.20					118.2	0.026
<i>Sciaena umbra</i>	SCIAENIDAE	3	28.3	10.41	1	42.0		1	76.0			118.0	0.026
<i>Citharus linguatula</i>	CITHARIDAE	1	110.0		1	26.0						110.9	0.025
<i>Ariosoma balearicum</i>	CONGRIDAE	2	28.6	24.61								110.0	0.024
<i>Symphodus mediterraneus</i>	LABRIDAE	1	8.0									76.2	0.017
<i>Peristedion cataphractum</i>	PERISTEDIIDAE	1	8.0									66.0	0.015
<i>Parablennius gattorugine</i>	BLENNIIDAE											8.0	0.002
<b>Total</b>		2198	167217.7		1574	160293.5		905	124292.1			451803.3	100.00

**Table 3.2.1.4.16. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Autumn 1999 (8 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/240				48/260				56/300				Total	% W
		n	W(g)	s.d.	n	W(g)	s.d.	n	W(g)	s.d.					
<i>Mullus surmuletus</i>	MULLIDAE	109	74.1	49.78	40	153.2	72.73	20	144.9	58.47	17102.9	23.24			
<i>Octopus vulgaris</i>	OCTOPODIDAE	1	570.0		8	565.1	428.92	1	1000.0		6091.0	8.28			
<i>Scorpaena porcus</i>	SCORPAENIDAE	16	106.7	79.24	18	87.7	46.93	19	107.3	44.18	5324.5	7.23			
<i>Boops boops</i>	SPARIDAE	47	71.8	13.48	8	108.6	24.25	5	99.2	24.33	4739.4	6.44			
<i>Spicara maena</i>	CENTRACANTHIDAE	10	54.0	14.97	22	85.5	11.84	19	88.9	15.26	4110.1	5.58			
<i>Trachurus mediterraneus</i>	CARANGIDAE	18	127.5	21.19	2	133.0	0.00	1	245.0		2806.0	3.81			
<i>Diplodus annularis</i>	SPARIDAE	40	26.6	9.76	24	39.5	8.69	15	48.2	12.33	2735.0	3.72			
<i>Pagrus pagrus</i>	SPARIDAE	3	86.0	58.08	4	611.1	1125.95				2702.4	3.67			
<i>Symphodus tinca</i>	LABRIDAE	7	61.7	38.88	6	91.0	21.18	15	99.3	23.88	2467.4	3.35			
<i>Serranus cabrilla</i>	SERRANIDAE	35	49.5	16.16	3	55.3	20.13	2	53.5	0.71	2005.4	2.72			
<i>Pagellus erythrinus</i>	SPARIDAE	5	261.2	259.68	5	69.2	21.37	1	112.0		1764.0	2.40			
<i>Sarpa salpa</i>	SPARIDAE				2	57.5	1.91	7	226.9	134.06	1703.3	2.31			
<i>Diplodus vulgaris</i>	SPARIDAE				5	61.7	26.71	10	134.0	72.15	1648.5	2.24			
<i>Sardinella aurita</i>	CLUPEIDAE	16	90.4	18.25	1	111.0					1557.4	2.12			
<i>Synodus saurus</i>	SYNODONTIDAE	12	129.5	40.96							1554.0	2.11			
<i>Sepia officinalis</i>	SEPIIDAE	3	223.7	196.16	6	111.7	67.93	2	101.5	48.79	1544.3	2.10			
<i>Spondylosoma cantharus</i>	SPARIDAE	1	27.0		20	48.4	14.59	5	71.6	21.88	1353.0	1.84			
<i>Galeorhinus galeus</i>	TRIAKIDAE				2	629.5	226.98				1259.0	1.71			
<i>Zeus faber</i>	ZEIDAE	1	50.0		5	51.2	40.99	6	154.7	124.24	1234.2	1.68			
<i>Labrus viridis</i>	LABRIDAE	1	81.0		2	109.4	24.61	5	165.4	49.40	1126.8	1.53			
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	1	285.0		4	173.8	33.43				980.2	1.33			
<i>Dentex dentex</i>	SPARIDAE	1	101.0		1	178.0		3	190.7	37.81	851.1	1.16			
<i>Liza aurata</i>	MUGILIDAE				1	680.0		1	680.0		680.0	0.92			
<i>Serranus scriba</i>	SERRANIDAE	10	61.9	23.68							619.0	0.84			
<i>Scomber japonicus</i>	SCOMBRIDAE	2	127.5	26.16	1	276.0					531.0	0.72			
<i>Trachinus araneus</i>	TRACHINIDAE	2	188.0	176.78				1	150.0		526.0	0.71			
<i>Sparisoma cretense</i>	SCARIDAE	4	48.5	10.21				2	143.5	13.44	481.0	0.65			
<i>Auxis rochei</i>	SCOMBRIDAE				1	462.0					462.0	0.63			

(To be concluded in next page)

Table 3.2.1.4.16. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/240			48/260			56/300			Total	% W	
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.			
<i>Loligo vulgaris</i>	LOLIGINIDAE	1	310.0		1	310.0		1	138.0		448.0	0.61	
<i>Sphyræna sphyræna</i>	SPHYRAENIDAE	1	414.0		1	414.0					414.0	0.56	
<i>Parablennius gattorugine</i>	BLENNIIDAE	3	55.7	9.50	2	110.5	60.10				388.1	0.53	
<i>Oblada melanura</i>	SPARIDAE	1	45.0		1	61.0		3	106.0	28.36	379.0	0.51	
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	1	45.0		1	219.0					264.0	0.36	
<i>Stephanolepis diaspros</i>	MONACANTHIDAE	1	78.0		1	256.0					256.0	0.35	
<i>Lithognathus mormyrus</i>	SPARIDAE	1	78.0					2	81.5	7.78	241.0	0.33	
<i>Trachinus draco</i>	TRACHINIDAE	3	63.0	23.52				1	32.0		221.0	0.30	
<i>Chromis chromis</i>	POMACENTRIDAE	7	28.9	2.27							202.3	0.27	
<i>Phycis phycis</i>	PHYCIDAE	4	34.0	4.97				1	197.0		197.0	0.27	
<i>Xyrichtys novacula</i>	LABRIDAE	3	42.3	26.50							136.0	0.18	
<i>Coris julis</i>	LABRIDAE	3	42.3	26.50							126.9	0.17	
<i>Diplodus sagus</i>	SPARIDAE	1	120.0					1	120.0		120.0	0.16	
<i>Sciaena umbra</i>	SCIAENIDAE	1	118.0					1	118.0		118.0	0.16	
<i>Microchirus ocellatus</i>	SOLEIDAE	2	27.0	11.31							54.0	0.07	
<i>Mullus barbatus</i>	MULLIDAE	1	47.0								47.0	0.06	
<i>Bothus podas</i>	BOTHIDAE	1	19.0		1	12.0					31.0	0.04	
<b>Total</b>		369	28025.9		200	26758.4		150	18817.9		73602.2	100.00	

**Table 3.2.1.4.17. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Winter 2000 (7 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/240				48/260				56/300					
		n	W(g)	s.d.		n	W(g)	s.d.		n	W(g)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	71	79.4	46.50	27	128.6	41.95	6	132.8	43.88	9906	17.63			
<i>Septa officinalis</i>	SEPIIDAE	6	455.0	252.88	6	336.7	189.81	10	221.1	118.84	6961	12.39			
<i>Sarda sarda</i>	SCOMBRIDAE	5	1330.0	565.16							6650	11.83			
<i>Spicara maena</i>	CENTRACANTHIDAE	46	46.0	11.32	40	74.2	8.32	4	96.0	15.80	5468	9.73			
<i>Octopus vulgaris</i>	OCTOPODIDAE	2	529.0	425.68	5	574.0	258.13				3928	6.99			
<i>Scopaeana porcus</i>	SCORPAENIDAE	12	75.6	67.30	10	121.3	129.98	14	123.6	67.96	3851	6.85			
<i>Diplodus annularis</i>	SPARIDAE	15	24.1	9.50	33	36.4	7.35	12	59.5	16.32	2277	4.05			
<i>Symphodus thra</i>	LABRIDAE	14	56.4	34.63	11	86.0	27.62	1	80.0		1816	3.23			
<i>Boops boops</i>	SPARIDAE	11	68.9	25.16	3	103.7	8.14	5	149.0	18.30	1814	3.23			
<i>Serranus cabrilla</i>	SERRANIDAE	24	59.3	16.67	4	69.5	7.55	3	211.7	8.33	1701	3.03			
<i>Labrus viridis</i>	LABRIDAE	1	372.0		3	124.7	38.56				1381	2.46			
<i>Pagellus acarne</i>	SPARIDAE	29	39.8	8.56				1	101.0		1255	2.23			
<i>Synodus saurus</i>	SYNODONTIDAE	6	154.2	45.37	1	142.0					1067	1.90			
<i>Auxis rochei</i>	SCOMBRIDAE	1	14.0		4	155.3	76.44	1	1050.0		1050	1.87			
<i>Diplodus vulgaris</i>	SPARIDAE	1	14.0		1	358.0		3	104.0	81.46	947	1.69			
<i>Zeus faber</i>	ZEIDAE	4	57.5	23.92	5	76.4	12.98	1	504.0		862	1.53			
<i>Pagellus erythrinus</i>	SPARIDAE	4	57.5	23.92	5	76.4	12.98	1	146.0		758	1.35			
<i>Pagrus pagrus</i>	SPARIDAE	3	74.7	23.18	3	74.7	23.18	5	86.8	17.77	658	1.17			
<i>Trachurus mediterraneus</i>	CARANGIDAE	3	109.7	27.50	3	109.7	27.50	1	241.0		570	1.01			
<i>Loligo vulgaris</i>	LOLIGINIDAE							2	256.0	5.66	512	0.91			
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	8	35.6	13.55	2	94.0	18.39				473	0.84			
<i>Torpedo marmorata</i>	TORPEDINIDAE	1	330.0								330	0.59			
<i>Labrus merula</i>	LABRIDAE	1	264.0								264	0.47			
<i>Xyrichtys novacula</i>	LABRIDAE	4	44.8	18.43							179	0.32			
<i>Trachinus draco</i>	TRACHINIDAE	3	54.0	21.93							162	0.29			
<i>Synaptura kleinii</i>	SOLEIDAE	1	158.0								158	0.28			
<i>Phycis phycis</i>	PHYCIDAE	3	50.3	38.70							151	0.27			
<i>Spondyliosoma cantharus</i>	SPARIDAE				1	51.0		1	99.0		150	0.27			

(To be concluded in next page)

Table 3.2.1.4.17. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)											
		40/240			48/260			56/300			Total	% W	
		n	W(g)	s.d.	n	W(g)	s.d.	n	W(g)	s.d.			
<i>Trachurus trachurus</i>	CARANGIDAE	1	75.0		1	135.0						135	0.24
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	2	61.5	4.95	1	59.0						134	0.24
<i>Parablennius gattorugine</i>	BLENNIIDAE	1	93.0									123	0.22
<i>Diplodus sargus</i>	SPARIDAE	1	63.0									106	0.19
<i>Sarpa salpa</i>	SPARIDAE	1	62.0									93	0.17
<i>Spinisoma cretense</i>	SCARIDAE	1	48.0									63	0.11
<i>Coris julis</i>	LABRIDAE	1	46.0									62	0.11
<i>Bothus podas</i>	BOTHIDAE	1	37.0									48	0.09
<i>Mullus barbatus</i>	MULLIDAE	1	36.0									46	0.08
<i>Oblada melanura</i>	SPARIDAE	1	8.0									37	0.07
<i>Symphodus mediterraneus</i>	LABRIDAE	1										36	0.06
<i>Citharus linguatula</i>	CITHARIDAE	1										8	0.01
<b>Total</b>		279	27245.9		164	18143.1		72	10801.3			56190.3	100.00

**Table 3.2.1.4.18. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Spring 2000 (11 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/240				48/260				56/300					
		n	W(g)	s.d.		n	W(g)	s.d.		n	W(g)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	82	52.0	46.57	73	82.3	38.49		129	99.2	27.35		23069	13.40	
<i>Raja clavata</i>	RAJIDAE				10	1813.0	363.75		1	1240.0			19370	11.25	
<i>Mullus surmuletus</i>	MULLIDAE	135	81.1	40.68	34	113.8	49.48		15	159.7	48.23		17213	10.00	
<i>Scorpaena porcus</i>	SCORPAENIDAE	71	104.1	138.57	19	129.8	188.39		19	166.6	174.54		13023	7.56	
<i>Trachurus mediterraneus</i>	CARANGIDAE	45	106.8	32.41	28	127.0	53.99		23	149.2	43.71		11794	6.85	
<i>Merluccius merluccius</i>	MERLUCCIIDAE	13	97.2	28.32	45	165.7	57.12		13	217.6	84.15		11549	6.71	
<i>Spicara maena</i>	CENTRACANTHIDAE	51	59.9	23.26	50	74.2	16.75		28	113.0	31.62		9929	5.77	
<i>Serranus cabrilla</i>	SERRANIDAE	75	48.1	10.77	25	72.7	10.73		15	84.8	27.84		6697	3.89	
<i>Boops boops</i>	SPARIDAE	65	77.2	17.28	6	52.5	29.10		6	41.3	8.00		5581	3.24	
<i>Octopus vulgaris</i>	OCTOPODIDAE	3	730.0	538.61	2	1275.0	1393.00		1	141.0			4881	2.84	
<i>Pagellus acarne</i>	SPARIDAE	30	43.2	9.84	23	76.0	14.40		20	87.6	21.02		4796	2.79	
<i>Synodus saurus</i>	SYNODONTIDAE	23	177.7	89.68	2	225.0	8.49		20	49.6	12.66		4537	2.64	
<i>Diplodus annularis</i>	SPARIDAE	50	27.7	10.06	49	37.4	6.00		20	49.6	12.66		4210	2.45	
<i>Scorber japonicus</i>	SCOMBRIDAE	6	218.2	27.84	1	127.0			12	213.8	50.69		4002	2.32	
<i>Lithognathus mormyrus</i>	SPARIDAE	96	36.1	16.47									3466	2.01	
<i>Phycis phycis</i>	PHYCIDAE	1	98.0		7	312.7	329.66		4	233.5	43.13		3221	1.87	
<i>Sepia officinalis</i>	SEPIIDAE	4	333.8	146.90	2	286.5	118.09		3	240.3	93.04		2629	1.53	
<i>Lophius budegassa</i>	LOPHIIDAE	1	2610.0										2610	1.52	
<i>Sarda sarda</i>	SCOMBRIDAE	1	780.0		1	2560.0							2560	1.49	
<i>Raja radula</i>	RAJIDAE				2	248.0	124.45		3	358.0	91.80		2350	1.37	
<i>Symphodus tinca</i>	LABRIDAE	7	82.7	53.22	10	83.0	33.53		3	85.6	17.86		1666	0.97	
<i>Mullus barbatus</i>	MULLIDAE	9	63.6	16.34	7	89.1	6.68		5	69.6	10.04		1544	0.90	
<i>Spansoma cretense</i>	SCARIDAE	8	133.4	46.41	1	107.0			1	149.0			1323	0.77	
<i>Uranoscopus scaber</i>	URANOSCOPIDAE	3	94.3	53.73	2	158.5	3.54		6	115.2	74.74		1291	0.75	
<i>Sardinella aurita</i>	CLUPEIDAE	12	87.9	30.08									1055	0.61	
<i>Serranus scriba</i>	SERRANIDAE	10	61.3	15.29	2	79.5	14.85		2	135.5	17.68		1043	0.61	
<i>Labrus viridis</i>	LABRIDAE	1	139.0		4	131.5	52.98		2	170.5	43.13		1006	0.58	
<i>Sphyraena sphyraena</i>	SPHYRAENIDAE	7	140.4	27.42									983	0.57	

(To be concluded in next page)

Table 3.2.1.4.18. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W						
		40/240				48/260				56/300											
		n	W(g)	s.d.		n	W(g)	s.d.		n	W(g)	s.d.									
<i>Torpedo marmorata</i>	TORPEDINIDAE																				
<i>Trachinus draco</i>	TRACHINIDAE	7	52.9	21.75	4	104.3	44.26		2	437.5	115.26								875	0.51	
<i>Muraena helena</i>	MURAENIDAE																			829	0.48
<i>Diplodus vulgaris</i>	SPARIDAE	6	50.5	40.20	1	39.0			1	700.0									700	0.41	
<i>Nephtys norvegicus</i>	NEPHROPIDAE	1	510.0						1	283.0									625	0.36	
<i>Chromis chromis</i>	POMACENTRIDAE	11	28.3	4.25															510	0.30	
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	2	56.0	50.91	2	60.0	35.36		1	59.0									311	0.18	
<i>Loligo vulgaris</i>	LOLIGINIDAE																		291	0.17	
<i>Citharus linguatula</i>	CITHARIDAE																		168	0.10	
<i>Trachurus trachurus</i>	CARANGIDAE	1	98.0		3	22.0	2.65		2	30.5	7.78								127	0.07	
<i>Coris julis</i>	LABRIDAE	1	64.0																98	0.06	
<i>Oblada melanura</i>	SPARIDAE	2	31.0	5.66															64	0.04	
<i>Spondyllosoma cantharus</i>	SPARIDAE	1	14.0																62	0.04	
<i>Anthias anthias</i>	SERRANIDAE	1	26.0																56	0.03	
<i>Apogon imberbis</i>	APOGONIDAE	1	22.0																26	0.02	
<b>Total</b>		843	66093.3		415	63058.5			341	43008.4									172160.2	100.00	

**Table 3.2.1.4.19. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during Summer 2000 (15 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/240				48/260				56/300					
		n	W(g)	s.d.		n	W(g)	s.d.		n	W(g)	s.d.			
<i>Pagellus erythrinus</i>	SPARIDAE	251	73.0	56.81	157	79.4	25.94	65	137.3	86.82	39713	18.29			
<i>Scorpaena porcus</i>	SCORPAENIDAE	62	109.5	71.33	86	99.6	113.92	100	185.3	212.99	33885	15.60			
<i>Mullus surmuletus</i>	MULLIDAE	143	94.4	31.81	86	121.5	32.59	29	162.5	51.50	28661	13.20			
<i>Boops boops</i>	SPARIDAE	90	76.6	16.45	45	102.5	18.52	14	110.4	32.13	13052	6.01			
<i>Serranus cabrilla</i>	SERRANIDAE	107	57.2	15.58	20	100.2	22.09	22	104.2	28.78	10417	4.80			
<i>Trachurus mediterraneus</i>	CARANGIDAE	10	105.7	14.21	48	129.5	21.12	4	176.8	28.58	7980	3.67			
<i>Spicara maena</i>	CENTRACANTHIDAE	25	77.7	31.79	27	71.0	9.84	32	125.9	19.88	7888	3.63			
<i>Palinurus elephas</i>	PALINURIDAE				4	787.5	243.67	5	702.0	898.09	6660	3.07			
<i>Diplodus annularis</i>	SPARIDAE	106	28.7	6.84	47	43.5	6.46	18	62.4	15.66	6210	2.86			
<i>Pagellus acarne</i>	SPARIDAE	93	42.4	12.16	7	54.1	31.05	21	56.0	35.68	5498	2.53			
<i>Synodus saurus</i>	SYNODONTIDAE	12	131.8	37.32	9	180.0	76.88	17	126.6	46.15	5354	2.47			
<i>Raja radula</i>	RAJIDAE	6	499.5	251.17	4	287.3	233.40	3	308.0	80.73	5070	2.33			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	3	131.3	7.57	5	257.0	110.21	10	299.3	103.31	4672	2.15			
<i>Octopus vulgaris</i>	OCTOPODIDAE	7	332.9	239.35	4	292.0	112.62	4	286.3	72.73	4644	2.14			
<i>Symphodus tinca</i>	LABRIDAE	18	66.2	27.31	8	82.0	15.61	16	111.4	24.71	3630	1.67			
<i>Diplodus vulgaris</i>	SPARIDAE	3	54.0	7.81	15	66.4	45.01	17	120.4	76.95	3205	1.48			
<i>Sepia officinalis</i>	SEPIIDAE	4	188.8	63.03	6	167.5	59.98	7	197.0	154.57	3139	1.45			
<i>Scomber japonicus</i>	SCOMBRIDAE	8	221.3	50.83	4	229.0	7.48	2	188.0	14.14	3062	1.41			
<i>Dasyatis pastinaca</i>	DASYATIDAE				1	2890.0		1	2890.0		2890	1.33			
<i>Uranoscopus scaber</i>	URANOSCOPIIDAE	8	99.5	61.67	11	87.5	81.32	6	117.0	33.59	2461	1.13			
<i>Spansoma cretense</i>	SCARIDAE	4	85.8	24.47	5	147.6	112.65	4	202.0	99.21	1889	0.87			
<i>Sarda sarda</i>	SCOMBRIDAE	1	1820.0								1820	0.84			
<i>Zeus faber</i>	ZEIDAE	5	53.2	12.99	1	183.0		8	120.5	75.22	1413	0.65			
<i>Phycis phycis</i>	PHYCIDAE	3	201.7	183.44	1	29.0		2	365.5	13.44	1365	0.63			
<i>Serranus scriba</i>	SERRANIDAE	4	67.5	21.42	11	80.5	27.23				1156	0.53			
<i>Dentex dentex</i>	SPARIDAE	1	500.0		1	500.0		1	616.0		1116	0.51			
<i>Spondyliosoma cantharus</i>	SPARIDAE	13	47.8	5.18	13	47.8	5.18	4	93.3	0.24	1070	0.49			
<i>Galeorhinus galeus</i>	TRIAKIDAE	1	970.0		1	970.0					970	0.45			

(To be concluded in next page)



**Table 3.2.1.4.20. Cyclades. Number of specimens (n), mean weight (W, g), standard deviation (s.d.) and total weight (total, in g) for all species caught with trammel nets during all trials 1999-2000 (41 trials, 750m / mesh size).**

Species	Families	Trammel net inner/outer panel mesh size (mm)												Total	% W
		40/240				48/260				56/300					
		n	W(g)	s.d.		n	W(g)	s.d.		n	W(g)	s.d.			
<i>Mullus surmuletus</i>	MULLIDAE	458	83.3	42.17	187	127.9	52.52	70	154.3	52.23	72869.7	14.04			
<i>Pagellus erythrinus</i>	SPARIDAE	342	70.5	65.57	240	80.0	30.00	196	112.2	57.30	65302.2	12.58			
<i>Scorpaena porcus</i>	SCORPAENIDAE	161	104.3	106.36	133	104.0	121.65	152	167.5	186.68	56084.3	10.80			
<i>Spicara maena</i>	CENTRACANTHIDAE	132	58.0	24.04	139	75.4	13.39	83	111.7	27.39	27407.7	5.28			
<i>Boops boops</i>	SPARIDAE	213	75.3	16.72	62	98.5	24.92	30	101.2	42.20	25181.9	4.85			
<i>Trachurus mediterraneus</i>	CARANGIDAE	73	111.8	29.25	81	128.0	35.77	29	159.5	47.08	23154.9	4.46			
<i>Serranus cabrilla</i>	SERRANIDAE	241	53.5	15.09	52	82.1	21.95	39	94.1	30.38	20832.6	4.01			
<i>Octopus vulgaris</i>	OCTOPODIDAE	13	472.9		19	585.9		6	381.0		19565.8	3.77			
<i>Raja clavata</i>	RAJIDAE	16	103.6	28.97	50	1813.0	365.75	1	1240.0		19370.0	3.73			
<i>Merluccius merluccius</i>	MERLUCCIIDAE	211	27.8	8.51	153	39.4	7.42	65	54.6	15.22	16218.9	3.12			
<i>Diplodus annularis</i>	SEPIIDAE	17	323.0		20	213.4		22	205.2		14273.4	2.75			
<i>Septa officinalis</i>	SYNODONTIDAE	53	153.7	68.92	12	184.3	69.16	17	126.6	46.15	12509.9	2.41			
<i>Synodus saurus</i>	SPARIDAE	152	42.0	11.12	30	70.9	21.10	42	72.1	33.12	11539.2	2.22			
<i>Pagellus acarne</i>	SCOMBRIDAE	6	1411.7	543.63	1	2560.0		35	103.1	24.59	11030.2	2.12			
<i>Sarda sarda</i>	LABRIDAE	46	65.1	33.99	35	85.1	25.46	14	210.1	47.72	9581.6	1.85			
<i>Symphodus tinca</i>	SCOMBRIDAE	16	208.4	50.08	6	219.8	49.55	6	333.0	82.02	7594.6	1.46			
<i>Scomber japonicus</i>	RAJIDAE	7	539.6	252.61	4	787.5	243.67	5	702.0	898.09	7420.4	1.43			
<i>Raja radula</i>	PALINURIDAE	10	47.9	32.49	25	78.6	56.82	31	128.4	77.88	6660.0	1.28			
<i>Painurus elephas</i>	SPARIDAE	7	122.0	132.49	8	277.3	321.27	7	266.0	115.08	6424.4	1.24			
<i>Diplodus vulgaris</i>	PHYCIDAE	13	110.7	74.08	18	113.0	76.09	12	116.1	55.25	4934.4	0.95			
<i>Phycis phycis</i>	URANOSCOPIDAE	4	175.0	133.45	11	123.4	35.87	10	180.3	42.18	4866.3	0.94			
<i>Uranoscopus scaber</i>	LABRIDAE	17	98.1	49.26	6	140.8	102.11	7	177.7	76.63	3860.4	0.74			
<i>Labrus viridis</i>	SCARIDAE	97	36.5	16.93	7	113.9	122.98	2	81.5	7.78	3756.4	0.72			
<i>Spisoma cretense</i>	SPARIDAE	6	52.7	11.69	7	381.2	846.34	15	159.7	133.03	3703.5	0.71			
<i>Lithognathus mormyrus</i>	ZEIDAE	3	86.0	58.08	7	381.2	846.34	5	86.8	17.77	3509.0	0.68			
<i>Zeus faber</i>	SPARIDAE	3	86.0	58.08	7	381.2	846.34	5	86.8	17.77	3360.4	0.65			
<i>Pagrus pagrus</i>	DASYATIDAE	1	2890.0		1	2890.0		1	2890.0		2890.0	0.56			

(To be continued in next page)

Table 3.2.1.4.20. Continued.

Species	Families	Trammel net inner/outer panel mesh size (mm)													
		40/240				48/260				56/300				Total	% W
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.		
<i>Sardinella aurita</i>	CLUPEIDAE	29	90.3	23.80	2	118.5	10.61	2	135.5	17.68	2	149.1	106.87	2855.7	0.55
<i>Serranus scriba</i>	SERRANIDAE	24	62.6	19.39	13	80.4	25.23	13	80.4	25.23	13	80.4	25.23	2818.6	0.54
<i>Sarpa salpa</i>	SPARIDAE	1	93.0		2	57.5	2.12	2	57.5	2.12	17	149.1	106.87	2742.7	0.53
<i>Lophius budegassa</i>	LOPHIIDAE	1	2610.0		1	70.0		1	70.0		1	70.0		2680.0	0.52
<i>Sponcyliosoma cantharus</i>	SPARIDAE	3	38.7	32.12	34	48.3	11.51	11	79.3	22.04	11	79.3	22.04	2630.6	0.51
<i>Galeorhinus galeus</i>	TRIAKIDAE	3	743.0	253.79	3	743.0	253.79	3	743.0	253.79	3	743.0	253.79	2229.0	0.43
<i>Dentex dentex</i>	SPARIDAE	1	101.0		2	339.0	227.69	2	339.0	227.69	4	297.0	214.90	1967.0	0.38
<i>Loligo vulgaris</i>	LOLIGINIDAE	2	275.0		2	275.0		2	275.0		6	232.7		1946.2	0.37
<i>Trachinus draco</i>	TRACHINIDAE	14	63.3	35.38	7	99.4	38.74	7	99.4	38.74	5	45.2	8.32	1808.0	0.35
<i>Torpedo marmorata</i>	TORPEDINIDAE	2	435.0	148.49	2	435.0	148.49	2	435.0	148.49	2	437.5	115.26	1745.0	0.34
<i>Mullus barbatus</i>	MULLIDAE	11	60.5	16.16	7	89.1	8.73	7	89.1	8.73	5	69.6	10.11	1637.2	0.32
<i>Auxis rochei</i>	SCOMBRIDAE	1	462.0		1	462.0		1	462.0		1	1050.0		1512.0	0.29
<i>Sphyraena sphyraena</i>	SPHYRAENIDAE	7	140.4	27.42	1	414.0		1	414.0		6	55.8	39.92	1396.8	0.27
<i>Chelidonichthys lastoviza</i>	TRIGLIDAE	12	39.9	20.40	6	96.5	65.19	6	96.5	65.19	6	55.8	39.92	1392.6	0.27
<i>Trachinus araneus</i>	TRACHINIDAE	2	188.0	176.78	4	126.8	91.03	4	126.8	91.03	1	150.0		1033.2	0.20
<i>Diplodus sagus</i>	SPARIDAE	33	30.6	5.21	1	125.0		1	125.0		3	302.0	327.43	1031.0	0.20
<i>Chromis chromis</i>	POMACENTRIDAE	3	33.0	5.29	3	81.3	17.62	3	81.3	17.62	4	107.8	23.42	1009.8	0.19
<i>Oblada melanura</i>	SPARIDAE	1	510.0		2	120.0	14.14	2	120.0	14.14	4	107.8	23.42	774.1	0.15
<i>Nephtops norvegicus</i>	NEPHROPIDAE	1	510.0		2	120.0	14.14	2	120.0	14.14	1	700.0		750.0	0.14
<i>Muraena helena</i>	MURAENIDAE	1	510.0		2	120.0	14.14	2	120.0	14.14	1	700.0		700.0	0.13
<i>Liza aurata</i>	MUGILIDAE	1	34.0		1	680.0		1	680.0		1	680.0		680.0	0.13
<i>Scorpaena scrofa</i>	SCORPAENIDAE	5	58.0	7.84	2	110.5	60.10	2	110.5	60.10	1	500.0		534.0	0.10
<i>Parablennius gattorugine</i>	BLENNIIDAE	9	39.7	1.51	1	77.0		1	77.0		1	77.0		511.0	0.10
<i>Xyrichtys novacula</i>	LABRIDAE	2	120.0	84.85	1	150.0		1	150.0		1	77.0		434.3	0.08
<i>Liocarcinus depurator</i>	PORTUNIDAE	1	39.0		1	39.0		1	39.0		3	99.0	22.61	390.0	0.08
<i>Sciaena umbra</i>	SCIAENIDAE	1	264.0		1	264.0		1	264.0		3	99.0	22.61	336.0	0.06
<i>Labrus merula</i>	LABRIDAE	1	264.0		1	264.0		1	264.0		3	99.0	22.61	264.0	0.05
<i>Stephanolepis diaspros</i>	MONACANTHIDAE	1	256.0		1	256.0		1	256.0		1	256.0		256.0	0.05

(To be concluded in next page)

Table 3.2.1.4.20. Concluded.

Species	Families	Trammel net inner/outer panel mesh size (mm)															
		40/240				48/260				56/300				Total	% W		
		n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.	n	W (g)	s.d.				
<i>Cois julis</i>	LABRIDAE	5	50.6	20.20												253.0	0.05
<i>Trachurus trachurus</i>	CARANGIDAE	1	98.0		1	135.0										233.0	0.04
<i>Bothus podas</i>	BOTHIDAE	2	33.5	20.51	2	21.5	13.44									218.0	0.04
<i>Citharus linguatula</i>	CITHARIDAE	1	8.0		6	21.2	6.05									196.2	0.04
<i>Scophthalmus maximus</i>	SCOPHTHALMIDAE															174.0	0.03
<i>Monochirus hispidus</i>	SOLEIDAE	6	24.8	11.92												163.8	0.03
<i>Syneptura kleinii</i>	SOLEIDAE	1	158.0													158.0	0.03
<i>Anthias anthias</i>	SERRANIDAE	4	28.0	1.83	1	33.0										145.0	0.03
<i>Microchirus ocellatus</i>	SOLEIDAE	2	30.0	8.49	3	26.3	8.08									78.9	0.02
<i>Symphodus mediterraneus</i>	LABRIDAE				1	40.0										60.0	0.01
<i>Conger conger</i>	CONGRIDAE															40.0	0.01
<i>Apogon imberbis</i>	APOGONIDAE	1	22.0													22.0	0.00
<i>Symphodus ocellatus</i>	LABRIDAE				1	10.0										10.0	0.00
<b>Total</b>		2499	200359.0		1432	175868.9										519161.8	100.00

**Table 3.2.1.4.21. Cyclades. Species caught per different inner/outer panel mesh combinations of trammel nets, species overlap between the two sets of trammel nets mounting different outer panel mesh sizes, and use of species (C=commercial, D=discarded).**

Species	Inner/outer panel (mm)			Total	Inner/outer panel (mm)			Total	Overlap	Use
	40/220	48/240	56/280		40/240	48/260	56/300			
<i>Anthias anthias</i>					x	x		x		D
<i>Apogon imberbis</i>					x			x		D
<i>Ariosoma balearicum</i>	x			x						D
<i>Auxis rochei</i>	x		x	x		x	x	x	x	C
<i>Boops boops</i>	x	x	x	x	x	x	x	x	x	C
<i>Bothus podas</i>	x	x	x	x	x	x	x	x	x	C
<i>Caranx rhonchus</i>		x		x						C
<i>Chelidonichthys lastoviza</i>	x	x	x	x	x	x	x	x	x	D
<i>Chelidonichthys lucerna</i>	x			x						C
<i>Chromis chromis</i>	x			x	x			x	x	D
<i>Citharus linguatula</i>	x	x		x	x	x	x	x	x	D
<i>Conger conger</i>		x	x	x		x		x	x	C
<i>Coris julis</i>	x	x		x	x			x	x	C
<i>Dasyatis centroura</i>	x			x						D
<i>Dasyatis pastinaca</i>			x	x			x	x	x	D
<i>Dentex dentex</i>	x	x	x	x	x	x	x	x	x	C
<i>Diplodus annularis</i>	x	x	x	x	x	x	x	x	x	C
<i>Diplodus puntazzo</i>			x	x						C
<i>Diplodus sargus</i>						x	x	x		C
<i>Diplodus vulgaris</i>	x	x	x	x	x	x	x	x	x	C
<i>Eledone chirosa</i>		x		x						C
<i>Galeorhinus galeus</i>		x	x	x		x		x	x	C
<i>Labrus merula</i>	x		x	x	x			x	x	C
<i>Labrus viridis</i>	x	x	x	x	x	x	x	x	x	C
<i>Liocarcinus depurator</i>		x	x	x	x	x		x	x	D
<i>Lithognathus mormyrus</i>	x		x	x	x		x	x	x	C

(To be continued in next page)

Table 3.2.1.4.21. (Continued).

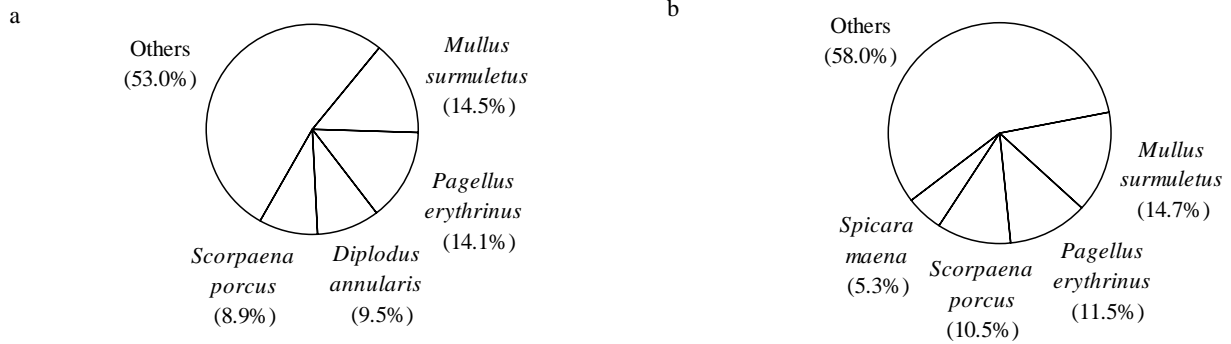
Species	Inner/outer panel (mm)			Total	Inner/outer panel (mm)			Total	Overlap	Use
	40/220	48/240	56/280		40/240	48/260	56/300			
<i>Liza aurata</i>							x	x		C
<i>Loligo vulgaris</i>		x	x	x		x	x	x	x	C
<i>Lophius budegassa</i>					x		x	x		C
<i>Merluccius merluccius</i>	x	x	x	x	x	x	x	x	x	C
<i>Microchirus ocellatus</i>	x	x		x		x		x	x	D
<i>Monochirus hispidus</i>	x	x		x	x		x	x	x	D
<i>Mullus barbatus</i>	x	x	x	x	x	x	x	x	x	C
<i>Mullus surmuletus</i>	x	x	x	x	x	x	x	x	x	C
<i>Muraena helena</i>							x	x		D
<i>Nephrops norvegicus</i>		x		x	x	x		x	x	C
<i>Oblada melanura</i>		x	x	x	x	x	x	x	x	C
<i>Octopus vulgaris</i>	x	x	x	x	x	x	x	x	x	C
<i>Pagellus acarne</i>	x	x	x	x	x	x	x	x	x	C
<i>Pagellus erythrinus</i>	x	x	x	x	x	x	x	x	x	C
<i>Pagrus pagrus</i>	x	x	x	x	x	x	x	x	x	C
<i>Palinurus elephas</i>	x	x	x	x		x	x	x	x	C
<i>Parablennius gattorugine</i>	x			x	x	x		x	x	D
<i>Peristedion cataphractum</i>			x	x						D
<i>Phycis phycis</i>	x	x	x	x	x	x	x	x	x	C
<i>Platichthys flesus</i>		x		x						C
<i>Raja clavata</i>		x		x		x	x	x	x	C
<i>Raja radula</i>	x	x	x	x	x	x	x	x	x	C
<i>Sarda sarda</i>		x		x	x	x		x	x	C
<i>Sardinella aurita</i>	x	x		x	x	x		x	x	C
<i>Sarpa salpa</i>		x	x	x	x	x	x	x	x	C
<i>Sciaena umbra</i>		x	x	x		x	x	x	x	C
<i>Scomber japonicus</i>	x	x	x	x	x	x	x	x	x	C

(To be concluded in next page)

**Table 3.2.1.4.21. (Concluded).**

Species	Inner/outer panel (mm)			Total	Inner/outer panel (mm)			Total	Overlap	Use
	40/220	48/240	56/280		40/240	48/260	56/300			
<i>Scophthalmus maximus</i>							x	x		D
<i>Scorpaena porcus</i>	x	x	x	x	x	x	x	x	x	C
<i>Scorpaena scrofa</i>		x	x	x	x		x	x	x	C
<i>Scyliorhinus canicula</i>			x	x						D
<i>Sepia officinalis</i>	x	x	x	x	x	x	x	x	x	C
<i>Serranus cabrilla</i>	x	x	x	x	x	x	x	x	x	C
<i>Serranus scriba</i>	x	x	x	x	x	x	x	x	x	C
<i>Solea solea</i>		x	x	x						C
<i>Sparisoma cretense</i>	x	x	x	x	x	x	x	x	x	C
<i>Sphyræna sphyraena</i>	x	x		x	x	x		x	x	C
<i>Spicara maena</i>	x	x	x	x	x	x	x	x	x	C
<i>Spondyliosoma cantharus</i>		x	x	x	x	x	x	x	x	C
<i>Stephanolepis diaspros</i>							x	x		D
<i>Symphodus mediterraneus</i>	x		x	x	x			x	x	D
<i>Symphodus ocellatus</i>							x	x		D
<i>Symphodus tinca</i>	x	x	x	x	x	x	x	x	x	C
<i>Synaptura kleinii</i>					x			x		D
<i>Synodus saurus</i>	x	x	x	x	x	x	x	x	x	D
<i>Torpedo marmorata</i>		x	x	x	x		x	x	x	D
<i>Trachinus araneus</i>	x	x	x	x	x	x	x	x	x	C
<i>Trachinus draco</i>	x	x	x	x	x	x	x	x	x	C
<i>Trachurus mediterraneus</i>	x	x	x	x	x	x	x	x	x	C
<i>Trachurus trachurus</i>					x	x		x		C
<i>Uranoscopus scaber</i>	x	x	x	x	x	x	x	x	x	C
<i>Xyrichthys novacula</i>	x	x	x	x	x		x	x	x	D
<i>Zeus faber</i>	x	x	x	x	x	x	x	x	x	C
<b>Total</b>	<b>47</b>	<b>55</b>	<b>51</b>	<b>68</b>	<b>54</b>	<b>53</b>	<b>50</b>	<b>69</b>	<b>58</b>	

Overall, *Mullus surmuletus* and *Pagellus erythrinus* dominated the combined catch of all inner/outer panel mesh size combinations in terms of both numbers, 14.5% and 14.1% respectively, and weight, 14.7% and 11.5% respectively, followed by *Diplodus annularis* and *Scorpaena porcus* in terms of numbers and by *Scorpaena porcus* and *Spicara maena* in terms of weight (Figure 3.2.1.4.1).

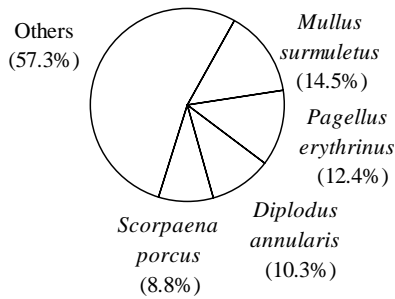


**Figure 3.2.1.4.1. Cyclades. Overall catch species composition of all inner/outer panel stretched mesh size combinations of trammel nets in terms of (a) number and (b) weight.**

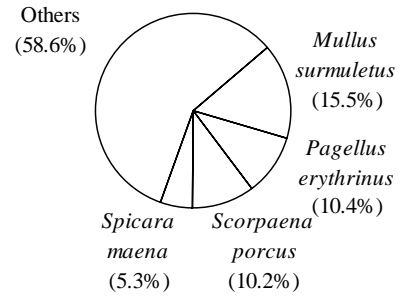
The species composition of the combined catch of the 40/220, 48/240 and 56/280 mm trammel nets did not differ considerably from that of the 40/240, 48/260 and 58/300 mm trammel nets both in terms of numbers and weight (Figure 3.2.1.4.2). Thus in terms of numbers, *Mullus surmuletus*, *Pagellus erythrinus*, *Diplodus annularis* and *Scorpaena porcus* dominated the combined catch of all trammel nets mounting the smaller outer panel meshes and *Pagellus erythrinus*, *Mullus surmuletus*, *Scorpaena porcus* and *Diplodus annularis* that of all trammel nets mounting the larger outer meshes (Figure 3.2.1.4.2a, c). In terms of weight, *Mullus surmuletus*, *Pagellus erythrinus*, *Scorpaena porcus* and *Spicara maena* dominated the catches of both sets of trammel nets (Figure 3.2.1.4.2b, d).

40/220, 48/240 and 56/280 mm of inner/outer panel mesh size combinations

a

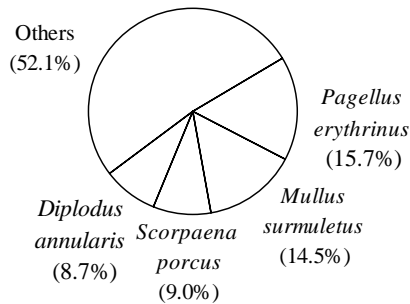


b

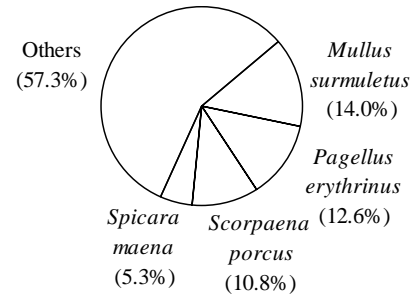


40/240, 48/260 and 56/300 mm of inner/outer panel mesh size combinations

c

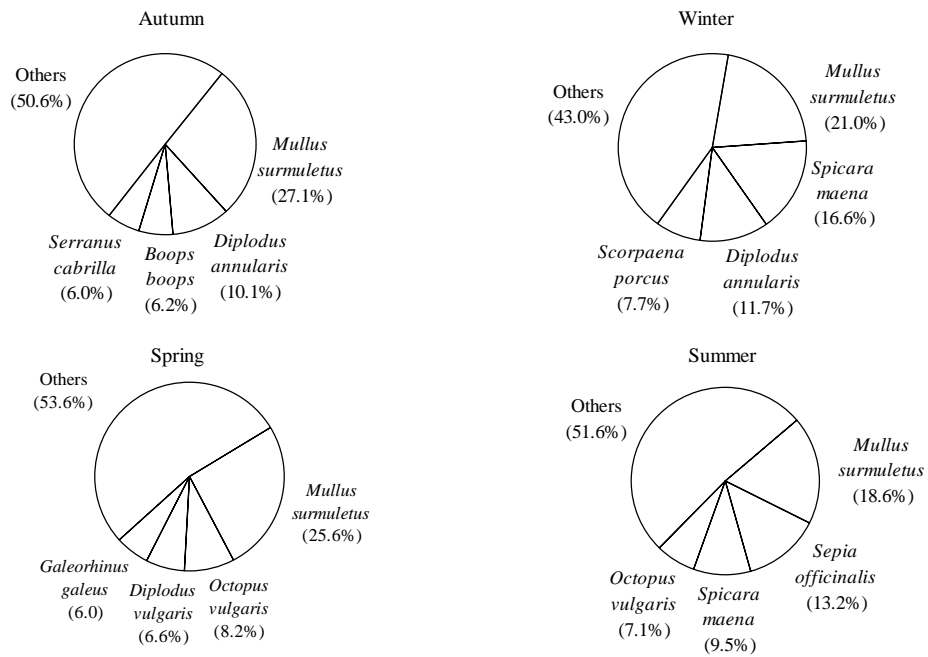


d

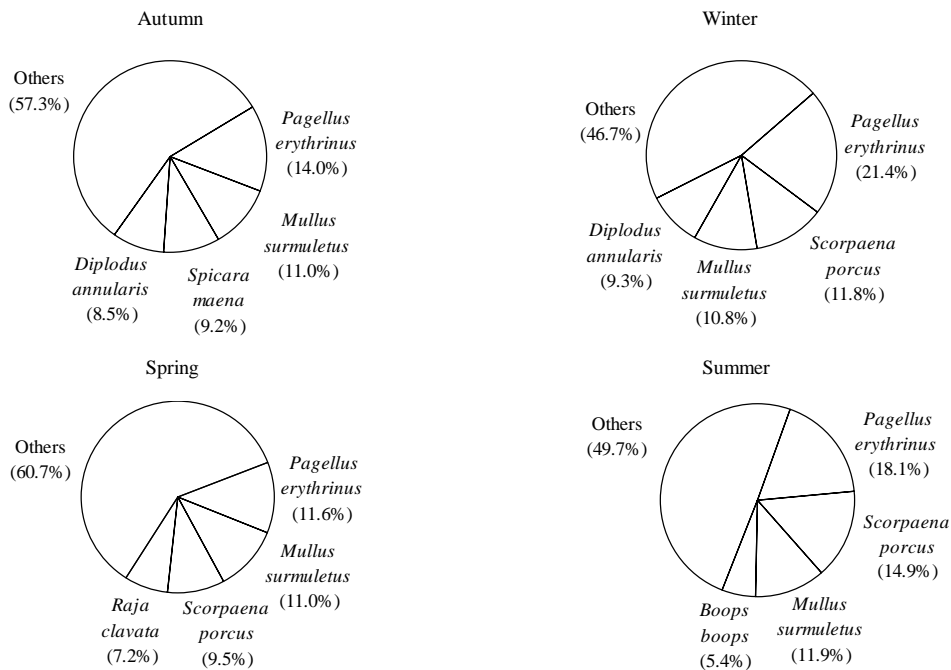


**Figure 3.2.1.4.2. Cyclades. Overall catch species composition of different inner/outer panel stretched mesh size combinations of trammel nets in terms of number (a, c) and weight (b, d).**

The catch species composition differed with season, with combined catches dominated by *Mullus surmuletus* in autumn and winter and *Pagellus erythrinus* in spring and summer in terms of both numbers (Figure 3.2.1.4.3) and weights (Figure 3.2.1.4.4).

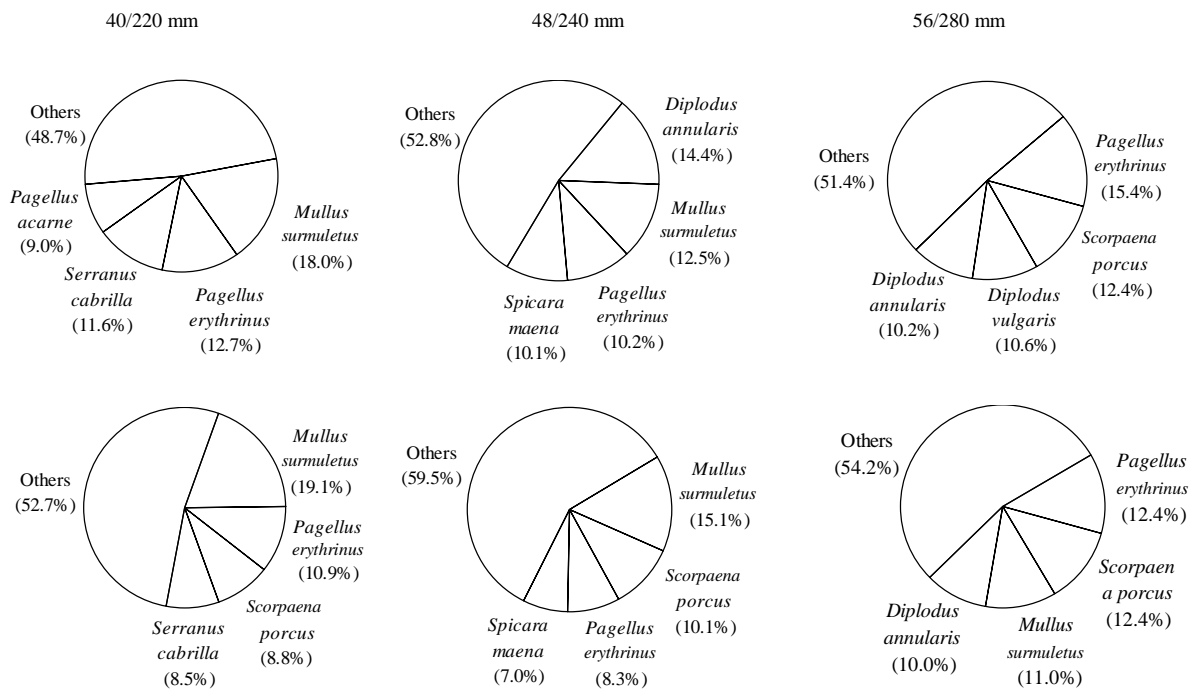


**Figure 3.2.1.4.3. Cyclades. Overall seasonal catch species composition of all inner/outer panel stretched mesh size combinations of trammel nets in terms of number.**

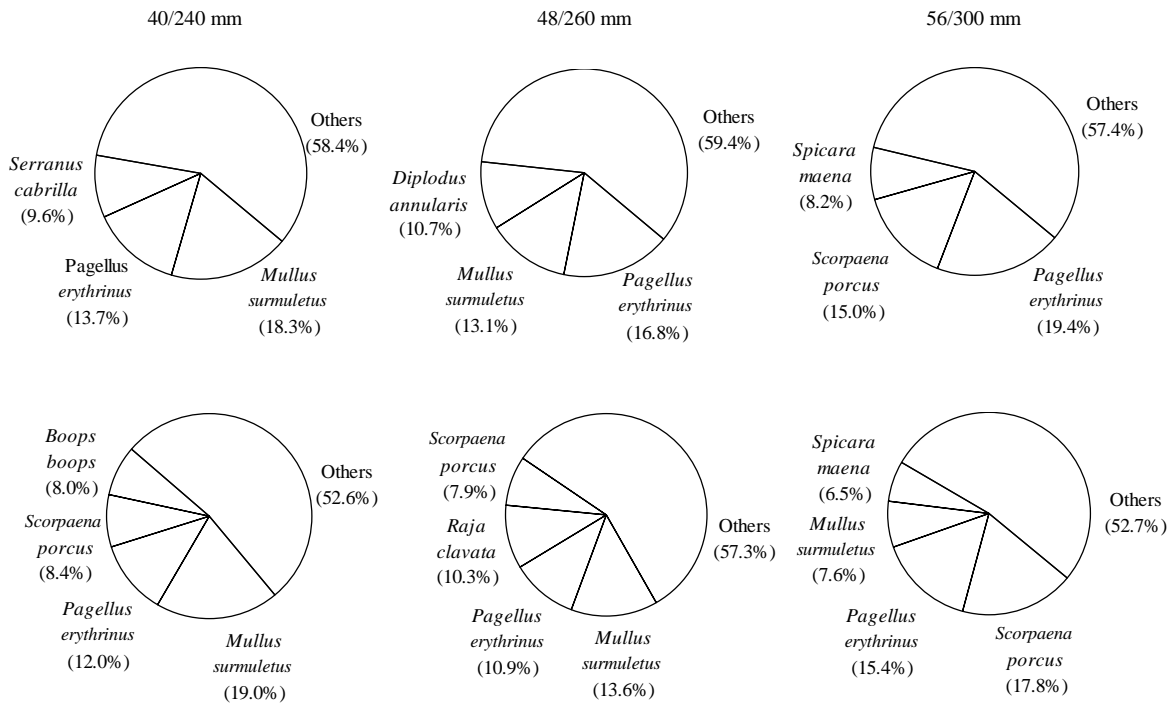


**Figure 3.2.1.4.4. Cyclades. Overall seasonal catch species composition of all inner/outer panel stretched mesh size combinations of trammel nets in terms of weight.**

Finally, catch species composition differed also with inner mesh size (Figures 3.2.1.4.5 and 3.2.1.4.6). Thus, the seasonally combined catch of the 40/220 mm net was numerically dominated by *Mullus surmuletus*, that of 48/240 mm trammel net by *Diplodus annularis* and that of the 56/280 mm trammel net by *Pagellus erythrinus* (Figure 3.2.1.4.5a). In terms of weight, the seasonally combined catches of the 40/220 and 48/240 mm trammel nets were both dominated by *Mullus surmuletus* and that of the 56/280 mm trammel net by *Pagellus erythrinus* (Figure 3.2.1.4.5b). In contrast, the seasonally combined catch of the 40/240 mm net was numerically dominated by *Mullus surmuletus* whereas those of the 48/260 mm and 56/300 mm trammel nets by *Pagellus erythrinus* (Figure 3.2.1.4.6a). In terms of weight, the seasonally combined catches of the 40/240 and 48/260 mm trammel nets were both dominated by *Mullus surmuletus* and that of the 56/300 mm trammel net by *Scorpaena porcus* (Figure 3.2.1.4.6b).



**Figure 3.2.1.4.5. Cyclades. Overall catch species composition of different inner/outer panel stretched mesh size combinations of trammel nets in terms of (upper) number and (lower) weight.**



**Figure 3.2.1.4.6. Cyclades. Overall catch species composition of different inner/outer panel stretched mesh size combinations of trammel nets in terms of (upper) number and (lower) weight.**

The seasonal catch rates, in terms of number and weight per 1000 m of net, for the different inner/outer panel mesh size combinations and for the six most abundant species caught (i.e., *Mullus surmuletus*, *Pagellus erythrinus*, *Diplodus annularis*, *Scorpaena porcus*, *Spicara maena*, *Serranus cabrilla*) are shown in Tables 3.2.1.4.22 and 3.2.1.4.23 respectively. The numerical catch rate of *Mullus surmuletus* was highest (23 individuals/1000 m) for the 40/220 mm net in autumn, of *Pagellus erythrinus* (22.3 individuals/1000 m) for the 40/240 mm net in summer, of *Diplodus annularis* (10.4 individuals/1000 m) for the 48/240 mm net in summer, of *Scorpaena porcus* (8.9 individuals/1000 m) for the 56/300 mm net in summer, of *Spicara maena* (10.3 individuals/1000 m) for the 48/240 mm net in winter, and of *Serranus cabrilla* (9.5 individuals/1000 m) for both the 40/220 and 40/240 mm nets in summer (Table 3.2.1.4.22). The weight catch rate of *Mullus surmuletus* was highest (1.6 kg/1000 m) for the 40/220 mm net in autumn, of *Pagellus erythrinus* (1.6 kg/1000 m) for the 40/240 mm net in summer, of *Diplodus annularis* (0.4 kg/1000 m) for the 48/240 mm net in summer, of *Scorpaena porcus* (1.6 kg/1000 m) for the 56/300 mm net in summer, of *Spicara maena* (0.7 kg/1000 m) for the 48/240 mm net in winter, and of *Serranus cabrilla* (0.6 kg/1000 m) for the 40/220 mm net in summer (Table 3.2.1.4.23).

**Table 3.2.1.4.22. Cyclades. Catch rate (numbers per 1000 m of net) for the most abundant species by season and inner/outer panel mesh size combination of trammel nets.**

Trammel type	Season									
	Autumn		Winter		Spring		Summer		Average	s.d.
	n	s.d.	n	s.d.	n	s.d.	n	s.d.		
<i>Mullus surmuletus</i>										
40/220	23.00	23.87	14.10	12.58	8.61	6.18	10.04	10.42	13.94	6.47
40/240	18.20	21.70	13.50	13.95	16.40	16.24	12.70	9.90	15.20	2.55
48/240	12.17	18.20	6.48	4.10	5.21	9.19	4.20	3.87	7.02	3.56
48/260	6.70	4.28	5.10	6.70	4.10	8.59	7.64	9.38	5.89	1.59
56/280	4.83	10.00	1.52	1.62	2.42	3.86	2.67	4.62	2.86	1.40
56/300	3.30	3.77	1.14	1.20	1.82	3.00	2.58	3.75	2.21	0.93
Average	11.37		6.97		6.43		6.64		7.85	
<i>Diplodus annularis</i>										
40/220	6.67	8.43	1.70	2.27	4.24	6.11	6.90	7.43	4.88	2.44
40/240	6.70	10.28	2.90	3.31	6.06	7.09	9.42	8.44	6.27	2.68
48/240	3.33	3.02	7.24	6.75	6.18	10.00	10.40	13.24	6.79	2.92
48/260	4.00	3.56	6.30	5.03	5.20	5.82	4.18	4.75	4.92	1.06
56/280	2.17	2.93	2.86	3.65	4.97	5.57	1.96	3.93	2.99	1.37
56/300	2.50	1.32	2.29	2.75	2.42	4.12	1.60	2.86	2.20	0.41
Average	4.23		3.88		4.85		5.74		4.67	
<i>Pagellus eythrinus</i>										
40/220	2.33	2.74	0.80	1.05	4.49	5.44	20.00	37.01	6.91	8.86
40/240	0.90	1.30	0.76	1.51	9.94	22.70	22.30	33.01	8.48	10.17
48/240	0.20	0.47	1.14	2.10	4.12	5.28	9.70	10.81	3.79	4.28
48/260	0.90	2.52	0.90	2.52	8.85	10.84	13.96	18.29	6.15	6.41
56/280	0.50	0.99	0.19	0.50	6.30	8.74	7.38	7.77	3.59	3.78
56/300	0.19	0.50	0.19	0.50	15.60	12.57	5.78	6.77	5.44	7.27
Average	0.84		0.66		8.22		13.19		5.73	

(To be concluded in next page)

**Table 3.2.1.4.22. (Concluded).**

Trammel type	Season									
	Autumn		Winter		Spring		Summer		Average	s.d.
	n	s.d.	n	s.d.	n	s.d.	n	s.d.		
<i>Scorpaena porcus</i>										
40/220	0.67	1.23	2.90	2.78	3.64	3.16	8.80	7.10	4.00	3.44
40/240	2.70	2.85	2.30	2.93	8.61	5.85	5.50	5.31	4.78	2.92
48/240	2.50	2.61	4.76	4.92	3.76	3.09	7.50	9.81	4.63	2.13
48/260	3.00	2.64	1.91	2.30	2.30	2.47	7.60	9.08	3.70	2.64
56/280	1.50	2.07	0.90	1.27	4.12	5.45	5.60	9.49	3.03	2.21
56/300	3.20	3.34	2.67	2.67	2.30	2.39	8.89	10.00	4.27	3.11
Average	2.26		2.57		4.12		7.32		4.07	
<i>Spicara maena</i>										
40/220	1.50	1.32	4.80	6.10	6.06	3.06	2.80	5.61	3.79	2.03
40/240	1.70	3.17	8.76	7.88	6.18	7.98	2.22	4.75	4.72	3.36
48/240	0.33	0.94	10.29	16.34	7.27	11.13	3.80	4.12	5.42	4.31
48/260	3.70	5.74	7.60	7.95	5.94	5.54	2.40	4.31	4.91	2.31
56/280	2.33	3.09	0.90	1.01	3.40	4.23	1.87	3.93	2.13	1.04
56/300	3.20	4.78	0.76	1.51	3.40	4.52	2.84	6.89	2.55	1.22
Average	2.13		5.52		5.38		2.66		3.92	
<i>Serranus cabrilla</i>										
40/220	7.67	5.95	5.50	4.65	8.97	5.60	9.50	7.93	7.91	1.78
40/240	5.70	5.90	4.60	4.80	9.09	7.79	9.50	13.55	7.22	2.44
48/240	0.67	1.01	0.19	0.50	4.85	6.06	3.30	7.11	2.25	2.21
48/260	0.50	0.99	0.76	1.51	3.03	2.47	1.60	2.86	1.47	1.14
56/280	-	-	0.19	0.50	1.21	2.42	0.71	1.50	0.70	0.51
56/300	0.30	0.94	-	-	1.82	1.82	1.96	3.22	1.36	0.92
Average	2.97		2.25		4.83		4.43		3.62	

**Table 3.2.1.4.23. Cyclades. Catch rate (weight, in g, per 1000 m of net) for the most abundant species by season and inner/outer panel mesh size combinations of trammel nets.**

Trammel type	Season									
	Autumn		Winter		Spring		Summer		Average	s.d.
<i>Mullus surmuletus</i>	W	s.d.	W	s.d.	W	s.d.	W	s.d.	Average	s.d.
40/220	1577.50	1303.93	1119.20	787.46	802.55	604.49	896.27	881.44	1098.88	345.62
40/240	1346.40	1293.24	1074.30	863.87	1314.80	1397.63	1199.40	1038.10	1233.73	123.64
48/240	1498.70	1987.51	895.62	542.85	613.82	1158.77	480.30	393.04	872.11	452.18
48/260	1013.80	858.57	661.52	936.30	489.02	938.67	929.20	1232.60	773.39	241.84
56/280	1011.30	2156.17	1841.90	194.94	342.40	561.70	337.80	509.58	883.35	713.08
56/300	482.80	584.95	151.80	156.13	290.30	501.98	418.84	658.15	335.94	146.55
Average	1155.08		957.39		642.15		710.30		866.23	
<i>Pagellus eythrinus</i>										
40/220	165.83	200.86	46.90	64.60	300.85	375.92	1287.29	1875.50	450.22	567.61
40/240	217.70	499.60	43.81	92.20	516.61	801.44	1628.10	1552.47	601.56	711.67
48/240	161.30	456.32	95.05	168.46	333.24	427.10	818.40	1134.86	352.00	326.74
48/260	57.70	163.11	72.76	192.51	728.24	911.53	1108.70	1347.74	491.85	516.56
56/280	44.00	94.43	16.38	43.34	643.40	906.91	867.56	1095.29	392.84	428.78
56/300	18.70	52.80	27.81	73.58	1551.60	1315.06	793.42	900.79	597.88	732.18
Average	110.87		50.45		678.99		1083.91		481.06	
<i>Diplodus annularis</i>										
40/220	168.47	225.79	47.60	62.36	117.94	170.92	211.70	242.55	136.43	70.53
40/240	177.50	280.71	69.00	74.28	166.67	195.03	275.91	252.66	172.27	84.59
48/240	117.45	103.46	258.48	254.56	217.94	344.93	430.04	564.73	255.98	130.31
48/260	157.80	145.66	228.60	188.19	223.64	221.78	181.70	216.61	197.94	34.04
56/280	114.67	161.29	158.86	217.08	294.06	310.86	88.98	151.11	164.14	91.29
56/300	120.40	69.60	136.00	185.71	120.00	214.05	99.90	180.74	119.08	14.80
Average	142.72		149.76		190.04		214.71		174.30	

(To be concluded in next page)

**Table 3.2.1.4.23. (Concluded).**

Trammel type	Season									
	Autumn		Winter		Spring		Summer		Average	s.d.
<i>Scorpaena porcus</i>	W	s.d.	W	s.d.	W	s.d.	W	s.d.	Average	s.d.
40/220	44.50	97.64	154.10	126.40	683.88	1042.14	701.51	663.46	396.00	345.58
40/240	284.50	383.00	172.80	257.05	884.10	650.86	608.60	593.58	487.50	322.59
48/240	194.50	254.35	357.10	408.25	443.20	383.08	849.30	1299.10	461.03	278.63
48/260	263.20	234.67	231.05	229.72	299.52	405.03	726.40	931.47	380.04	232.59
56/280	156.00	174.29	137.90	196.02	632.20	884.92	750.13	1270.37	419.06	317.96
56/300	339.70	406.98	329.50	355.09	380.85	335.76	1647.00	2478.98	674.26	648.87
Average	213.73		230.41		553.96		880.49		469.65	
<i>Spicara maena</i>										
40/220	76.75	87.85	252.38	258.19	286.42	159.77	122.31	250.07	184.47	100.79
40/240	102.90	191.50	403.24	354.51	396.00	442.12	172.89	376.86	268.76	153.81
48/240	29.87	84.48	740.76	1176.40	483.52	732.25	303.00	330.95	389.29	299.47
48/260	365.40	497.90	678.67	631.33	451.76	436.71	170.31	310.40	416.54	210.71
56/280	182.17	225.28	84.00	100.07	339.64	529.66	195.64	385.47	200.36	105.34
56/300	321.90	437.60	73.14	138.27	238.42	381.21	350.40	873.90	245.97	124.63
Average	179.83		372.03		365.96		219.09		284.23	
<i>Serranus cabrilla</i>										
40/220	378.28	303.55	282.67	306.66	433.20	314.27	567.64	575.58	415.45	119.01
40/240	329.70	258.00	263.81	297.94	443.61	390.09	544.62	804.91	395.44	124.13
48/240	55.33	89.11	12.95	34.27	352.73	445.45	263.27	656.73	171.07	163.20
48/260	31.60	57.30	52.95	108.13	218.67	183.51	160.27	287.38	115.87	88.69
56/280	-	-	12.38	32.76	75.39	130.83	56.60	120.36	48.12	32.35
56/300	20.40	53.92	-	-	154.30	174.92	203.70	368.32	126.13	94.84
Average	163.06		124.95		279.65		299.35		216.75	

The total number of species caught and the different diversity indices for the different inner/outer panel mesh combinations used are shown in Table 3.2.1.4.24. Overall, the number of species caught was lowest (18 species) for the 56/300 mm trammel net in winter and highest (43 species) for the 48/260 trammel net in summer (Table 3.2.1.4.24). In general, the mean number of species and individuals, mean richness, mean evenness and mean Shannon-Wiener diversity all did not differ significantly (for all cases:  $t$  values  $<0.52$ ,  $p>0.61$ ) between the two sets of nets differing in the outer panel mesh size.

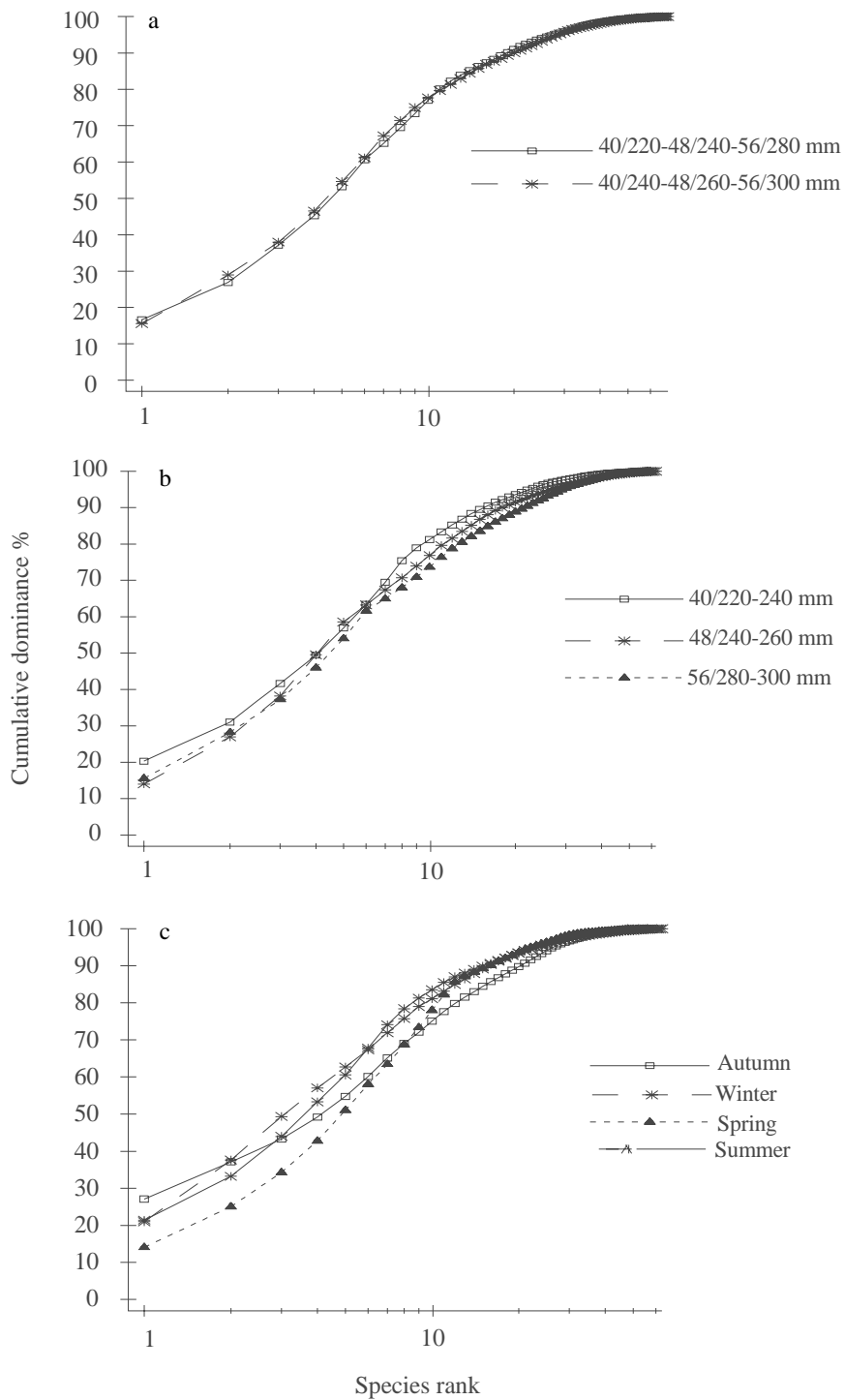
**Table 3.2.1.4.24. Cyclades. Total number of species (S), total number of individuals (N, mean seasonal catch numbers per 1000 m of net), total richness (D), diversity (H') and evenness (J) for each season per different inner/outer panel stretched mesh size (in mm) combinations of trammel nets.**

<b>Inner/outer</b>	<b>Season</b>	<b>S</b>	<b>N</b>	<b>D</b>	<b>J</b>	<b>H'</b>
40/220	Autumn	27	61.9	6.3	0.7	2.3
48/240	Autumn	32	35.9	8.7	0.8	2.7
56/280	Autumn	28	34.3	7.6	0.8	2.5
40/240	Autumn	32	62	7.5	0.7	2.6
48/260	Autumn	31	33.4	8.6	0.8	2.8
56/300	Autumn	27	25.2	8.1	0.8	2.8
40/220	Winter	24	44.2	6.1	0.7	2.4
48/240	Winter	21	43.4	5.3	0.8	2.3
56/280	Winter	28	14.9	10.0	0.9	2.9
40/240	Winter	32	53.5	7.8	0.7	2.6
48/260	Winter	20	31.5	5.5	0.8	2.4
56/300	Winter	18	14	6.4	0.9	2.5
40/220	Spring	36	71.2	8.2	0.8	2.9
48/240	Spring	33	56.3	7.9	0.8	2.6
56/280	Spring	22	29.4	6.2	0.8	2.4
40/240	Spring	37	101.9	7.8	0.8	2.8
48/260	Spring	28	49.8	6.9	0.8	2.6
56/300	Spring	30	41	7.8	0.7	2.4
40/220	Summer	34	90.1	7.3	0.7	2.5
48/240	Summer	41	59.3	9.8	0.7	2.8
56/280	Summer	35	33.8	9.7	0.8	2.8
40/240	Summer	36	89.8	7.8	0.7	2.5
48/260	Summer	43	58.5	10.3	0.7	2.7
56/300	Summer	38	40.1	10.0	0.8	2.9
<b>Min</b>		18	14	5.3	0.7	2.3
<b>Max</b>		43	101.9	10.3	0.9	2.9
<b>Mean</b>		31	49.0	7.8	0.8	2.6

One-way ANOVA indicated significant (for both cases  $F > 3.7$ ,  $p < 0.05$ ) differences in the mean number of species and the mean richness of the 24 mesh-size/season combinations between seasons. The use of Fisher's LSD test indicated that the former was significantly (at 0.05) higher in summer and lower in winter whereas mean richness was higher in summer when compared with all remaining seasons. In contrast, the mean number of individuals caught, mean evenness and mean Shannon-Wiener diversity did not differ significantly (for all cases  $F < 1.3$ ,  $P > 0.09$ ) between seasons.

Finally, one-way ANOVA also indicated significant (for both cases  $F > 5.5$ ,  $p < 0.05$ ) differences in the mean number of individuals caught and the mean evenness of the 24 mesh-size/season combinations between inner mesh sizes. The use of Fisher's LSD test indicated that the mean number of individuals declined significantly with inner mesh size whereas the opposite was true of the mean evenness. In contrast, the mean number of species, mean richness and mean Shannon-Wiener diversity did not differ significantly (for all cases  $F < 0.78$ ,  $P > 0.47$ ) between inner mesh sizes.

Dominance of the combined catch of the 40/220, 48/240 and 56/280 mm inner/outer panel mesh combinations did not differ from that of the 40/240, 48/260 and 56/300 mm mesh combinations (Figure 3.2.1.4.7a). The same was also true for dominance in terms of inner mesh sizes, although it was slightly higher for the 40 mm inner mesh size combinations than for the remaining ones (Figure 3.2.1.4.7b). In contrast, dominance differed with season, being more pronounced in autumn and less so in spring (Figure 3.2.1.4.7c).



**Figure 3.2.1.4.7. Cyclades. K-dominance curves based on catch numbers (per 1000 m of net) for all species caught for six combinations of inner/outer panel stretched mesh sizes (in mm): (a) and (b) for all seasons combined and (c) by season.**

### 3.2.2. Depth related changes

#### 3.2.2.1. Basque Country

Overall 271 Km of trammel nets were used for the purpose of the fishing trials. All the fishing trials took place below 80 metres depth (Table 3.2.2.1.1). The depth distribution of the nets set was uneven among seasons due to seasonal differences in fishing conditions (weather at sea, supposed depth distribution of the target species by the skipper). In autumn and winter most of the nets were set in depths above 40 m, whereas spring and particularly summer fishing trials were carried out mainly below 40 m.

**Table 3.2.2.1.1 Basque Country. Length (in m) of nets set by depth stratum (in m) and season.**

Depth range	Season				Total
	Winter	Spring	Summer	Autumn	
0-19		7.575	15.150		22.725
20-39	3.030	36.360	60.600		99.990
40-59	34.845	15.150			49.995
60-79	31.815	9.090		57.570	98.475
Total	69.690	68.175	75.750	57.570	271.185

The catch rates of the seven main species caught by season and depth stratum are shown in Table 3.2.2.1.2. The highest catch rate for *Solea vulgaris* was recorded in winter on the 60-79 m depth stratum (32.0 individuals/1000 m). The catch rate of this species declined during the rest of the seasons in which highest catch rates took place mainly in shallow waters, particularly in spring where the highest catch rate was obtained under 20 m depth (14.4 individuals/1000 m). Taking into account that *S. vulgaris* was the main target fish during the fishing trials, the catch rate variation would suggest a seasonal change in the depth distribution of the species. The highest catch rate for *Trisopterus luscus* was recorded in winter on the fishing grounds between 20 to 39 m deep. There was a decline in the catch rate of the species with depth both in winter and spring. Due to the ubiquity of *Scomber scombrus* as a pelagic species, the catch rate of the trammel nets for the species in winter do not show a clear trend in variation with depth; the values remained stable around 20 individuals/1000 m throughout the depth range. In contrast, *Trachinus draco* showed higher catch rates as the

fishing grounds depth increased, particularly in spring where the highest catch rate was recorded in the 60-79 m depth stratum (22.4 individuals/1000 m). Most of the rest of species selected did not show a clear pattern of depth related catch rate variation, except for *Sardina pilchardus* whose highest yields in winter were recorded in deep water (17.8 individuals/1000 m).

**Table 3.2.2.1.2 Basque Country. Mean catch rate (number per 1000 of net) by main species and depth stratum (in m). Note: s: number of sets; n: catch rate; s.d.: standard deviation; -: no set of nets in the depth stratum.**

Species	Depth stratum											
	0-19			20-39			40-59			60-79		
	s	n	s.d.	s	n	s.d.	s	n	s.d.	s	n	s.d.
<b>WINTER</b>												
<i>Solea vulgaris</i>	-	-	-	2	6.60	0.93	23	18.65	8.88	21	31.97	17.52
<i>Trisopterus luscus</i>	-	-	-	2	26.40	0.00	23	11.74	11.59	21	8.58	8.26
<i>Scomber scombrus</i>	-	-	-	2	18.81	0.47	23	21.44	20.38	21	22.29	38.79
<i>Trachinus draco</i>	-	-	-	2	0.00	0.00	23	0.32	0.66	21	2.89	2.77
<i>Sardina pilchardus</i>	-	-	-	2	0.00	0.00	23	6.03	20.84	21	17.82	45.27
<i>Merluccius merluccius</i>	-	-	-	2	5.61	7.00	23	3.07	5.91	21	3.65	5.37
<i>Trigla lucerna</i>	-	-	-	2	0.00	0.00	23	1.21	2.88	21	3.36	6.20
<b>SPRING</b>												
<i>Solea vulgaris</i>	5	14.39	12.61	24	6.30	3.37	10	4.09	2.85	6	2.42	2.11
<i>Trisopterus luscus</i>	5	3.43	1.71	24	3.38	1.94	10	2.64	1.49	6	1.87	1.14
<i>Scomber scombrus</i>	5	0.13	0.30	24	0.00	0.00	10	0.00	0.00	6	0.88	2.16
<i>Trachinus draco</i>	5	3.30	3.33	24	3.27	2.67	10	9.17	3.88	6	22.44	18.53
<i>Sardina pilchardus</i>	5	0.40	0.89	24	0.08	0.30	10	0.07	0.21	6	0.00	0.00
<i>Merluccius merluccius</i>	5	4.36	5.95	24	1.90	1.99	10	1.72	1.92	6	1.21	2.06
<i>Trigla lucerna</i>	5	0.66	0.81	24	1.76	1.36	10	1.32	1.21	6	1.43	1.41
<b>SUMMER</b>												
<i>Solea vulgaris</i>	10	6.34	5.72	40	6.73	3.45	-	-	-	-	-	-
<i>Trisopterus luscus</i>	10	0.46	0.45	40	2.72	3.30	-	-	-	-	-	-
<i>Scomber scombrus</i>	10	0.00	0.00	40	0.02	0.10	-	-	-	-	-	-
<i>Trachinus draco</i>	10	7.59	5.07	40	9.22	8.18	-	-	-	-	-	-
<i>Sardina pilchardus</i>	10	6.53	15.90	40	1.30	3.67	-	-	-	-	-	-
<i>Merluccius merluccius</i>	10	0.59	1.44	40	1.04	1.61	-	-	-	-	-	-
<i>Trigla lucerna</i>	10	1.91	1.90	40	2.11	1.86	-	-	-	-	-	-
<b>AUTUMN</b>												
<i>Solea vulgaris</i>	-	-	-	-	-	-	-	-	-	38	11.03	14.33
<i>Trisopterus luscus</i>	-	-	-	-	-	-	-	-	-	38	4.95	5.17
<i>Scomber scombrus</i>	-	-	-	-	-	-	-	-	-	38	0.14	0.54
<i>Trachinus draco</i>	-	-	-	-	-	-	-	-	-	38	15.67	9.29
<i>Sardina pilchardus</i>	-	-	-	-	-	-	-	-	-	38	0.36	1.00
<i>Merluccius merluccius</i>	-	-	-	-	-	-	-	-	-	38	9.10	11.34
<i>Trigla lucerna</i>	-	-	-	-	-	-	-	-	-	38	3.04	3.18

### 3.2.2.2. Algarve

The experimental fishing trials with trammel nets took place at depths from less than 20 m to 100 m. For the purposes of this study, five different depth ranges were used for evaluating catch rates as a function of depth and season. The depth ranges are 0-19, 20-39, 40-59, 60-79 and 80-99 m (Table 3.2.2.2.1).

**Table 3.2.2.2.1. Algarve. Number of metres of nets used by depth stratum and sampling season.**

Depth range (meters)	Seasons			
	Winter	Spring	Summer	Autumn
0-19		53400		26700
20-39	81880	26700	17800	26700
40-59	10680	8900	26700	26700
60-79			8900	8900
80-99			35600	
Total	92560	89000	89000	89000

A total of 359560 m of trammel net were fished, with 89000 m fished in the Spring, Summer and Autumn and 92560 m were fished in the winter (Table 3.2.2.2.1). Approximately 65% of the fishing effort (m of net) took place at depths of less than 40 m, while 85% of the fishing effort was at depths less than 60 m. Depths from 20 to 60 m were fished in all seasons. The shallowest depth range (<20m) was fished only in the spring and the fall. In contrast, the 60-79m depth range was fished only in the summer and in the autumn, while the deepest depth range was fished only in the summer.

Catch rates in numbers per 1000 m of net by depth range and season for the most eleven most important species are given in Table 3.2.2.2.2. For *Sepia officinalis*, strong seasonality in the catch rates can be seen, with the highest catch rates in the winter. The highest catch rates were at depths between 20 and 39 m for all seasons, with moderate catch rates at less than 20 m and between 40 and 59 m in the autumn.

As was the case for the cuttlefish, the highest catch rates in all seasons for the two main commercial species of sole (*Solea senegalensis* and *Microchirus azevia*) were in the 20 to 39 m depth stratum. Although caught in all depth strata, the fork-beard (*Phycis phycis*) catch rates were highest at depths greater than 40 m, with the highest mean catch rate of 13 fish/1000 m obtained in the summer season and in the deepest stratum.

For *Chelidonichthys obscurus* the highest catch rates in all seasons except the spring were in the 20 to 39 m depth range. The highest catch rates in the spring were in the shallowest depths. In the case of *Chelidonichthys lastoviza*, the highest catch rates were for the autumn fishing trials at depths between 40 and 60 m .

The greater weever, *Trachinus draco*, was caught mainly in the shallowest depths and especially in the spring and summer. The chub mackerel, *Scomber japonicus*, had the highest catch rates in the summer and autumn and at intermediate depths (20 to 60 m).

Relatively high catch rates of *Scorpaena notata* were throughout the depth range fished, with particular emphasis on the shallowest depth range in the autumn and the deepest depth stratum in the summer. The highest catch rates of the axillary sea bream, *Pagellus acarne*, were made in the summer and in the deepest depth stratum, with the lowest catch rates at the lowest depths. Similarly, the highest hake (*Merluccius merluccius*) catch rates were obtained in the summer and at depths greater than 80 m.

**Table 3.2.2.2.2. Algarve. Catch rates in numbers per 1000 metres of trammel net ( $\pm$  1 s.d.) by season and depth stratum.**

Species	Season	Depth ranges (meters)				
		0-19	20-39	40-59	60-79	80-99
<i>Chelidonichthys obscurus</i>	Winter		3.52 $\pm$ 4.70	0.37		
	Spring	1.69 $\pm$ 0.43	0.86 $\pm$ 1.02	0.56		
	Summer		3.65 $\pm$ 4.05	0.04		0.03
	Autumn	0.56 $\pm$ 0.56	1.69 $\pm$ 0.49	0.64 $\pm$ 0.45		
<i>Sepia officinalis</i>	Winter		16.63 $\pm$ 7.87	6.37		
	Spring	3.07 $\pm$ 1.99	2.10 $\pm$ 1.73	0.90		
	Summer		1.97 $\pm$ 0.40	1.01 $\pm$ 0.79	0.11	0.00
	Autumn	4.08 $\pm$ 2.78	5.36 $\pm$ 0.84	4.16 $\pm$ 1.54	0.11	
<i>Microchirus azevia</i>	Winter		7.40 $\pm$ 4.26	4.87		
	Spring	0.34 $\pm$ 0.51	6.29 $\pm$ 9.93	8.09		
	Summer		12.92 $\pm$ 6.51	0.26 $\pm$ 0.17	0.11	0.03
	Autumn	0.37 $\pm$ 0.48	6.37 $\pm$ 3.28	3.75 $\pm$ 2.56	5.39	
<i>Scomber japonicus</i>	Winter		8.38 $\pm$ 9.09	9.36		
	Spring	1.27 $\pm$ 1.10	1.09 $\pm$ 1.83	6.74		
	Summer		8.09	12.85 $\pm$ 16.58	0.11	2.10 $\pm$ 1.92
	Autumn	1.05 $\pm$ 1.62	18.46 $\pm$ 19.19	17.23 $\pm$ 27.23	15.39	
<i>Trachinus draco</i>	Winter		1.24 $\pm$ 1.00	0.09		
	Spring	6.55 $\pm$ 1.71	4.76 $\pm$ 6.01			
	Summer		6.24 $\pm$ 5.64	0.00		0.00
	Autumn	0.04	0.52 $\pm$ 0.45	0.26 $\pm$ 0.17		
<i>Phycis phycis</i>	Winter		0.40 $\pm$ 0.63	0.47		
	Spring	0.07 $\pm$ 0.00	0.07	3.82		
	Summer		0.00	4.83 $\pm$ 1.35	2.81	12.99 $\pm$ 16.04
	Autumn	1.65 $\pm$ 0.98	1.24 $\pm$ 0.11	2.25 $\pm$ 2.76	1.91	
<i>Scorpaena notata</i>	Winter		0.42 $\pm$ 0.65	0.94		
	Spring	1.37 $\pm$ 0.91	1.65 $\pm$ 2.19	7.08		
	Summer		1.40 $\pm$ 1.35	0.37 $\pm$ 0.23	1.12	3.50 $\pm$ 6.33
	Autumn	4.42 $\pm$ 1.15	2.43 $\pm$ 1.39	1.57 $\pm$ 0.88	3.71	
<i>Pagellus acarne</i>	Winter		1.36 $\pm$ 0.71	1.78		
	Spring	0.86 $\pm$ 0.39	1.05 $\pm$ 0.84	2.36		
	Summer		0.73 $\pm$ 0.08	1.42 $\pm$ 0.36	1.69	5.85 $\pm$ 7.44
	Autumn	0.86 $\pm$ 1.03	2.43 $\pm$ 0.98	1.99 $\pm$ 1.34	3.71	
<i>Solea senegalensis</i>	Winter		1.33 $\pm$ 1.07	0.09		
	Spring	3.82 $\pm$ 1.24	2.43 $\pm$ 2.42			
	Summer		1.97 $\pm$ 1.19	0.00		0.00
	Autumn	0.22 $\pm$ 0.11	0.19 $\pm$ 0.24	0.04		
<i>Chelidonichthys lastoviza</i>	Winter		1.18 $\pm$ 0.86	0.47		
	Spring	0.02	0.07 $\pm$ 0.00	3.15		
	Summer		0.34 $\pm$ 0.16	0.19 $\pm$ 0.08	0.11	0.67 $\pm$ 0.89
	Autumn	0.07 $\pm$ 0.00	1.84 $\pm$ 1.61	4.19 $\pm$ 1.72	0.11	
<i>Merluccius merluccius</i>	Winter		1.06 $\pm$ 0.59	1.97		
	Spring	0.06 $\pm$ 0.00	0.49 $\pm$ 0.56			
	Summer		0.28	0.22	2.92	9.60 $\pm$ 14.94
	Autumn	0.04	0.34 $\pm$ 0.24	0.07	9.66	

### 3.2.2.3. Gulf of Cádiz

Experimental fishing was carried out using a total length of 184500 m of trammel nets, at depths ranging from 0 to 20 meters. For the purposes of this study, four different depth ranges were established: 0-5, 5-10, 10-15 and 15-20 m. The lengths of net, in meters, used in the fishing in each depth stratum and in each fishing season, are given in Table 3.2.2.3.1, varied between 256.5 m., for the 15-20 m. range in spring, to 58726 m., for the 5-10 m. range, also in spring. In the total assessment, 50% of the fishing activity was conducted in zones with depths in the 5-10 m. range, and 30% in shallower zones with depths in the 0-5 m. range.

**Table 3.2.2.3.1. Gulf of Cádiz. Length (in m) of nets set by depth stratum (in m) and season.**

Depth range	Season		Total
	Spring	Autumn	
0-5	0	57175	57175
5-10	58726	34234.5	92960.5
10-15	33717.5	1290.5	35008
15-20	256.5	0	256.5
Total	92700	92700	185400

In the two sampling periods, approximately 60 % of the fishing effort was applied in one single depth range: 5-10 m. in spring and 0-5 m. in autumn. This clear alternation was decided mainly in view of the climatological differences between the two seasons. In spring it was possible to fish with the nets at greater depths without much risk of losing them in the event of the weather turning bad the following day: in autumn the more frequent bad weather did not allow this, so the experimental fishing was conducted closer to the coastline.

Seasonal catch rates, in terms of abundance and biomass per 1000 m. length of net used, for all the various combinations of inner and outer panel types together, and for the 4 predominant species (i.e. *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*) are given in Tables 3.2.2.3.2. and 3.2.2.3.3., by abundance and biomass, respectively.

**Table 3.2.2.3.2. Gulf of Cádiz. Cath rate (number per 1000 m of net) by main species and depth stratum (in m).**

Species	Depth stratum								Total
	0-5		5-10		10-15		15-20		
	n	s.d.	n	s.d.	n	s.d.	n	s.d.	
<b>Spring</b>									
<i>Sepia officinalis</i>	-	-	29.83	16.50	38.89	24.21	38.99	0.00	107.71
<i>Solea senegalensis</i>	-	-	2.38	1.61	3.64	1.96	3.9	0.00	9.92
<i>Synaptura lusitanica</i>	-	-	3.26	2.31	2.08	2.13	-	-	5.34
<i>Torpedo torpedo</i>	-	-	0.51	0.72	0.96	1.92	-	-	1.47
Total			35.98		45.57		42.89		124.44
<b>Autumn</b>									
<i>Sepia officinalis</i>	4.21	3.71	3.87	3.93	3.22	0.00	-	-	11.3
<i>Solea senegalensis</i>	3.36	2.6	5.04	6.1	0.64	0.00	-	-	9.04
<i>Synaptura lusitanica</i>	2.28	1.63	1.83	1.43	-	-	-	-	4.11
<i>Torpedo torpedo</i>	5.19	6.27	6.44	11.58	-	-	-	-	11.63
Total	15.04		17.18		3.86				36.08

**Table 3.2.2.3.3. Gulf of Cádiz. Cath rate (weight in g per 1000 m. of net) by main species and depth stratum (in m).**

Species	Depth stratum								Total
	0-5		5-10		10-15		15-20		
	W	s.d.	W	s.d.	W	s.d.	W	s.d.	
<b>Spring</b>									
<i>Sepia officinalis</i>	-	-	13651.71	8088.75	20038.03	15404.10	12842.11	0.00	46531.85
<i>Solea senegalensis</i>	-	-	616.52	455.33	1065.72	562.97	-	-	1682.24
<i>Synaptura lusitanica</i>	-	-	1069.62	815.50	692.19	639.79	1376.22	0.00	3138.03
<i>Torpedo torpedo</i>	-	-	189.73	424.34	421.30	1313.18	-	-	611.04
Total			15527.59		22217.25		14218.32		51963.16
<b>Autumn</b>									
<i>Sepia officinalis</i>	1340.90	1113.78	1278.24	1199.92	1050.29	0.00	-	-	3669.43
<i>Solea senegalensis</i>	648.54	416.72	1060.87	1223.70	-	-	-	-	1709.41
<i>Synaptura lusitanica</i>	464.10	358.23	463.51	364.04	-	-	-	-	927.61
<i>Torpedo torpedo</i>	821.12	1012.31	1021.85	1680.00	508.70	0.00	-	-	2351.68
Total			3824.48		1558.99				8658.13

In terms of abundance, the highest catch rate for *Sepia officinalis* (38.99 specimens/1000 m) was in the 15-20 m depth range in spring; the highest catch rate for *Solea senegalensis* (5.04 specimens/1000 m) was in the 5-10 m depth stratum in autumn; that for *Synaptura lusitanica* (3.26 specimens/1000 m) was in the 5-10 m depth stratum in spring; and that for *Torpedo torpedo* (6.44 specimens/1000 m) was in the 5-10 m depth stratum in autumn

(Table 3.2.2.3.2).

In terms of biomass, the highest catch rate for *Sepia officinalis* (20.0 kg/1000 m) was in the 10-15 m depth range, also in spring; that for *Solea senegalensis* (1.0 kg/1000 m) was in the 10-15 m depth range, in spring, and very similar to that obtained at 5-10 m depths in autumn; that for *Synaptura lusitanica* (1.3 kg/1000 m) was at 15-20 m depths in spring; and that for *Torpedo torpedo* (1.0 kg/1000 m) was at 5-10 m depths in autumn (Table 3.2.2.3.3).

The catches of *Sepia officinalis* and *Solea senegalensis* increased with greater depth of fishing in spring, but the opposite tendency was seen in autumn. In spring *Sepia officinalis* presents high catch values, ranging between 29.83 specimens/1000 m at 5-10 m depth and the maximum obtained, 38.99 specimens/1000 m at 15-20 m depth. In autumn, the values are considerably lower and are of the same order as those of the other main species. *Solea senegalensis* had higher catch rates in autumn, with the highest value of 5.04 specimens/1000 m obtained in the 5-10 m depth range, and the lowest value of 0.64 specimens in the 10-15 m. depth stratum, also in autumn.

The catches of *Synaptura lusitanica* were less at greater fishing depths, in both spring and autumn. The lowest value of 1.83 specimens was obtained in the 5-10 m depth range in autumn, while the highest value, 3.26 specimens, was obtained in the 5-10 m depth stratum in spring.

For *Torpedo torpedo*, catches increased with greater fishing depths in both sampling periods. The highest value obtained for this species was 6.44 specimens in the 5-10 m depth stratum in autumn, and the lowest was 0.51 at 10-15 m depths in spring.

The greatest depth range for this experimental fishing was 15- 20 m. and this range was only fished in spring. Of the 4 main species studied, only *Sepia officinalis* and *Solea senegalensis* were caught at these depths.

#### **3.2.2.4. Cyclades**

Overall, 184500 m of nets was set at depths ranging from 10 to 81 m. For the purposes of this analysis, two depth strata were considered, 0-39 and 40-81 m. The length of the nets set by depth stratum and season, shown in Table 3.2.2.4.1, ranged from 1500 m, for the 40-81 m depth stratum in winter, to 39000 m, for the 0-39 m depth stratum in summer.

**Table 3.2.2.4.1. Cyclades. Length (in m) of nets set by depth stratum (in m) and season.**

<b>Depth range</b>	<b>Season</b>				<b>Total</b>
	<b>Autumn</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>	
0-39	30750	30000	17250	39000	117000
40-81	5250	1500	32250	28500	67500
<b>Total</b>	<b>36000</b>	<b>31500</b>	<b>49500</b>	<b>67500</b>	<b>184500</b>

The seasonal catch rates, in terms of number and weight per 1000 m of net, for all different inner/outer panel mesh sizes combined and for the six most abundant species caught (i.e., *Mullus surmuletus*, *Pagellus erythrinus*, *Diplodus annularis*, *Scorpaena porcus*, *Spicara maena*, *Serranus cabrilla*) are shown in Tables 3.2.2.4.2 and Table 3.2.2.4.3, respectively.

**Table 3.2.2.4.2. Cyclades. Catch rate (number per 1000 m of net) by main species and depth stratum (in m).**

Species	Depth stratum				Total
	0-39		40-79		
	n	s.d.	n	s.d.	
<b>Autumn</b>					
<i>Mullus surmuletus</i>	45.75	37.40	5.38	11.24	51.13
<i>Pagellus erythrinus</i>	4.25	6.30	0.63	0.58	4.88
<i>Diplodus annularis</i>	17.50	17.44	1.50	2.83	19.00
<i>Scorpaena porcus</i>	8.63	4.37	1.50	1.41	10.13
<i>Serranus cabrilla</i>	10.25	8.78	1.00	2.83	11.25
<i>Spicara maena</i>	9.38	7.63	0.13	-	9.50
<b>Total</b>	<b>95.75</b>		<b>10.13</b>		<b>105.88</b>
<b>Winter</b>					
<i>Mullus surmuletus</i>	29.29	21.01	2.14	-	31.43
<i>Pagellus erythrinus</i>	2.71	4.16	0.29	-	3.00
<i>Diplodus annularis</i>	17.57	10.44	-	-	17.57
<i>Scorpaena porcus</i>	10.57	9.34	1.00	-	11.57
<i>Serranus cabrilla</i>	7.14	4.53	1.29	-	8.43
<i>Spicara maena</i>	24.43	20.43	0.43	-	24.86
<b>Total</b>	<b>91.71</b>		<b>5.14</b>		<b>96.86</b>
<b>Spring</b>					
<i>Mullus surmuletus</i>	10.27	17.00	18.64	14.17	28.91
<i>Pagellus erythrinus</i>	14.82	18.20	22.18	17.56	37.00
<i>Diplodus annularis</i>	6.82	11.02	15.64	10.09	22.45
<i>Scorpaena porcus</i>	8.55	11.09	10.00	8.14	18.55
<i>Serranus cabrilla</i>	6.64	9.93	15.09	9.37	21.73
<i>Spicara maena</i>	8.18	15.37	16.09	15.61	24.27
<b>Total</b>	<b>55.27</b>		<b>97.64</b>		<b>152.91</b>
<b>Summer</b>					
<i>Mullus surmuletus</i>	19.13	26.69	10.73	18.14	29.87
<i>Pagellus erythrinus</i>	4.58	11.17	0.95	14.50	5.53
<i>Diplodus annularis</i>	18.60	19.75	7.33	12.69	25.93
<i>Scorpaena porcus</i>	24.93	46.83	7.87	10.16	32.80
<i>Serranus cabrilla</i>	13.47	16.91	6.60	15.42	20.07
<i>Spicara maena</i>	5.87	5.80	6.13	26.90	12.00
<b>Total</b>	<b>86.58</b>		<b>39.61</b>		<b>126.20</b>

**Table 3.2.2.4.3. Cyclades. Catch rate (weight in g per 1000 m of net) by main species and depth stratum (in m).**

Species	Depth stratum				Total
	0-39		40-79		
	W	s.d.	W	s.d.	
<b>Autumn</b>					
<i>Mullus surmuletus</i>	5783.15	82.73	1154.83	100.34	6937.98
<i>Pagellus erythrinus</i>	441.00	154.60	224.17	336.00	665.17
<i>Diplodus annularis</i>	759.37	16.86	98.67	21.37	858.03
<i>Scorpaena porcus</i>	1040.50	74.83	241.83	73.62	1282.33
<i>Serranus cabrilla</i>	680.23	17.73	88.17	27.12	768.40
<i>Spicara maena</i>	980.64	34.25	10.67	-	991.31
<b>Total</b>	<b>9684.9</b>		<b>1818.3</b>		<b>11503.23</b>
<b>Winter</b>					
<i>Mullus surmuletus</i>	3884.19	95.08	202.48	27.71	4086.67
<i>Pagellus erythrinus</i>	266.86	29.15	35.81	98.05	302.67
<i>Diplodus annularis</i>	898.48	20.56	-	-	898.48
<i>Scorpaena porcus</i>	1327.43	108.80	55.05	25.57	1382.48
<i>Serranus cabrilla</i>	576.00	22.49	86.67	6.64	662.67
<i>Spicara maena</i>	2049.33	26.80	51.24	15.45	2100.57
<b>Total</b>	<b>9002.29</b>		<b>431.24</b>		<b>9433.52</b>
<b>Spring</b>					
<i>Mullus surmuletus</i>	1202.06	54.38	2643.39	82.43	3845.45
<i>Pagellus erythrinus</i>	1383.64	60.27	2690.81	55.73	4074.45
<i>Diplodus annularis</i>	321.94	15.13	815.52	21.54	1137.45
<i>Scorpaena porcus</i>	1069.21	126.35	2268.85	264.25	3338.06
<i>Serranus cabrilla</i>	450.18	24.89	1251.73	23.30	1701.92
<i>Spicara maena</i>	764.00	59.07	1609.47	36.73	2373.47
<b>Total</b>	<b>5191.03</b>		<b>11279.77</b>		<b>16470.80</b>
<b>Summer</b>					
<i>Mullus surmuletus</i>	2695.20	55.71	1562.04	50.81	4257.24
<i>Pagellus erythrinus</i>	3632.27	60.44	2849.78	93.10	6482.04
<i>Diplodus annularis</i>	1037.60	16.43	250.13	17.50	1287.73
<i>Scorpaena porcus</i>	3914.31	153.39	1409.51	243.70	5323.82
<i>Serranus cabrilla</i>	1161.26	30.31	702.66	29.48	1863.92
<i>Spicara maena</i>	582.31	34.40	733.60	46.45	1315.91
<b>Total</b>	<b>13022.95</b>		<b>7507.72</b>		<b>20530.68</b>

The numerical and weight catch rates of all six species were highest in the 0-39 m for autumn, winter and summer, with the exception of *Spicara maena* in summer, the abundance

of which was higher in the 40-81 m depth stratum (Tables 3.2.2.4.2 and 3.2.2.4.3). In contrast, in spring the numerical and weight catch rate of all six species was highest in the 40-81 m depth stratum (Tables 3.2.2.4.2 and 3.2.2.4.3).

The numerical catch rate of *Mullus surmuletus* was highest (45.8 individuals/1000 m) for the 0-39 m in autumn, of *Pagellus erythrinus* (22.2 individuals/1000 m) for the 40-81 m in spring, of *Diplodus annularis* (18.6 individuals/1000 m) for the 0-39 m in summer, of *Scorpaena porcus* (24.9 individuals/1000 m) for the 0-39 m in summer, of *Spicara maena* (24.4 individuals/1000 m) for the 0-39 m in winter, and of *Serranus cabrilla* (15.1 individuals/1000 m) for the 40-81 m in spring (Table 3.2.2.4.2).

The weight catch rate of *Mullus surmuletus* was highest (5.8 kg/1000 m) for the 0-39 m in autumn, of *Pagellus erythrinus* (3.6 kg/1000 m) for the 0-39 m in summer, of *Diplodus annularis* (1.0 kg/1000 m) for the 0-39 m in summer, of *Scorpaena porcus* (3.9 kg/1000 m) for the 0-39 m in summer, of *Spicara maena* (2.0 kg/1000 m) for the 0-39 m in winter, and of *Serranus cabrilla* (1.3 kg/1000 m) for the 40-81 m net in spring (Table 3.2.2.4.3).

### **3.2.3. Discards and discarding practices**

#### **3.2.3.1. Basque Country**

Overall 65 different species were discarded in the fishing trials of all the seasons combined (Tables 3.2.3.1.1). Fishes contributed by far the greatest part of the discards (61 species: 95.2% in numbers), followed by crustaceans (3 species: 4.7 % in numbers) and cephalopods (1 species: 0.1 in numbers). The overall level of discarding diminished with the increase of the mesh size in the inner panel of the trammel net (39% of the total individuals discarded with the 90 mm mesh size; whereas 32.7% and 28.1% were discarded with the 100 and 110 mm mesh size respectively).

Eleven species of fishes accounted for 75% of the total discards in number. The main reason for discarding for most of these species was the bad state of the catch, probably due to the lengthy stay at sea once caught, particularly for valuable commercial species like *Trisopterus luscus*, *Trachinus draco* and *Merluccius merluccius*. Some other species are discarded because of the lack of commercial interest (*Sardina pilchardus*; *Torpedo marmorata*). Only a few species are discarded because the individuals were below the commercial landing size (*Lophius piscatorius*, *Maja squinado*).

*Trisopterus luscus* was the main species discarded (16.0 % of the total number of individuals discarded), followed by *Sardina pilchardus* (15.0%). Some other important discarded species are *Trachinus draco* (10.3%), *Scomber scombrus* (7.5%) and *Merluccius merluccius* (4.8%).

For most of the major species discarded a decline in the number of individuals discarded was observed as the mesh size in the inner panel increased. However this was not the case for some species (*Scomber scombrus*, *Lophius piscatorius*). Only in a few species was the level of discards higher with larger mesh sizes of the inner panel of the trammel net (*Torpedo marmorata*).

There were seasonal differences in the species composition of the discards and the importance of species discarded by trammel nets (Tables 3.2.3.1.2 to 3.2.3.1.5). In winter, discards were dominated by *Sardina pilchardus* (34.2 % of overall discards in number), *Scomber scombrus* (22.6%) and *Trisopterus luscus* (13.4%), whereas in spring the species dominance in the discards was less pronounced than in winter and the principal species in the ranking of discards were also different: *Torpedo marmorata* (14.2%), *Trachinus draco* (12.5%), *Lophius piscatorius* (10.6%). The bulk of summer discards were also distributed among a large number of species with a dominance of *Trachinus draco* (19.5%), *Sardina pilchardus* (14.9%), *Trachurus trachurus* (7.1%) and *Trisopterus luscus* (6.7%). In autumn, discards were mainly composed of *Trisopterus luscus* (43.2%), *Merluccius merluccius* (13.4%) and *Trachinus draco* (7.4%).

**Table 3.2.3.1.1 Basque Country. Number of individuals discarded by trammel net mesh size combination during all fishing trials. Year 2000 (49 trials).**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Trisopterus luscus</i>	121	118	104	102	81	84	610	16.03
<i>Sardina pilchardus</i>	81	149	87	112	45	95	569	30.99
<i>Trachinus draco</i>	87	93	55	67	46	42	390	41.24
<i>Scomber scombrus</i>	47	47	47	53	48	42	284	48.70
<i>Merluccius merluccius</i>	41	49	27	26	19	21	183	53.51
<i>Torpedo marmorata</i>	20	23	28	26	39	37	173	58.06
<i>Lophius piscatorius</i>	27	15	29	32	25	33	161	62.29
<i>Maja squinado</i>	24	19	24	20	33	35	155	66.36
<i>Trachurus trachurus</i>	50	18	11	26	12	17	134	69.88
<i>Aspitrigla obscura</i>	23	19	17	19	10	13	101	72.54
<i>Trigla lucerna</i>	25	15	12	15	16	14	97	75.09
<i>Micromesistius poutassou</i>	13	17	20	15	8	10	83	77.27
<i>Microchirus variegatus</i>	25	22	11	8	2	6	74	79.21
<i>Scomber japonicus</i>	10	15	6	13	12	12	68	81.00
<i>Raja montagui</i>	9	3	12	7	19	10	60	82.58
<i>Callionymus lyra</i>	12	14	6	10	6	9	57	84.07
<i>Boops boops</i>	27	10	6	4	6	3	56	85.55
<i>Solea vulgaris</i>	11	6	10	9	6	5	47	86.78
<i>Triglidae spp.</i>	10	6	4	15	6	6	47	88.02
<i>Aspitrigla cuculus</i>	8	6	10	6	9	5	44	89.17
<i>Sciaena umbra</i>	8	11	10	3	3	4	39	90.20
<i>Solea lascaris</i>	14	13	4	2	3	2	38	91.20
<i>Raja undulata</i>	5	4	5	6	12	5	37	92.17
<i>Mullus surmuletus</i>	11	4	4	7	3	7	36	93.11
<i>Mola mola</i>	6	3	5	8	3	9	34	94.01
<i>Raja clavata</i>	5	3	9	4	3	6	30	94.80
<i>Mugil chelo</i>	1	3		6	2	5	17	95.24
<i>Cancer pagurus</i>	1	2		5	1	6	15	95.64
<i>Pagellus acarne</i>	1	2	1	3	2	4	13	95.98
<i>Dicologlossa cuneata</i>	2	3	4		1	1	11	96.27
<i>Trisopterus minutus</i>	1	2	2	3	1	2	11	96.56
<i>Myliobatis aquila</i>		2	4		3		9	96.79
<i>Pagellus erythrinus</i>	3	4		1	1		9	97.03
<i>Solea senegalensis</i>	2	1	1	1	2	2	9	97.27
<i>Lithognatus mormyrus</i>	2	1	2	2		1	8	97.48
<i>Alosa spp.</i>	1	3			1	2	7	97.66
<i>Diplodus sargus</i>	3	1				3	7	97.84

(To be concluded in next page)

**Table 3.2.3.1.1.Concluded.**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Necora puber</i>		2	2	2	1		7	98.03
<i>Rajidae spp.</i>	1	1	2		2		6	98.19
<i>Galeorhinus galeus</i>	2		1	2			5	98.32
<i>Scorpaena notata</i>	3		2				5	98.45
<i>Serranus cabrilla</i>	1			2	1	1	5	98.58
<i>Spondiliosoma cantharus</i>	1	1	3				5	98.71
<i>Engraulis encrasicolus</i>	2		1	1			4	98.82
<i>Lepidorhombus whiffiagonis</i>	2	2					4	98.92
<i>Pagellus centrodontus</i>	1	1			1	1	4	99.03
<i>Psetta maxima</i>		1	2			1	4	99.13
<i>Scyliorhinus canicula</i>		1		1	2		4	99.24
<i>Balistes carolinensis</i>			1			2	3	99.32
<i>Octopus vulgaris</i>		1			1	1	3	99.40
<i>Sepia officinalis</i>			1		2		3	99.47
<i>Trachurus mediterraneus</i>		1	1		1		3	99.55
<i>Belone belone</i>	1			1			2	99.61
<i>Ctenolabrus rupestris</i>			1	1			2	99.66
<i>Lophius budegassa</i>					1	1	2	99.71
<i>Scorpaena porcus</i>				2			2	99.76
<i>Dicentrarchus labrax</i>	1						1	99.79
<i>Diplodus vulgaris</i>				1			1	99.82
<i>Mugil capito</i>						1	1	99.84
<i>Mugilidae spp.</i>	1						1	99.87
<i>Pleuronectes platessa</i>						1	1	99.89
<i>Raja brachyura</i>						1	1	99.92
<i>Scophthalmus rhombus</i>			1				1	99.95
<i>Scorpaena scrofa</i>						1	1	99.97
<i>Sparus pagrus</i>						1	1	100.00
<b>Total</b>	<b>753</b>	<b>737</b>	<b>595</b>	<b>649</b>	<b>501</b>	<b>570</b>	<b>3805</b>	

**Table 3.2.3.1.2 Basque Country. Number of individuals discarded by trammel net mesh size combination. Winter 2000 (12 trials).**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Sardina pilchardus</i>	54	93	72	80	37	74	410	34.22
<i>Scomber scombrus</i>	46	44	47	44	48	42	271	56.84
<i>Trisopterus luscus</i>	37	28	32	23	20	20	160	70.20
<i>Microchirus variegatus</i>	22	14	7	4	1	1	49	74.29
<i>Lophius piscatorius</i>	11	4	7	13	2	8	45	78.05
<i>Trachinus draco</i>	7	13	7	5	3	5	40	81.39
<i>Scomber japonicus</i>	6	9	3	4	3	7	32	84.06
<i>Triglidae spp.</i>	7	5	3	8	6	2	31	86.64
<i>Merluccius merluccius</i>	3	5	3	3	1	3	18	88.15
<i>Callionymus lyra</i>	4	3	3	2	2	2	16	89.48
<i>Maja squinado</i>	2	1	1	1	8	2	15	90.73
<i>Raja montagui</i>	2		2	3	4	4	15	91.99
<i>Solea vulgaris</i>	3	3	2	1	2	3	14	93.16
<i>Torpedo marmorata</i>	1	2	1	2	3	2	11	94.07
<i>Trachurus trachurus</i>	2	4	1	4			11	94.99
<i>Trigla lucerna</i>	2	2	1	1	2	1	9	95.74
<i>Trisopterus minutus</i>	1		1	3			5	96.16
<i>Pagellus acarne</i>					2	2	4	96.49
<i>Solea lascaris</i>	2				1	1	4	96.83
<i>Spondiliosoma cantharus</i>	1	1	2				4	97.16
<i>Aspitrigla obscura</i>	1		1	1	1		4	97.50
<i>Micromesistius poutassou</i>		1	1		1		3	97.75
<i>Boops boops</i>	1			1			2	97.91
<i>Mullus surmuletus</i>	1			1			2	98.08
<i>Myliobatis aquila</i>		1			1		2	98.25
<i>Necora puber</i>		2					2	98.41
<i>Raja clavata</i>		1				1	2	98.58
<i>Rajidae spp.</i>					2		2	98.75
<i>Sciaena umbra</i>			2				2	98.91
<i>Serranus cabrilla</i>				1	1		2	99.08
<i>Alosa spp.</i>	1						1	99.17
<i>Dicentrarchus labrax</i>	1						1	99.25
<i>Galeorhinus galeus</i>			1				1	99.42
<i>Lepidorhombus whiffiagonis</i>		1					1	99.50
<i>Mola mola</i>			1				1	99.58
<i>Mugilidae spp.</i>	1						1	99.67
<i>Octopus vulgaris</i>					1		1	99.75
<i>Scorpaena notata</i>	1						1	99.83
<i>Scyliorhinus canicula</i>				1			1	99.92
<i>Aspitrigla cuculus</i>					1		1	100.00
<b>Total</b>	<b>220</b>	<b>237</b>	<b>201</b>	<b>206</b>	<b>153</b>	<b>180</b>	<b>1197</b>	

**Table 3.2.3.1.3. Basque Country. Number of individuals discarded by trammel net mesh size combination. Spring 2000 (13 trials).**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Torpedo marmorata</i>	15	16	23	21	27	28	130	14.16
<i>Trachinus draco</i>	22	26	17	24	11	15	115	26.69
<i>Lophius piscatorius</i>	13	9	21	16	18	20	97	37.25
<i>Aspitrigla obscura</i>	16	15	9	11	3	5	59	43.68
<i>Maja squinado</i>	11	10	6	7	10	13	57	49.89
<i>Trisopterus luscus</i>	10	4	11	9	10	10	54	55.77
<i>Trachurus trachurus</i>	23	2	1	12	2	1	41	60.24
<i>Micromesistius poutassou</i>	9	9	7	10	1	3	39	64.49
<i>Merluccius merluccius</i>	7	9	7	10	1	4	38	68.63
<i>Callionymus lyra</i>	7	8	3	6	4	7	35	72.44
<i>Solea lascaris</i>	12	11	3	2	2	1	31	75.82
<i>Trigla lucerna</i>	6	5	4	4	7	4	30	79.08
<i>Aspitrigla cuculus</i>	6	5	5	4	6	3	29	82.24
<i>Solea vulgaris</i>	2		2	7	4	1	16	83.99
<i>Cancer pagurus</i>	1	2		5	1	6	15	85.62
<i>Mugil chelo</i>	1	1		6	2	5	15	87.25
<i>Boops boops</i>	2	5	3	1	1		12	88.56
<i>Mullus surmuletus</i>	3	3	3	1	1	1	12	89.87
<i>Raja montagui</i>	3		2	1	6		12	91.18
<i>Dicologlossa cuneata</i>	2	2	4			1	9	92.16
<i>Scomber scombrus</i>				8			8	93.03
<i>Alosa spp.</i>		3			1	2	6	93.68
<i>Diplodus sargus</i>	3					2	5	94.23
<i>Pagellus acarne</i>		1		3		1	5	94.77
<i>Sardina pilchardus</i>	3	1		1			5	95.32
<i>Psetta maxima</i>		1	2			1	4	95.75
<i>Raja undulata</i>		1	1	1	1		4	96.19
<i>Microchirus variegatus</i>		2		1			3	96.51
<i>Myliobatis aquila</i>			2		1		3	96.84
<i>Necora puber</i>			1	2			3	97.17
<i>Pagellus erythrinus</i>		3					3	97.49
<i>Scyliorhinus canicula</i>		1			2		3	97.82
<i>Ctenolabrus rupestris</i>			1	1			2	98.04
<i>Lepidorhombus whiffiagonis</i>	2						2	98.26
<i>Scomber japonicus</i>						2	2	98.47
<i>Serranus cabrilla</i>	1					1	2	98.69
<i>Solea senegalensis</i>						2	2	98.91

(To be concluded in next page)

**Table 3.2.3.1.3. Concluded.**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Trachurus mediterraneus</i>		1	1				2	99.13
<i>Trisopterus minutus</i>							2	99.35
<i>Belone belone</i>	1						1	99.46
<i>Diplodus vulgaris</i>				1			1	99.56
<i>Lithognathus mormyrus</i>	1						1	99.67
<i>Lophius budegassa</i>					1		1	99.78
<i>Octopus vulgaris</i>							1	99.89
<i>Raja clavata</i>							1	100.00
<b>Total</b>	<b>182</b>	<b>156</b>	<b>139</b>	<b>175</b>	<b>123</b>	<b>143</b>	<b>918</b>	

**Table 3.2.3.1.4 Basque Country. Number of individuals discarded by trammel net mesh size combination. Summer 2000 (12 trials).**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Trachinus draco</i>	40	44	22	29	27	16	178	19.47
<i>Sardina pilchardus</i>	24	43	14	26	8	21	136	34.35
<i>Trachurus trachurus</i>	17	11	9	10	5	13	65	41.47
<i>Trisopterus luscus</i>	17	16	7	12	6	3	61	48.14
<i>Maja squinado</i>	9	5	8	9	10	10	51	53.72
<i>Trigla lucerna</i>	14	7	6	8	4	7	46	58.75
<i>Boops boops</i>	24	5	3	2	5	3	42	63.35
<i>Micromesistius poutassou</i>	4	5	8	5	5	7	34	67.07
<i>Mola mola</i>	6	3	4	8	2	9	32	70.57
<i>Raja undulata</i>	5	3	4	5	10	4	31	73.96
<i>Torpedo marmorata</i>	3	5	3	2	7	6	26	76.81
<i>Merluccius merluccius</i>	6	7	3	3	2	2	23	79.32
<i>Aspitrigla obscura</i>	2	1	4	4	4	6	21	81.62
<i>Sciaena umbra</i>	4	5	3	2	1	2	17	83.48
<i>Scomber japonicus</i>	2	4	2	3	5	1	17	85.34
<i>Solea vulgaris</i>	5	3	4	1		1	14	86.87
<i>Triglidae spp.</i>	2		1	7		4	14	88.40
<i>Raja montagui</i>	1	1	6	1	2	2	13	89.82
<i>Mullus surmuletus</i>	4		1	2	2	3	12	91.14
<i>Lithognatus mormyrus</i>	1	1	2	2		1	7	91.90
<i>Solea senegalensis</i>	2	1	1	1	2		7	92.67
<i>Aspitrigla cuculus</i>		1	3		1	2	7	93.44
<i>Callionymus lyra</i>	1	3		2			6	94.09
<i>Pagellus erythrinus</i>	2	1		1	1		5	94.64
<i>Engraulis encrasicolus</i>	2		1	1			4	95.08
<i>Galeorhinus galeus</i>	2			2			4	95.51
<i>Myliobatis aquila</i>		1	2		1		4	95.95
<i>Pagellus centrodontus</i>	1	1			1	1	4	96.39
<i>Scorpaena notata</i>	2		2				4	96.83
<i>Balistes carolinensis</i>			1			2	3	97.16
<i>Solea lascaris</i>		2	1				3	97.48
<i>Dicologlossa cuneata</i>		1			1		2	97.70
<i>Diplodus sargus</i>		1				1	2	97.92
<i>Lophius piscatorius</i>			1		1		2	98.14
<i>Mugil chelo</i>		2					2	98.36
<i>Necora puber</i>			1		1		2	98.58
<i>Pagellus acarne</i>	1		1				2	98.80
<i>Rajidae spp.</i>		1	1				2	99.02

(To be concluded in next page)

**Table 3.2.3.1.4. Concluded.**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Scorpaena porcus</i>				2			2	99.23
<i>Lepidorhombus whiffiagonis</i>		1					1	99.34
<i>Pleuronectes platessa</i>						1	1	99.45
<i>Raja clavata</i>	1						1	99.56
<i>Scomber scombrus</i>	1						1	99.67
<i>Scophthalmus rhombus</i>			1				1	99.78
<i>Sparus pagrus</i>						1	1	99.89
<i>Trachurus mediterraneus</i>					1		1	100.00
<b>Total</b>	<b>205</b>	<b>185</b>	<b>130</b>	<b>150</b>	<b>115</b>	<b>129</b>	<b>914</b>	

**Table 3.2.3.1.5 Basque Country. Number of individuals discarded by trammel net mesh size combination. Autumn 2000 (12 trials).**

Species	Trammel net inner/outer panel mesh size (mm)						Total	Cumulative %
	90/500	90/600	100/500	100/600	110/500	110/600		
<i>Trisopterus luscus</i>	57	70	54	58	45	51	335	43.17
<i>Merluccius merluccius</i>	25	28	14	10	15	12	104	56.57
<i>Trachinus draco</i>	18	10	9	9	5	6	57	63.92
<i>Maja squinado</i>	2	3	9	3	5	10	32	68.04
<i>Raja clavata</i>	4	2	9	4	3	4	26	71.39
<i>Microchirus variegatus</i>	3	6	4	3	1	5	22	74.23
<i>Raja montagui</i>	3	2	2	2	7	4	20	76.80
<i>Sciaena umbra</i>	4	6	5	1	2	2	20	79.38
<i>Sardina pilchardus</i>		12	1	5			18	81.70
<i>Lophius piscatorius</i>	3	2		3	4	5	17	83.89
<i>Scomber japonicus</i>	2	2	1	6	4	2	17	86.08
<i>Trachurus trachurus</i>	8	1			5	3	17	88.27
<i>Aspitrigla obscura</i>	4	3	3	3	2	2	17	90.46
<i>Trigla lucerna</i>	3	1	1	2	3	2	12	92.01
<i>Mullus surmuletus</i>	3	1		3		3	10	93.30
<i>Micromesistius poutassou</i>		2	4		1		7	94.20
<i>Aspitrigla cuculus</i>	2		2	2	1		7	95.10
<i>Torpedo marmorata</i>	1		1	1	2	1	6	95.88
<i>Scomber scombrus</i>		3		1			4	96.39
<i>Trisopterus minutus</i>		2	1		1		4	96.91
<i>Sepia officinalis</i>			1		2		3	97.29
<i>Solea vulgaris</i>	1		2				3	97.68
<i>Pagellus acarne</i>		1				1	2	97.94
<i>Raja undulata</i>					1	1	2	98.20
<i>Rajidae spp.</i>	1		1				2	98.45
<i>Triglidae spp.</i>	1	1					2	98.71
<i>Belone belone</i>				1			1	98.84
<i>Lophius budegassa</i>						1	1	98.97
<i>Mola mola</i>					1		1	99.10
<i>Mugil capito</i>						1	1	99.23
<i>Octopus vulgaris</i>		1					1	99.36
<i>Pagellus erythrinus</i>	1						1	99.48
<i>Raja brachyura</i>						1	1	99.61
<i>Scorpaena scrofa</i>						1	1	99.74
<i>Serranus cabrilla</i>				1			1	99.87
<i>Spondiliosoma cantharus</i>			1				1	100.00
<b>Total</b>	<b>146</b>	<b>159</b>	<b>125</b>	<b>118</b>	<b>110</b>	<b>118</b>	<b>776</b>	

With regards the proportion retained and discarded for the major species in all fishing trials combined, there was a large variability among species in the discarding pattern (Table 3.2.3.1.6). The main species in the ranking of discards were partially discarded: *Trisopterus luscus* (29.9%), *Trachinus draco* (27.1%), *Scomber scombrus* (18.6%), *Merluccius merluccius* (18.7%). The proportion of the catch discarded depends to a great extent on how resistant the fish is to deterioration, as the main reason for discarding practises was the bad condition of the catch. Nevertheless, some other reasons like the time required to handle the catch (*Sardina pilchardus*), or being below the commercial size (*Lophius piscatorius*, *Maja squinado*) were also relevant. For most of the main species discarded, there was no clear relationship between the proportion of individuals discarded and the inner/outer panel mesh size combination in the trammel nets (i.e.: the proportion discarded for one particular species would not depend on the trammel net mesh size). A few species are totally discarded because of the lack of commercial interest (*Torpedo marmorata*, *Callionimus lyra* and *Boops boops*).

If the proportion discarded of each species is considered on a seasonal basis (Tables 3.2.3.1.7 to 3.2.3.1.10), there was different seasonal discarding patterns among species. The proportion of *Trisopterus luscus* individuals discarded increased steadily from winter (21.0%) to autumn (37.1%). Several factors could explain this seasonal variation of the discarding pattern: differences in the fish size distribution among seasons (higher abundance of small fishes vulnerable to the trammel nets in the second half of the year and/or seasonal differences in fish deterioration speed due to abundance of scavenger invertebrates (mainly Amphipods). There was a high proportion of *Sardina pilchardus* discarded in both winter and summer, probably due to a crew decision in relation to the difficulty of handling of the catch and the low commercial value of the species. *Trachinus draco* was discarded in a higher proportion in winter and autumn, probably because of the high catch rate of the main target species (*Solea vulgaris*) during this seasons which could have had an influence in the discarding practice of the crew for associated species. A smaller proportion of *Merluccius merluccius* was discarded in autumn and winter compared to that in the spring and summer, in all likelihood because of the seasonal variation in the size distribution of the fish (smaller individuals in spring and summer time) and/or the seasonal variation in the abundance of scavenger fauna.

No effect of mesh size combination in the inner and outer panel of the fishing gear seemed to be significant in the proportion discarded of the main species by season.

**Table 3.2.3.1.6. Basque Country. Number of individuals caught (N) and proportion discarded (D%) by trammel net mesh size combination. Year 2000 (49 trials). Note: species are ranked by numerical importance in the discards. Only species that account for the 95% of the total discards are shown.**

Species	Trammel net inner/outer panel mesh size (mm)													
	90/500		90/600		100/500		100/600		110/500		110/600		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Trisopterus luscus</i>	440	27.50	395	29.87	332	31.33	334	30.54	258	31.40	283	29.88	2042	29.87
<i>Sardina pilchardus</i>	134	60.45	221	67.42	159	54.72	196	57.14	113	39.82	160	59.38	983	57.88
<i>Trachinus dtaco</i>	327	26.61	358	25.98	208	26.44	251	26.89	119	38.86	176	23.86	1439	27.10
<i>Scomber scombrus</i>	264	17.80	236	19.92	225	20.89	266	19.92	253	18.97	287	14.63	1531	18.56
<i>Merluccius merluccius</i>	214	19.16	187	26.20	153	17.66	159	16.36	126	15.08	136	15.44	975	18.77
<i>Toipedo marmorata</i>	20	100.00	23	100.00	28	100.00	26	100.00	39	100.00	37	100.00	173	100.00
<i>Lophius piscatorius</i>	84	32.14	61	24.59	93	31.18	75	42.67	69	36.23	100	33.00	482	33.40
<i>Maja squinado</i>	68	35.29	54	35.19	60	40.00	55	36.36	68	48.53	75	46.67	380	40.79
<i>Trachurus trachurus</i>	79	63.29	35	51.43	33	33.33	43	60.47	26	46.15	38	44.74	254	52.76
<i>Aspitrigla obscura</i>	55	41.82	50	38.00	54	31.48	59	32.20	38	26.32	47	27.66	303	33.33
<i>Trigla lucerna</i>	157	15.92	145	10.34	100	12.00	112	13.39	104	15.38	75	18.67	693	14.00
<i>Micromesistius poulassou</i>	29	44.83	29	58.62	37	54.05	35	42.86	21	38.10	25	40.00	176	47.16
<i>Microchirus variegatus</i>	192	13.02	171	12.87	86	12.79	99	8.08	42	4.76	51	11.76	641	11.54
<i>Scomber japonicus</i>	10	100.00	15	100.00	6	100.00	13	100.00	12	100.00	12	100.00	68	100.00
<i>Raja montagui</i>	16	56.25	14	21.43	17	70.59	13	53.86	34	55.88	29	34.48	123	48.78
<i>Callionymus lyra</i>	12	100.00	14	100.00	6	100.00	10	100.00	6	100.00	9	100.00	57	100.00
<i>Boops boops</i>	27	100.00	10	100.00	6	100.00	4	100.00	6	100.00	3	100.00	56	100.00
<i>Solea vulgaris</i>	617	1.78	554	1.08	577	1.73	567	1.59	481	1.25	452	1.11	3248	1.45
<i>Trigidae spp.</i>	37	27.03	29	20.69	23	17.39	37	40.54	18	33.33	14	42.86	158	29.75
<i>Aspitrigla cuculus</i>	23	34.78	19	31.58	19	52.63	13	46.15	17	52.94	14	36.71	105	41.90
<i>Sciaena umbra</i>	85	9.41	86	12.79	52	19.23	30	10.00	11	27.27	14	28.57	278	14.03
<i>Solea lascaris</i>	81	17.28	59	22.03	37	10.81	34	5.88	22	13.64	23	8.70	256	14.84
<i>Raja undulata</i>	17	29.41	11	36.36	17	29.41	17	35.29	44	27.27	27	18.52	133	27.82
<i>Mullus surmuletus</i>	29	37.93	18	22.22	13	30.77	14	50.00	7	42.86	12	58.33	93	38.71
<i>Mola mola</i>	6	100.00	3	100.00	5	100.00	8	100.00	3	100.00	9	100.00	34	100.00
<i>Raja clavata</i>	11	45.45	6	50.00	16	56.25	9	44.44	13	23.08	10	60.00	65	46.15
<i>Mugil chelo</i>	5	20.00	3	100.00			10	60.00	2	100.00	7	71.43	27	62.96
<b>Total</b>	<b>3039</b>	<b>23.72</b>	<b>2806</b>	<b>25.12</b>	<b>2362</b>	<b>23.84</b>	<b>2489</b>	<b>24.95</b>	<b>1952</b>	<b>24.44</b>	<b>2125</b>	<b>25.27</b>	<b>14773</b>	<b>24.53</b>
														<b>3624</b>

**Table 3.2.3.1.7. Basque Country. Number of individuals caught (N) and proportion discarded (D%) by trammel net mesh size combination. Winter 2000 (12 trials). Note: species are ranked by numerical importance in the discards. Only species that account for the 95% of the total discards are shown.**

Species	Trammel net inner/outer panel mesh size (mm)													
	90/500		90/600		100/500		100/600		110/500		110/600		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Sardina pilchardus</i>	98	55.10	157	59.24	139	51.80	153	52.29	98	37.76	132	56.06	777	52.77
<i>Scomber scombrus</i>	263	17.49	232	18.97	224	20.98	257	17.12	250	19.20	287	14.63	1513	17.91
<i>Trisopterus luscus</i>	156	23.72	129	21.71	139	23.02	131	17.56	104	19.23	103	19.42	762	21.00
<i>Microchirus variegatus</i>	135	16.30	119	11.76	52	13.46	68	5.88	26	3.85	26	3.85	426	11.50
<i>Lophius piscatorius</i>	16	68.75	8	50.00	8	87.50	16	81.25	5	40.00	14	57.14	67	67.16
<i>Trachinus draco</i>	20	35.00	34	38.24	17	41.18	14	35.71	5	60.00	13	38.46	103	38.83
<i>Scomber japonicus</i>	6	100.00	9	100.00	3	100.00	4	100.00	3	100.00	7	100.00	32	100.00
<i>Triglidae spp.</i>	31	22.58	23	21.74	19	15.79	23	34.78	17	35.29	9	22.22	122	25.41
<i>Merluccius merluccius</i>	52	5.77	42	11.90	39	7.69	33	9.09	36	2.78	38	7.89	240	7.50
<i>Callionymus lyra</i>	4	100.00	3	100.00	3	100.00	2	100.00	2	100.00	2	100.00	16	100.00
<i>Maja squinado</i>	13	15.38	4	25.00	7	14.29	9	11.11	13	61.54	10	20.00	56	26.79
<i>Raja montagui</i>	4	50.00	3	0.00	5	40.00	3	100.00	6	66.67	8	50.00	29	51.72
<i>Solea vulgaris</i>	313	0.96	296	1.01	254	0.79	299	0.33	264	0.76	261	1.15	1687	0.83
<i>Topedo marmorata</i>	1	100.00	2	100.00	1	100.00	2	100.00	3	100.00	2	100.00	11	100.00
<i>Trachurus trachurus</i>	10	20.00	10	40.00	10	10.00	7	57.14	5	0.00	3	0.00	45	24.44
<i>Trigla lucerna</i>	31	6.45	29	6.90	25	4.00	19	5.26	27	7.41	18	5.56	149	6.04
Total	1153	18.13	1100	20.91	945	20.32	1040	19.04	864	16.44	933	18.66	6035	19.01

**Table 3.2.3.1.8. Basque Country. Number of individuals caught (N) and proportion discarded (D%) by trammel net mesh size combination. Spring 2000 (13 trials). Note: species are ranked by numerical importance in the discards. Only species that account for the 95% of the total discards are shown.**

Species	Trammel net inner/outer panel mesh size (mm)													
	90/500		90/600		100/500		100/600		110/500		110/600		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Trachinus marmorata</i>	15	100.00	16	100.00	23	100.00	21	100.00	27	100.00	28	100.00	130	100.00
<i>Trachinus draco</i>	96	22.92	127	20.47	71	23.94	97	24.74	24	45.83	72	20.83	487	23.61
<i>Lopholatilus piscatorius</i>	49	26.53	36	25.00	57	36.84	43	37.21	44	40.91	56	35.71	285	34.04
<i>Aspitrigla obscura</i>	37	43.24	37	40.54	30	30.00	31	35.48	23	13.04	21	23.81	179	32.96
<i>Maja squinado</i>	18	61.11	12	83.33	6	100.00	12	58.33	13	76.92	17	76.47	78	73.08
<i>Trisopterus luscus</i>	36	27.78	23	17.39	36	30.56	36	25.00	45	22.22	30	33.33	206	26.21
<i>Trachurus trachurus</i>	30	76.67	5	40.00	2	50.00	16	75.00	3	66.67	5	20.00	61	67.21
<i>Micromesistius poutassou</i>	18	50.00	14	64.29	14	50.00	21	47.62	7	14.29	9	33.33	83	46.99
<i>Merluccius merluccius</i>	30	23.33	26	34.62	24	29.17	31	32.26	10	10.00	18	22.22	139	27.34
<i>Callionymus lyra</i>	7	100.00	8	100.00	3	100.00	6	100.00	4	100.00	7	100.00	35	100.00
<i>Solea lascaris</i>	46	26.09	41	26.83	26	11.54	18	11.11	10	20.00	13	7.69	154	20.13
<i>Trigla lucerna</i>	19	31.58	26	19.23	19	21.05	17	23.53	12	58.33	9	44.44	102	29.41
<i>Aspitrigla cuculus</i>	10	60.00	13	38.46	10	50.00	8	50.00	9	66.67	6	50.00	56	51.79
<i>Solea vulgaris</i>	79	2.53	72	0.00	100	2.00	76	9.21	54	7.41	41	2.44	422	3.79
<i>Cancer pagurus</i>	3	33.33	4	50.00	2	0.00	9	55.56	3	33.33	6	100.00	27	55.56
<i>Mugil chelo</i>	5	20.00	1	100.00	1	100.00	10	60.00	2	100.00	7	71.43	25	60.00
<i>Boops boops</i>	2	100.00	5	100.00	3	100.00	1	100.00	1	100.00	1	100.00	12	100.00
<i>Mullus surmuletus</i>	9	33.33	8	37.50	4	75.00	3	33.33	1	100.00	3	33.33	28	42.86
<i>Raja montagui</i>	4	75.00	4	0.00	3	66.67	3	33.33	10	60.00	5	0.00	29	41.38
<i>Dicologlossa cuneata</i>	13	15.38	8	25.00	10	40.00	2	0.00	4	0.00	4	25.00	41	21.95
<i>Scorpaenopsis scorpaenopsis</i>			1	0.00			8	100.00					9	88.89
<i>Alosa spp.</i>			3	100.00			8	0.00	1	100.00	2	100.00	6	100.00
<i>Diplodus sargus</i>	22	13.64	10	0.00	7	0.00	8	0.00	8	0.00	11	18.18	66	7.58
<i>Pagellus acarne</i>	1	0.00	6	16.67	4	0.00	6	50.00	1	0.00	6	16.67	24	20.83
<i>Sardina pilchardus</i>	3	100.00	2	50.00			2	50.00			0		7	71.43
Total	552	32.07	508	28.94	454	28.85	485	34.85	316	37.34	376	35.37	2691	32.52
														875

**Table 3.2.3.1.9. Basque Country. Number of individuals caught (N) and proportion discarded (D%) by trammel net mesh size combination. Summer 2000 (12 trials). Note: species are ranked by numerical importance in the discards. Only species that account for the 95% of the total discards are shown.**

Species	Trammel net inner/outer panel mesh size (mm)													
	90/500		90/600		100/500		100/600		110/500		110/600		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Trachinus draco</i>	164	24.39	163	26.99	92	23.91	112	25.89	73	36.99	69	23.19	673	26.45
<i>Sardina pilchardus</i>	32	75	49	87.76	18	77.78	36	72.22	15	53.33	28	75	178	76.4
<i>Trachurus trachurus</i>	26	65.38	18	61.11	17	52.94	18	55.56	10	50	24	54.17	113	57.52
<i>Trisopterus luscus</i>	43	39.53	44	36.36	28	25	28	42.86	13	46.15	16	18.75	172	35.47
<i>Maja squinado</i>	19	47.37	20	25	19	42.11	18	50	20	50	14	71.43	110	46.36
<i>Trigla lucerna</i>	51	27.45	33	21.21	15	40	16	50	23	17.39	19	36.84	157	29.3
<i>Boops boops</i>	24	100	5	100	3	100	2	100	5	100	3	100	42	100
<i>Micromesistius poutassou</i>	7	57.14	7	71.43	11	72.73	11	45.45	7	71.43	13	53.85	56	60.71
<i>Mola mola</i>	6	100	3	100	4	100	8	100	2	100	9	100	32	100
<i>Raja undulata</i>	10	50	8	37.5	10	40	10	50	35	28.57	23	17.39	96	32.29
<i>Toxpedo marmorata</i>	3	100	5	100	3	100	2	100	7	100	6	100	26	100
<i>Merluccius merluccius</i>	19	31.58	12	58.33	8	37.5	15	20	10	20	8	25	72	31.94
<i>Aspitrigla obscura</i>	8	25	5	20	11	36.36	12	33.33	9	44.44	12	50	57	36.84
<i>Sciaena umbra</i>	49	8.16	47	10.64	33	9.09	18	11.11	6	16.67	7	28.57	160	10.63
<i>Scomber japonicus</i>	2	100	4	100	2	100	3	100	5	100	1	100	17	100
<i>Solea vulgaris</i>	103	4.85	88	3.41	90	4.44	88	1.14	74	0	60	1.67	503	2.78
<i>Trigidae spp.</i>	4	50	4	0	3	33.33	13	53.85	1	0	5	80	30	46.67
<i>Raja montagui</i>	2	50	2	50	6	100	2	50	6	33.33	5	40	23	56.52
<i>Mullus surmuletus</i>	7	57.14	4	0	6	16.67	5	40	5	40	5	60	32	37.5
<i>Lithognathus mormyrus</i>	9	11.11	7	14.29	5	40	8	25	2	0	3	33.33	34	20.59
<i>Solea senegalensis</i>	62	3.23	57	1.75	72	1.39	64	1.56	42	4.76	40	0	337	2.08
<i>Aspitrigla cuculus</i>	2	0	5	20	4	75	0	#DIV/0!	3	33.33	4	50	18	38.89
<i>Callionymus lyra</i>	1	100	3	100	2	100	2	100	1	100	1	0	6	100
<i>Pagellus egyptinus</i>	12	16.67	4	25	8	0	11	9.09	1	100	1	0	37	13.51
<i>Engraulis encrasicolus</i>	2	100	3	0	2	50	1	100	1	0	1	0	9	44.44
Total	667	29.54	600	29.17	470	25.32	503	29.03	374	29.14	376	32.71	2990	29.06

**Table 3.2.3.1.10. Basque Country. Number of individuals caught (N) and proportion discarded (D%) by trammel net mesh size combination. Autumn 2000 (12 trials).**

Note: species are ranked by numerical importance in the discards. Only species that account for the 95% of the total discards are shown.

Species	Trammel net inner/outer panel mesh size (mm)													
	90/500		90/600		100/500		100/600		110/500		110/600		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Trisopterus luscus</i>	205	27.8	199	35.18	129	41.86	139	41.73	96	46.88	134	38.06	902	37.14
<i>Merluccius merluccius</i>	113	22.12	107	26.17	82	17.07	80	12.5	70	21.43	72	16.67	524	19.85
<i>Trachinus draco</i>	47	38.3	34	29.41	28	32.14	27	33.33	17	29.41	22	27.27	175	32.57
<i>Maja squinado</i>	18	11.11	18	16.67	28	32.14	16	18.75	22	22.73	34	29.41	136	23.53
<i>Raja clavata</i>	7	57.14	4	50	11	81.82	6	66.67	3	100	5	80	36	72.22
<i>Microchirus variegatus</i>	47	6.38	38	15.79	27	14.81	24	12.5	12	8.33	19	26.32	167	13.17
<i>Raja montagui</i>	6	50	5	40	3	66.67	5	40	12	58.33	11	36.36	42	47.62
<i>Sciaena umbra</i>	21	19.05	32	18.75	16	31.25	9	11.11	5	40	6	33.33	89	22.47
<i>Sardina pilchardus</i>	1	0	13	92.31	2	50	5	100	0	0	0	0	21	85.71
<i>Lophius piscatorius</i>	13	23.08	15	13.33	17	0	12	25	13	30.77	20	25	90	18.89
<i>Scorpaenopsis japonicus</i>	2	100	2	100	1	100	6	100	4	100	2	100	17	100
<i>Trachurus trachurus</i>	13	61.54	2	50	4	0	2	0	8	62.5	6	50	35	48.57
<i>Aspitrigla obscura</i>	6	66.67	4	75	7	42.86	10	30	4	50	5	40	36	47.22
<i>Trigla lucerna</i>	56	5.36	57	1.75	41	2.44	60	3.33	42	7.14	29	6.9	285	4.21
<i>Mullus surmuletus</i>	6	50	3	33.33	3	0	4	75	1	100	4	75	20	50
<i>Micromesistius poufassou</i>	3	0	3	66.67	9	44.44	2	0	0	0	1	0	19	36.84
<i>Aspitrigla cuculus</i>	8	25	1	0	5	40	5	40	4	25	4	0	27	25.93
Total	572	24.65	537	28.12	413	28.57	412	27.67	313	32.91	374	29.68	2621	28.16
														738

### 3.2.3.2. Algarve

A large number of species caught in the experimental trammel net fisheries were discarded. However, the vast majority were discarded in relatively small numbers. The largest numbers of discarded species were in the spring (69) and in the autumn (71) and the largest numbers of fish were discarded in the winter (2209) and autumn (3190) seasons. In the winter season, 16 species accounted for 95% of the total discards in numbers, with the small pelagics *Scomber japonicus* and *Sardina pilchardus* together accounting for 64% of the discards (Table 3.2.3.2.1). In the spring, 26 species contributed to 95% of the total numbers discarded, with *Trachinus draco*, *Scorpaena notata* and *Scomber japonicus* responsible for 45% of the total discards (Table 3.2.3.2.2). In the summer, the dominant discard species were *Scomber japonicus*, *Microchirus azevia*, *Sardina pilchardus* and *Boops boops* with a total of 60% of the numbers discarded (Table 3.2.3.2.3). In the summer, 19 species accounted for 95% of the total discards in numbers, with the most important species being the small pelagics *Scomber japonicus* and *Sardina pilchardus* (55%) (Table 3.2.3.2.4). Overall, 24 species accounted for 95% of the 8193 fish and cephalopods that were discarded (Table 3.2.3.2.5). *Scomber japonicus*, *Sardina pilchardus* and *Boops boops* were the dominant discard species with 55% of the total numbers discarded (Table 3.2.3.2.5).

The discard rates by season and for all seasons combined of the 24 most important species are given in Tables 3.2.3.2.6 to 3.2.3.2.10. Discard rates among species and from season to season. Species of low or no commercial value were discarded at high rates (>95%). These include the chub mackerel (*Scomber japonicus*), the bogue (*Boops boops*) and the rockfish (*Scorpaena notata*). Commercially valuable species that had low or intermediate discard rates were discarded primarily because they were damaged or were undersized. It should be noted that species such as the sardine were discarded because they were not caught in quantities that would justify sale in auction and also because many were damaged in the nets.

**Table 3.2.3.2.1. Algarve. Number of individuals discarded per inner/outer mesh size combination in Winter.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Scomber japonicus</i>	89	92	106	115	190	177	769	34.81
<i>Sardina pilchardus</i>	109	169	133	153	39	42	645	64.01
<i>Chelidonichthys obscurus</i>	74	28	21	44	17	6	190	72.61
<i>Sepia officinalis</i>	20	8	27	11	3	5	74	75.96
<i>Microchirus azevia</i>	9	16	10	16	12	3	66	78.95
<i>Pagellus acarne</i>	24	23	2	8	0	1	58	81.58
<i>Scorpaena notata</i>	18	16	5	0	2	3	44	83.57
<i>Callionymus lyra</i>	14	13	4	8	2	1	42	85.47
<i>Trachinus draco</i>	10	8	8	4	5	3	38	87.19
<i>Boops boops</i>	8	10	7	6	3	1	35	88.77
<i>Chelidonichthys lastoviza</i>	7	8	5	5	4	1	30	90.13
<i>Merluccius merluccius</i>	3	8	3	6	1	5	26	91.31
<i>Trachurus trachurus</i>	3	4	6	6	2	3	24	92.39
<i>Serranus cabrilla</i>	7	13	1	2	1	0	24	93.48
<i>Lepidotrigla cavillone</i>	0	4	6	5	1	1	17	94.25
<i>Diplodus vulgaris</i>	7	5	1	2	0	1	16	94.98
<i>Trisopterus luscus</i>	8	2	2	0	1	0	13	95.56
<i>Solea vulgaris</i>	3	6	1	0	1	2	13	96.15
<i>Citharus linguatula</i>	1	2	0	3	1	0	7	96.47
<i>Solea senegalensis</i>	1	1	3	0	1	0	6	96.74
<i>Phycis phycis</i>	0	3	1	1	1	0	6	97.01
<i>Sarda sarda</i>	1	1	1	1	1	0	5	97.24
<i>Dicentrarchus labrax</i>	2	1	1	1	0	0	5	97.46
<i>Uranoscopus scaber</i>	2	0	0	0	1	1	4	97.65
<i>Halobatrachus didactylus</i>	1	0	3	0	0	0	4	97.83
<i>Chelidonichthys lucerna</i>	1	2	1	0	0	0	4	98.01
<i>Pagellus erythrinus</i>	0	0	1	2	1	0	4	98.19
<i>Spondylisoma cantharus</i>	2	2	0	0	0	0	4	98.37
<i>Chelidonichthys spp.</i>	1	2	0	0	1	0	4	98.55
<i>Scomber scombrus</i>	0	1	0	0	2	1	4	98.73
<i>Zeus faber</i>	0	1	1	0	1	0	3	98.87
<i>Balistes carolinensis</i>	0	1	0	0	0	1	2	98.96
<i>Arnoglossus imperialis</i>	0	1	1	0	0	0	2	99.05
<i>Mola mola</i>	1	0	0	0	1	0	2	99.14
<i>Scophthalmus rhombus</i>	0	0	1	0	0	1	2	99.23
<i>Hippocampus hippocampus</i>	1	0	0	0	0	1	2	99.32

(To be concluded on next page)

**Table 3.2.3.2.1. Concluded.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Serranus hepatus</i>	0	0	1	1	0	0	2	99.41
<i>Diplodus bellottii</i>	1	1	0	0	0	0	2	99.50
<i>Dentex gibbosus</i>	0	0	0	0	1	0	1	99.55
<i>Serranus atricauda</i>	1	0	0	0	0	0	1	99.59
<i>Solea lascaris</i>	0	0	0	0	1	0	1	99.64
<i>Loligo spp.</i>	0	1	0	0	0	0	1	99.68
<i>Raja undulata</i>	0	0	0	0	1	0	1	99.73
<i>Pteromylaeus bovinus</i>	0	1	0	0	0	0	1	99.77
<i>Torpedo torpedo</i>	0	0	0	1	0	0	1	99.82
<i>Euthynnus alletteratus</i>	0	1	0	0	0	0	1	99.86
<i>Dicologlossa cuneata</i>	0	1	0	0	0	0	1	99.91
<i>Microchirus ocellatus</i>	0	0	0	0	1	0	1	99.95
<i>Conger conger</i>	0	1	0	0	0	0	1	100.00
<b>Total</b>	<b>429</b>	<b>457</b>	<b>363</b>	<b>401</b>	<b>299</b>	<b>260</b>	<b>2209</b>	

**Table 3.2.3.2.2. Algarve. Number of individuals discarded per inner/outer mesh size combination in Spring.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Trachinus draco</i>	59	66	65	47	32	31	300	21.37
<i>Scorpaena notata</i>	65	59	22	17	6	8	177	33.97
<i>Scomber japonicus</i>	9	23	17	40	17	42	148	44.52
<i>Microchirus azevia</i>	21	17	14	16	21	30	119	52.99
<i>Chelidonichthys obscurus</i>	22	5	7	12	14	14	74	58.26
<i>Pagellus erythrinus</i>	8	10	9	13	5	17	62	62.68
<i>Pagellus acarne</i>	21	16	6	5	3	2	53	66.45
<i>Serranus cabrilla</i>	18	11	9	12	1	0	51	70.09
<i>Callionymus lyra</i>	10	14	7	5	1	3	40	72.93
<i>Sardina pilchardus</i>	4	6	4	11	1	13	39	75.71
<i>Solea senegalensis</i>	5	6	12	2	3	5	33	78.06
<i>Halobatrachus didactylus</i>	4	15	5	7	2	0	33	80.41
<i>Bothus podas</i>	10	11	5	5	0	0	31	82.62
<i>Sepia officinalis</i>	6	4	3	4	3	4	24	84.33
<i>SpondylIOSoma cantharus</i>	9	1	4	1	2	4	21	85.83
<i>Solea lascaris</i>	4	6	1	4	1	5	21	87.32
<i>Phycis phycis</i>	7	2	3	4	1	4	21	88.82
<i>Citharus linguatula</i>	3	4	3	2	4	1	17	90.03
<i>Diplodus bellottii</i>	1	3	3	3	0	1	11	90.81
<i>Zeus faber</i>	2	2	3	1	2	0	10	91.52
<i>Diplodus vulgaris</i>	2	1	3	3	0	0	9	92.17
<i>Boops boops</i>	3	1	3	0	1	1	9	92.81
<i>Chelidonichthys lastoviza</i>	3	5	1	0	0	0	9	93.45
<i>Maja squinado</i>	1	0	1	1	4	0	7	93.95
<i>Conger conger</i>	1	1	1	0	1	2	6	94.37
<i>Lithognathus mormyrus</i>	1	1	1	1	1	1	6	94.80
<i>Chelidonichthys spp.</i>	0	2	1	2	0	1	6	95.23
<i>Pteromylaeus bovinus</i>	0	1	0	1	2	2	6	95.66
<i>Merluccius merluccius</i>	0	1	0	2	1	1	5	96.01
<i>Sparus aurata</i>	1	1	0	1	0	0	3	96.23
<i>Hippocampus hippocampus</i>	3	0	0	0	0	0	3	96.44
<i>Sarda sarda</i>	0	0	0	1	2	0	3	96.65
<i>Pagrus pagrus</i>	1	0	1	0	1	0	3	96.87
<i>Octopus vulgaris</i>	1	0	1	0	1	0	3	97.08
<i>Trachurus trachurus</i>	0	0	1	1	0	0	2	97.22
<i>Apogon imberbis</i>	1	1	0	0	0	0	2	97.36

(To be concluded on next page)

**Table 3.2.3.2.2. Concluded.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Solea vulgaris</i>	0	1	0	0	1	0	2	97.51
<i>Dentex dentex</i>	1	0	0	0	1	0	2	97.65
<i>Diplodus sargus</i>	1	0	0	0	1	0	2	97.79
<i>Palinurus elephas</i>	1	1	0	0	0	0	2	97.93
<i>Liza ramada</i>	0	0	0	1	0	0	1	98.01
<i>Pagrus auriga</i>	0	0	0	1	0	0	1	98.08
<i>Microchirus variegatus</i>	1	0	0	0	0	0	1	98.15
<i>Hippocampus sp</i>	0	0	1	0	0	0	1	98.22
<i>Chelidonichthys lucerna</i>	0	0	1	0	0	0	1	98.29
<i>Loligo vulgaris</i>	0	0	0	1	0	0	1	98.36
<i>Raja asterias</i>	0	0	0	0	1	0	1	98.43
<i>Microchirus ocellatus</i>	0	0	1	0	0	0	1	98.50
<i>Chelon labrosus</i>	0	0	0	0	0	1	1	98.58
<i>Sarpa salpa</i>	1	0	0	0	0	0	1	98.65
<i>Dentex canariensis</i>	0	0	1	0	0	0	1	98.72
<i>Scomber scombrus</i>	0	0	0	0	1	0	1	98.79
<i>Scophthalmus rhombus</i>	0	0	0	0	1	0	1	98.86
<i>Belone belone</i>	0	0	0	0	0	1	1	98.93
<i>Scorpaena scrofa</i>	0	0	0	1	0	0	1	99.00
<i>Mola mola</i>	0	0	0	1	0	0	1	99.07
<i>Loligo spp.</i>	0	0	1	0	0	0	1	99.15
<i>Diplodus annularis</i>	0	1	0	0	0	0	1	99.22
<i>Diplodus cervinus</i>	0	0	1	0	0	0	1	99.29
<i>Solea sp</i>	0	1	0	0	0	0	1	99.36
<i>Myliobatis aquila</i>	0	0	0	0	0	1	1	99.43
<i>Labrus bergylta</i>	0	0	1	0	0	0	1	99.50
<i>Dicologlossa cuneata</i>	1	0	0	0	0	0	1	99.57
<i>Torpedo marmorata</i>	0	0	0	1	0	0	1	99.64
<i>Mugil sp.</i>	0	0	1	0	0	0	1	99.72
<i>Trachurus sp.</i>	0	0	0	0	1	0	1	99.79
<i>Mugil cephalus</i>	0	0	0	1	0	0	1	99.86
<i>Trisopterus luscus</i>	1	0	0	0	0	0	1	99.93
<i>Uranoscopus scaber</i>	0	0	0	0	0	1	1	100.00
<b>Total</b>	<b>313</b>	<b>300</b>	<b>224</b>	<b>231</b>	<b>140</b>	<b>196</b>	<b>1404</b>	

**Table 3.2.3.2.3. Algarve. Number of individuals discarded per inner/outer mesh size combination in Summer.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Scomber japonicus</i>	13	19	25	204	33	200	494	35.54
<i>Microchirus azevia</i>	25	25	19	34	15	10	128	44.75
<i>Sardina pilchardus</i>	3	23	29	21	9	23	108	52.52
<i>Boops boops</i>	19	34	21	12	9	11	106	60.14
<i>Trachinus draco</i>	12	20	13	15	10	10	80	65.90
<i>Trachurus trachurus</i>	13	22	12	2	18	1	68	70.79
<i>Scorpaena notata</i>	20	22	13	3	1	4	63	75.32
<i>Citharus linguatula</i>	17	10	8	7	2	6	50	78.92
<i>Serranus cabrilla</i>	12	13	6	11	1	1	44	82.09
<i>Chelidonichthys obscurus</i>	10	6	6	8	4	9	43	85.18
<i>Scomber scombrus</i>	4	1	0	5	1	10	21	86.69
<i>Phycis phycis</i>	6	3	6	2	1	3	21	88.20
<i>Pagellus acarne</i>	6	3	2	5	1	1	18	89.50
<i>Solea senegalensis</i>	1	2	2	3	3	3	14	90.50
<i>Spondylisoma cantharus</i>	4	0	2	2	1	3	12	91.37
<i>Sepia officinalis</i>	1	0	3	3	3	2	12	92.23
<i>Maja squinado</i>	2	0	1	2	5	1	11	93.02
<i>Pagellus erythrinus</i>	3	0	1	5	2	0	11	93.81
<i>Uranoscopus scaber</i>	1	0	1	4	0	4	10	94.53
<i>Trisopterus luscus</i>	3	4	2	1	0	0	10	95.25
<i>Trachurus mediterraneus</i>	0	8	0	0	0	1	9	95.90
<i>Halobatrachus didactylus</i>	2	1	1	3	1	0	8	96.47
<i>Diplodus vulgaris</i>	1	3	2	0	0	0	6	96.91
<i>Merluccius merluccius</i>	2	1	0	2	0	0	5	97.27
<i>Pagellus bogaraveo</i>	1	1	1	1	0	0	4	97.55
<i>Micromesistius poutassou</i>	2	1	0	0	1	0	4	97.84
<i>Anthias anthias</i>	0	2	1	1	0	0	4	98.13
<i>Chelidonichthys lastoviza</i>	0	1	0	2	0	1	4	98.42
<i>Raja undulata</i>	0	0	0	0	0	3	3	98.63
<i>Zeus faber</i>	2	0	0	0	0	0	2	98.78
<i>Raja miraletus</i>	0	0	0	0	0	2	2	98.92
<i>Spicara maena</i>	0	0	1	0	1	0	2	99.06
<i>Mullus surmuletus</i>	1	0	0	0	0	1	2	99.21
<i>Lithognathus mormyrus</i>	0	0	0	0	1	0	1	99.28
<i>Gobideo</i>	0	0	0	0	1	0	1	99.35
<i>Serranus hepatus</i>	0	0	0	0	1	0	1	99.42

**Table 3.2.3.2.3. Concluded.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Octopus vulgaris</i>	0	0	0	0	1	0	1	99.50
<i>Scyliorhinus canicula</i>	0	0	1	0	0	0	1	99.57
<i>Sciaena umbra</i>	0	0	1	0	0	0	1	99.64
<i>Eledone cirrosa</i>	0	0	0	1	0	0	1	99.71
<i>Raja clavata</i>	0	0	0	1	0	0	1	99.78
<i>Conger conger</i>	0	1	0	0	0	0	1	99.86
<i>Psetta maxima</i>	0	1	0	0	0	0	1	99.93
<i>Pagellus bellottii</i>	0	0	0	1	0	0	1	100.00
<b>Total</b>	<b>186</b>	<b>227</b>	<b>180</b>	<b>361</b>	<b>126</b>	<b>310</b>	<b>1390</b>	

**Table 3.2.3.2.4. Algarve. Number of individuals discarded per inner/outer mesh size combination in Autumn.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Scomber japonicus</i>	83	180	259	134	174	263	1093	34.26
<i>Sardina pilchardus</i>	152	196	119	39	104	38	648	54.58
<i>Boops boops</i>	30	151	184	10	47	25	447	68.59
<i>Scorpaena notata</i>	72	96	28	46	5	5	252	76.49
<i>Pagellus acarne</i>	19	25	10	13	12	8	87	79.22
<i>Trachurus trachurus</i>	2	29	27	4	15	3	80	81.72
<i>Microchirus azevia</i>	12	12	16	17	13	4	74	84.04
<i>Merluccius merluccius</i>	17	8	12	13	7	15	72	86.30
<i>Serranus cabrilla</i>	13	14	8	7	4	2	48	87.81
<i>Phycis phycis</i>	7	11	5	11	9	3	46	89.25
<i>Chelidonichthys obscurus</i>	3	7	4	11	3	4	32	90.25
<i>Scomber scombrus</i>	1	23	3	2	1	1	31	91.22
<i>Citharus linguatula</i>	10	9	5	1	2	0	27	92.07
<i>Chelidonichthys lastoviza</i>	13	3	4	4	0	1	25	92.85
<i>Sepia officinalis</i>	1	3	3	4	1	4	16	93.35
<i>Trachinus draco</i>	4	4	0	1	2	1	12	93.73
<i>Diplodus vulgaris</i>	6	5	0	0	0	1	12	94.11
<i>Conger conger</i>	0	1	3	4	1	1	10	94.42
<i>Mola mola</i>	0	2	1	1	3	3	10	94.73
<i>Liza aurata</i>	4	2	1	2	0	1	10	95.05
<i>Labrus bergylta</i>	4	0	3	3	0	0	10	95.36
<i>Chelidonichthys spp.</i>	2	4	2	1	0	0	9	95.64
<i>Pagellus erythrinus</i>	1	4	1	0	1	2	9	95.92
<i>Spondylisoma cantharus</i>	0	4	2	1	0	1	8	96.18
<i>Solea vulgaris</i>	3	0	1	1	1	1	7	96.39
<i>Pagrus pagrus</i>	2	2	0	0	1	2	7	96.61
<i>Zeus faber</i>	1	1	1	2	1	0	6	96.80
<i>Uranoscopus scaber</i>	0	2	0	1	1	1	5	96.96
<i>Sparus aurata</i>	1	1	2	1	0	0	5	97.12
<i>Pagrus auriga</i>	1	0	3	1	0	0	5	97.27
<i>Microchirus ocellatus</i>	4	1	0	0	0	0	5	97.43
<i>Trisopterus luscus</i>	0	0	1	3	0	0	4	97.55
<i>Scorpaena porcus</i>	1	0	2	1	0	0	4	97.68
<i>Bothus podas</i>	0	0	0	3	0	1	4	97.81
<i>Raja clavata</i>	0	0	1	0	1	2	4	97.93
<i>Mullus surmuletus</i>	3	1	0	0	0	0	4	98.06

(To be concluded in next page)

**Table 3.2.3.2.4. Concluded.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Chelidonichthys lucerna</i>	0	0	2	0	0	1	3	98.15
<i>Diplodus sargus</i>	0	1	0	1	1	0	3	98.24
<i>Scorpaena scrofa</i>	1	0	0	1	1	0	3	98.34
<i>Sarpa salpa</i>	1	1	0	0	0	1	3	98.43
<i>Balistes carolinensis</i>	1	1	0	1	0	0	3	98.53
<i>Sarda sarda</i>	0	0	2	1	0	0	3	98.62
<i>Liza ramada</i>	2	0	0	0	1	0	3	98.71
<i>Raja brachyura</i>	0	1	0	1	1	0	3	98.81
<i>Dicentrarchus labrax</i>	0	1	1	1	0	0	3	98.90
<i>Charonia lampas</i>	0	1	0	1	0	0	2	98.97
<i>Diplodus cervinus</i>	0	0	2	0	0	0	2	99.03
<i>Raja miraletus</i>	0	1	0	0	1	0	2	99.09
<i>Octopus vulgaris</i>	1	0	0	0	1	0	2	99.15
<i>Raja undulata</i>	0	0	0	0	2	0	2	99.22
<i>Callionymus lyra</i>	1	0	0	1	0	0	2	99.28
<i>Merlangius merlangus</i>	2	0	0	0	0	0	2	99.34
<i>Halobatrachus didactylus</i>	0	1	1	0	0	0	2	99.40
<i>Scophthalmus rhombus</i>	0	0	0	1	1	0	2	99.47
<i>Loligo spp.</i>	0	1	0	0	0	0	1	99.50
<i>Diplodus bellottii</i>	1	0	0	0	0	0	1	99.53
<i>Arnoglossus imperialis</i>	0	0	1	0	0	0	1	99.56
<i>Dentex gibbosus</i>	0	0	1	0	0	0	1	99.59
<i>Maja squinado</i>	0	0	0	0	0	1	1	99.62
<i>Scyliorhinus canicula</i>	0	0	1	0	0	0	1	99.66
<i>Dentex maroccanus</i>	0	0	0	1	0	0	1	99.69
<i>Dentex dentex</i>	0	0	0	0	1	0	1	99.72
<i>Solea lascaris</i>	0	0	0	1	0	0	1	99.75
<i>Diplodus puntazzo</i>	1	0	0	0	0	0	1	99.78
<i>Lophius piscatorius</i>	1	0	0	0	0	0	1	99.81
<i>Palinurus elephas</i>	0	0	1	0	0	0	1	99.84
<i>Symphodus bailloni</i>	0	1	0	0	0	0	1	99.87
<i>Dentex sp.</i>	0	1	0	0	0	0	1	99.91
<i>Raja sp.</i>	1	0	0	0	0	0	1	99.94
<i>Muraena helena</i>	0	0	0	1	0	0	1	99.97
<i>Loligo vulgaris</i>	1	0	0	0	0	0	1	100.00
<b>Total</b>	<b>486</b>	<b>812</b>	<b>723</b>	<b>354</b>	<b>419</b>	<b>396</b>	<b>3190</b>	

**Table 3.2.3.2.5. Algarve. Number of individuals discarded per inner/outer mesh size combination for all seasons.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Scomber japonicus</i>	194	314	407	493	414	682	2504	30.56
<i>Sardina pilchardus</i>	268	394	285	224	153	116	1440	48.14
<i>Boops boops</i>	60	196	215	28	60	38	597	55.43
<i>Scorpaena notata</i>	175	193	68	66	14	20	536	61.97
<i>Trachinus draco</i>	85	98	86	67	49	45	430	67.22
<i>Microchirus azevia</i>	67	70	59	83	61	47	387	71.94
<i>Chelidonichthys obscurus</i>	109	46	38	75	38	33	339	76.08
<i>Pagellus acarne</i>	70	67	20	31	16	12	216	78.71
<i>Trachurus trachurus</i>	18	55	46	13	35	7	174	80.84
<i>Serranus cabrilla</i>	50	51	24	32	7	3	167	82.88
<i>Sepia officinalis</i>	28	15	36	22	10	15	126	84.41
<i>Merluccius merluccius</i>	22	18	15	23	9	21	108	85.73
<i>Citharus linguatula</i>	31	25	16	13	9	7	101	86.96
<i>Phycis phycis</i>	20	19	15	18	12	10	94	88.11
<i>Pagellus erythrinus</i>	12	14	12	20	9	19	86	89.16
<i>Callionymus lyra</i>	25	27	11	14	3	4	84	90.19
<i>Chelidonichthys lastoviza</i>	23	17	10	11	4	3	68	91.02
<i>Scomber scombrus</i>	5	25	3	7	5	12	57	91.71
<i>Solea senegalensis</i>	7	9	17	5	7	8	53	92.36
<i>Halobatrachus didactylus</i>	7	17	10	10	3	0	47	92.93
<i>Spondylisoma cantharus</i>	15	7	8	4	3	8	45	93.48
<i>Diplodus vulgaris</i>	16	14	6	5	0	2	43	94.01
<i>Bothus podas</i>	10	11	5	8	0	1	35	94.43
<i>Trisopterus luscus</i>	12	6	5	4	1	0	28	94.78
<i>Solea lascaris</i>	4	6	1	5	2	5	23	95.06
<i>Solea vulgaris</i>	6	7	2	1	3	3	22	95.33
<i>Zeus faber</i>	5	4	5	3	4	0	21	95.58
<i>Uranoscopus scaber</i>	3	2	1	5	2	7	20	95.83
<i>Chelidonichthys spp.</i>	3	8	3	3	1	1	19	96.06
<i>Maja squinado</i>	3	0	2	3	9	2	19	96.29
<i>Conger conger</i>	1	4	4	4	2	3	18	96.51
<i>Lepidotrigla cavillone</i>	0	4	6	5	1	1	17	96.72
<i>Diplodus bellottii</i>	3	4	3	3	0	1	14	96.89
<i>Mola mola</i>	1	2	1	2	4	3	13	97.05

(To be continued in next page)

**Table 3.2.3.2.5. Continued.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Sarda sarda</i>	1	1	3	3	3	0	11	97.18
<i>Labrus bergylta</i>	4	0	4	3	0	0	11	97.31
<i>Pagrus pagrus</i>	3	2	1	0	2	2	10	97.44
<i>Liza aurata</i>	4	2	1	2	0	1	10	97.56
<i>Trachurus mediterraneus</i>	0	8	0	0	0	1	9	97.67
<i>Sparus aurata</i>	2	2	2	2	0	0	8	97.77
<i>Chelidonichthys lucerna</i>	1	2	4	0	0	1	8	97.86
<i>Dicentrarchus labrax</i>	2	2	2	2	0	0	8	97.96
<i>Lithognathus mormyrus</i>	1	1	1	1	2	1	7	98.05
<i>Pteromylaeus bovinus</i>	0	2	0	1	2	2	7	98.13
<i>Microchirus ocellatus</i>	4	1	1	0	1	0	7	98.22
<i>Raja undulata</i>	0	0	0	0	3	3	6	98.29
<i>Pagrus auriga</i>	1	0	3	2	0	0	6	98.36
<i>Octopus vulgaris</i>	2	0	1	0	3	0	6	98.44
<i>Mullus surmuletus</i>	4	1	0	0	0	1	6	98.51
<i>Diplodus sargus</i>	1	1	0	1	2	0	5	98.57
<i>Balistes carolinensis</i>	1	2	0	1	0	1	5	98.63
<i>Hippocampus hippocampus</i>	4	0	0	0	0	1	5	98.69
<i>Scophthalmus rhombus</i>	0	0	1	1	2	1	5	98.76
<i>Raja clavata</i>	0	0	1	1	1	2	5	98.82
<i>Micromesistius poutassou</i>	2	1	0	0	1	0	4	98.86
<i>Liza ramada</i>	2	0	0	1	1	0	4	98.91
<i>Scorpaena scrofa</i>	1	0	0	2	1	0	4	98.96
<i>Scorpaena porcus</i>	1	0	2	1	0	0	4	99.01
<i>Anthias anthias</i>	0	2	1	1	0	0	4	99.06
<i>Sarpa salpa</i>	2	1	0	0	0	1	4	99.11
<i>Pagellus bogaraveo</i>	1	1	1	1	0	0	4	99.16
<i>Raja miraletus</i>	0	1	0	0	1	2	4	99.21
<i>Diplodus cervinus</i>	0	0	3	0	0	0	3	99.24
<i>Serranus hepatus</i>	0	0	1	1	1	0	3	99.28
<i>Palinurus elephas</i>	1	1	1	0	0	0	3	99.32
<i>Loligo spp.</i>	0	2	1	0	0	0	3	99.35
<i>Dentex dentex</i>	1	0	0	0	2	0	3	99.39
<i>Arnoglossus imperialis</i>	0	1	2	0	0	0	3	99.43
<i>Raja brachyura</i>	0	1	0	1	1	0	3	99.46
<i>Charonia lampas</i>	0	1	0	1	0	0	2	99.49

(To be concluded in next page)

**Table 3.2.3.2.5. Concluded.**

Discarded species	Inner panel / Outer panel mesh size (mm)						Subtotal	cumulative %
	100/600	100/800	120/600	120/800	140/600	140/800		
<i>Spicara maena</i>	0	0	1	0	1	0	2	99.51
<i>Dentex gibbosus</i>	0	0	1	0	1	0	2	99.54
<i>Scyliorhinus canicula</i>	0	0	2	0	0	0	2	99.56
<i>Dicologoglossa cuneata</i>	1	1	0	0	0	0	2	99.59
<i>Merlangius merlangus</i>	2	0	0	0	0	0	2	99.61
<i>Apogon imberbis</i>	1	1	0	0	0	0	2	99.63
<i>Loligo vulgaris</i>	1	0	0	1	0	0	2	99.66
<i>Diplodus puntazzo</i>	1	0	0	0	0	0	1	99.67
<i>Pagellus bellottii</i>	0	0	0	1	0	0	1	99.68
<i>Eledone cirrosa</i>	0	0	0	1	0	0	1	99.69
<i>Mugil sp.</i>	0	0	1	0	0	0	1	99.71
<i>Mugil cephalus</i>	0	0	0	1	0	0	1	99.72
<i>Euthynnus alletteratus</i>	0	1	0	0	0	0	1	99.73
<i>Sciaena umbra</i>	0	0	1	0	0	0	1	99.74
<i>Hippocampus sp</i>	0	0	1	0	0	0	1	99.76
<i>Psetta maxima</i>	0	1	0	0	0	0	1	99.77
<i>Serranus atricauda</i>	1	0	0	0	0	0	1	99.78
<i>Dentex canariensis</i>	0	0	1	0	0	0	1	99.79
<i>Chelon labrosus</i>	0	0	0	0	0	1	1	99.80
<i>Dentex maroccanus</i>	0	0	0	1	0	0	1	99.82
<i>Raja sp.</i>	1	0	0	0	0	0	1	99.83
<i>Solea sp</i>	0	1	0	0	0	0	1	99.84
<i>Gobideo</i>	0	0	0	0	1	0	1	99.85
<i>Myliobatis aquila</i>	0	0	0	0	0	1	1	99.87
<i>Raja asterias</i>	0	0	0	0	1	0	1	99.88
<i>Dentex sp.</i>	0	1	0	0	0	0	1	99.89
<i>Symphodus bailloni</i>	0	1	0	0	0	0	1	99.90
<i>Torpedo marmorata</i>	0	0	0	1	0	0	1	99.91
<i>Torpedo torpedo</i>	0	0	0	1	0	0	1	99.93
<i>Belone belone</i>	0	0	0	0	0	1	1	99.94
<i>Lophius piscatorius</i>	1	0	0	0	0	0	1	99.95
<i>Trachurus sp.</i>	0	0	0	0	1	0	1	99.96
<i>Microchirus variegatus</i>	1	0	0	0	0	0	1	99.98
<i>Diplodus annularis</i>	0	1	0	0	0	0	1	99.99
<i>Muraena helena</i>	0	0	0	1	0	0	1	100.00
<b>Total</b>	<b>1414</b>	<b>1796</b>	<b>1490</b>	<b>1347</b>	<b>984</b>	<b>1162</b>	<b>8193</b>	

**Table 3.2.3.2.6. Algarve. Number of individuals caught and percentage discarded by species and trammel type in Winter.**

Discarded species	Inner panel / Outer panel mesh size (mm)												Subtotal	
	100/600		100/800		120/600		120/800		140/600		140/800		N	D (%)
	N	% D	N	% D	N	% D	N	% D	N	% D	N	% D		
<i>Scorber japonicus</i>	89	6.87	92	100.00	106	100.00	117	98.29	191	99.48	177	100.00	772	99.61
<i>Sardina pilchardus</i>	109	100.00	169	100.00	133	100.00	154	99.35	39	100.00	42	100.00	646	99.85
<i>Boops boops</i>	9	7.26	10	100.00	7	100.00	7	85.71	3	100.00	1	100.00	37	94.59
<i>Scorpaena notata</i>	18	100.00	16	100.00	5	100.00	0	0.00	2	100.00	3	100.00	44	100.00
<i>Trachinus draco</i>	19	76.29	19	42.11	20	40.00	18	22.22	19	26.32	6	50.00	101	37.62
<i>Microchirus azevia</i>	124	51.06	208	7.69	104	9.62	110	14.55	55	21.82	56	5.36	657	10.05
<i>Chelidonichthys obscurus</i>	97	9.09	51	54.90	40	52.50	60	73.33	27	62.96	13	46.15	288	65.97
<i>Pagellus acarne</i>	47	23.08	53	43.40	8	25.00	15	53.33	3	0.00	2	50.00	128	45.31
<i>Trachurus trachurus</i>	4	21.88	10	40.00	9	66.67	12	50.00	4	50.00	5	60.00	44	54.55
<i>Serranus cabrilla</i>	11	52.63	14	92.86	2	50.00	4	50.00	3	33.33	0	0.00	34	70.59
<i>Sepia officinalis</i>	291	5.26	232	3.45	312	8.65	244	4.51	183	1.64	176	2.84	1438	5.15
<i>Merluccius merluccius</i>	13	0.00	22	36.36	10	30.00	19	31.58	16	6.25	26	19.23	106	24.53
<i>Citharus linguatula</i>	1	75.00	2	100.00	0	0.00	3	100.00	2	50.00	0	0.00	8	87.50
<i>Phycis phycis</i>	8	100.00	11	27.27	8	12.50	5	20.00	3	33.33	2	0.00	37	16.22
<i>Pagellus erythrinus</i>	2	100.00	3	0.00	3	33.33	5	40.00	2	50.00	0	0.00	15	26.67
<i>Callionymus lyra</i>	14	88.89	13	100.00	4	100.00	8	100.00	2	100.00	1	100.00	42	100.00
<i>Chelidonichthys lastoviza</i>	32	0.00	28	28.57	17	29.41	16	31.25	7	57.14	2	50.00	102	29.41
<i>Scorber scombrus</i>	2	63.64	11	9.09	6	0.00	8	0.00	11	18.18	9	11.11	47	8.51
<i>Solea senegalensis</i>	11	70.00	14	7.14	15	20.00	16	0.00	27	3.70	27	0.00	110	5.45
<i>Habbatrachus didactylus</i>	19	100.00	20	0.00	10	30.00	7	0.00	3	0.00	2	0.00	61	6.56
<i>Spondyliosoma cantharus</i>	3	0.00	7	28.57	1	0.00	1	0.00	0	0.00	0	0.00	12	33.33
<i>Diplodus vulgaris</i>	10	66.67	7	71.43	1	100.00	7	28.57	1	0.00	5	20.00	31	51.61
<i>Bothus podas</i>	0	100.00	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.00
<i>Trisopterus luscus</i>	8	0.00	3	66.67	5	40.00	0	0.00	1	100.00	1	0.00	18	72.22
<b>Total</b>	<b>1046</b>	<b>41.01</b>	<b>1151</b>	<b>39.70</b>	<b>909</b>	<b>39.93</b>	<b>945</b>	<b>42.43</b>	<b>688</b>	<b>43.46</b>	<b>645</b>	<b>40.31</b>	<b>5384</b>	<b>41.03</b>

**Table 3.2.3.2.7. Algarve. Number of individuals caught and percentage discarded by species and trammel type in Spring.**

Discarded species	Inner panel / Outer panel mesh size (mm)												Subtotal	
	100/600		100/800		120/600		120/800		140/600		140/800		N	D (%)
	N	% D	N	% D	N	% D	N	% D	N	% D	N	% D		
<i>Scomber japonicus</i>	10	90.00	24	95.83	17	100.00	44	90.91	20	85.00	42	100.00	157	94.27
<i>Sardina pilchardus</i>	4	100.00	6	100.00	4	100.00	11	100.00	1	100.00	13	100.00	39	100.00
<i>Boops boops</i>	3	100.00	1	100.00	3	100.00	0	0.00	1	100.00	1	100.00	9	100.00
<i>Scorpaena notata</i>	68	95.59	59	100.00	22	100.00	17	100.00	6	100.00	8	100.00	180	98.33
<i>Trachurus draco</i>	95	62.11	100	66.00	95	68.42	87	54.02	54	59.26	46	67.39	477	62.89
<i>Microchirus azevia</i>	50	42.00	53	32.08	31	45.16	40	40.00	33	63.64	51	58.82	258	46.12
<i>Chelidonichthys obscurus</i>	31	70.97	7	71.43	18	38.89	20	60.00	20	70.00	22	63.64	118	62.71
<i>Pagellus acarne</i>	34	61.76	31	51.61	12	50.00	10	50.00	5	60.00	3	66.67	95	55.79
<i>Trachurus trachurus</i>	0	0.00	2	0.00	1	100.00	2	50.00	1	0.00	1	0.00	7	28.57
<i>Serranus cabrilla</i>	20	90.00	15	73.33	9	100.00	12	100.00	1	100.00	0	0.00	57	89.47
<i>Sepia officinalis</i>	60	10.00	33	12.12	42	7.14	33	12.12	26	11.54	34	11.76	228	10.53
<i>Merluccius merluccius</i>	2	0.00	1	100.00	1	0.00	6	33.33	3	33.33	3	33.33	16	31.25
<i>Citharus linguatula</i>	3	100.00	5	80.00	3	100.00	2	100.00	4	100.00	1	100.00	18	94.44
<i>Phycis phycis</i>	14	50.00	7	28.57	5	60.00	7	57.14	2	50.00	5	80.00	40	52.50
<i>Pagellus erythrinus</i>	9	88.89	13	76.92	13	69.23	16	81.25	13	38.46	26	65.38	90	68.89
<i>Callionymus lyra</i>	10	100.00	14	100.00	7	100.00	5	100.00	1	100.00	3	100.00	40	100.00
<i>Chelidonichthys lastoviza</i>	6	50.00	10	50.00	9	11.11	3	0.00	0	0.00	3	0.00	31	29.03
<i>Scomber scombrus</i>	0	0.00	1	0.00	1	0.00	0	0.00	2	50.00	0	0.00	4	25.00
<i>Solea senegalensis</i>	30	16.67	31	19.35	84	14.29	51	3.92	48	6.25	25	20.00	269	12.27
<i>Habbatrachus didactylus</i>	32	12.50	42	35.71	16	31.25	26	26.92	7	28.57	4	0.00	127	25.98
<i>Spondyliosoma cantharus</i>	19	47.37	11	9.09	10	40.00	8	12.50	9	22.22	9	44.44	66	31.82
<i>Diplodus vulgaris</i>	6	33.33	7	14.29	3	100.00	5	60.00	0	0.00	0	0.00	21	42.86
<i>Bothus podas</i>	10	100.00	11	100.00	5	100.00	5	100.00	0	0.00	0	0.00	31	100.00
<i>Trisopterus luscus</i>	1	100.00	1	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	50.00
<b>Total</b>	<b>630</b>	<b>49.68</b>	<b>573</b>	<b>52.36</b>	<b>519</b>	<b>43.16</b>	<b>531</b>	<b>43.50</b>	<b>379</b>	<b>36.94</b>	<b>422</b>	<b>46.45</b>	<b>3054</b>	<b>45.97</b>

**Table 3.2.3.2.8. Algarve. Number of individuals caught and percentage discarded by species and trammel type in Summer.**

Discarded species	Inner panel / Outer panel mesh size (mm)												Subtotal	
	100/600		100/800		120/600		120/800		140/600		140/800		N	D (%)
	N	% D	N	% D	N	% D	N	% D	N	% D	N	% D		
<i>Scomber japonicus</i>	18	72.22	26	73.08	33	75.76	208	98.08	39	84.62	207	96.62	531	93.03
<i>Sardina pilchardus</i>	3	100.00	23	100.00	29	100.00	21	100.00	9	100.00	23	100.00	108	100.00
<i>Boops boops</i>	19	100.00	34	100.00	21	100.00	12	100.00	9	100.00	11	100.00	106	100.00
<i>Scorpaena notata</i>	21	95.24	25	88.00	13	100.00	3	100.00	1	100.00	4	100.00	67	94.03
<i>Trachinus draco</i>	18	66.67	30	66.67	21	61.90	18	83.33	13	76.92	11	90.91	111	72.07
<i>Microchirus azevia</i>	55	45.45	60	41.67	33	57.58	48	70.83	24	62.50	19	52.63	239	53.56
<i>Chelidonichthys obscurus</i>	15	66.67	13	46.15	12	50.00	10	80.00	5	80.00	12	75.00	67	64.18
<i>Pagellus acarne</i>	28	21.43	22	13.64	21	9.52	19	26.32	28	3.57	22	4.55	140	12.86
<i>Trachurus trachurus</i>	26	50.00	28	78.57	16	75.00	5	40.00	27	86.67	11	9.09	113	60.18
<i>Serranus cabrilla</i>	13	92.31	14	92.86	8	75.00	11	100.00	3	33.33	2	50.00	51	86.27
<i>Sepia officinalis</i>	9	11.11	5	0.00	12	25.00	12	25.00	12	25.00	13	15.38	63	19.05
<i>Merluccius merluccius</i>	17	11.76	18	5.56	23	0.00	20	10.00	24	0.00	24	0.00	126	3.97
<i>Citharus linguatula</i>	17	100.00	10	100.00	8	100.00	7	100.00	2	100.00	6	100.00	50	100.00
<i>Phycis phycis</i>	47	12.77	54	5.56	76	7.89	75	2.67	38	2.63	34	8.82	324	6.48
<i>Pagellus erythrinus</i>	8	37.50	11	0.00	9	11.11	13	38.46	4	50.00	1	0.00	46	23.91
<i>Chelidonichthys lastoviza</i>	4	0.00	7	14.29	2	0.00	6	33.33	0	0.00	1	100.00	20	20.00
<i>Scomber scombrus</i>	52	7.69	24	4.17	34	0.00	42	11.90	44	2.27	43	23.26	239	8.79
<i>Solea senegalensis</i>	6	16.67	6	33.33	8	25.00	7	42.86	3	100.00	5	60.00	35	40.00
<i>Habbatrachus didactylus</i>	12	16.67	11	9.09	7	14.29	7	42.86	2	50.00	2	0.00	41	19.51
<i>Spondyliosoma cantharus</i>	6	66.67	2	0.00	4	50.00	2	100.00	3	33.33	10	30.00	27	44.44
<i>Diplodus vulgaris</i>	12	8.33	17	17.65	6	33.33	5	0.00	4	0.00	0	0.00	44	13.64
<i>Trisopterus luscus</i>	9	33.33	9	44.44	9	22.22	7	14.29	7	0.00	2	0.00	43	23.26
<b>Total</b>	<b>485</b>	<b>38.35</b>	<b>517</b>	<b>43.91</b>	<b>481</b>	<b>37.42</b>	<b>640</b>	<b>56.41</b>	<b>393</b>	<b>32.06</b>	<b>557</b>	<b>55.66</b>	<b>3073</b>	<b>45.23</b>

**Table 3.2.3.2.9. Algarve. Number of individuals caught and percentage discarded by species and trammel type in Autumn.**

Discarded species	Inner panel / Outer panel mesh size (mm)												Subtotal	
	100/600		100/800		120/600		120/800		140/600		140/800		N	D (%)
	N	% D	N	% D	N	% D	N	% D	N	% D	N	% D		
<i>Scomber japonicus</i>	84	98.81	194	92.78	260	99.62	138	97.10	177	98.31	265	99.25	1118	97.76
<i>Sardina pilchardus</i>	152	100.00	196	100.00	119	100.00	39	100.00	104	100.00	38	100.00	648	100.00
<i>Boops boops</i>	30	100.00	154	98.05	184	100.00	10	100.00	47	100.00	25	100.00	450	99.33
<i>Scorpaena notata</i>	74	97.30	100	96.00	28	100.00	46	100.00	5	100.00	5	100.00	258	97.67
<i>Trachinus draco</i>	7	57.14	6	66.67	3	0.00	2	50.00	2	100.00	2	50.00	22	54.55
<i>Microchirus azevia</i>	58	20.69	75	16.00	88	23.53	57	29.82	40	32.50	30	13.33	328	22.56
<i>Chelidonichthys obscurus</i>	9	33.33	15	46.67	12	33.33	26	42.31	6	50.00	9	44.44	77	41.56
<i>Pagellus acarne</i>	27	70.37	48	52.08	26	38.46	34	38.24	23	52.17	16	50.00	174	50.00
<i>Trachurus trachurus</i>	5	40.00	41	70.73	46	58.70	5	80.00	19	78.95	8	37.50	124	64.52
<i>Serranus cabrilla</i>	21	61.90	18	77.78	14	57.14	10	70.00	4	100.00	5	40.00	72	66.67
<i>Sepia officinalis</i>	40	2.50	37	8.11	69	4.35	54	7.41	72	1.39	92	4.35	364	4.40
<i>Merluccius merluccius</i>	20	85.00	13	61.54	15	80.00	14	92.86	13	53.85	23	65.22	98	73.47
<i>Citharus linguatula</i>	10	100.00	9	100.00	5	100.00	1	100.00	2	100.00	0	0.00	27	100.00
<i>Phycis phycis</i>	23	30.43	25	44.00	23	21.74	40	27.50	29	31.03	14	21.43	154	29.87
<i>Callionymus lyra</i>	1	100.00	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	2	100.00
<i>Chelidonichthys lastoviza</i>	67	18.40	34	8.82	22	18.18	31	12.90	7	0.00	3	33.33	164	15.24
<i>Scomber scombrus</i>	3	33.33	34	67.65	7	42.86	3	66.67	2	50.00	5	20.00	54	57.41
<i>Solea senegalensis</i>	0	0.00	2	0.00	5	0.00	2	0.00	0	0.00	3	0.00	12	0.00
<i>Halibatrachus didactylus</i>	0	0.00	2	50.00	2	50.00	1	0.00	0	0.00	0	0.00	5	40.00
<i>Spondyliosoma cantharus</i>	1	0.00	10	40.00	4	50.00	2	50.00	2	0.00	5	20.00	24	33.33
<i>Diplodus vulgaris</i>	8	75.00	14	35.71	2	0.00	1	0.00	0	0.00	2	50.00	27	44.44
<i>Bothus podas</i>	0	0.00	0	0.00	0	0.00	3	100.00	0	0.00	1	100.00	4	100.00
<i>Trisopterus luscus</i>	2	0.00	4	0.00	3	33.33	8	37.50	5	0.00	2	0.00	24	16.67
<b>Total</b>	<b>784</b>	<b>61.99</b>	<b>1172</b>	<b>69.28</b>	<b>1060</b>	<b>68.21</b>	<b>684</b>	<b>51.75</b>	<b>679</b>	<b>61.71</b>	<b>684</b>	<b>57.89</b>	<b>5063</b>	<b>63.01</b>

**Table 3.2.3.2.10. Algarve. Number of individuals caught and percentage discarded by species and trammel type for all seasons.**

Discarded species	Inner panel / Outer panel mesh size (mm)												Subtotal	
	100/600		100/800		120/600		120/800		140/600		140/800		N	D (%)
	N	% D	N	% D	N	D (%)	N	D (%)	N	D (%)	N	D (%)		
<i>Scomber japonicus</i>	201	96.52	336	93.45	416	97.84	507	97.24	427	96.96	691	98.70	2578	97.13
<i>Sardina pilchardus</i>	268	100.00	394	100.00	285	100.00	225	99.56	153	100.00	116	100.00	1441	99.93
<i>Boops boops</i>	61	98.36	199	98.49	215	100.00	29	96.55	60	100.00	38	100.00	602	99.17
<i>Scorpaena notata</i>	181	96.69	200	96.50	68	100.00	66	100.00	14	100.00	20	100.00	549	97.63
<i>Trachinus draco</i>	139	61.15	155	63.23	139	61.87	125	53.60	88	55.68	65	69.23	711	60.48
<i>Microchirus azevia</i>	287	23.34	396	17.68	236	25.00	255	32.55	152	40.13	156	30.13	1462	26.11
<i>Chelidonichthys obscurus</i>	152	71.71	86	53.49	82	46.34	116	64.66	58	65.52	56	58.93	550	61.64
<i>Pagellus acarne</i>	136	51.47	154	43.51	67	29.85	78	39.74	59	27.12	43	27.91	537	40.22
<i>Trachurus trachurus</i>	35	51.43	81	67.90	72	63.89	24	54.17	51	68.63	25	28.00	288	60.42
<i>Senanus cabrilla</i>	65	76.92	61	83.61	33	72.73	37	86.49	11	63.64	7	42.86	214	78.04
<i>Sepia officinalis</i>	400	7.00	307	4.89	435	8.28	343	6.41	293	3.41	315	4.76	2093	6.02
<i>Merluccius merluccius</i>	52	42.31	54	33.33	49	30.61	59	38.98	56	16.07	76	27.63	346	31.21
<i>Citharus linguatula</i>	31	100.00	26	96.15	16	100.00	13	100.00	10	90.00	7	100.00	103	98.06
<i>Phycis phycis</i>	92	21.74	97	19.59	112	13.39	127	14.17	72	16.67	55	18.18	555	16.94
<i>Pagellus erythrinus</i>	24	50.00	38	36.84	36	33.33	36	55.56	23	39.13	35	54.29	192	44.79
<i>Callionymus lyra</i>	25	100.00	27	100.00	11	100.00	14	100.00	3	100.00	4	100.00	84	100.00
<i>Chelidonichthys lastoviza</i>	109	21.10	79	21.52	50	20.00	56	19.64	14	28.57	9	33.33	317	21.45
<i>Scomber scombrus</i>	57	8.77	70	35.71	48	6.25	53	13.21	59	8.47	57	21.05	344	16.57
<i>Solea senegalensis</i>	47	14.89	53	16.98	112	15.18	76	6.58	78	8.97	60	13.33	426	12.44
<i>Habbatrachus dibactylus</i>	63	11.11	75	22.67	35	28.57	41	24.39	12	25.00	8	0.00	234	20.09
<i>Spondyliosoma cantharus</i>	29	51.72	30	23.33	19	42.11	13	30.77	14	21.43	24	33.33	129	34.86
<i>Diplodus vulgaris</i>	36	44.44	45	31.11	12	50.00	18	27.78	5	0.00	7	28.57	123	34.96
<i>Bothus podas</i>	10	100.00	12	91.67	5	100.00	8	100.00	0	0.00	1	100.00	36	97.22
<i>Trisopterus luscus</i>	20	60.00	17	35.29	17	29.41	15	26.67	13	7.69	5	0.00	87	32.18
<b>Total</b>	<b>2945</b>	<b>48.01</b>	<b>3413</b>	<b>52.62</b>	<b>2969</b>	<b>50.19</b>	<b>2800</b>	<b>48.11</b>	<b>2139</b>	<b>46.00</b>	<b>2308</b>	<b>50.35</b>	<b>16574</b>	<b>49.43</b>

### 3.2.3.3. Gulf of Cádiz

Discards are the catches of species other than the target species, that are not used commercially. In this study they are classified as follows: D discards, DSC are those discarded or taken for direct consumption by the crew for reasons of insufficient size; SC: self-consumption; DBAIT discards are those destined for use as bait. This latter category was found to represent a significant part of the total catches obtained. The numbers of specimens discarded, by mesh size of inner and outer panels used, for each species and season, together with cumulative percentages, are presented in Tables 3.2.3.3.1 to 3.2.3.3.3.

In total, of all the species caught, 15 species belonging to 11 different families account for 95 % of all the discards, in terms of abundance. Of these, only 7 species account for 81 % of the total discards: *Torpedo torpedo* (21.01 %), *Sardina pilchardus* (20.82%), *Halobatrachus didactylus* (11.55%), *Raja asterias* (8.32%), *Raja undulata* (7.94%), *Torpedo marmorata* (6.24%) and *Mugil cephalus* (5.58%) (Table 3.2.3.3.3). Although *Sardina pilchardus* is a target species in other *metiérs*, it is not a commercial species in trammel net fishing. It is only occasionally, not regularly, caught and it is discarded mainly because it is not usually in fit condition for consumption at the times of year when trammel fishing is carried out.

Together with the above-cited species, discards also include others that are commercial species and these are discarded because they are too small when they are caught. This is the case with *Diplodus bellottii*, *Argyrosomus regius*, *Pomadasys incisus* and *Lithognathus mormyrus*; together these species only account for less than 14 % of total discards (Table 3.2.3.3.3). Notable among these species caught is *Diplodus bellottii*, which is discarded in significant quantities in spring when it accounts for 12.38% of the total discards (Table 3.2.3.3.1).

The composition of the total numbers discarded is fairly similar in the two fishing seasons. In spring the most important are *Sardina pilchardus* and *Diplodus bellottii*, together representing 40.97 % of the discards in this season (Table 3.2.3.3.1), while in autumn *Torpedo torpedo* and *Sardina pilchardus* are the two most significant species among the discards, accounting for 44.67% of the autumn discards (Table 3.2.3.3.2).

There are few differences between the seasons with regards to the other species present in the discards. *Engraulis encrasicolus*, *Lithognathus momyrus* and *Trachinus draco* do not appear to any significant extent in the autumn discards, while *Mugil cephalus*, which does account for a notable proportion in autumn, is hardly ever caught in spring (Tables

3.2.3.3.1 and 3.2.3.3.2).

**Table 3.2.3.3.1. Gulf of Cádiz. Composition of discards in number by trammel type in Spring 2000.**

Discarded Species	Inner panel / Outer panel mesh size (mm)						Subtotal	Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400		
<i>Sardina pilchardus</i>	31	31	24	42	39	50	217	28.59
<i>Diplodus bellottii</i>	9	8	13	21	19	24	94	40.97
<i>Torpedo marmorata</i>	10	9	5	19	15	21	79	51.38
<i>Torpedo torpedo</i>	6	5	8	9	5	19	52	58.23
<i>Trachinus draco</i>	6	1	8	19	3	13	50	64.82
<i>Raja asterias</i>	8	8	6	5	7	14	48	71.15
<i>Raja undulata</i>	5	3	2	11	5	20	46	77.21
<i>Halobatrachus didactylus</i>	5	4	1	13	15	3	41	82.61
<i>Pomadasys incisus</i>	1	4	2	8	4	8	27	86.17
<i>Alosa alosa</i>	2		5	3	1	9	20	88.80
<i>Trigla lucerna</i>	1		4	8	3	3	19	91.30
<i>Lithognathus mormyrus</i>	3	1	1	5	2	1	13	93.02
<i>Engraulis encrasicolus</i>	4			4	1	1	10	94.33
<i>Scomber japonicus</i>	2	1	1	3		3	10	95.65
<i>Mugil cephalus</i>	1		2	5		1	9	96.84
<i>Raja montagui</i>	1	1				4	6	97.63
<i>Plectorhinchus mediterraneus</i>	3			1		1	5	98.29
<i>Raja brachyura</i>				2		2	4	98.81
<i>Chelon labrosus</i>		3					3	99.21
<i>Alosa fallax</i>				1			1	99.34
<i>Caranx rhonchus</i>			1				1	99.47
<i>Liza aurata</i>				1			1	99.60
<i>Salpa salpa</i>				1			1	99.74
<i>Scomber scomber</i>						1	1	99.87
<i>Scorpaena scrofa</i>	1						1	100.00
<i>Argyrosomus regius</i>							0	100.00
<i>Balistes carolinensis</i>							0	100.00
<i>Dentex canariensis</i>							0	100.00
<i>Dentex gibbosus</i>							0	100.00
<i>Dicentrarchus labrax</i>							0	100.00
<i>Dicologlossa cuneata</i>							0	100.00
<i>Diplodus sargus</i>							0	100.00
<i>Loligo vulgaris</i>							0	100.00
<i>Maja squinado</i>							0	100.00
<i>Melicertus kerathurus</i>							0	100.00
<i>Octopus vulgaris</i>							0	100.00
<i>Pagellus acarne</i>							0	100.00
<i>Pagellus erythrinus</i>							0	100.00

(To be concluded in next page)

**Table 3.2.3.3.1 – Concluded.**

Discarded Species	Inner panel / Outer panel mesh size (mm)							Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400	Subtotal	
<i>Scophthalmus rhombus</i>							0	100.00
<i>Sepia officinalis</i>							0	100.00
<i>Seriola dumerili</i>							0	100.00
<i>Solea kleinii</i>							0	100.00
<i>Solea lascaris</i>							0	100.00
<i>Solea senegalensis</i>							0	100.00
<i>Sparus aurata</i>							0	100.00
<i>Spondyliosoma cantharus</i>							0	100.00
<i>Synaptura lusitanica</i>							0	100.00
<b>Total</b>	100	79	83	183	119	199	763	

**Table 3.2.3.3.2 Gulf of Cádiz. Composition of discards in number by trammel type in Autumn 2000.**

Discarded Species	Inner panel / Outer panel mesh size (mm)							Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400	Subtotal	
<i>Torpedo torpedo</i>	84	80	68	89	72	90	483	27.10
<i>Sardina pilchardus</i>	61	31	51	65	35	70	313	44.67
<i>Halobatrachus didactylus</i>	52	35	27	68	46	25	253	58.87
<i>Raja asterias</i>	19	35	34	19	22	35	164	68.07
<i>Raja undulata</i>	12	37	34	20	15	38	156	76.82
<i>Mugil cephalus</i>	22	19	17	35	16	24	133	84.29
<i>Torpedo marmorata</i>	12	10	7	22	14	15	80	88.78
<i>Diplodus bellottii</i>	9	4	5	9	1	5	33	90.63
<i>Argyrosomus regius</i>		5	2	9	6	9	31	92.37
<i>Alosa fallax</i>	4	1	2	8	4	5	24	93.71
<i>Alosa alosa</i>	2	3	3		4	11	23	95.01
<i>Scomber japonicus</i>	4	2		5	3	2	16	95.90
<i>Lithognathus mormyrus</i>	2	3	1	5	1		12	96.58
<i>Seriola dumerili</i>	2	1	2		2	1	8	97.03
<i>Trachinus draco</i>	2	1	1	3			7	97.42
<i>Umbrina canariensis</i>				2	2	2	6	97.76
<i>Dicologlossa cuneata</i>	2	1		2		1	6	98.09
<i>Pteromylaeus bovinus</i>				2		2	4	98.32
<i>Belone belone</i>			1		1	1	3	98.48
<i>Engraulis encrasicolus</i>	2			1			3	98.65
<i>Solea lascaris</i>		1		2			3	98.82

(To be concluded in next page)

**Table 3.2.3.3.2. Concluded.**

Discarded Species	Inner panel / Outer panel mesh size (mm)						Subtotal	Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400		
<i>Dentex canariensis</i>			1			1	2	98.93
<i>Stromateus fiatola</i>				1		1	2	99.05
<i>Dicentrarchus punctatus</i>	1	1					2	99.16
<i>Trigla lucerna</i>		1				1	2	99.27
<i>Octopus vulgaris</i>		1			1		2	99.38
<i>Bothus podas</i>				1			1	99.44
<i>Conger conger</i>						1	1	99.49
<i>Liza saliens</i>	1						1	99.55
<i>Squilla mantis</i>				1			1	99.61
<i>Trachinotus ovatus</i>					1		1	99.66
<i>Pomadasys incisus</i>		1					1	99.72
<i>Mullus surmuletus</i>				1			1	99.78
<i>Sciaena umbra</i>				1			1	99.83
<i>Diplodus sargus</i>	1						1	99.89
<i>Scophthalmus rhombus</i>			1				1	99.94
<i>Sepia officinalis</i>		1					1	100.00
<i>Balistes carolinensis</i>								100.00
<i>Dicentrarchus labrax</i>								100.00
<i>Galeorhinus galeus</i>								100.00
<i>Loligo vulgaris</i>								100.00
<i>Melicertus kerathurus</i>								100.00
<i>Mullus barbatus</i>								100.00
<i>Pagellus acarne</i>								100.00
<i>Pagellus erythrinus</i>								100.00
<i>Scophthalmus maximus</i>								100.00
<i>Solea senegalensis</i>								100.00
<i>Solea vulgaris</i>								100.00
<i>Sparus aurata</i>								100.00
<i>Synaptura lusitanica</i>								100.00
<b>Total</b>	<b>297</b>	<b>279</b>	<b>259</b>	<b>376</b>	<b>248</b>	<b>344</b>	<b>1803</b>	

**Table 3.2.3.3.3. Gulf of Cádiz. Total composition of discards in number by trammel type in the total sampling period.**

Discarded Species	Inner panel / Outer panel mesh size (mm)						Subtotal	Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400		
<i>Torpedo torpedo</i>	90	85	76	98	77	109	535	21.01
<i>Sardina pilchardus</i>	92	62	75	107	74	120	530	41.83
<i>Halobatrachus didactylus</i>	57	39	28	81	61	28	294	53.38
<i>Raja asterias</i>	27	43	40	24	29	49	212	61.70
<i>Raja undulata</i>	17	40	36	31	20	58	202	69.64
<i>Torpedo marmorata</i>	22	19	12	41	29	36	159	75.88
<i>Mugil cephalus</i>	23	19	19	40	16	25	142	81.46
<i>Diplodus bellottii</i>	18	12	18	30	20	29	127	86.45
<i>Trachinus draco</i>	8	2	9	22	3	13	57	88.69
<i>Alosa alosa</i>	4	3	8	3	5	20	43	90.38
<i>Argyrosomus regius</i>		5	2	9	6	9	31	91.59
<i>Pomadasyus incisus</i>	1	5	2	8	4	8	28	92.69
<i>Scomber japonicus</i>	6	3	1	8	3	5	26	93.72
<i>Alosa fallax</i>	4	1	2	9	4	5	25	94.70
<i>Lithognathus mormyrus</i>	5	4	2	10	3	1	25	95.68
<i>Trigla lucerna</i>	1	1	4	8	3	4	21	96.50
<i>Engraulis encrasicolus</i>	6			5	1	1	13	97.01
<i>Dicologlossa cuneata</i>	2	1	3	2		1	9	97.37
<i>Seriola dumerili</i>	2	1	2		2		7	97.64
<i>Raja montagui</i>	1	1				4	6	97.88
<i>Umbrina canariensis</i>				2	2	2	6	98.11
<i>Plectorhinchus mediterraneus</i>	3			1		1	5	98.31
<i>Raja brachyura</i>				2		2	4	98.47
<i>Pteromylaeus bovinus</i>				2		2	4	98.63
<i>Dicentrarchus punctatus</i>	1	1	2				4	98.78
<i>Solea lascaris</i>		1		2		1	4	98.94
<i>Chelon labrosus</i>		3					3	99.06
<i>Belone belone</i>			1		1	1	3	99.18
<i>Dentex canariensis</i>			1			1	2	99.25
<i>Stromateus fiatola</i>				1		1	2	99.33
<i>Octopus vulgaris</i>		1			1		2	99.41
<i>Caranx rhonchus</i>			1				1	99.45
<i>Liza aurata</i>				1			1	99.49
<i>Salpa salpa</i>				1			1	99.53
<i>Scomber scomber</i>						1	1	99.57
<i>Scorpaena scrofa</i>	1						1	99.61
<i>Bothus podas</i>				1			1	99.65
<i>Liza saliens</i>	1						1	99.69
<i>Trachinotus ovatus</i>					1		1	99.73

(To be concluded in next page)

**Table 3.2.3.3.3. Concluded.**

Discarded Species	Inner panel / Outer panel mesh size (mm)							Cumulative %
	80/300	90/300	100/300	80/400	90/400	100/400	Subtotal	
<i>Conger conger</i>						1	1	99.76
<i>Squilla mantis</i>				1			1	99.80
<i>Mullus surmuletus</i>				1			1	99.84
<i>Sciaena umbra</i>				1			1	99.88
<i>Diplodus sargus</i>	1						1	99.92
<i>Scophthalmus rhombus</i>			1				1	99.96
<i>Sepia officinalis</i>		1					1	100.00
<i>Balistes carolinensis</i>								100.00
<i>Dentex gibbosus</i>								100.00
<i>Dicentrarchus labrax</i>								100.00
<i>Loligo vulgaris</i>								100.00
<i>Maja squinado</i>								100.00
<i>Melicertus kerathurus</i>								100.00
<i>Pagellus acarne</i>								100.00
<i>Pagellus erythrinus</i>								100.00
<i>Solea kleinii</i>								100.00
<i>Solea senegalensis</i>								100.00
<i>Sparus aurata</i>								100.00
<i>Spondyliosoma cantharus</i>								100.00
<i>Synaptura lusitanica</i>								100.00
<i>Scophthalmus maximus</i>								100.00
<i>Solea vulgaris</i>								100.00
<i>Galeorhinus galeus</i>								100.00
<i>Mullus barbatus</i>								100.00
<b>Total</b>	<b>397</b>	<b>355</b>	<b>347</b>	<b>561</b>	<b>366</b>	<b>541</b>	<b>2567</b>	

The percentages discarded in relation to the total catch, by net type and by season, and the total for the species accounting for 95 % of the discards in the total are given in Tables 3.2.3.3.4 to 3.2.3.3.6. In these tables, it can be seen that the species discarded for lack of commercial value: *Torpedo torpedo*, *Halobatrachus didactylus*, *Raja asterias*, *Raja undulata*, *Torpedo marmorata* and *Mugil cephalus* among others, are always 100% discarded, whereas in both seasons those discarded for reasons of small size or poor quality are not always totally discarded.

In spring, all specimens of discard species caught are discarded, with the exception of *Argyrosomus regius*, all of which are destined for the crews' own consumption or for sale. In autumn, better use is made of some of the discard species, as is the case with *Sardina pilchardus* and specimens of medium size of *Argyrosomus regius*, *Pomadasis incisus* and *Scomber japonicus*, which are destined for crew consumption, together with certain examples of *Raja undulata* of large size that are destined for sale.

**Table 3.2.3.3.4. Gulf of Cádiz. Number of individuals caught and percentage discarded by species and trammel type in Spring 2000.**

Discarded species	Inner pannel / Outer pannel mesh size (mm)											
	80/300		90/300		100/300		80/400		90/400		100/400	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Torpedo torpedo</i>	6	100.00	5	100.00	8	100.00	9	100.00	5	100.00	19	100.00
<i>Sardina pilchardus</i>	31	100.00	31	100.00	24	100.00	42	100.00	39	100.00	50	100.00
<i>Halobatrachus didactylus</i>	5	100.00	4	100.00	1	100.00	13	100.00	15	100.00	3	100.00
<i>Raja asterias</i>	8	100.00	8	100.00	6	100.00	5	100.00	7	100.00	14	100.00
<i>Raja undulata</i>	5	100.00	3	100.00	2	100.00	11	100.00	5	100.00	20	100.00
<i>Torpedo marmorata</i>	10	100.00	9	100.00	5	100.00	19	100.00	15	100.00	21	100.00
<i>Mugil cephalus</i>	1	100.00			2	100.00	5	100.00			1	100.00
<i>Diplodus bellottii</i>	9	100.00	8	100.00	13	100.00	21	100.00	19	100.00	24	100.00
<i>Trachinus draco</i>	6	100.00	1	100.00	8	100.00	19	100.00	3	100.00	13	100.00
<i>Alosa alosa</i>	2	100.00			5	100.00	3	100.00	1	100.00	9	100.00
<i>Argyrosomus regius</i>							1	0.00	2	0.00	2	0.00
<i>Pomadasys incisus</i>	1	100.00	4	100.00	2	100.00	8	100.00	4	100.00	8	100.00
<i>Scomber japonicus</i>	2	100.00	1	100.00	1	100.00	3	100.00			3	100.00
<i>Alosa fallax</i>							1	100.00				
<i>Lithognathus mormyrus</i>	3	100.00	1	100.00	1	100.00	5	100.00	2	100.00	1	100.00

**Table 3.2.3.3.5. Gulf of Cádiz. Number of individuals caught and percentage discarded by species and trammel type in Autumn 2000.**

Discarded species	Inner pannel / Outer pannel mesh size (mm)											
	80/300		90/300		100/300		80/400		90/400		100/400	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Torpedo torpedo</i>	84	100.00	80	100.00	68	100.00	89	100.00	72	100.00	90	100.00
<i>Sardina pilchardus</i>	65	93.85	36	86.11	61	83.61	80	81.25	39	89.74	101	69.31
<i>Halobatrachus didactylus</i>	52	100.00	35	100.00	27	100.00	68	100.00	46	100.00	25	100.00
<i>Raja asterias</i>	19	100.00	35	100.00	34	100.00	19	100.00	22	100.00	35	100.00
<i>Raja undulata</i>	12	100.00	38	97.37	34	100.00	22	90.91	18	83.33	42	90.48
<i>Torpedo marmorata</i>	12	100.00	10	100.00	7	100.00	22	100.00	14	100.00	15	100.00
<i>Mugil cephalus</i>	22	100.00	19	100.00	17	100.00	35	100.00	16	100.00	24	100.00
<i>Diplodus bellottii</i>	9	100.00	4	100.00	5	100.00	9	100.00	1	100.00	5	100.00
<i>Trachinus draco</i>	2	100.00	1	100.00	1	100.00	3	100.00				
<i>Alosa alosa</i>	2	100.00	3	100.00	3	100.00			4	100.00	11	100.00
<i>Argyrosomus regius</i>	20	0.00	27	18.52	18	11.11	36	25.00	24	25.00	34	26.47
<i>Pomadasys incisus</i>			1	100.00					1	0.00		
<i>Scomber japonicus</i>	9	44.44	6	33.33	1	0.00	5	100.00	3	100.00	4	50.00
<i>Alosa fallax</i>	4	100.00	1	100.00	2	100.00	8	100.00	4	100.00	5	100.00
<i>Lithognathus mormyrus</i>	2	100.00	3	100.00	1	100.00	5	100.00	1	100.00		

**Table 3.2.3.3.6. Gulf of Cádiz. Number of individuals caught and percentage discarded by species and trammel type in total sampling period.**

Discarded species	Inner pannel / Outer pannel mesh size (mm)											
	80/300		90/300		100/300		80/400		90/400		100/400	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Torpedo torpedo</i>	90	100.00	85	100.00	76	100.00	98	100.00	77	100.00	109	100.00
<i>Sardina pilchardus</i>	96	95.83	67	92.54	85	88.24	122	87.70	79	93.67	151	79.47
<i>Halobatrachus didactylus</i>	57	100.00	39	100.00	28	100.00	81	100.00	61	100.00	28	100.00
<i>Raja asterias</i>	27	100.00	43	100.00	40	100.00	24	100.00	29	100.00	49	100.00
<i>Raja undulata</i>	17	100.00	41	97.56	36	100.00	33	93.94	23	86.96	62	93.55
<i>Torpedo marmorata</i>	22	100.00	19	100.00	12	100.00	41	100.00	29	100.00	36	100.00
<i>Mugil cephalus</i>	23	100.00	19	100.00	19	100.00	40	100.00	16	100.00	25	100.00
<i>Diplodus bellottii</i>	18	100.00	12	100.00	18	100.00	30	100.00	20	100.00	29	100.00
<i>Trachinus draco</i>	8	100.00	2	100.00	9	100.00	22	100.00	3	100.00	13	100.00
<i>Alosa alosa</i>	4	100.00	3	100.00	8	100.00	3	100.00	5	100.00	20	100.00
<i>Argyrosomus regius</i>	20	0.00	27	18.52	18	11.11	37	24.32	26	23.08	36	25.00
<i>Pomadasys incisus</i>	1	100.00	5	100.00	2	100.00	8	100.00	5	80.00	8	100.00
<i>Scomber japonicus</i>	11	54.55	7	42.86	2	50.00	8	100.00	3	100.00	7	71.43
<i>Alosa fallax</i>	4	100.00	1	100.00	2	100.00	9	100.00	4	100.00	5	100.00
<i>Lithognathus mormyrus</i>	5	100.00	4	100.00	2	100.00	10	100.00	3	100.00	1	100.00

For the purposes of this study, all the specimens of discard species caught were landed and measured for the analysis. However, the normal practice is for these to be returned to the water, dead or alive, as they are extracted from the nets. When they are brought aboard alive, the fishermen take special care to remove them from the mesh and throw them back alive, particularly the small sizes of those species of higher commercial value, such as *Argyrosomus regius*, *Diplodus sargus*, *Umbrina canariensis*, *Dicentrarchus labrax* and *Dicentrarchus punctatus*, among others. This is not done with other species of little commercial value, such as those belonging to the Mugilidae family, and some of the Clupeidae and Torpedinidae. In this case of the latter, it is often necessary to kill them first in order to avoid the strong electrical shocks received when handling them to remove them from the mesh. During spring, some of these discard species are utilised as bait for the fishing of octopus and other types of fishing carried out with traps. This is the case with *Sardina pilchardus* and *Alosa* spp.

In general terms the discards accounted for 31.08 % of the total catch in abundance, and considering the two fishing seasons separately, it can be seen that catches of discards are of much greater significance in autumn, when they represented nearly half of the total catch, 48.97 %, compared with only 16.72 % in the spring. Of the various combinations of net used, those producing the highest percentages of discards were the 80/400 and 100/400mm mesh sizes. In the autumn, discards accounted for 10.2% of the total catch with the 80/400mm mesh net, while in spring they accounted for 4.4% of the total catch with the 100/400mm mesh net. For the two seasons together, discards accounted for 6.8% of the total catch with the 80/400

mm mesh net (Table 3.2.3.3.7).

**Table 3.2.3.3.7. Gulf of Cádiz. Percentage of different uses (C = commercial, D = discarded, DBAIT = used as bait, DSC = discarded or self consumption according to TL and SC = self consumption), of the caughts per different inner/outer panel mesh combinations and season. \*(Total D = D+DBAIT+DSC).**

	Uses					Total D*	Total
	C	D	DBAIT	DSC	SC		
<b>Spring</b>							
80/300	17.4	1.1	0.8	0.3	0.2	2.2	19.7
90/300	12.5	0.9	0.7	0.2	0.0	1.7	14.3
100/300	6.5	1.0	0.5	0.3	0.1	1.8	8.4
80/400	25.2	2.4	1.0	0.6	0.3	4.0	29.4
90/400	13.4	1.3	0.9	0.5	0.2	2.6	16.2
100/400	7.4	2.7	1.1	0.6	0.2	4.4	12.0
<b>Total</b>	<b>82.4</b>	<b>9.3</b>	<b>5.0</b>	<b>2.5</b>	<b>0.9</b>	<b>16.7</b>	<b>100.0</b>
<b>Autumn</b>							
80/300	9.1	7.8	-	0.3	1.1	8.1	18.3
90/300	7.3	7.3	-	0.2	1.1	7.5	15.9
100/300	2.8	6.9	-	0.2	0.9	7.1	10.7
80/400	13.1	9.8	-	0.4	1.8	10.2	25.0
90/400	6.8	6.7	-	0.1	1.0	6.8	14.5
100/400	4.3	9.2	-	0.1	1.8	9.3	15.5
<b>Total</b>	<b>43.3</b>	<b>47.7</b>		<b>1.2</b>	<b>7.7</b>	<b>49.0</b>	<b>100.0</b>
<b>All trials</b>							
80/300	13.7	4.1	0.4	0.3	0.6	4.8	19.1
90/300	10.1	3.7	0.4	0.2	0.5	4.3	15.0
100/300	4.8	3.6	0.3	0.2	0.4	4.2	9.4
80/400	19.8	5.7	0.6	0.5	0.9	6.7	27.5
90/400	10.5	3.7	0.5	0.3	0.6	4.5	15.5
100/400	6.1	5.6	0.6	0.4	0.9	6.6	13.5
<b>Total</b>	<b>65.0</b>	<b>26.4</b>	<b>2.8</b>	<b>1.9</b>	<b>3.9</b>	<b>31.1</b>	<b>100.0</b>

#### 3.2.3.4. Cyclades

Overall, 32 species were discarded (Tables 3.2.3.4.1 to 3.2.3.4.10) of which 23 species were non-commercial (see Table 3.2.1.4.21) and the remaining nine species (i.e., *Diplodus annularis*, *Diplodus vulgaris*, *Pagellus erythrinus*, *Bothus podas*, *Pagrus pagrus*, *Merluccius merluccius*, *Mullus surmuletus*, *Diplodus sargus*, *Scorpaena porcus*) were commercial but undersized (i.e., smaller than the legal minimum landed size).

In general, *Diplodus annularis* made up numerically more than 60% of discards in all seasons with the numbers discarded being higher for the two inner/outer panel combinations of the 40 and 48 inner mesh sizes (Tables 3.2.3.4.1 to 3.2.3.4.4). Similarly, in terms of discarded weight (Tables 3.2.3.4.5 to 3.2.3.4.8), *Diplodus annularis* and *Synodus saurus* also made up more than 63% of the total in all seasons and their discarded weights were again higher for the two inner/outer panel combinations of the 40 and 48 inner mesh sizes. In general, both the total number and weight of discards declined with an increase in the inner mesh size (Tables 3.2.3.4.1 to 3.2.3.4.10).

The 95% of total numbers and weights discarded was attributed to 8 species in autumn, 8 species in winter, 8 species in spring and 9 species in summer (Tables 3.2.3.4.1 to 3.2.3.4.8). Overall, 12 species made up 95% of the combined discards in terms of numbers (Table 3.2.3.4.9) and 13 species in terms of weight (Table 3.2.3.4.10). In addition, the overall number of individuals discarded declined with an increase in the outer mesh size only for the 48 and 56 mm inner mesh size nets (Table 3.2.3.4.9). This pattern was not true in terms of weight (Table 3.2.3.4.10).

**Table 3.2.3.4.1. Cyclades. Number of individuals discarded per inner/outer mesh size combination in autumn.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
Autumn								
<i>Diplodus annularis</i>	38	40	20	24	12		134	61.57
<i>Diplodus vulgaris</i>	1		1	5	13	3	23	71.07
<i>Synodus saurus</i>	3	12	1				16	77.69
<i>Xyrichthys novacula</i>	3	4	4		3		14	83.47
<i>Pagrus pagrus</i>	3	2	2	3			10	87.60
<i>Chromis chromis</i>	2	7					9	91.32
<i>Microchirus ocellatus</i>			3	2			5	93.39
<i>Parablennius gattorugine</i>		3		2			5	95.45
<i>Bothus podas</i>	2	1		1	1		5	97.52
<i>Chelidonichthys lastoviza</i>		1			1		2	98.35
<i>Torpedo marmorata</i>			1				1	98.76
<i>Mullus surmuletus</i>		1					1	99.17
<i>Stephanolepis diaspros</i>				1			1	99.59
<i>Symphodus mediterraneus</i>	1						1	100.00
<b>Total</b>	<b>53</b>	<b>71</b>	<b>32</b>	<b>38</b>	<b>30</b>	<b>3</b>	<b>227</b>	

**Table 3.2.3.4.2. Cyclades. Number of individuals discarded per inner/outer mesh size combination in winter.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
Winter								
<i>Diplodus annularis</i>	10	15	38	33	13	9	118	64.48
<i>Chelidonichthys lastoviza</i>	2	8	3	2			15	72.68
<i>Synodus saurus</i>	4	6	1	1	1		13	79.78
<i>Diplodus vulgaris</i>	3	1	2		1	2	9	84.70
<i>Pagrus pagrus</i>				3	1	5	9	89.62
<i>Xyrichthys novacula</i>	2	4					6	92.90
<i>Bothus podas</i>	1	1					2	93.99
<i>Parablennius gattorugine</i>		2					2	95.08
<i>Symphodus mediterraneus</i>	1	1					2	96.17
<i>Torpedo marmorata</i>		1			1		2	97.27
<i>Citharus linguatula</i>		1					1	97.81
<i>Diplodus sargus</i>						1	1	98.36
<i>Pagellus erythrinus</i>		1					1	98.91
<i>Peristedion cataphractum</i>					1		1	99.45
<i>Synaptura kleiini</i>		1					1	100.00
<b>Total</b>	<b>23</b>	<b>42</b>	<b>44</b>	<b>39</b>	<b>18</b>	<b>17</b>	<b>183</b>	

**Table 3.2.3.4.3. Cyclades. Number of individuals discarded per inner/outer mesh size combination in spring.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Spring</b>								
<i>Diplodus annularis</i>	35	50	51	49	38	19	242	61.73
<i>Synodus saurus</i>	16	23	5	2			46	73.47
<i>Chromis chromis</i>	12	11					23	79.34
<i>Pagellus erythrinus</i>	4	19					23	85.20
<i>Chelidonichthys lastoviza</i>	4	2	2	2	3	1	14	88.78
<i>Merluccius merluccius</i>	3	4	2				9	91.07
<i>Diplodus vulgaris</i>	1	5		1	1		8	93.11
<i>Citharus linguatula</i>	2			3		2	7	94.90
<i>Bothus podas</i>	2		2				4	95.92
<i>Monochirus hispidus</i>			3				3	96.68
<i>Torpedo marmorata</i>				1		2	3	97.45
<i>Microchirus ocellatus</i>	1		1				2	97.96
<i>Xyrichtys novacula</i>	1		1				2	98.47
<i>Anthias anthias</i>		1					1	98.72
<i>Apogon imberbis</i>		1					1	98.98
<i>Muraena helena</i>						1	1	99.23
<i>Parablennius gattorugine</i>	1						1	99.49
<i>Scyliorhinus canicula</i>					1		1	99.74
<i>Symphodus mediterraneus</i>					1		1	100.00
<b>Total</b>	<b>82</b>	<b>116</b>	<b>67</b>	<b>58</b>	<b>44</b>	<b>25</b>	<b>392</b>	

**Table 3.2.3.4.4. Cyclades. Number of individuals discarded per inner/outer mesh size combination in summer.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Summer</b>								
<i>Diplodus annularis</i>	77	106	114	47	22	13	379	61.73
<i>Synodus saurus</i>	22	12	2	9	2	17	64	72.15
<i>Diplodus vulgaris</i>	4	3	14	12	2	7	42	78.99
<i>Pagellus erythrinus</i>	9	20					29	83.71
<i>Chelidonichthys lastoviza</i>	12	1		1	1	5	20	86.97
<i>Chromis chromis</i>	1	15					16	89.58
<i>Liocarcinus depurator</i>		2	3	1	6		12	91.53
<i>Bothus podas</i>	4			1	3	3	11	93.32
<i>Monochirus hispidus</i>	2	6				1	9	94.79
<i>Citharus linguatula</i>	1		1	3			5	95.60
<i>Scopthalmus maximus</i>						5	5	96.42
<i>Anthias anthias</i>		3		1			4	97.07
<i>Pagrus pagrus</i>	2		1				3	97.56
<i>Dasyatis pastinaca</i>					1	1	2	97.88
<i>Merluccius merluccius</i>	2						2	98.21
<i>Microchirus ocellatus</i>	1		1				2	98.53
<i>Torpedo marmorata</i>		1	1				2	98.86
<i>Ariosoma balearicum</i>	1						1	99.02
<i>Dasyatis centroura</i>	1						1	99.19
<i>Mullus surmuletus</i>	1						1	99.35
<i>Scorpaena porcus</i>			1				1	99.51
<i>Symphodus mediterraneus</i>		1					1	99.67
<i>Symphodus ocellatus</i>				1			1	99.84
<i>Xyrichthys novacula</i>		1					1	100
<b>Total</b>	<b>140</b>	<b>171</b>	<b>138</b>	<b>76</b>	<b>37</b>	<b>52</b>	<b>614</b>	

**Table 3.2.3.4.5. Cyclades. Weight (g) of individuals discarded per inner/outer mesh size combination in autumn.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Autumn</b>								
<i>Diplodus annularis</i>	938.10	1065.00	704.80	947.00	623.00	722.30	5000.20	44.17
<i>Synodus saurus</i>	445.00	1554.00	163.00				2162.00	63.26
<i>Diplodus vulgaris</i>	20.80		25.00	247.40	724.00	170.00	1187.20	73.75
<i>Xyrichthys novacula</i>	164.00	136.00	223.00		219.00		742.00	80.31
<i>Pagrus pagrus</i>	151.00	105.00	93.00	144.40			493.40	84.66
<i>Parablennius gattorugine</i>		167.00		221.00			388.00	88.09
<i>Chelidonichthys lastoviza</i>		45.00		219.00	118.00		382.00	91.47
<i>Chromis chromis</i>	61.00	202.00					263.00	93.79
<i>Stephanolepis diaspros</i>				256.00			256.00	96.05
<i>Torpedo marmorata</i>			197.00				197.00	97.79
<i>Microchirus ocellatus</i>			68.00	54.00			122.00	98.87
<i>Bothus podas</i>	46.00	19.00		12.00	22.00		99.00	99.74
<i>Mullus surmuletus</i>		18.00					18.00	99.90
<i>Symphodus mediterraneus</i>	11.20						11.20	100.00
<b>Total</b>	<b>1837.10</b>	<b>3311.00</b>	<b>1473.80</b>	<b>2100.80</b>	<b>1706.00</b>	<b>892.30</b>	<b>11321.00</b>	

**Table 3.2.3.4.6. Cyclades. Weight (g) of individuals discarded per inner/outer mesh size combination in winter.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Winter</b>								
<i>Diplodus annularis</i>	250.00	362.00	1357.00	1200.00	679.00	471.00	4319.00	42.68
<i>Synodus saurus</i>	699.00	925.00	213.00	142.00	212.00		2191.00	64.33
<i>Torpedo marmorata</i>		330.00			485.00		815.00	72.38
<i>Chelidonichthys lastoviza</i>	117.00	285.00	209.00	188.00			799.00	80.28
<i>Pagrus pagrus</i>				224.00	67.00	434.00	725.00	87.44
<i>Diplodus vulgaris</i>	75.00	14.00	92.00		63.00	114.00	358.00	90.98
<i>Xyrichthys novacula</i>	97.00	179.00					276.00	93.71
<i>Synaptura kleini</i>		158.00					158.00	95.27
<i>Parablennius gattorugine</i>		123.00					123.00	96.48
<i>Diplodus sargus</i>						106.00	106.00	97.53
<i>Symphodus mediterraneus</i>	46.00	36.00					82.00	98.34
<i>Peristedion cataphractum</i>					66.00		66.00	98.99
<i>Bothus podas</i>	15.00	48.00					63.00	99.61
<i>Pagellus erythrinus</i>		31.00					31.00	99.92
<i>Citharus linguatula</i>		8.00					8.00	100.00
<b>Total</b>	<b>1299.00</b>	<b>2499.00</b>	<b>1871.00</b>	<b>1754.00</b>	<b>1572.00</b>	<b>1125.00</b>	<b>10120.00</b>	

**Table 3.2.3.4.7. Cyclades. Weight (g) of individuals discarded per inner/outer mesh size combination in spring.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Spring</b>								
<i>Diplodus annularis</i>	949.00	1384.00	1798.00	1835.00	2087.00	918.00	8971.00	40.38
<i>Synodus saurus</i>	2216.00	4086.00	884.00	450.00			7636.00	74.76
<i>Torpedo marmorata</i>				230.00		875.00	1105.00	79.73
<i>Muraena helena</i>						750.00	750.00	83.11
<i>Pagellus erythrinus</i>	131.00	548.00					679.00	86.16
<i>Chromis chromis</i>	343.00	311.00					654.00	89.11
<i>Merluccius merluccius</i>	203.00	263.00	132.00				598.00	91.80
<i>Chelidonichthys lastoviza</i>	112.00	112.00	59.00	120.00	112.00	59.00	574.00	94.38
<i>Diplodus vulgaris</i>	81.00	180.00		39.00	72.00		372.00	96.06
<i>Scyliorhinus canicula</i>					210.00		210.00	97.00
<i>Citharus linguatula</i>	60.00			66.00		61.00	187.00	97.84
<i>Bothus podas</i>	46.00		91.00				137.00	98.46
<i>Monochirus hispidus</i>			134.00				134.00	99.06
<i>Xyrichtys novacula</i>	31.00		62.00				93.00	99.48
<i>Microchirus ocellatus</i>	19.00		21.00				40.00	99.66
<i>Anthias anthias</i>		26.00					26.00	99.78
<i>Apogon imberbis</i>		22.00					22.00	99.88
<i>Symphodus mediterraneus</i>					19.00		19.00	99.96
<i>Parablennius gattorugine</i>	8.00						8.00	100.00
<b>Total</b>	<b>4199.00</b>	<b>6932.00</b>	<b>3181.00</b>	<b>2740.00</b>	<b>2500.00</b>	<b>2663.00</b>	<b>22215.00</b>	

**Table 3.2.3.4.8. Cyclades. Weight (g) of individuals discarded per inner/outer mesh size combination in summer.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<b>Summer</b>								
<i>Diplodus annularis</i>	2282.00	3045.00	4715.00	2044.00	1001.00	702.00	13789.00	39.64
<i>Synodus saurus</i>	2906.00	1582.00	353.00	1620.00	643.00	2152.00	9256.00	66.24
<i>Dasyatis pastinaca</i>					780.00	2890.00	3670.00	76.79
<i>Diplodus vulgaris</i>	218.00	162.00	709.00	550.00	138.00	408.00	2185.00	83.07
<i>Liocarcinus depurator</i>		240.00	340.00	150.00	480.00		1210.00	86.55
<i>Chelidonichthys lastoviza</i>	557.00	37.00		52.00	23.00	276.00	945.00	89.27
<i>Pagellus erythrinus</i>	261.00	669.00					930.00	91.94
<i>Torpedo marmorata</i>		540.00	40.00				580.00	93.61
<i>Chromis chromis</i>		498.00					498.00	95.04
<i>Bothus podas</i>	78.00			31.00	123.00	108.00	340.00	96.02
<i>Dasyatis centroura</i>	250.00						250.00	96.74
<i>Monochirus hispidus</i>	83.00	149.00				15.00	247.00	97.45
<i>Scopthalmus maximus</i>						174.00	174.00	97.95
<i>Merluccius merluccius</i>	135.00						135.00	98.34
<i>Anthias anthias</i>		86.00		33.00			119.00	98.68
<i>Citharus linguatula</i>	25.00		26.00	61.00			112.00	99.00
<i>Ariosoma balearicum</i>	110.00						110.00	99.32
<i>Pagrus pagrus</i>	62.00		35.00				97.00	99.59
<i>Xyrichtys novacula</i>		42.00					42.00	99.72
<i>Microchirus ocellatus</i>	10.00		25.00				35.00	99.82
<i>Symphodus mediterraneus</i>		24.00					24.00	99.89
<i>Scorpaena porcus</i>			21.00				21.00	99.95
<i>Symphodus ocellatus</i>				10.00			10.00	99.97
<i>Mullus surmuletus</i>	9.00						9.00	100.00
<b>Total</b>	<b>6986.00</b>	<b>7074.00</b>	<b>6264.00</b>	<b>4551.00</b>	<b>3188.00</b>	<b>6725.00</b>	<b>34788.00</b>	

**Table 3.2.3.4.9. Cyclades. Number of individuals discarded per inner/outer mesh size combination all seasons combined.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<i>Diplodus annularis</i>	160	211	223	153	85	41	873	61.65
<i>Synodus saurus</i>	45	53	9	12	3	17	139	71.47
<i>Diplodus vulgaris</i>	9	9	17	18	17	12	82	77.26
<i>Pagellus erythrinus</i>	13	40					53	81.00
<i>Chelidonichthys lastoviza</i>	18	12	5	5	5	6	51	84.60
<i>Chromis chromis</i>	14	33					47	87.99
<i>Xyrichthys novacula</i>	6	9	5		3	1	24	89.62
<i>Bothus podas</i>	9	2	2	2	4	3	22	91.17
<i>Pagrus pagrus</i>	5	2	3	6	1	5	22	92.73
<i>Citharus linguatula</i>	3	1	1	6		2	13	93.64
<i>Liocarcinus depurator</i>		2	3	1	6		12	94.49
<i>Monochirus hispidus</i>	2	6	3			1	12	95.34
<i>Merluccius merluccius</i>	5	4	2				11	96.12
<i>Microchirus ocellatus</i>	2		5	2			9	96.75
<i>Parablennius gattorugine</i>	1	5		2			8	97.32
<i>Torpedo marmorata</i>		2	2	1	1	2	8	97.88
<i>Anthias anthias</i>		4		1			5	98.23
<i>Scopthalmus maximus</i>						5	5	98.59
<i>Symphodus mediterraneus</i>	2	2			1		5	98.94
<i>Dasyatis pastinaca</i>					1	1	2	99.08
<i>Mullus surmuletus</i>	1	1					2	99.22
<i>Apogon imberbis</i>		1					1	99.29
<i>Ariosoma balearicum</i>	1						1	99.36
<i>Dasyatis centroura</i>	1						1	99.44
<i>Diplodus sargus</i>						1	1	99.51
<i>Muraena helena</i>						1	1	99.58
<i>Peristedion cataphractum</i>					1		1	99.65
<i>Scorpaena porcus</i>			1				1	99.72
<i>Scyliorhinus canicula</i>					1		1	99.79
<i>Stephanolepis diaspros</i>				1			1	99.86
<i>Symphodus ocellatus</i>				1			1	99.93
<i>Synaptura kleiini</i>		1					1	100.00
<b>Total</b>	<b>297</b>	<b>400</b>	<b>281</b>	<b>211</b>	<b>129</b>	<b>98</b>	<b>1416</b>	

**Table 3.2.3.4.10. Cyclades. Weight (g) of individuals discarded per inner/outer mesh size combination all seasons combined.**

Discarded species	40/220	40/240	48/240	48/260	56/280	56/300	Subtotal	Cumulative %
<i>Diplodus annularis</i>	4419.10	5856.00	8574.80	6026.00	4390.00	2813.30	32079.20	40.85
<i>Synodus saurus</i>	6266.00	8147.00	1613.00	2212.00	855.00	2152.00	21245.00	67.91
<i>Diplodus vulgaris</i>	394.80	356.00	826.00	836.40	997.00	692.00	4102.20	73.14
<i>Dasyatis pastinaca</i>					780.00	2890.00	3670.00	77.81
<i>Chelidonichthys lastoviza</i>	786.00	479.00	268.00	579.00	253.00	335.00	2700.00	81.25
<i>Torpedo marmorata</i>		870.00	237.00	230.00	485.00	875.00	2697.00	84.68
<i>Pagellus erythrinus</i>	392.00	1248.00					1640.00	86.77
<i>Chromis chromis</i>	404.00	1011.00					1415.00	88.57
<i>Pagrus pagrus</i>	213.00	105.00	128.00	368.40	67.00	434.00	1315.40	90.25
<i>Liocarcinus depurator</i>		240.00	340.00	150.00	480.00		1210.00	91.79
<i>Xyrichtys novacula</i>	292.00	357.00	285.00		219.00	77.00	1230.00	93.36
<i>Muraena helena</i>						750.00	750.00	94.31
<i>Merluccius merluccius</i>	338.00	263.00	132.00				733.00	95.24
<i>Bothus podas</i>	185.00	67.00	91.00	43.00	145.00	108.00	639.00	96.06
<i>Parablennius gattorugine</i>	8.00	290.00		221.00			519.00	96.72
<i>Monochirus hispidus</i>	83.00	149.00	134.00			15.00	381.00	97.20
<i>Citharus linguatula</i>	85.00	8.00	26.00	127.00		61.00	307.00	97.60
<i>Stephanolepis diaspros</i>				256.00			256.00	97.92
<i>Dasyatis centroura</i>	250.00						250.00	98.24
<i>Scyliorhinus canicula</i>					210.00		210.00	98.51
<i>Microchirus ocellatus</i>	29.00		114.00	54.00			197.00	98.76
<i>Scophthalmus maximus</i>						174.00	174.00	98.98
<i>Synaptura kleiini</i>		158.00					158.00	99.18
<i>Anthias anthias</i>		112.00		33.00			145.00	99.37
<i>Symphodus mediterraneus</i>	57.20	60.00			19.00		136.20	99.54
<i>Ariosoma balearicum</i>	110.00						110.00	99.68
<i>Diplodus sargus</i>						106.00	106.00	99.81
<i>Peristedion cataphractum</i>					66.00		66.00	99.90
<i>Mullus surmuletus</i>	9.00	18.00					27.00	99.93
<i>Apogon imberbis</i>		22.00					22.00	99.96
<i>Scorpaena porcus</i>			21.00				21.00	99.99
<i>Symphodus ocellatus</i>				10.00			10.00	100.00
<b>Total</b>	<b>14321.10</b>	<b>19816.00</b>	<b>12789.80</b>	<b>11145.80</b>	<b>8966.00</b>	<b>11482.30</b>	<b>78521.00</b>	

Tables 3.2.3.4.11 to 3.2.3.4.15 present the species-specific percentages discarded in relation to the total catch, by mesh size combination and season. From these tables it was evident that the species discarded because of no commercial value are always 100% discarded, whereas the discard rates of the undersized commercial species ranged from less than 1% (e.g. *Mullus surmuletus* in autumn) to more than 90% for *Diplodus annularis* in winter and spring (Tables 3.2.3.4.11 to 3.2.3.4.14).

The overall C/T ratios between the different outer/inner panel mesh combinations ranged between 0.68 and 0.88 by number and between 0.71 to 0.92 by weight (Table 3.2.3.4.16). In general, the C/T ratio increased with an increase in mesh size and generally, the combinations with the larger outer panel mesh size were characterised by larger C/T ratios only for the 48 and 56 inner mesh sizes.

**Table 3.2.3.4.11. Cyclades. Number of individuals caught and percentage discarded by species and inner/outer mesh size combination in Autumn.**

Discarded species	40/220		40/240		48/240		48/260		56/280		56/300		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Diplodus annularis</i>	40	95.00	40	100.00	20	100.00	24	100.00	13	92.31	15	0.00	152	88.16
<i>Diplodus vulgaris</i>	2	50.00			3	33.33	5	100.00	64	20.31	10	30.00	84	27.38
<i>Synodus saurus</i>	3	100.00	12	100.00	1	100.00							16	100.00
<i>Xyrichtys novacula</i>	3	100.00	4	100.00	4	100.00			3	100.00			14	100.00
<i>Pagrus pagrus</i>	4	75.00	3	66.67	2	100.00	4	75.00					13	76.92
<i>Chromis chromis</i>	2	100.00	7	100.00									9	100.00
<i>Bothus podas</i>	2	100.00	1	100.00			1	100.00	1	100.00			5	100.00
<i>Microchirus ocellatus</i>					3	100.00	2	100.00					5	100.00
<i>Parablennius gattorugine</i>			3	100.00			2	100.00					5	100.00
<i>Chelidonichthys lastoviza</i>			1	100.00			2	100.00					5	100.00
<i>Mullus surmuletus</i>			109	1.09					1	100.00			2	100.00
<i>Torpedo marmorata</i>					1	100.00							109	0.92
<i>Stephanolepis diaspros</i>							1	100.00					1	100.00
<i>Symphodus mediterraneus</i>	1	100.00											1	100.00
<b>Total</b>	<b>57</b>	<b>92.98</b>	<b>180</b>	<b>39.44</b>	<b>34</b>	<b>94.12</b>	<b>39</b>	<b>97.44</b>	<b>82</b>	<b>36.59</b>	<b>25</b>	<b>12.00</b>	<b>417</b>	<b>54.44</b>
														<b>227</b>

**Table 3.2.3.4.12. Cyclades. Number of individuals caught and percentage discarded by species and inner/outer mesh size combination in Winter.**

Discarded species	40/220		40/240		48/240		48/260		56/280		56/300		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Diplodus annularis</i>	10	100.00	15	100.00	38	100.00	33	100.00	15	86.67	12	75.00	123	95.93
<i>Chelidonicichthys lastoviza</i>	2	100.00	8	100.00	3	100.00	2	100.00					15	100.00
<i>Synodus saurus</i>	4	100.00	6	100.00	1	100.00	1	100.00	1	100.00			13	100.00
<i>Diplodus vulgaris</i>	3	100.00	1	100.00	2	100.00			2	50.00	3	66.67	11	81.82
<i>Pagrus pagrus</i>							3	100.00	1	100.00	5	100.00	9	100.00
<i>Xyrichtys novacula</i>	2	100.00	4	100.00									6	100.00
<i>Bothus podas</i>	1	100.00	1	100.00									2	100.00
<i>Parablennius gattorugine</i>			2	100.00									2	100.00
<i>Symphodus mediterraneus</i>	1	100.00	1	100.00									2	100.00
<i>Torpedo marmorata</i>			1	100.00					1	100.00			2	100.00
<i>Citharus linguatula</i>			1	100.00									1	100.00
<i>Diplodus sargus</i>											1	100.00	1	100.00
<i>Pagellus erythrinus</i>			4	25.00									4	25.00
<i>Peristedion cataphractum</i>									1	100.00			1	100.00
<i>Synaptura kleini</i>			1	100.00									1	100.00
<b>Total</b>	<b>23</b>	<b>100.00</b>	<b>45</b>	<b>91.11</b>	<b>44</b>	<b>100.00</b>	<b>39</b>	<b>100.00</b>	<b>21</b>	<b>85.71</b>	<b>21</b>	<b>80.95</b>	<b>193</b>	<b>94.82</b>
													<b>183</b>	

**Table 3.2.3.4.13. Cyclades. Number of individuals caught and percentage discarded by species and inner/outer mesh size combination in Spring.**

Discarded species	40/220		40/240		48/240		48/260		56/260		56/300		Total		
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	
<i>Diplodus annularis</i>	35	100.00	50	100.00	51	100.00	49	100.00	42	90.48	20	95.00	247	97.98	
<i>Synodus saurus</i>	16	100.00	23	100.00	5	100.00	2	100.00					46	100.00	
<i>Chromis chromis</i>	12	100.00	11	100.00									23	100.00	
<i>Pagellus erythrinus</i>	37	10.81	82	23.17									119	19.33	
<i>Chelidonichthys lastoviza</i>	4	100.00	2	100.00	2	100.00	2	100.00	3	100.00	1	100.00	14	100.00	
<i>Merluccius merluccius</i>	12	25.00	13	30.77	33	6.06							58	15.52	
<i>Diplodus vulgaris</i>	2	50.00	6	83.33			1	100.00	3	33.33			12	66.67	
<i>Citharus linguatula</i>	2	100.00					3	100.00			2	100.00	7	100.00	
<i>Bothus podas</i>	2	100.00											4	100.00	
<i>Monochirus hispidus</i>					2	100.00							3	100.00	
<i>Torpedo marmorata</i>					3	100.00							3	100.00	
<i>Microchirus ocellatus</i>	1	100.00					1	100.00			2	100.00	3	100.00	
<i>Xyrichtys novacula</i>	1	100.00			1	100.00							2	100.00	
<i>Anthias anthias</i>			1	100.00									1	100.00	
<i>Apogon imberbis</i>			1	100.00									1	100.00	
<i>Muraena helena</i>											1	100.00	1	100.00	
<i>Parablennius gattorugine</i>	1	100.00											1	100.00	
<i>Scyliorhinus canicula</i>								1	100.00				1	100.00	
<i>Symphodus mediterraneus</i>								1	100.00				1	100.00	
<b>Total</b>	<b>125</b>	<b>65.60</b>	<b>189</b>	<b>61.38</b>	<b>98</b>	<b>68.37</b>	<b>58</b>	<b>100.00</b>	<b>50</b>	<b>84.00</b>	<b>26</b>	<b>96.15</b>	<b>546</b>	<b>71.79</b>	<b>392</b>

**Table 3.2.3.4.14. Cyclades. Number of individuals caught and percentage discarded by species and inner/outer mesh size combination in Summer.**

Discarded species	40/220		40/240		48/240		48/260		56/260		56/300		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Diplobus annularis</i>	78	98.72	106	100.00	118	96.61	47	100.00	22	100.00	18	72.22	389	44.99
<i>Synodus saurus</i>	22	100.00	12	100.00	2	100.00	9	100.00	2	100.00	17	100.00	64	100.00
<i>Pagellus erythrinus</i>	225	4.00	251	7.97									476	0.00
<i>Chelidonichthys lastoviza</i>	12	100.00	1	100.00			1	100.00	1	100.00	5	100.00	20	100.00
<i>Chromis chromis</i>	1	100.00	15	100.00									16	100.00
<i>Liocarcinus depurator</i>			2	100.00	3	100.00	1	100.00	6	100.00			12	100.00
<i>Bothus podas</i>	4	100.00					1	100.00	3	100.00	3	100.00	11	100.00
<i>Monochirus hispidus</i>	2	100.00	6	100.00							1	100.00	9	100.00
<i>Citharus linguatula</i>	1	100.00			1	100.00	3	100.00					5	100.00
<i>Scopthalmus maximus</i>									5	100.00			5	100.00
<i>Anthias anthias</i>			3	100.00			1	100.00					4	100.00
<i>Diplobus vulgaris</i>	7	57.14	3	100.00	24	58.33	15	80.00	27	7.41	17	41.18	93	3.23
<i>Dasyatis pastinaca</i>									1	100.00	1	100.00	2	100.00
<i>Merluccius merluccius</i>	2	100.00											2	100.00
<i>Microchirus ocellatus</i>	1	100.00			1	100.00							2	100.00
<i>Pagrus pagrus</i>	2	100.00			2	50.00							4	50.00
<i>Torpedo marmorata</i>			1	100.00	1	100.00							2	100.00
<i>Ariosoma balearicum</i>	1	100.00											1	100.00
<i>Dasyatis centroura</i>	1	100.00											1	100.00
<i>Mullus surmuletus</i>	113	0.88											113	0.00
<i>Scorpaena porcus</i>					84	1.19							84	0.00
<i>Symphodus mediterraneus</i>			1	100.00									1	100.00
<i>Symphodus ocellatus</i>							1	100.00					1	100.00
<i>Xyrichtys novacula</i>			1	100.00									1	100.00
<b>Total</b>	<b>472</b>	<b>10.38</b>	<b>402</b>	<b>37.56</b>	<b>236</b>	<b>3.39</b>	<b>79</b>	<b>81.01</b>	<b>62</b>	<b>56.45</b>	<b>67</b>	<b>47.76</b>	<b>1318</b>	<b>28.07</b>
														<b>370</b>

**Table 3.2.3.4.15. Cyclades. Number of individuals caught and percentage discarded by species and inner/outer mesh size combination for all seasons combined.**

Discarded species	40/220		40/240		48/240		48/260		56/260		56/300		Total	
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)
<i>Diplodus annularis</i>	163	98.16	211	100.00	227	98.24	153	100.00	92	92.39	65	63.08	911	97.48
<i>Synodus saurus</i>	45	100.00	53	100.00	9	100.00	12	100.00	3	100.00	17	100.00	139	100.00
<i>Diplodus vulgaris</i>	14	64.29	10	90.00	29	58.62	25	72.00	96	17.71	31	38.71	205	40.00
<i>Pagellus erythrinus</i>	280	4.64	342	11.70									622	8.52
<i>Chelidonichthys lastoviza</i>	18	100.00	12	100.00	5	100.00	5	100.00	5	100.00	6	100.00	51	100.00
<i>Chromis chromis</i>	14	100.00	33	100.00									47	100.00
<i>Xyrichtys novacula</i>	6	100.00	9	100.00	5	100.00			3	100.00	1	100.00	24	100.00
<i>Bothus podas</i>	9	100.00	2	100.00	2	100.00	2	100.00	4	100.00	3	100.00	22	100.00
<i>Pagrus pagrus</i>	6	83.33	3	66.67	4	75.00	7	85.71	2	50.00	5	100.00	27	81.48
<i>Citharus linguatula</i>	3	100.00	1	100.00	1	100.00	6	100.00			2	100.00	13	100.00
<i>Monochirus hispidus</i>	2	100.00	6	100.00	3	100.00					1	100.00	12	100.00
<i>Liocarcinus depurator</i>			2	100.00	3	100.00	1	100.00	6	100.00			12	100.00
<i>Merluccius merluccius</i>	14	35.71	16	25.00	37	5.41							67	16.42
<i>Microchirus ocellatus</i>	2	100.00			5	100.00	2	100.00					9	100.00
<i>Parablennius gattorugine</i>	1	100.00	5	100.00			2	100.00					8	100.00
<i>Torpedo marmorata</i>			2	100.00	2	100.00	1	100.00	1	100.00	2	100.00	8	100.00
<i>Anthias anthias</i>			4	100.00			1	100.00					5	100.00
<i>Symphodus mediterraneus</i>	2	100.00	2	100.00					1	100.00			5	100.00
<i>Scopthalmus maximus</i>										5	100.00		5	100.00
<i>Dasyatis pastinaca</i>									1	100.00	1	100.00	2	100.00
<i>Mullus surmuletus</i>	396	0.25	458	0.22									854	0.23
<i>Ariosoma balearicum</i>	1	100.00											1	100.00
<i>Apogon imberbis</i>			1	100.00									1	100.00
<i>Dasyatis centroura</i>	1	100.00											1	100.00
<i>Diplodus sargus</i>											1	100.00	1	100.00

(To be concluded in next page)

Table 3.2.3.4.15. Concluded.

Discarded species	40/220		48/240		48/260		56/280		56/300		Total				
	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)	N	D (%)			
<i>Muraena helena</i>	1						1	100.00	1	100.00	1	100.00			
<i>Peristedion cataphractum</i>					1	100.00					1	100.00			
<i>Scorpaena porcus</i>			155	0.65					155	0.65					
<i>Scyliorhinus canicula</i>					1	100.00			1	100.00	1	100.00			
<i>Stephanolepis diaspros</i>							1	100.00			1	100.00			
<i>Symphodus ocellatus</i>					1	100.00			1	100.00	1	100.00			
<i>Synaptura kleini</i>			1	100.00							1	100.00			
Total	977	30.40	1173	34.10	487	57.70	219	96.36	216	59.72	141	80.14	3213	44.54	1431

**Table 3.2.3.4.16. Cyclades. Total catch, in terms of numbers (N) and weights (W, g), of discarded (D) and commercial (C) species and C/T ratio per inner/outer panel mesh combination.**

inner/outer panel	C	%C	D	%D	C/T
40/220					
N	2198	69.2	977.0	30.8	0.69
W	167217.7	71.7	65979.4	28.3	0.72
40/240					
N	2499.0	68.1	1173.0	31.9	0.68
W	200359.0	70.8	82505.5	29.2	0.71
48/240					
N	1574.0	76.4	487.0	23.6	0.76
W	160293.5	81.7	35997.2	18.3	0.82
48/260					
N	1432.0	86.7	219.0	13.3	0.87
W	175868.9	92.3	14574.2	7.7	0.92
56/280					
N	905.0	80.7	216.0	19.3	0.81
W	124292.1	85.3	21402.8	14.7	0.85
56/300					
N	1011.0	87.8	141.0	12.2	0.88
W	142933.9	89.8	16311.0	10.2	0.90

### 3.3. Selectivity

#### 3.3.1. Basque Country

##### 3.3.1.1. Catch size frequency distributions

The length frequency distributions of the most abundant species caught in the fishing trials (*Solea vulgaris*, *Trisopterus luscus*, *Scomber scombrus*, *Trachinus draco*, *Sardina pilchardus* and *Trigla lucerna*) are shown in Figures 3.3.1.1.1 to 3.3.1.1.12. Data on *Merluccius merluccius* were not analysed due to the broad size range of the species and the poor representation of individuals in the size distribution.

There was a significant difference among seasonal catch size distributions for the six species ( $p < 0.05$ ) in the paired comparisons using the Kolmogorov-Smirnov test (Table 3.3.1.1.1a). For *Scomber scombrus* and *Sardina pilchardus* some of the paired comparisons

were not possible due to the small number of individuals caught in some seasons<sup>1</sup>.

The paired comparison between size distributions in the annual combined catch of trammel with 500 mm *versus* 600 mm mesh size in the outer panel also showed a significant difference for all the six species (Table 3.3.1.1 b).

For *Solea vulgaris*, the annual combined length frequency distributions ranged from 16 to 51 cm (Figure 3.3.1.1.1). All the distributions were skewed to the right and the modal length increased in both series of mesh combinations using 500 and 600 mm in the outer panel with the increase of the inner panel mesh size (Figure 3.3.1.1.1a, b): modal length of 28-29 cm for 90 mm in the inner panel; 31 cm for 100 mm; 34-35 cm for 110 mm. The number of fishes caught diminished steadily when the mesh size in the inner panel increased. Combined catches of the series of mesh combinations using 500 mm in the outer panel on one side and 600 mm in the other side showed overlapped size distributions (Figure 3.3.1.1.1c).

The increase in the modal length when the inner panel mesh size increased was also recorded in the seasonal catch size distributions (Figures 3.3.1.1.2a,b to 3.3.1.1.5a,b), particularly in those seasons with a high level of catches (winter and autumn). The overlapping of the size distribution corresponding to the two series of combined catches (500 mm *versus* 600 mm in the outer panel) was also true for the seasonal catches (Figures 3.3.1.1.2c to 3.3.1.1.5c).

For *Trisopterus luscus*, the annual combined length frequency distributions ranged from 13 to 37 cm (Figure 3.3.1.1.6). The annual size distributions for inner/outer mesh size combinations were bimodal (first mode in 18-20 cm, second one in 29-30 cm), particularly in the case of the trammel nets using the combinations of mesh sizes 90/500 and 90/600 mm (Figure 3.3.1.1.6a,b). In both series of mesh combinations using 500 and 600 mm in the outer panel, the biggest mesh size in the inner panel (110 mm) was the least efficient in catching the biggest individuals of *T. luscus*. Thus, the catches of those mesh size were composed mainly of small individuals. There was no evident increase in the size of the fish belonging to the first modal part of the distributions when the inner mesh sizes of the trammel nets increased. The number of individuals caught decreased with the increase of the inner panel mesh size. Combined catch size distributions of the series of mesh combinations using 500 mm and 600 mm in the other side were clearly bimodal and were overlapped (Figure 3.3.1.1.6c).

The most important fishing seasons for *T. luscus* were winter and autumn (Figures

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<sup>1</sup> Given the results of the tests and the seasonal abundance of the catches, the catch size distribution of *Solea vulgaris* and *Trisopterus luscus* are presented by seasons, whereas those of the four remaining species are shown only annually, due to the small abundance in the seasonal catches.

3.3.1.1.7 and 3.3.1.1.10). In those seasons all the size distributions of the mesh size combinations were bimodal and the change of the size of the fish with the increase of the inner panel mesh size was unclear. In spring and summer the level of catches was low and consequently the distributions were poorly defined. Nevertheless, those of the combined catches of the series of mesh combinations using 500 and 600 mm showed a bimodal pattern. The overlapping of the size distribution corresponding to the two series of combined catches (500 mm versus 600 mm in the outer panel) was also true for the seasonal catches (Figures 3.3.1.1.7c to 3.3.1.1.10c).

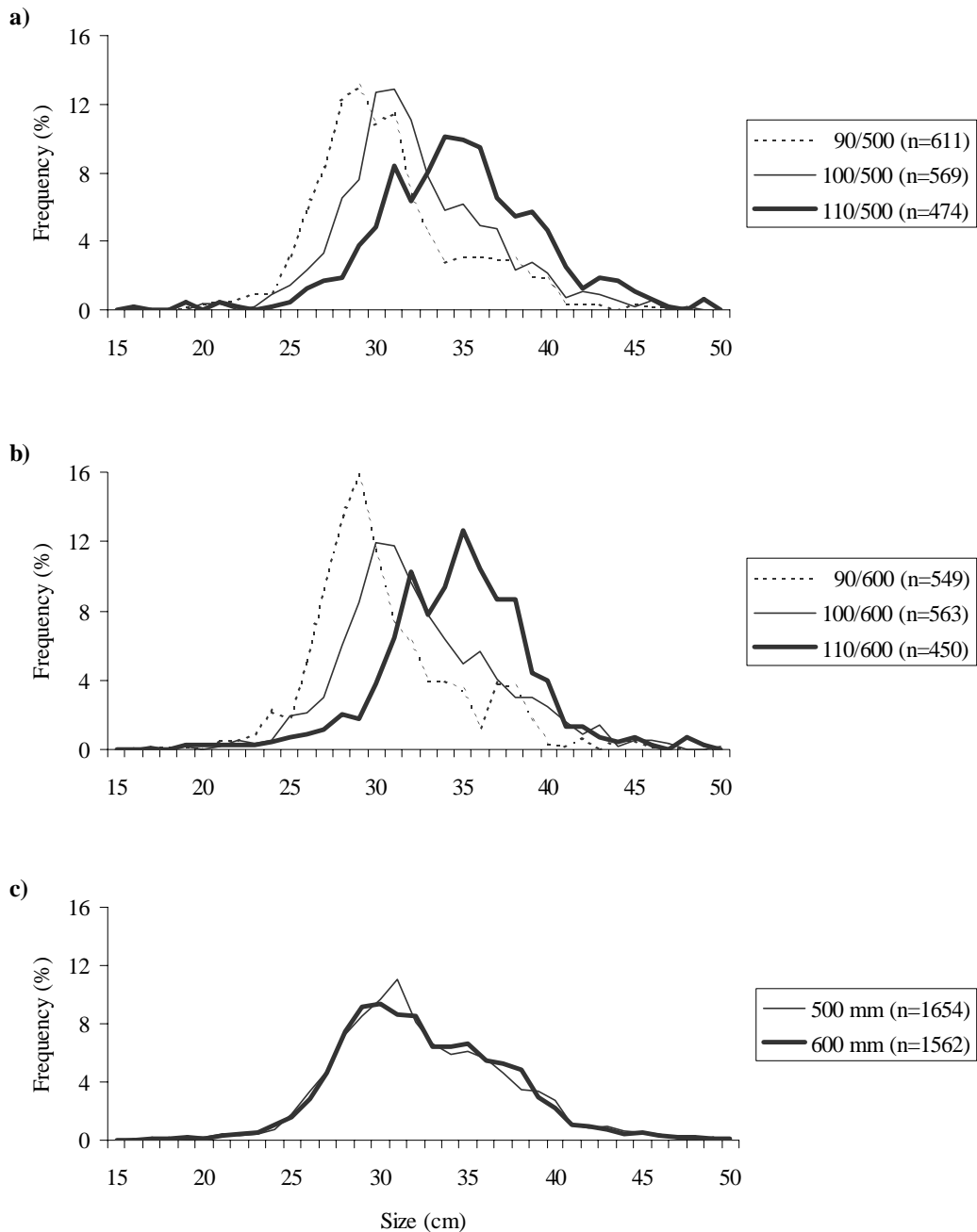
The annual size distributions of *Scomber scombrus* ranged from 25 to 49 cm (Figure 3.3.1.1.11). There was no apparent effect of the inner panel mesh size on the length of the fish caught as the distributions of the different inner/outer mesh size combinations were overlapped both for the series of inner panel mesh having 500 mm mesh size in the outer panel and for that having 600 mm (Figure 3.3.1.1.11a,b). Thus modal lengths of the different trammel types are very close to each other: modal length of 34-35 cm for 90 mm inner panel mesh size; 35 cm for 100 mm; 36 cm for 110 mm. When catches were combined by outer panel mesh size, their size distributions were also overlapped (Figure 3.3.1.1.11c). The most efficient trammel net in terms of number of individuals caught was the one using the mesh combination 110/600 mm followed by the trammel net mounted with 90/500 mm mesh sizes.

The total length of *Trachinus draco* fished with the trammel nets extended from 13 to 37 cm (Figure 3.3.1.1.12). Modal lengths of the size distributions were slightly higher for the trammel nets mounted with bigger mesh sizes in the inner panel: modal length of 22 cm for 90 mm inner mesh size; 23-24 cm for 100 mm; 24-25 cm for 110 mm. Size distributions of the different trammel net mesh size combinations were overlapped (Figure 3.3.1.1.12a,b), except for the one belonging to the combination 110/500 mm which was different from the others. Nevertheless, the number of fishes caught with this mesh combination was low and consequently the size distribution was poorly defined. The number of individuals caught decreased sharply with the increase of the inner panel mesh size of the trammel nets. The combined catches for the outer panel mesh size showed a difference between the modal length of the trammel nets mounted with 500 and 600 mm, with the last one having a higher modal length (Figure 3.3.1.1.12c).

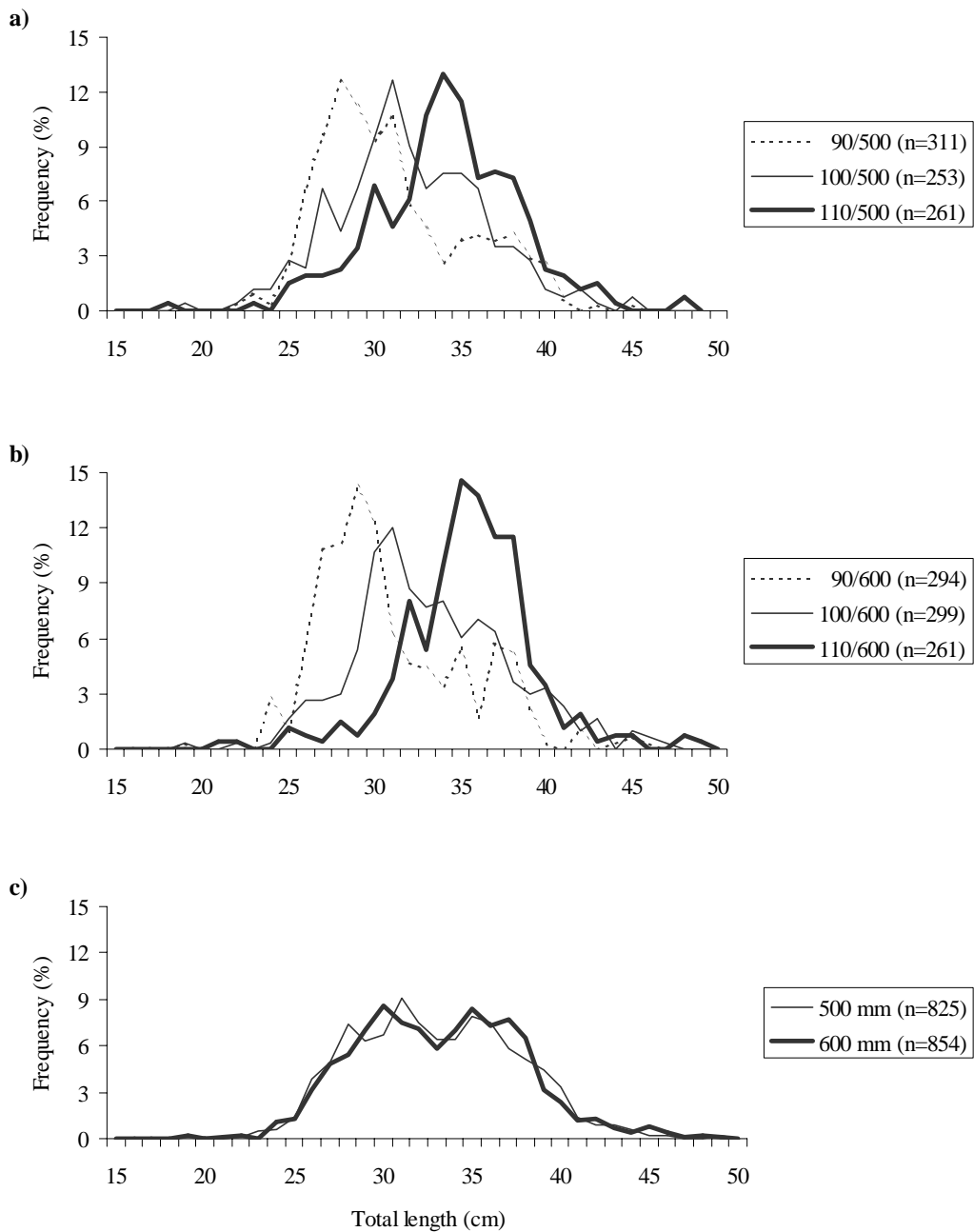
The size range of *Sardina pilchardus* in the trammel net catches extended from 13 to 35 cm but most of the catches were composed of individuals of a limited size range between 18 and 24 cm (Figure 3.3.1.1.13). All the fish length distributions of the mesh size combinations were overlapped except for the ones belonging to the 110/500 and 110/600 mm

trammel nets mesh combinations which had slightly smaller modal lengths compared to the rest (modal length of 21 cm *versus* 22 cm respectively). Combined catches by outer panel mesh size showed overlapped size distributions (Figure 3.3.1.1.13c).

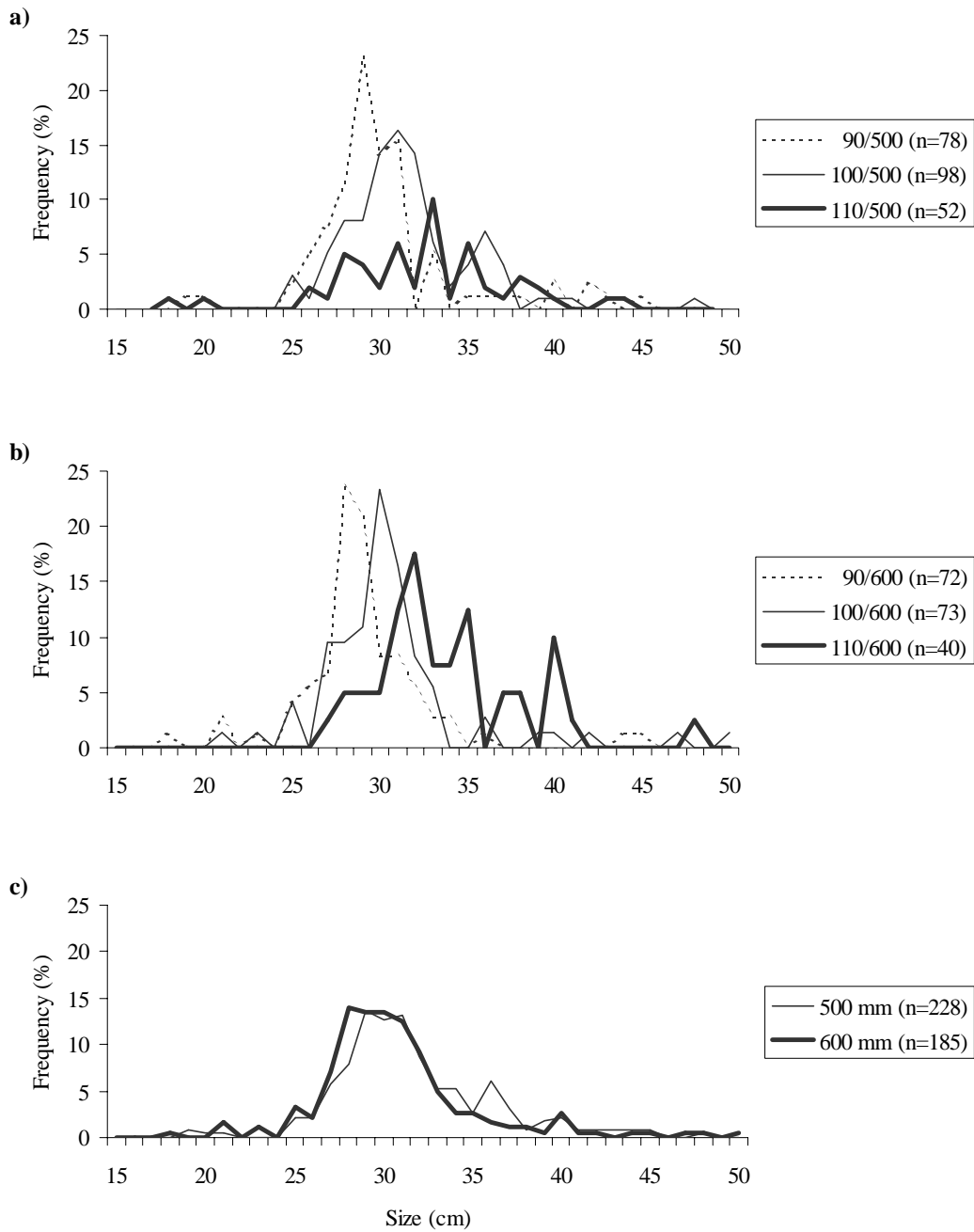
The length distribution of *Trigla lucerna* in the annual catches ranged from 14 to 63 cm. Catches of this species were poor compared to the other main species and as a result size distributions were not well defined (Figure 3.3.1.1.14). Nevertheless, size distributions of the different mesh size combinations were overlapped (Figure 3.3.1.1.14a,b), as well as those for the combined catches by outer panel mesh size (Figure 3.3.1.1.14c). The number of individuals caught decreased steadily with the increase of the inner panel mesh size of the trammel nets.



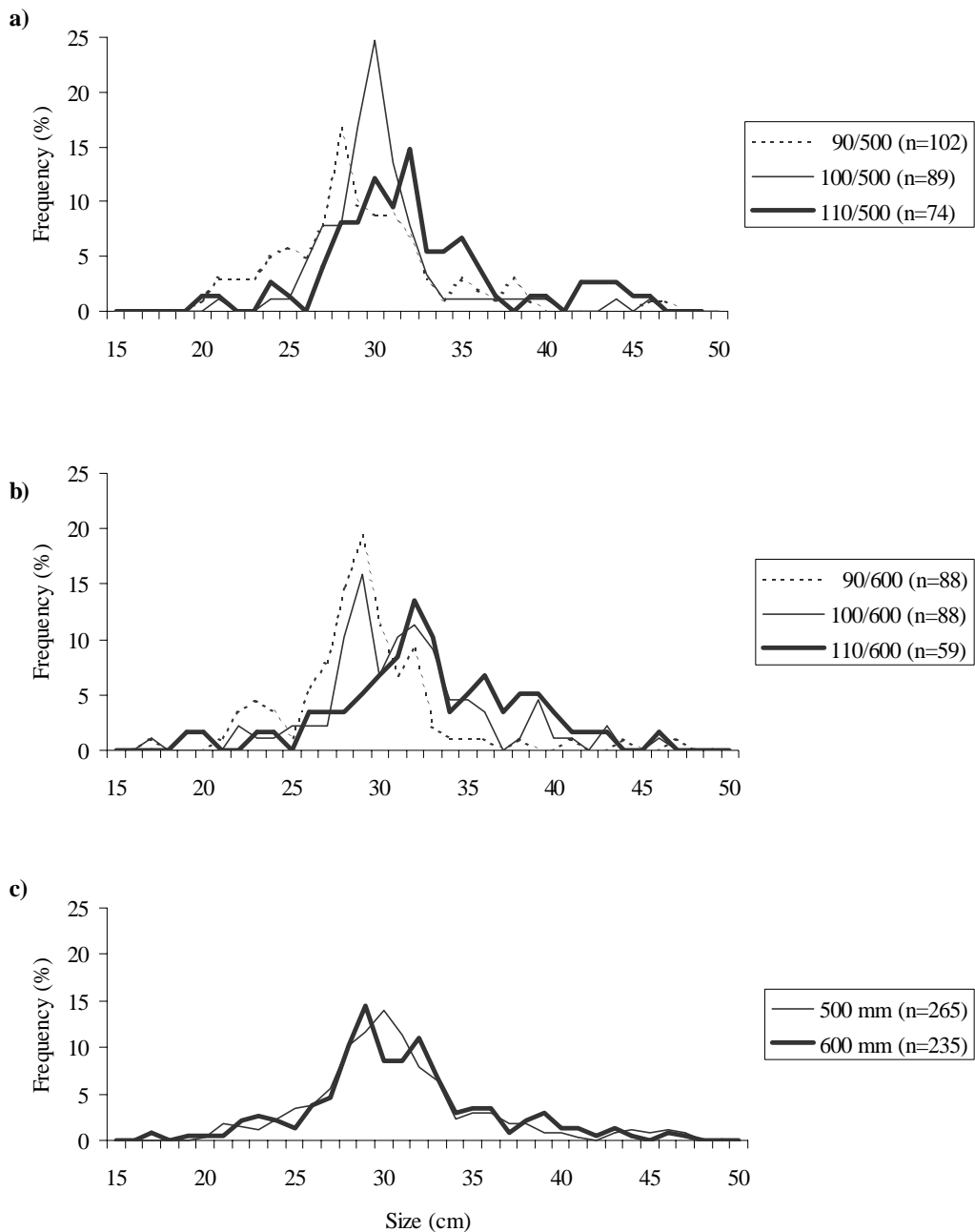
**Figure 3.3.1.1.1. Basque Country. Year 2000. Length frequency distributions of *Solea vulgaris* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



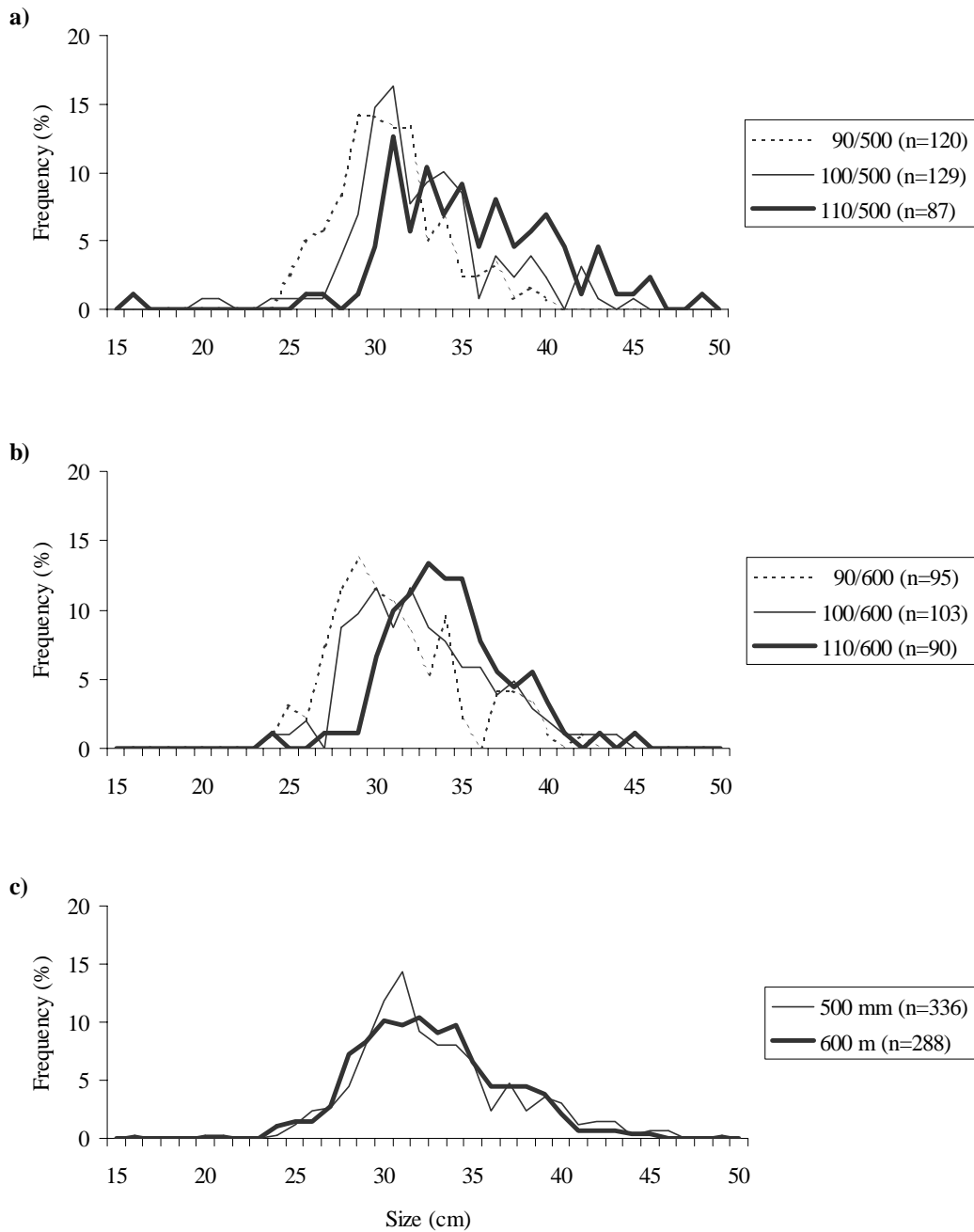
**Figure 3.3.1.1.2: Basque Country. Winter 2000. Length frequency distributions of *Solea vulgaris* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



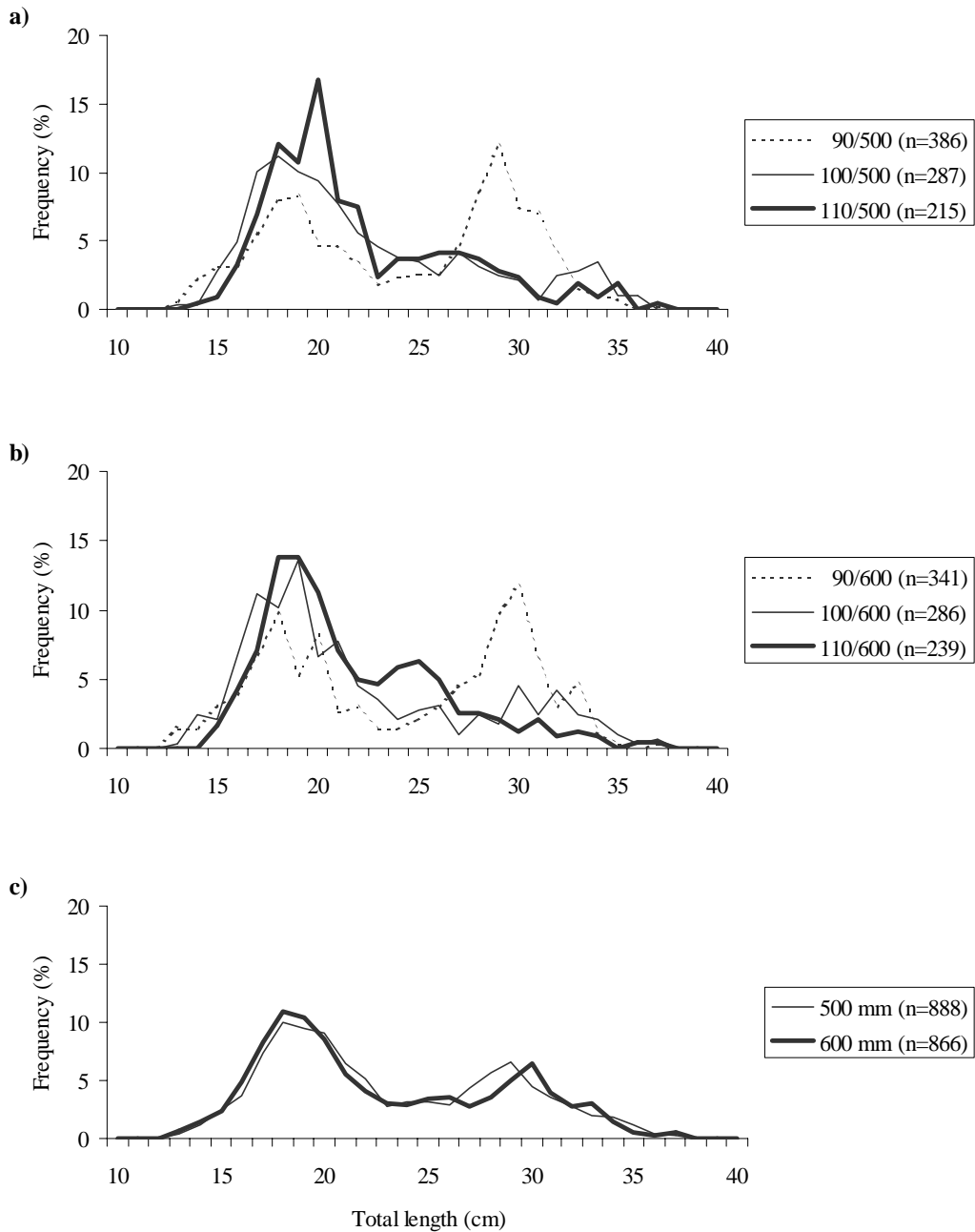
**Figure 3.3.1.1.3. Basque Country. Spring 2000. Length frequency distributions of *Solea vulgaris* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



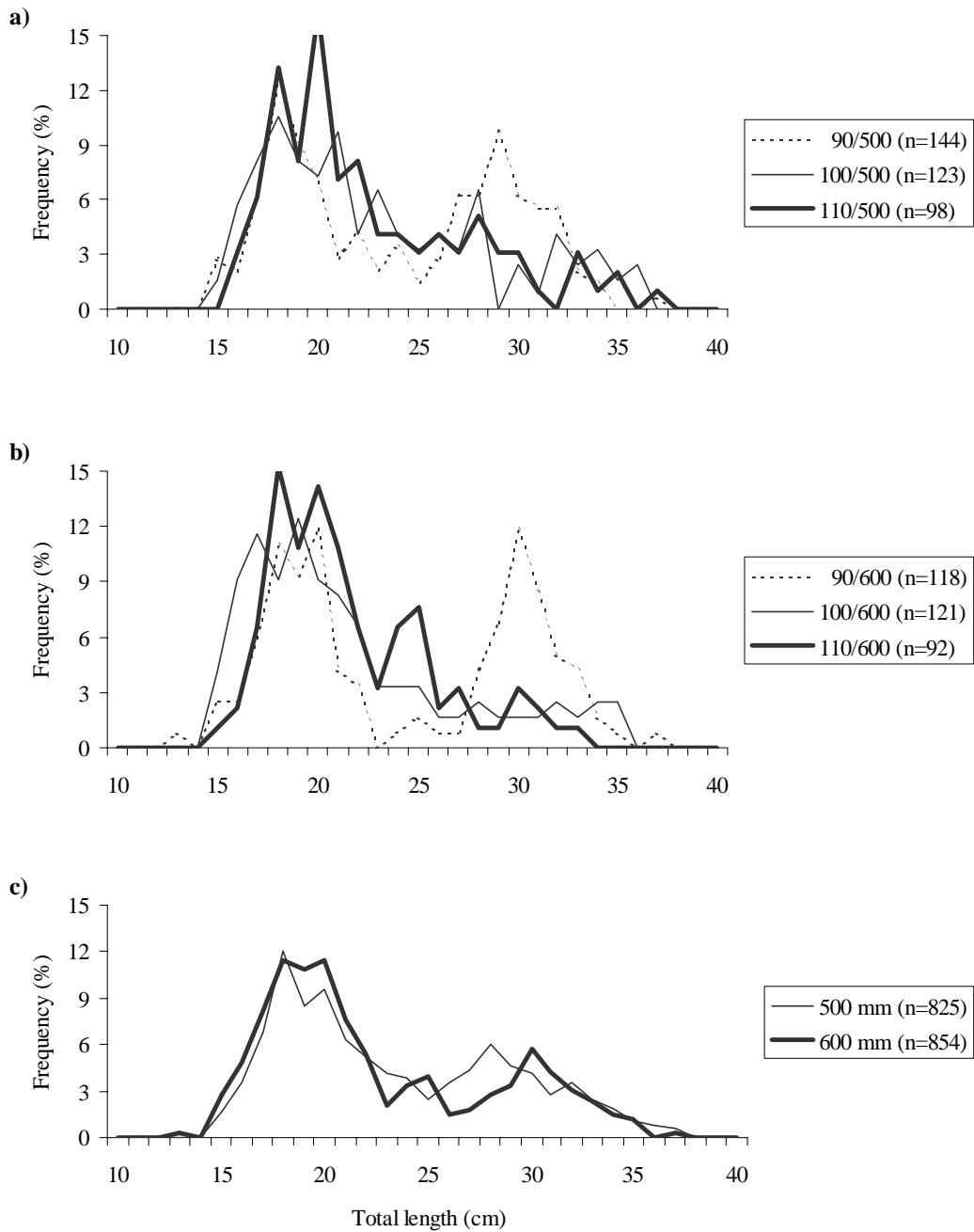
**Figure 3.3.1.1.4. Basque Country. Summer 2000. Length frequency distributions of *Solea vulgaris* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



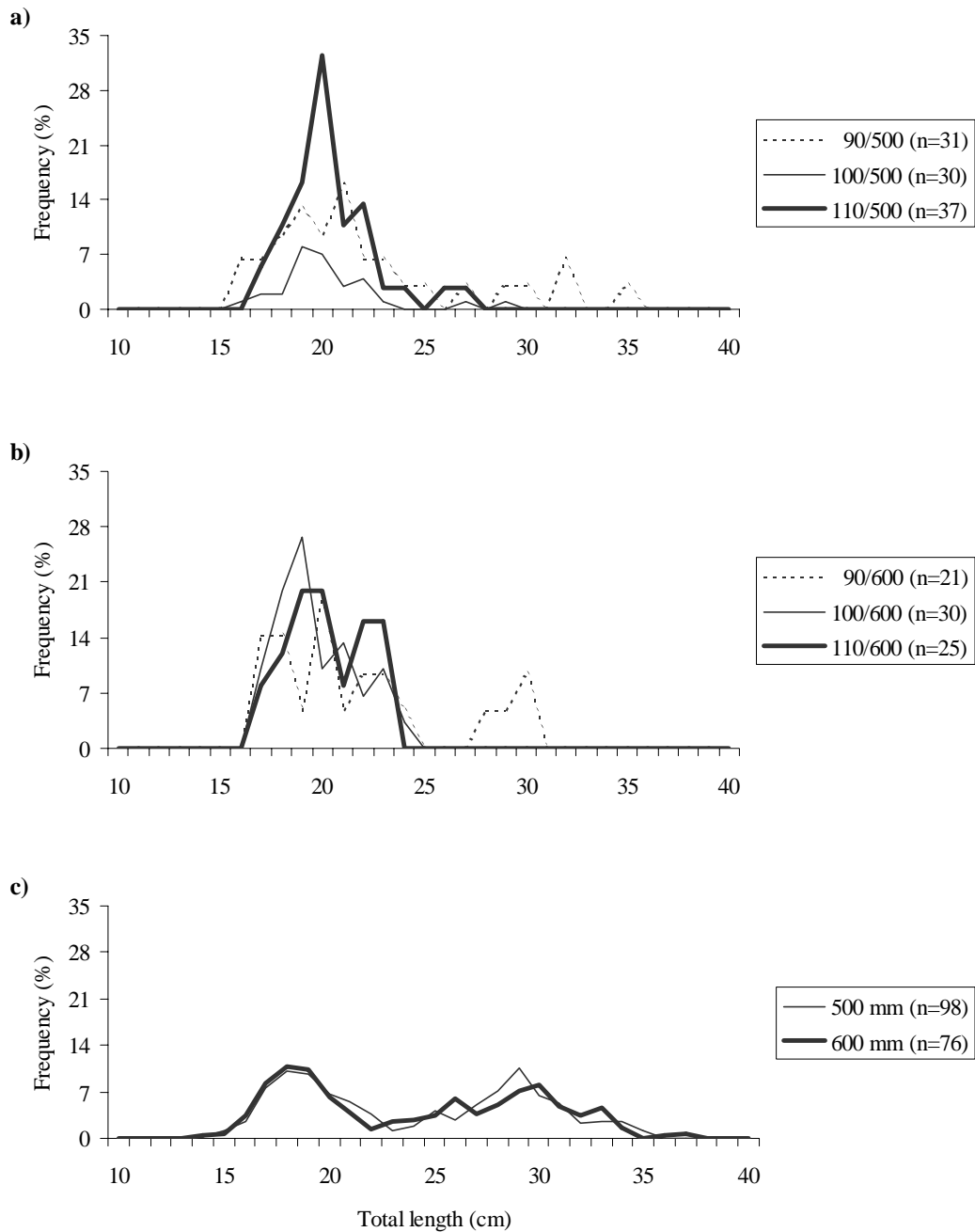
**Figure 3.3.1.1.5. Basque Country. Autumn 2000. Length frequency distributions of *Solea vulgaris* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



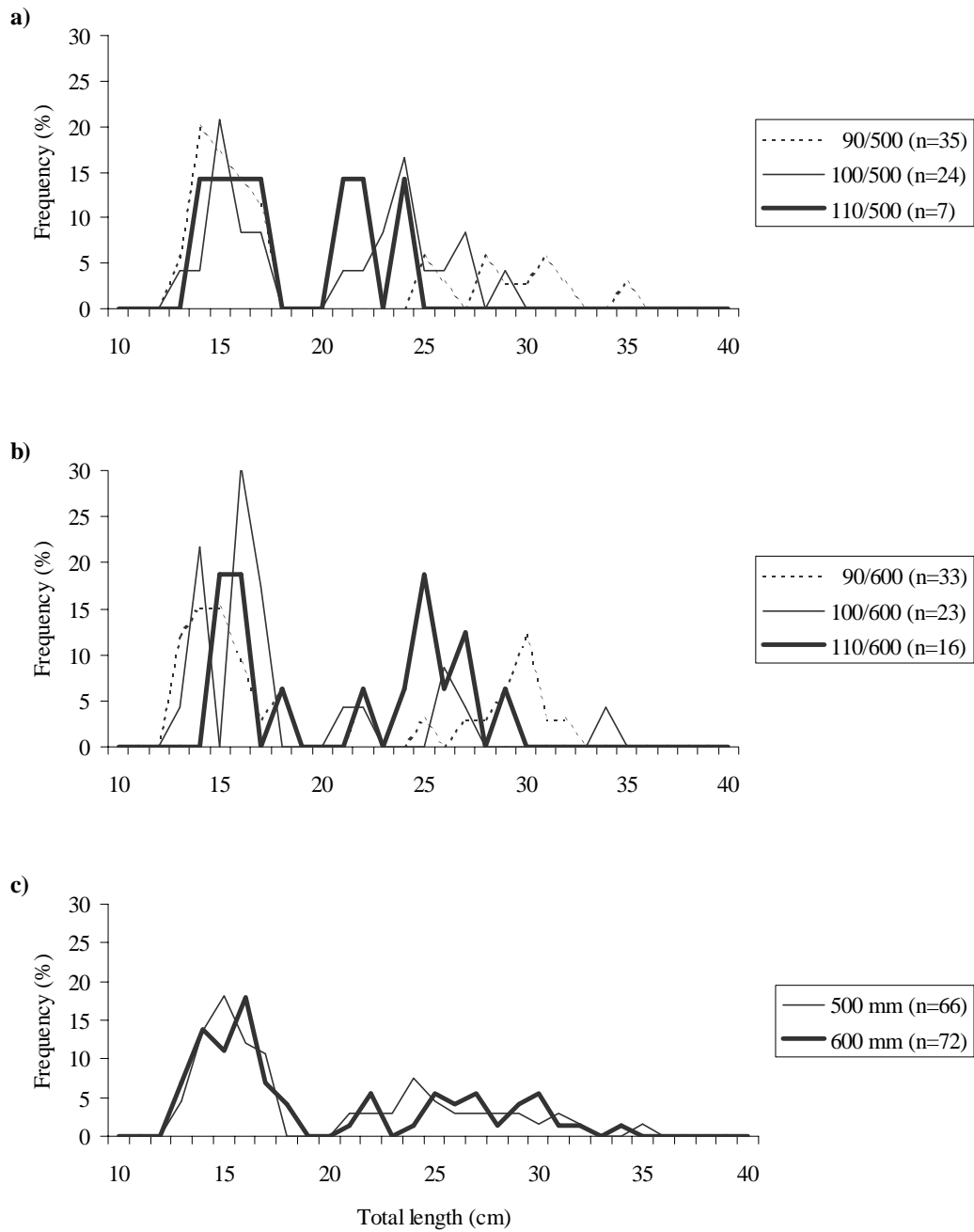
**Figure 3.3.1.1.6. Basque Country. Year 2000. Length frequency distributions of *Trisopterus luscus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



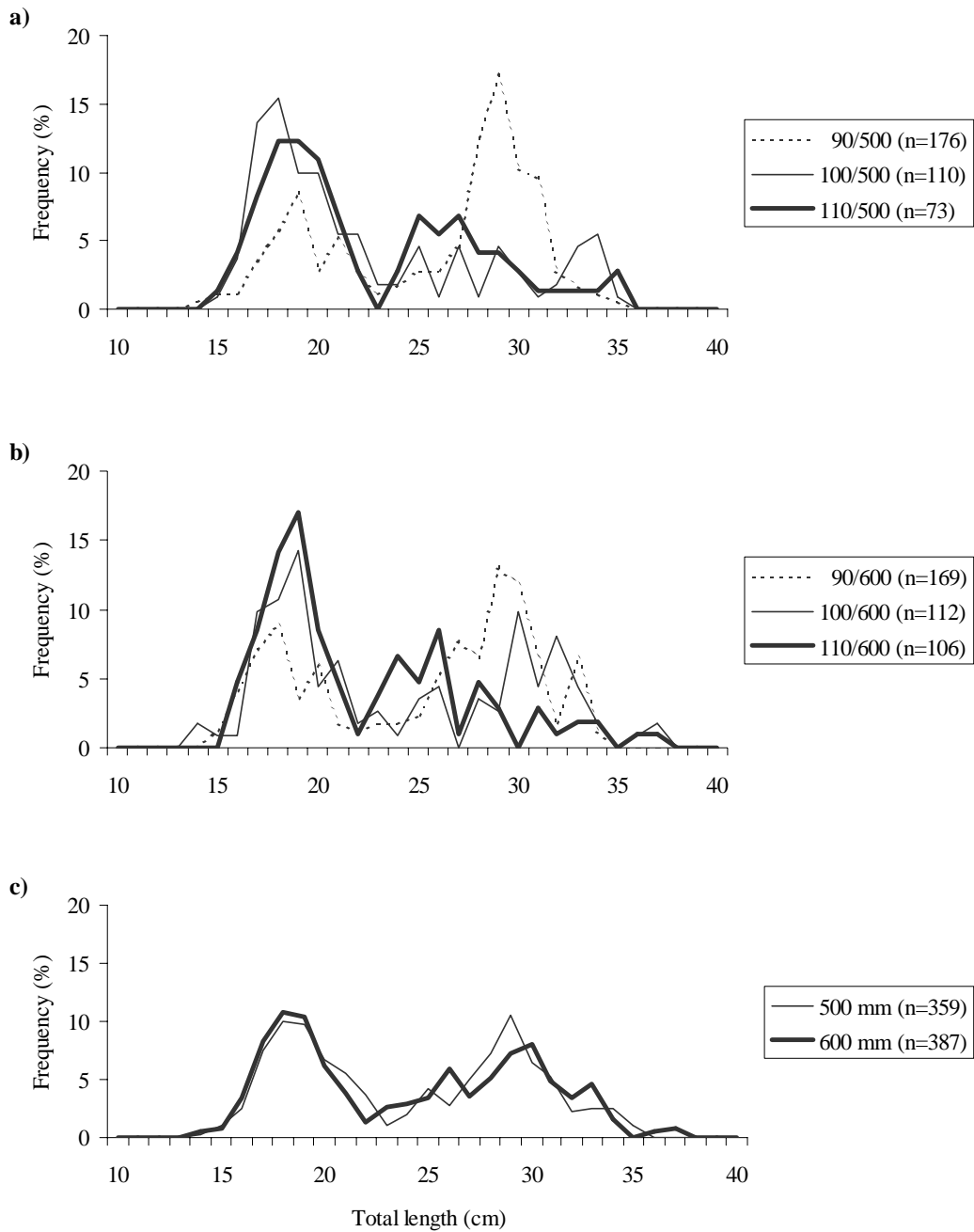
**Figure 3.3.1.1.7. Basque Country. Winter 2000. Length frequency distributions of *Trisopterus luscus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



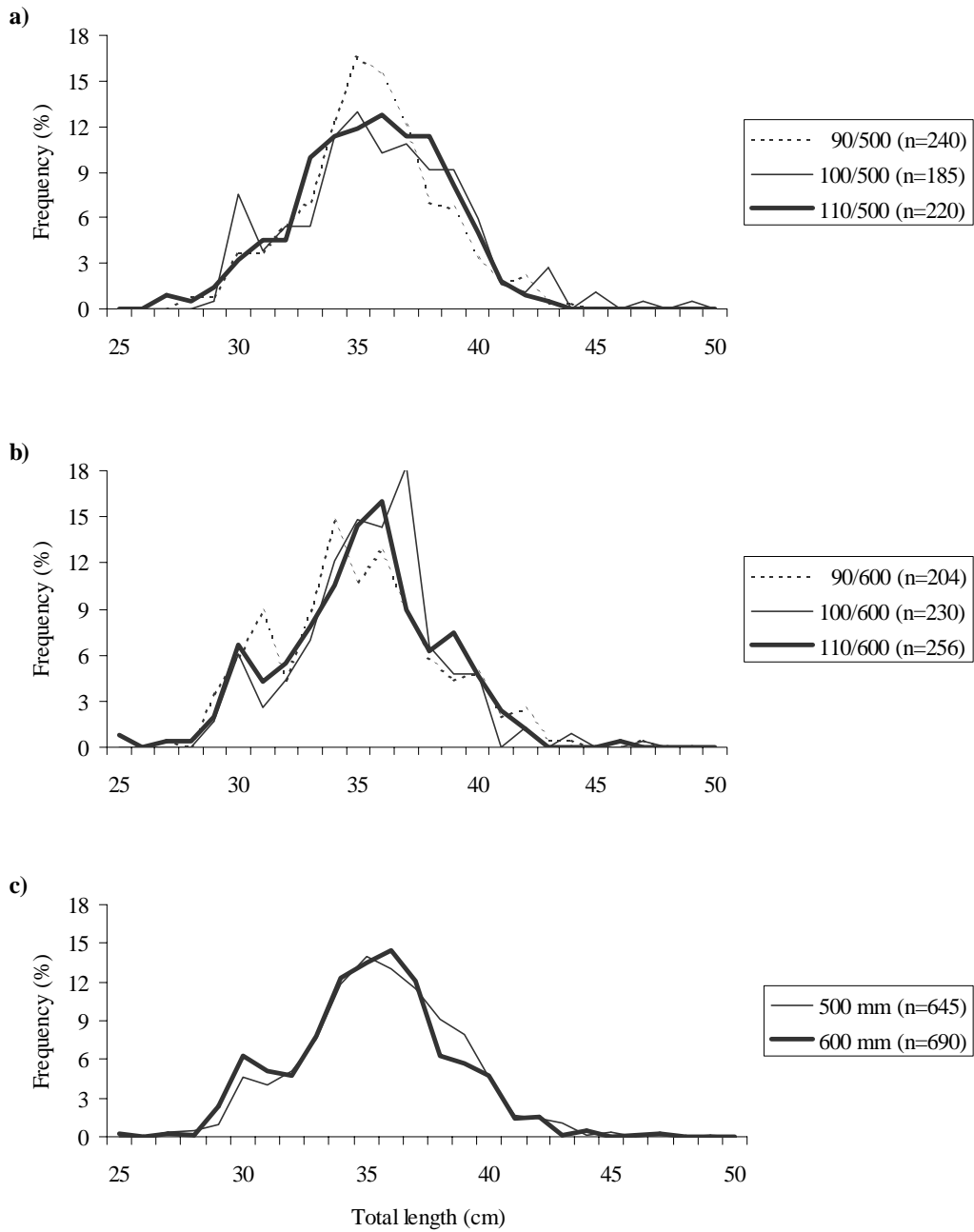
**Figure 3.3.1.1.8. Basque Country. Spring 2000. Length frequency distributions of *Trisopterus luscus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



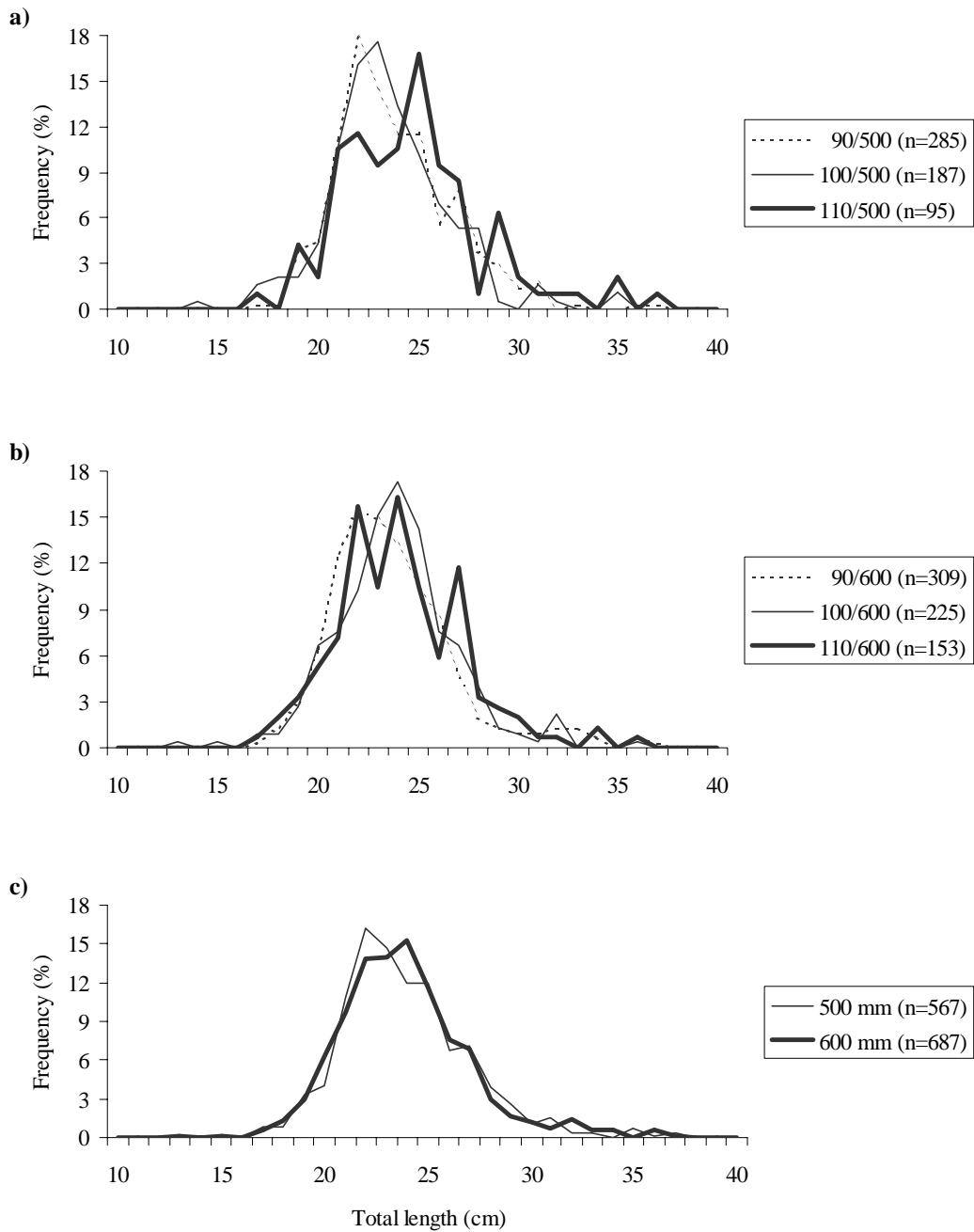
**Figure 3.3.1.1.9. Basque Country. Summer 2000. Length frequency distributions of *Trisopterus luscus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



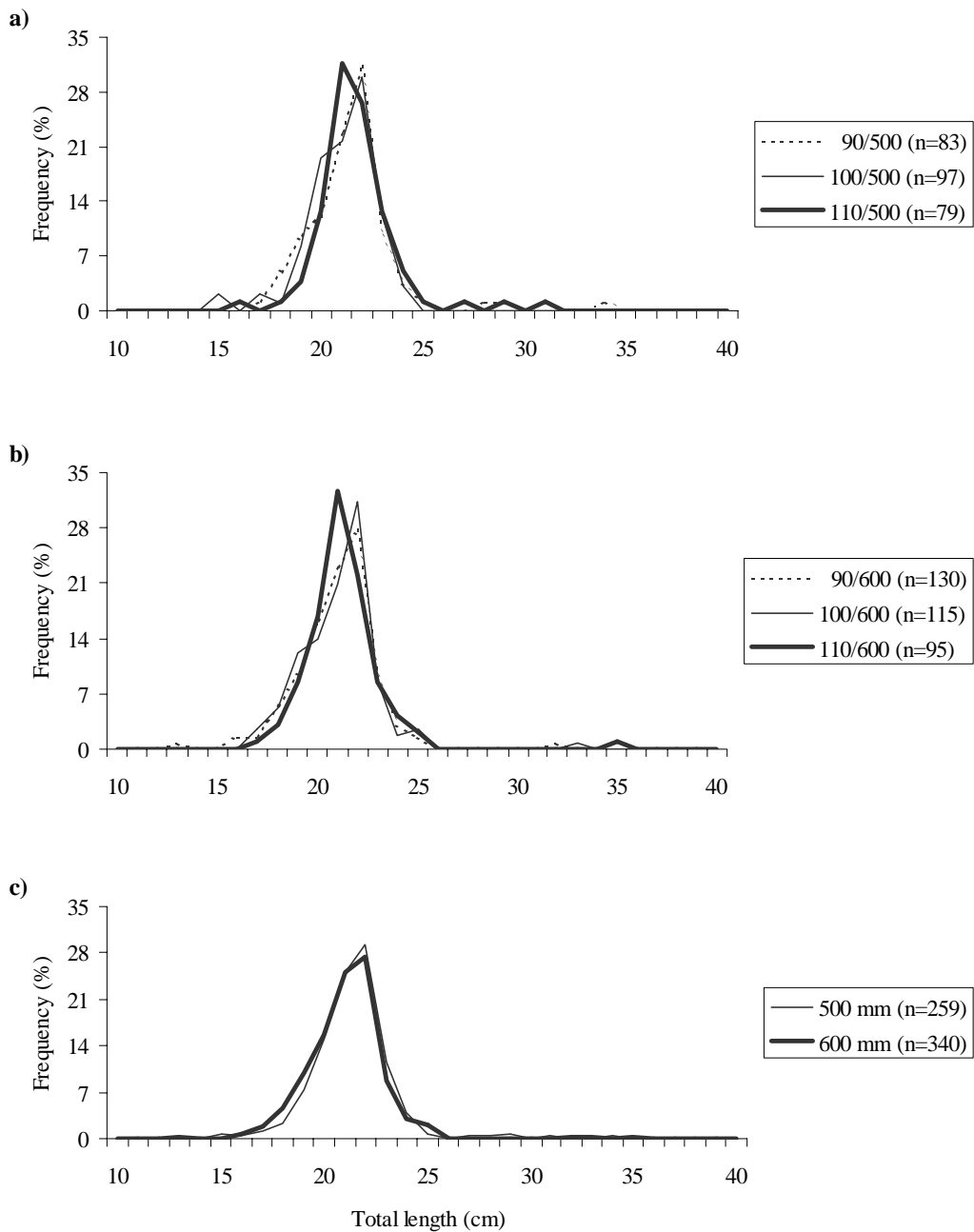
**Figure 3.3.1.1.10. Basque Country. Autumn 2000. Length frequency distributions of *Trisopterus luscus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



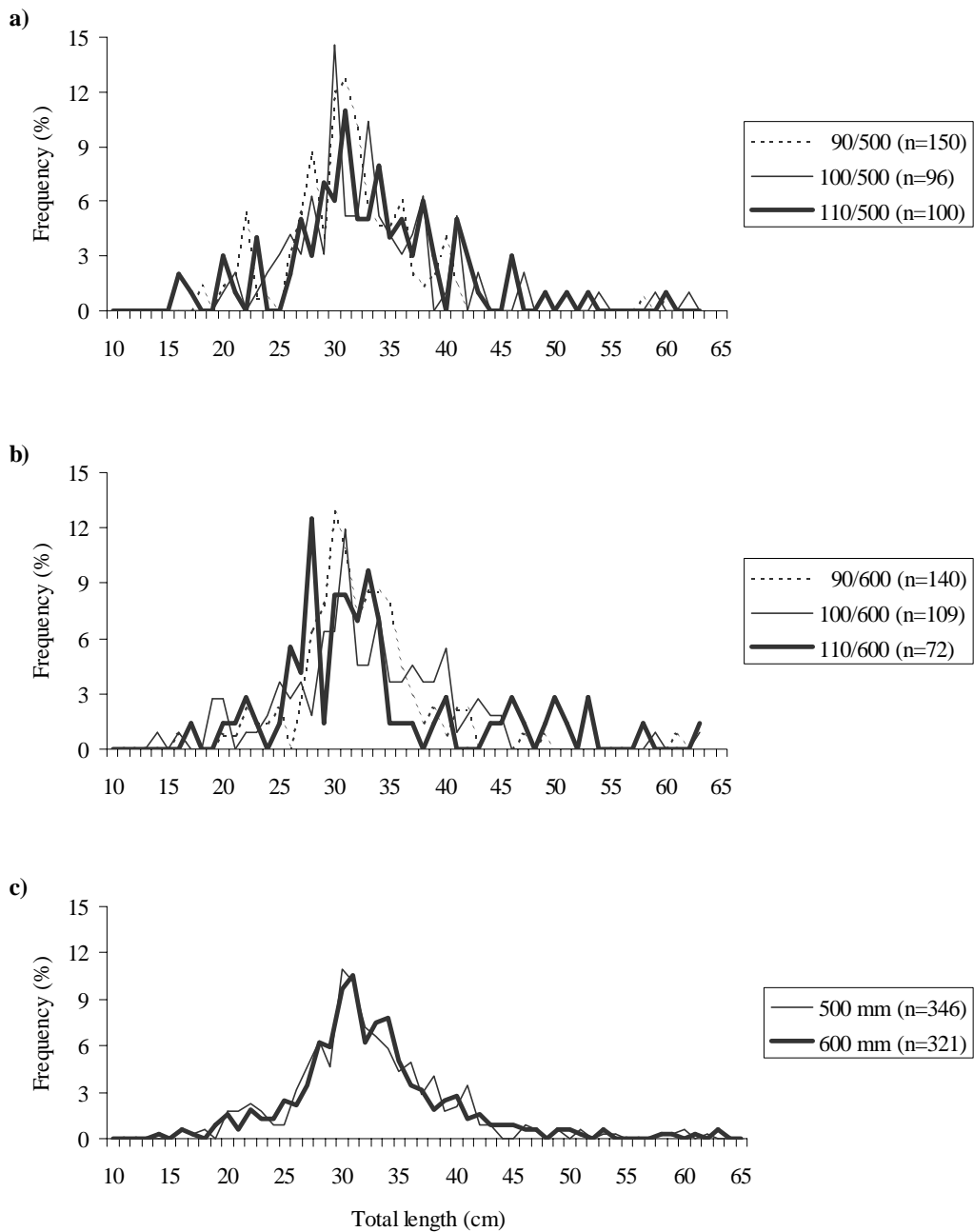
**Figure 3.3.1.1.11. Basque Country. Year 2000. Length frequency distributions of *Scomber scombrus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



**Figure 3.3.1.1.12. Basque Country. Year 2000. Length frequency distributions of *Trachinus draco* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



**Figure 3.3.1.1.13. Basque Country. Year 2000. Length frequency distributions of *Sardina pilchardus* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**



**Figure 3.3.1.1.14. Basque Country. Year 2000. Length frequency distributions of *Trigla lucerna* for trammel nets of different inner/outer panel stretched mesh size combinations (in mm): a) 500 mm in the outer panel with 90, 100 and 110 mm in the inner panel; b) 600 mm in the outer panel with 90, 100 and 110 mm in the inner panel; c) 90, 100 and 110 mm combined in the inner panel with 500 and 600 mm in the outer panel.**

**Table 3.3.1.1.1. Basque Country. Paired comparisons using Kolmogorov-Smirnov test for the most important species caught of a) seasonal length frequency distributions of the combined catches, b) annual length frequency distributions of the combined catches with 500 and 600 mm mesh size in the outer panel of the trammel net. Notes: (\*) = statistically significant difference between the two distributions at the 95.0% confidence level ( $p < 0.05$ ); (n.s) = not significant; - = not enough data for this procedure.**

a):

Paired comparisons	<i>Solea vulgaris</i>	<i>Trisopterus luscus</i>	<i>Scomber scombrus</i>	<i>Trachinus draco</i>	<i>Sardina pilchardus</i>	<i>Trigla lucerna</i>
Winter-Spring	(*)	(*)	(*)	(*)	(*)	(*)
Winter-Summer	(*)	(*)	-	(*)	(*)	(*)
Winter-Autumn	(*)	(*)	-	(*)	(*)	(*)
Spring-Summer	(*)	(*)	-	(*)	-	(*)
Spring-Autumn	(*)	(*)	-	(*)	-	(*)
Summer-Autumn	(*)	(*)	-	(*)	(*)	(*)

b):

Paired comparison	<i>Solea vulgaris</i>	<i>Trisopterus luscus</i>	<i>Scomber scombrus</i>	<i>Trachinus draco</i>	<i>Sardina pilchardus</i>	<i>Trigla lucerna</i>
Annual 500-600	(*)	(*)	(*)	(*)	(*)	(*)

### 3.3.1.2. Size selectivity

The sole, *Solea vulgaris*, seasonal size frequency distributions were different but the mesh size of the outer panel did not seem to have an effect in terms of size selectivity. Thus, the data were analysed by season with the 500 and 600 mm mesh outer panels combined. In all cases the bi-modal model was the best with a smaller peak to the right of the main peak in each selectivity curve. The fitted selectivity curves are given in Figure 3.3.1.2.1 and the estimated parameters and modal lengths are given in Table 3.3.1.2.1.

For the second most abundant species, the bib (*Trisopterus luscus*), the data for the two outer panel mesh sizes were combined and the analysis with the GillNet software carried out seasonally. For the autumn and the winter, the bi-modal model was best, with no other models fitting the data in the winter season. As can be seen in Figure 3.3.1.2.2, in both seasons the smaller peak in the selectivity curve corresponds to fish in the lower end of the size range. No fits were obtained with any model for the spring or summer data. The fitted selectivity curves are given in Figure 3.3.1.2.2 and the estimated parameters and modal lengths are given in Table 3.3.1.2.1.

The makerel, *Scomber scombrus*, was caught primarily in the winter season. Thus the analysis was carried out only for this season. The data for the two outer panel mesh sizes were analysed separately (500 mm and 600 mm) and combined (500 + 600 mm) using the GillNet software. The catch size frequency distributions were highly overlapped and in general most models could not be fit. For the 500 mm mesh outer panel data, only the bi-modal model could be fit, resulting in estimated modal lengths of 20.1, 22.4 and 24.6 cm for the 90, 100 and 110 mm mesh size inner panels. In the case of the 600 mm mesh outer panel, the only model that fit was the log-normal, giving modal lengths of 18.3, 20.4 and 22.4 cm for the three inner panel mesh sizes. No model could be fitted to the combined data (600 + 800 mm mesh outer panels). The fitted selectivity curves are given in Figure 3.3.1.2.3 and the estimated parameters and modal lengths are given in Table 3.3.1.2.1.

Most of the greater weever, *Trachinus draco*, were caught in the summer, with some catches in the spring and few individuals in the winter and autumn. Thus the analysis focused on the summer catches. The summer data were analysed by outer panel mesh size separately and combined. In all cases, the Gamma-Wileman model gave the best fits. The fitted selectivity curves are given in Figure 3.3.1.2.4 and the estimated parameters and modal lengths are given in Table 3.3.1.2.1. In all cases, the selectivity curves are more similar to logistic curves than uni-modal curves, showing a sharp increase in selectivity with size,

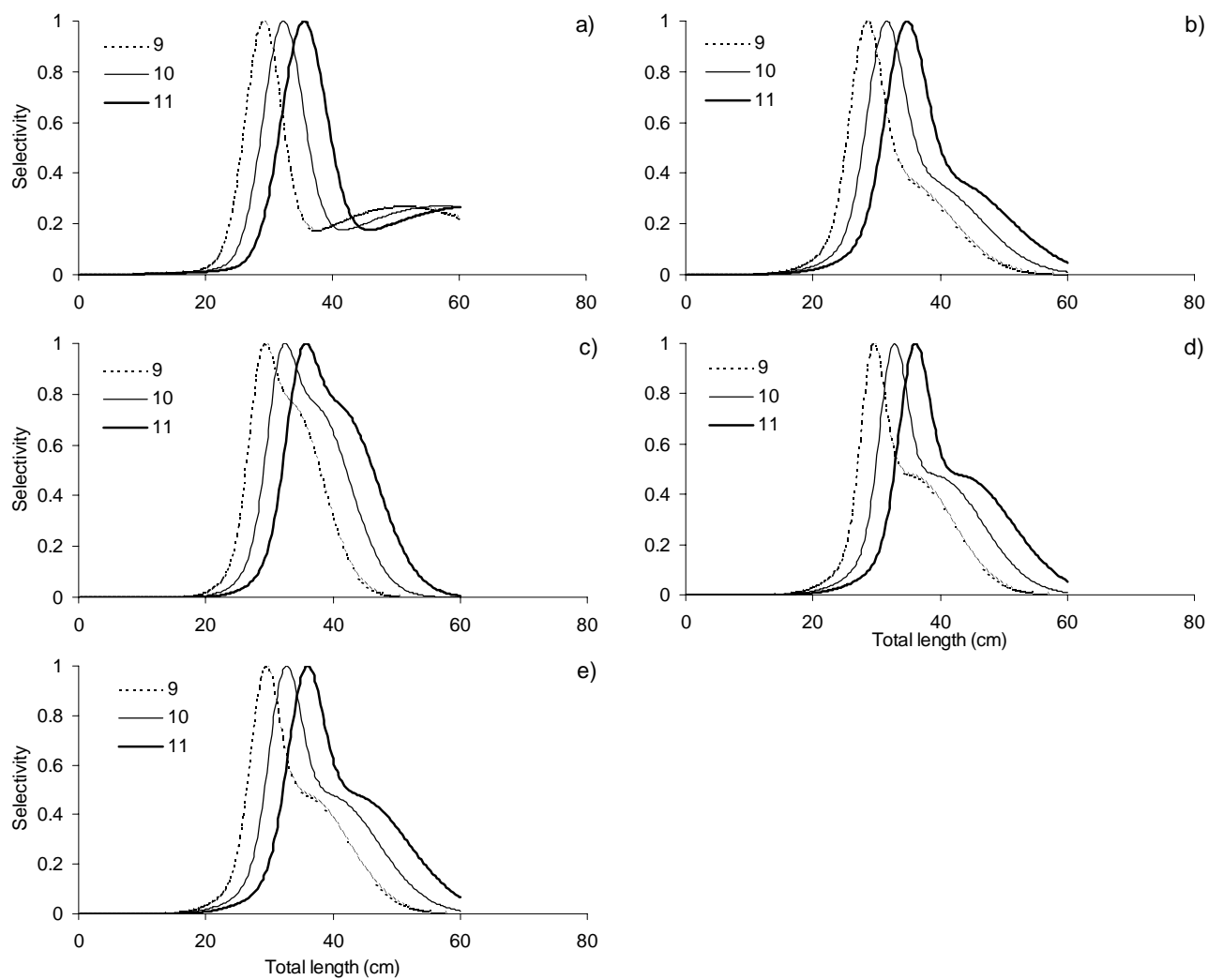
followed by a levelling off for larger size classes.

For the tub gurnard, *Trigla lucerna*, most of the catches were in the Autumn. Thus the selectivity analysis was carried out using the autumn data for the 500 and 600 mm mesh outer panels separately and for the 500 and 600 mm outer panels combined. In general, uni-modal selectivity curves fit the data, although the estimated modal lengths were somewhat high. For the autumn 500 mm, 600 mm and 500+600 mm combined data sets, the log-normal model was considered the best. The fitted selectivity curves are given in Figure 3.2.1.2.5 and the estimated parameters and modal lengths are given in Table 3.3.1.2.1.

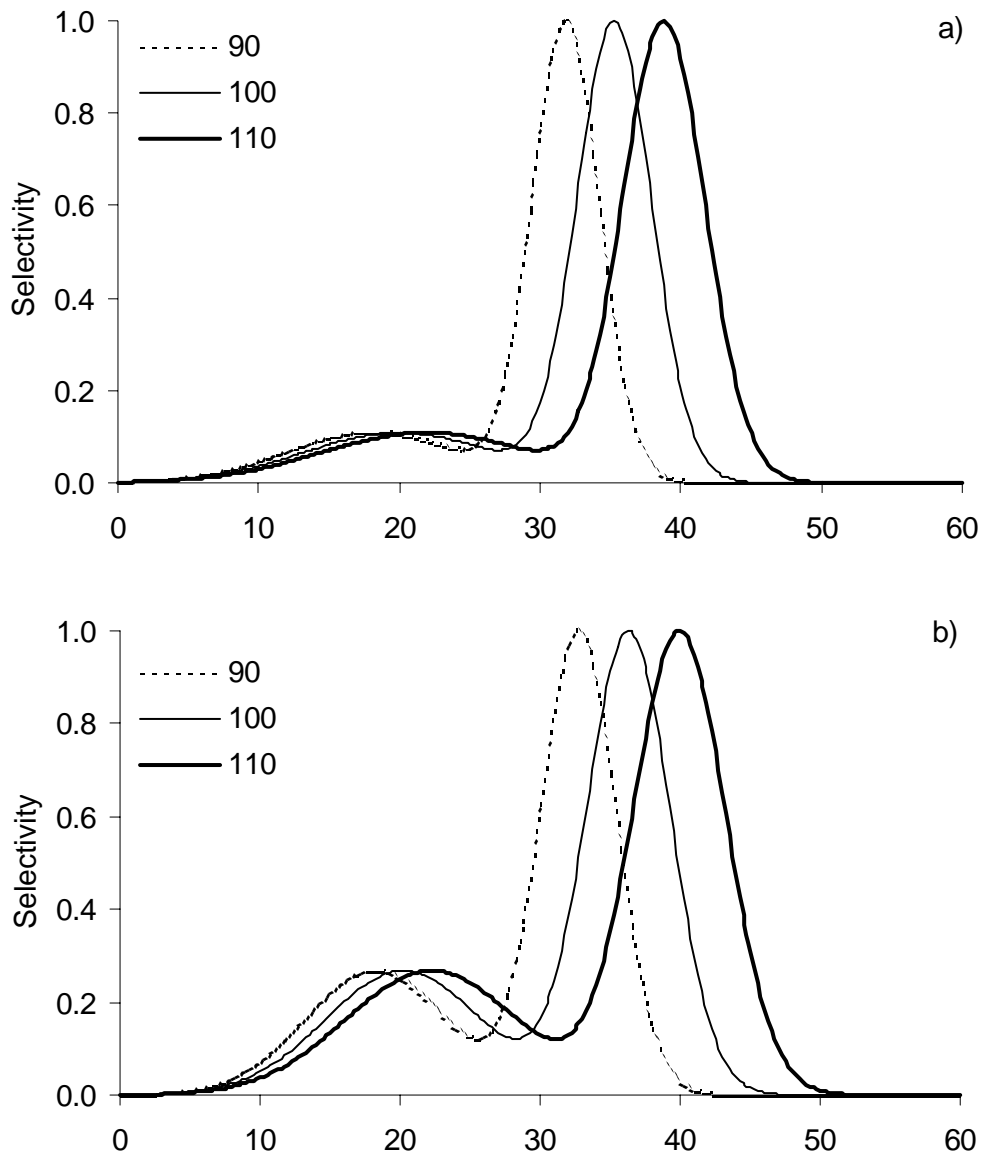
For the pilchard (*Sardina pilchardus*) and the hake (*Merluccius merluccius*), no fits could be obtained with any of the models either because of highly overlapped and/or sparse data.

**Table 3.3.1.2.1. Basque Country. Results of the selectivity models fitted with GillNet software. For each species and case (500mm and 600mm outer panel separately and combined data (All data)) the fitted model, effort mode, equation parameters, modal lengths for each inner panel (90, 100 and 110mm), model deviance and degrees of freedom (df) are shown.**

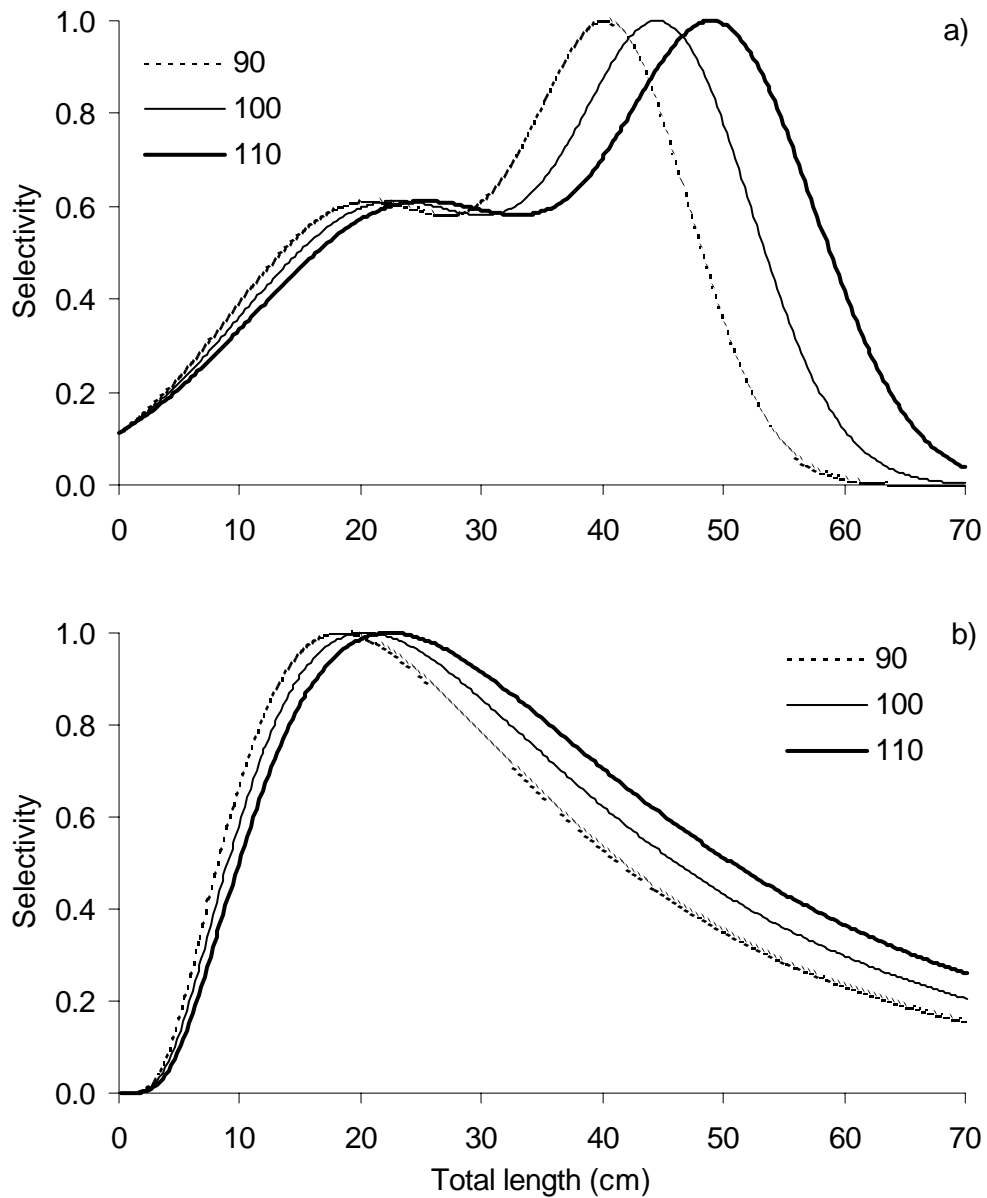
Species	Model	Effort	Season	Case	Parameters	90	100	110	Model deviance	df
<i>Trisopterus luscus</i>	Bi-Modal	Equal	Autumn	All data	(1.9982, 0.6738, 3.5284, 0.2661, 9.1491)	18.0	20.0	22.0	29.7	43
	Bi-Modal	Equal	Winter	All data	(2.0198, 0.5573, 3.6321, 0.3001, 3.7227)	18.2	20.2	22.2	51.9	43
	Bi-Modal	Meshsize	Winter	500	(2.2372, 1.2201, 4.5515, 0.7116, 1.4721)	20.1	22.4	24.6	33.5	37
<i>Scomber scombrus</i>	Log-Normal	Meshsize	Winter	600	(m, s) = (3.3904, 0.6938)	18.3	20.4	22.4	34.5	40
	Gamma Semi Wileman	Meshsize	Summer	500	(k, a, c) = (0.3062, 14.0988, 8.4664)	36.1	40.1	44.1	37.0	35
<i>Trachinus draco</i>	Gamma Semi Wileman	Meshsize	Summer	600	(k, a, c) = (0.1679, 21.0288, 14.181079000000000)	30.3	33.6	37.0	26.0	35
	Gamma Semi Wileman	Meshsize	Summer	All data	(k, a, c) = (0.2473, 15.6624, 27.170186000000000)	32.6	36.3	39.9	34.0	37
	Log-Normal	Equal	Autumn	500	(m, s) = (3.6555, 0.2852)	35.7	39.6	43.6	30.8	54
<i>Trigla lucerna</i>	Log-Normal	Equal	Autumn	600	(m, s) = (3.7024, 0.2412)	38.3	42.5	46.8	42.1	60
	Log-Normal	Equal	Autumn	All data	(m, s) = (3.6833, 0.2610)	37.2	41.3	45.4	46.8	70



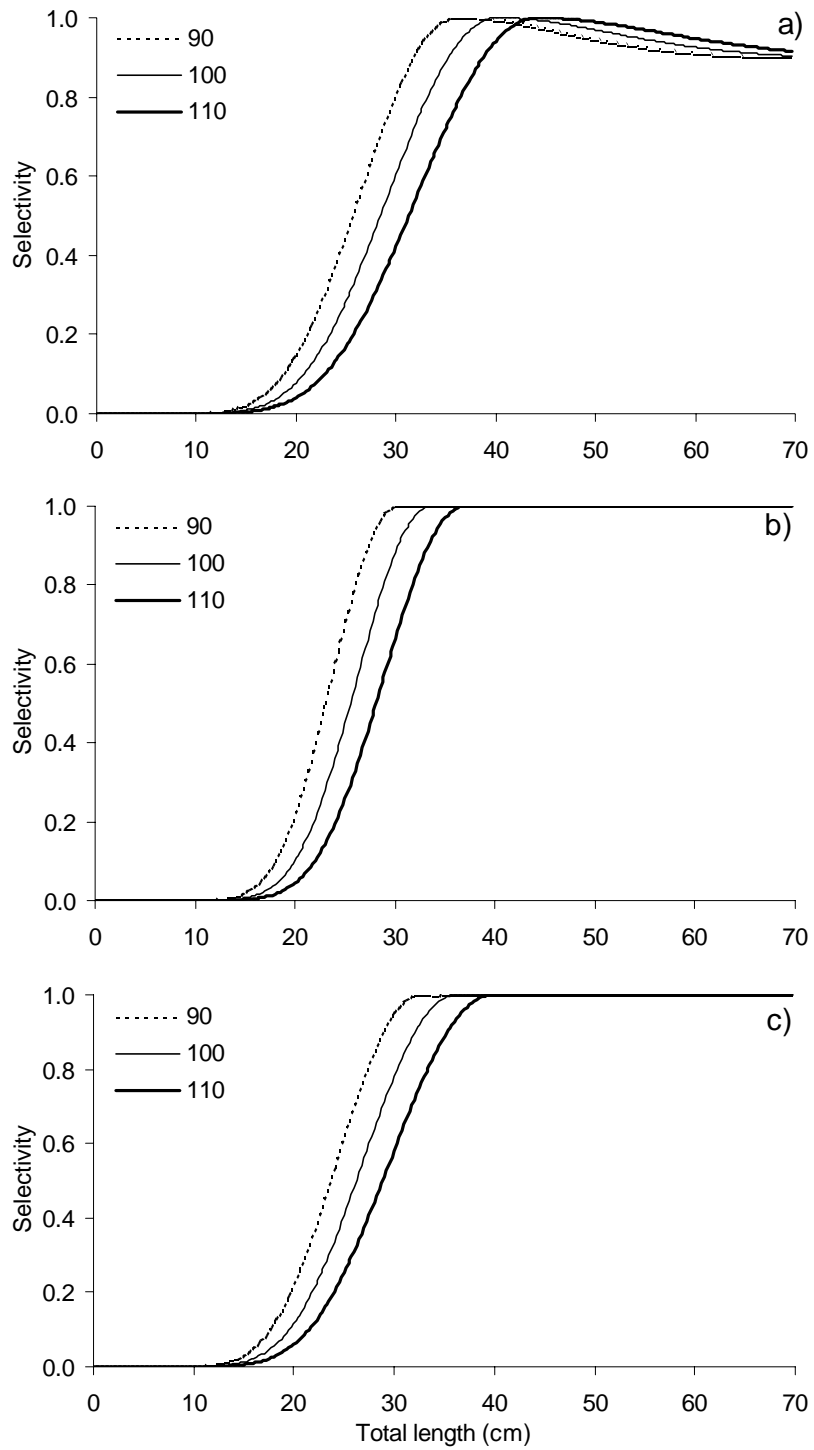
**Figure 3.3.1.2.1. Basque Country. Standardized selectivity plots for *Solea vulgaris* caught by trammel nets (90, 100 and 110 mm mesh inner panel). a) Spring, b) Summer, c) Autumn, d) Winter) and e) All Seasons.**



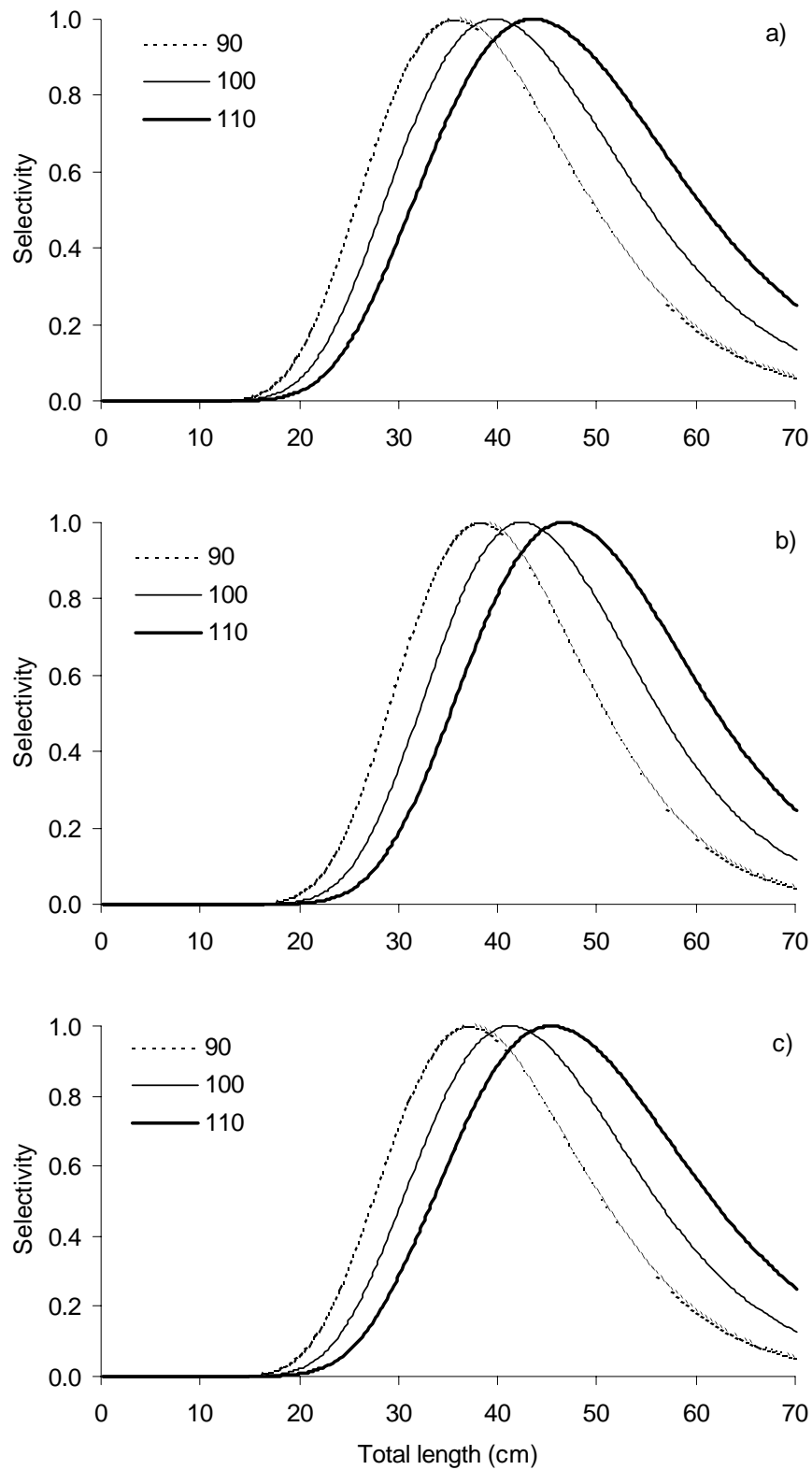
**Figure 3.3.1.2.2. Basque Country. Selectivity plots for *Trisopterus luscus* caught by trammel nets (90, 100 and 110 mm mesh inner panels). a) Autumn (bi-modal), b) Winter (bi-modal) and c) Spring (gamma semi-wileman).**



**Figure 3.3.1.2.3. Basque Country. Selectivity plots for mackerel, *Scomber scombrus*, caught by trammel nets (90, 100 and 110 mm mesh inner panels). a) Winter, 500mm outer mesh size (bi-modal) and b) Winter, 600mm outer mesh size (bi-modal).**



**Figure 3.3.1.2.4. Basque Country. Gamma-Wileman selectivity plots for the greater weever (*Trachinus draco*), caught by trammel nets (90, 100 and 110 mm mesh inner panels). a) Summer, 500mm mesh outer panel, b) Summer, 600mm mesh outer panel and c) 500 + 600 mm combined.**



**Figure 3.3.1.2.5. Basque Country. Log-normal selectivity plots for the tub gurnard (*Trigla lucerna*), caught by trammel nets (90, 100 and 110 mm mesh inner panels). a) Autumn, 500mm mesh outer panel, b) Autumn, 600mm mesh outer panel and c) 500 + 600 mm combined.**

## 3.3.2. Algarve

### 3.3.2.1. Catch size frequency distributions

The length frequency distributions for the eleven most abundant species (*Sepia officinalis*, *Microchirus azevia*, *Scomber japonicus*, *Trachinus draco*, *Phycis phycis*, *Scorpaena notata*, *Pagellus acarne*, *Chelidonichthys obscurus*, *Solea senegalensis*, *Chelidonichthys lastoviza* and *Merluccius merluccius*) are given in Figures 3.3.2.1.1 to 3.3.2.1.11. In general the size frequency distributions were highly overlapped and skewed to the right. The results of the Kolmogorov-Smirnov tests for comparing the catch size distributions of the different trammel nets are given in Tables 3.3.2.1.1 to 3.3.2.1.11.

For *Sepia officinalis* (Figure 3.3.2.1.1a, b), there was clear evidence of size selectivity with respect to the small mesh inner panels, with increasing modal lengths. However, the combined length frequencies for the two large mesh outer panels (600 and 800 mm) are practically identical (Figure 3.3.2.1.1c). A wide size range of cuttlefish was caught by all trammel nets, with mantle lengths ranging from 10 to 40 cm. The results of the Kolmogorov-Smirnov test show that there are no differences between the 600 and 800 mm catch size frequency distributions (Table 3.3.2.1.1c) and no differences between the distributions of the same inner panel mesh size (e.g. 100/600 vs. 100/800), while all other comparisons were significant.

For the bastard sole, *Microchirus azevia*, all distributions are highly overlapped and bell shaped (Figure 3.3.2.1.2a,b,c). Fish from 12 to 38 cm TL were caught, with modal lengths for all trammel nets of approximately 26 cm. The results of the Kolmogorov-Smirnov test showed no significant differences for any of the comparisons except that for the 120/800 and 140/800 trammel nets.

Chub mackerel, *Scomber japonicus*, distributions were also highly overlapped, with some evidence of bi-modality, especially for the 600 mm outer panel trammel nets (Figure 3.3.2.1.3a,b,c). Chub mackerel from 16 to 35 cm TL were caught, with modal lengths varying between 26 and 28 cm. Most comparisons based on the Kolmogorov-Smirnov test showed significant differences. Only the 100/600 vs. 140/600 and 100/800 vs. 140/800 trammel net distributions were not significantly different.

The greater weever, *Trachinus draco*, distributions were all highly overlapped and skewed to the right (Figures 3.3.2.1.4a,b,c). Fish from 14 to 38 cm TL were caught, with modal lengths from 26 to 27 cm. The results of the Kolmogorov-Smirnov test showed that

there were no significant differences between any of the distributions that were compared.

For *Phycis phycis*, sizes ranged from 14 to 60 cm TL (Figures 3.3.2.1.5a,b,c). The distributions were highly overlapped and skewed to the right. Although there was no evidence of an increase in modal size with increasing inner panel mesh size, the Kolmogorov-Smirnov test results showed that for the same outer panel mesh size, there were differences between some of the small mesh size distributions and overall, there was a difference between the catch size frequency distributions for the 600 and 800 mm mesh outer panels (Figure 3.3.2.1.5c).

A limited size range, from 8 to 21 cm TL, of *Scorpaena notata* was caught in all the trammel nets (Figures 3.3.2.1.6a,b,c). For the 800 mm mesh outer panel there were no significant differences between the distributions of the three small mesh inner panels. Overall, the results of the Kolmogorov-Smirnov test showed a significant difference between the distributions of the 600 and 800 mm mesh trammel nets (Figure 3.3.2.1.6c) as well differences between the three types of trammel nets with the 600 mm mesh outer panel.

For the axillary sea bream, *Pagellus acarne*, there was a clear progression of modal lengths with increasing inner panel mesh size for both the 600 and the 800 mm mesh outer panels (Figures 3.3.2.1.7a,b). Fish from 13 to 35 cm TL were caught, with some distributions highly skewed to the right or even bi-modal. The results of the Kolmogorov-Smirnov test showed that the distributions for the 600 and 800 mm mesh panels were all significantly different, while the pooled size frequency distributions (Figure 3.3.2.1.7c) were not significantly different.

The *Chelidonichthys obscurus* distributions were highly overlapped and skewed to the right, with modal lengths from approximately 21 to 24 cm TL (Figures 3.3.2.1.8a,b,c). Fish from 10 to 35 cm TL were caught. For the 600 mm mesh outer panel, the Kolmogorov-Smirnov test showed that there were significant differences between the 100 and the 120 and 140 mm inner mesh panel trammel net distributions (Figure 3.3.2.1.8a). For the 800 mm mesh outer panel, only the 100 and 140mm inner mesh trammel net distributions were significantly different (Figure 3.3.2.1.8b). There was no significant difference between the 600 and the 800 mm pooled catch size frequency distributions (Figure 3.3.2.1.8c).

The trammel nets caught a wide range of Senegal sole, *Solea senegalensis*, with fish from 19 to 53 cm TL (Figures 3.3.2.1.9a,b,c). The distributions were highly overlapped, with little evidence of an increase in modal length with increasing inner panel mesh size for either the 600 or the 800 mm mesh outer panel trammel nets (Figures 3.3.2.1.9a,b). The results of the Kolmogorov-Smirnov tests showed that there significant differences in all cases except for

the comparisons between trammel nets of the same inner panel mesh size (e.g. 100/600 vs. 100/800).

The distributions for *Chelidonichthys lastoviza* were all highly overlapped, with modal lengths of approximately 23 cm TL (Figures 3.3.2.1.10a,b,c). Fish from 12 to 40 cm TL were caught. According to the Kolmogorov-Smirnov test, none of the comparisons showed a significant difference between catch frequency distributions.

The hake, *Merluccius merluccius*, distributions were highly overlapped and skewed to the right, with fish from 14 to 68 cm TL caught. Modal lengths ranged from approximately 30 to 33 cm TL. As for the previous species, the Kolmogorov-Smirnov test showed that there were no significant differences between any of the catch size frequency distributions that were compared.

*Sepia officinalis*

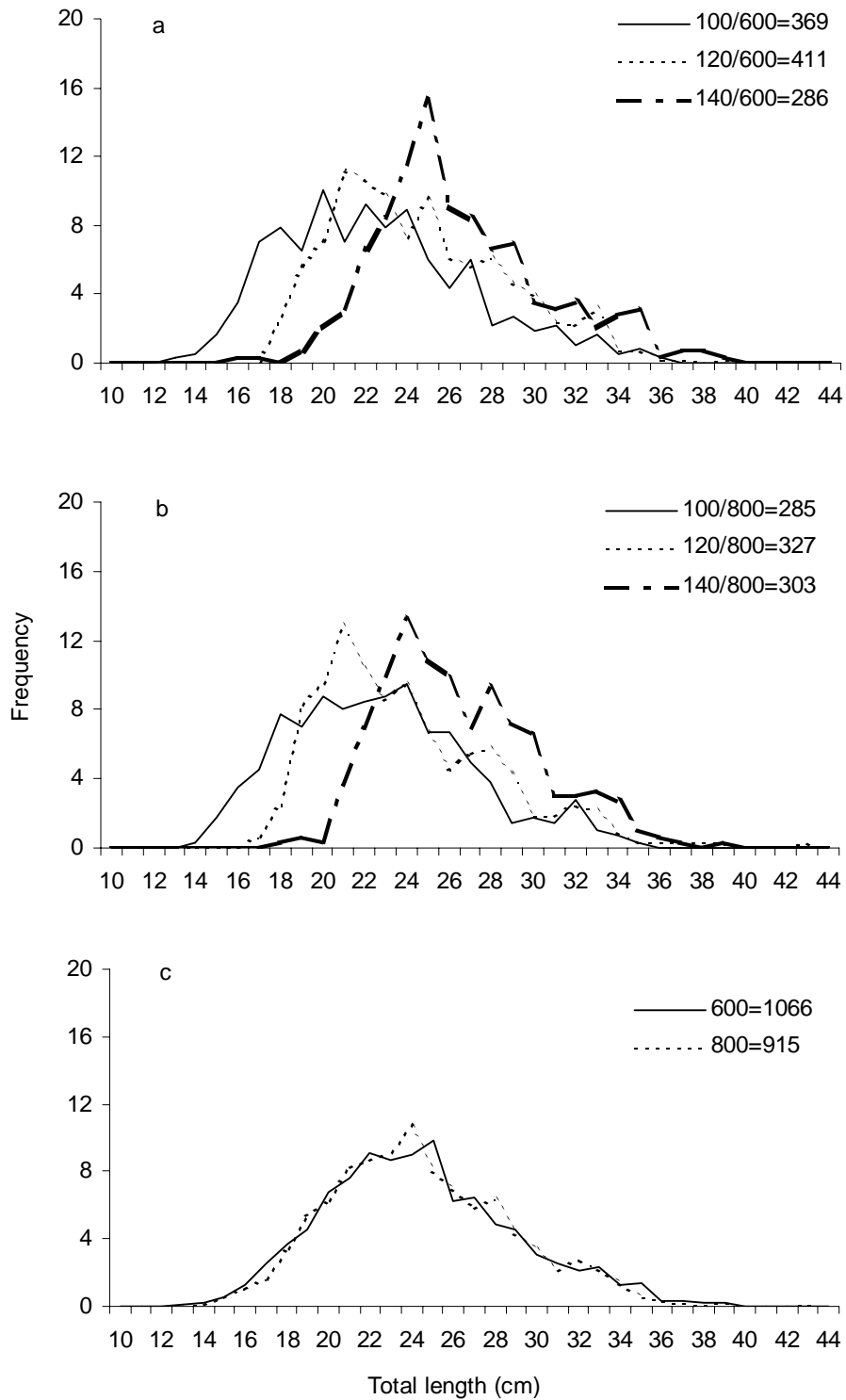
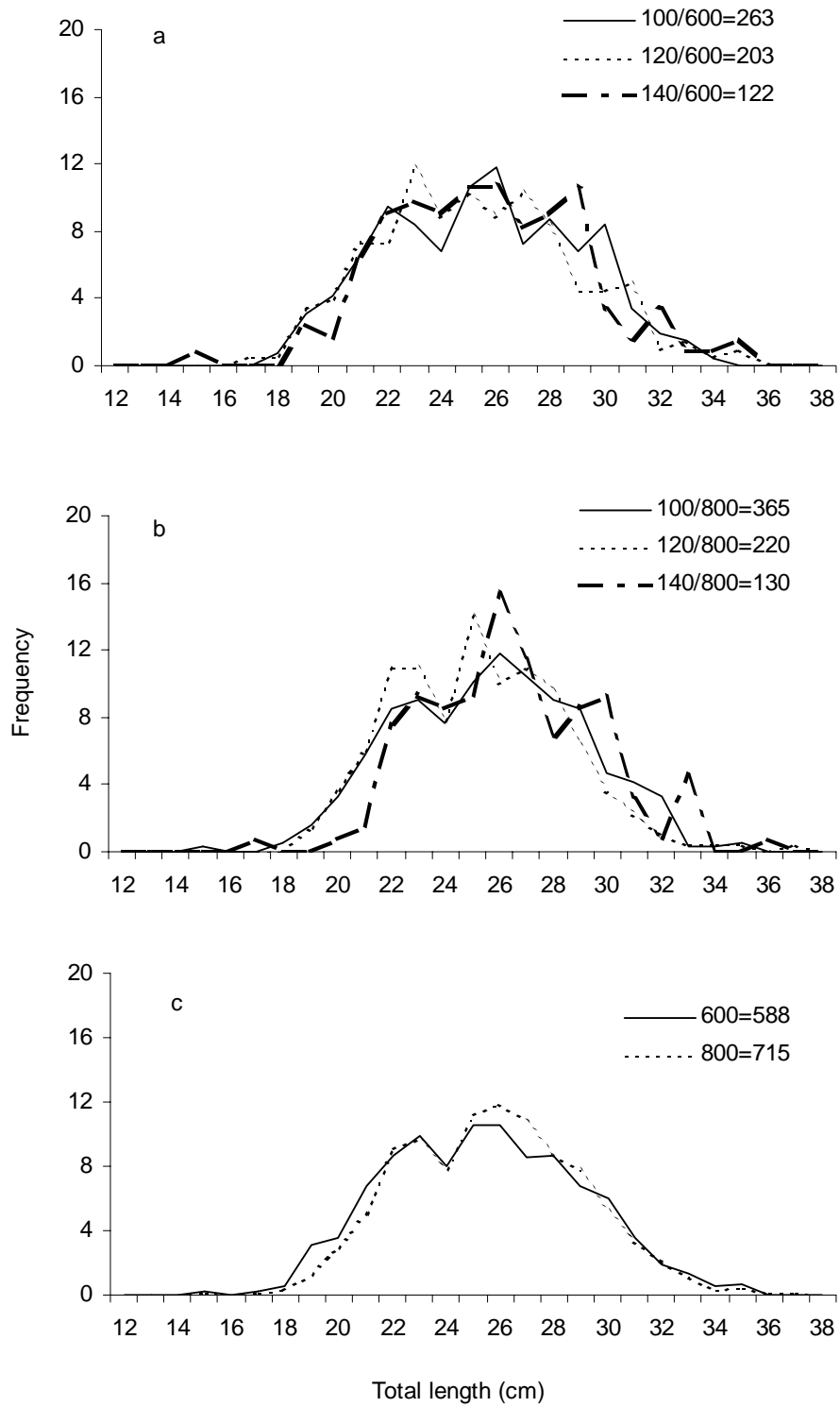


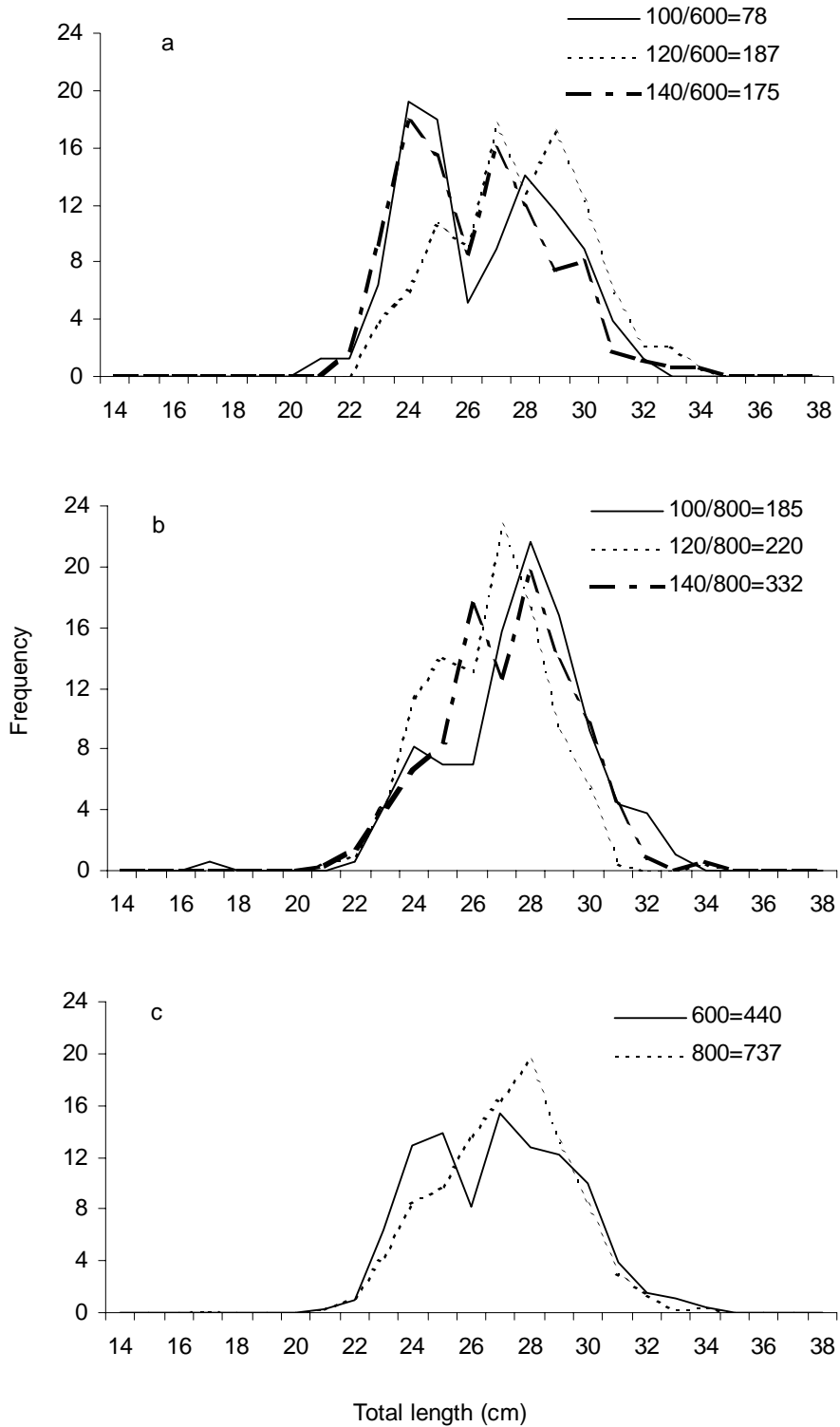
Figure 3.3.2.1.1. Algarve. Length frequency distributions of *Sepia officinalis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.

*Microchirus azevia*



**Figure 3.3.2.1.2. Algarve. Length frequency distributions of *Microchirus azevia* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Scomber japonicus*



**Figure 3.3.2.1.3. Algarve. Length frequency distributions of *Scomber japonicus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Trachinus draco*

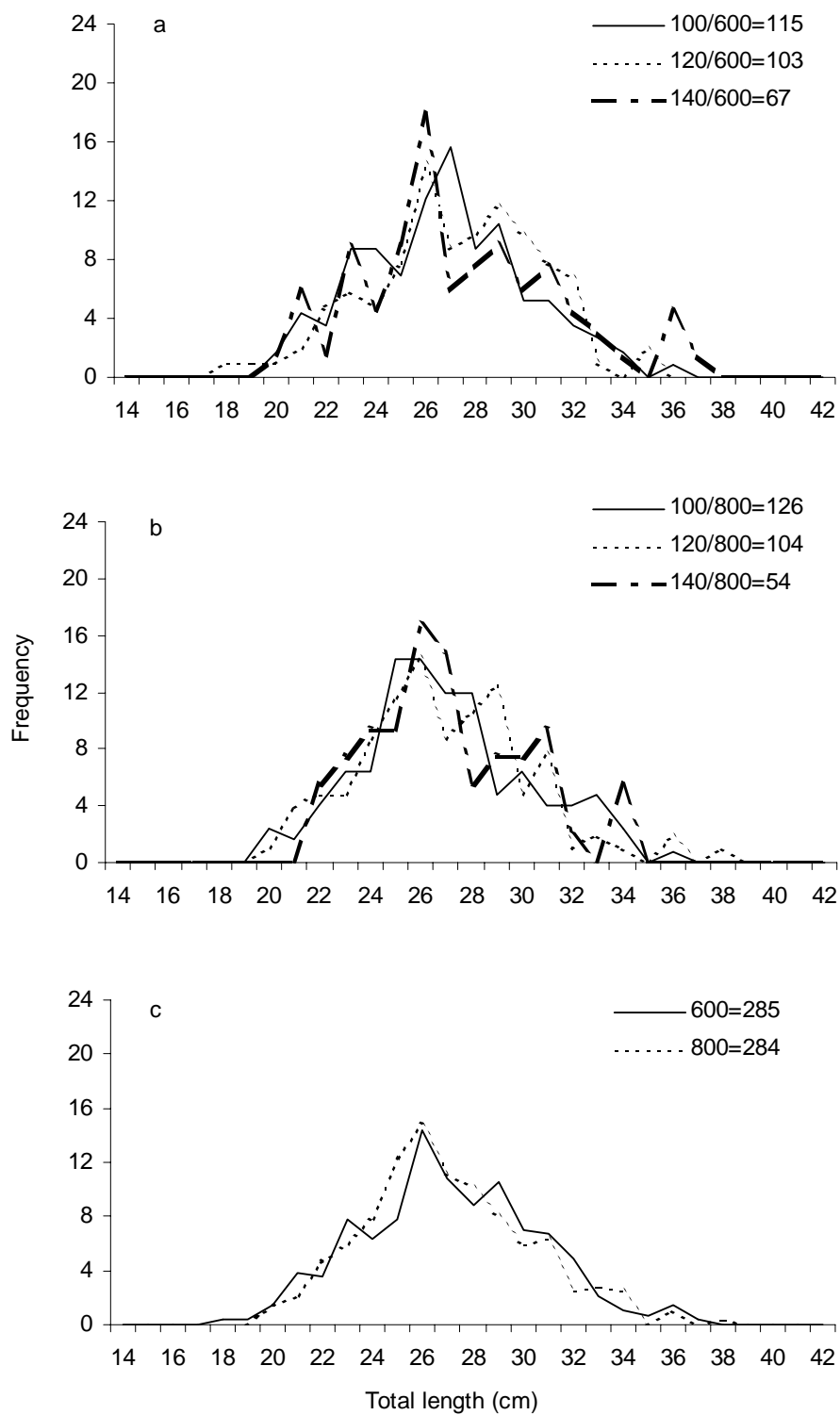


Figure 3.3.2.1.4. Algarve. Length frequency distributions of *Trachinus draco* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.

*Phycis phycis*

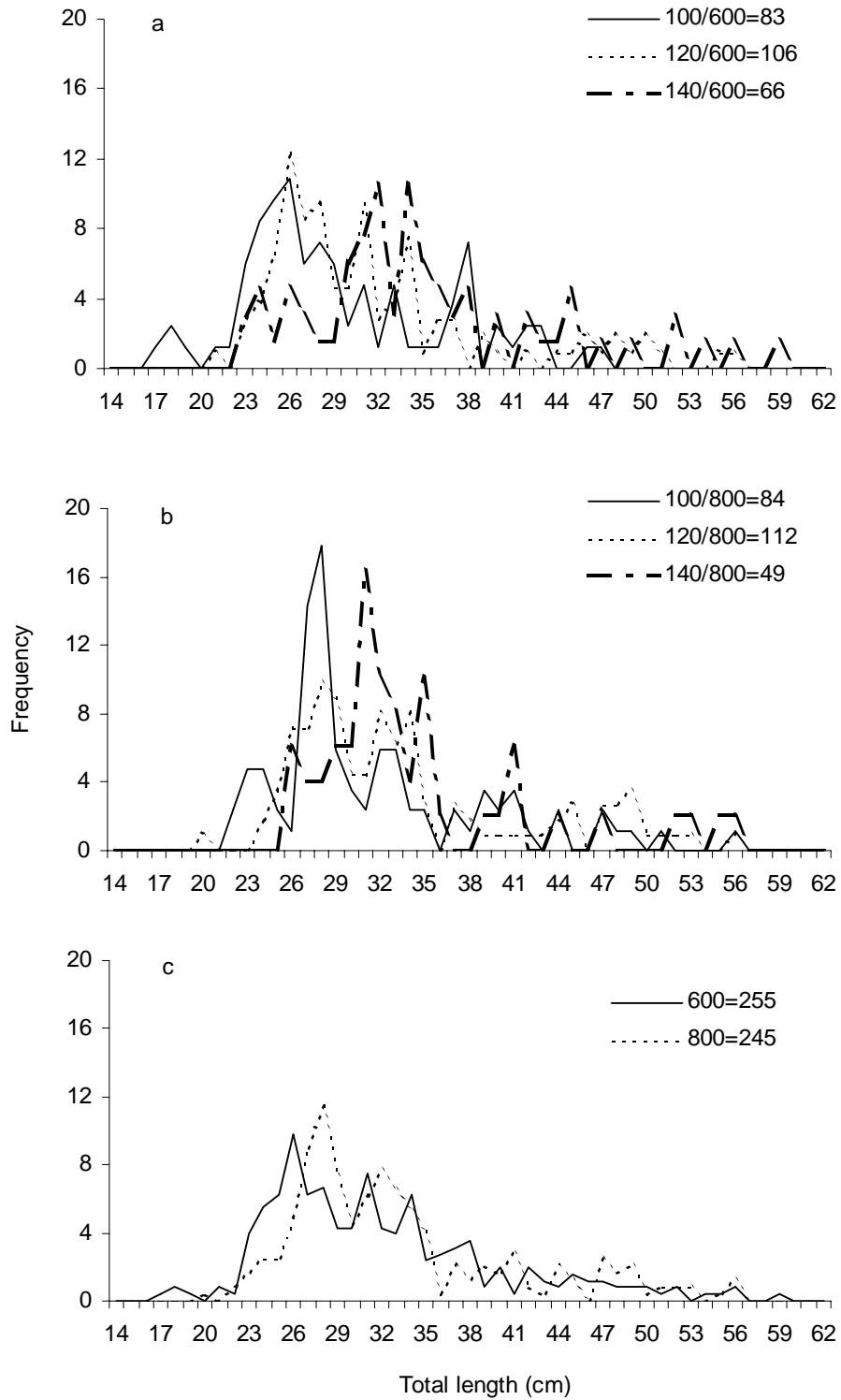


Figure 3.3.2.1.5. Algarve. Length frequency distributions of *Phycis phycis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.

*Scorpaena notata*

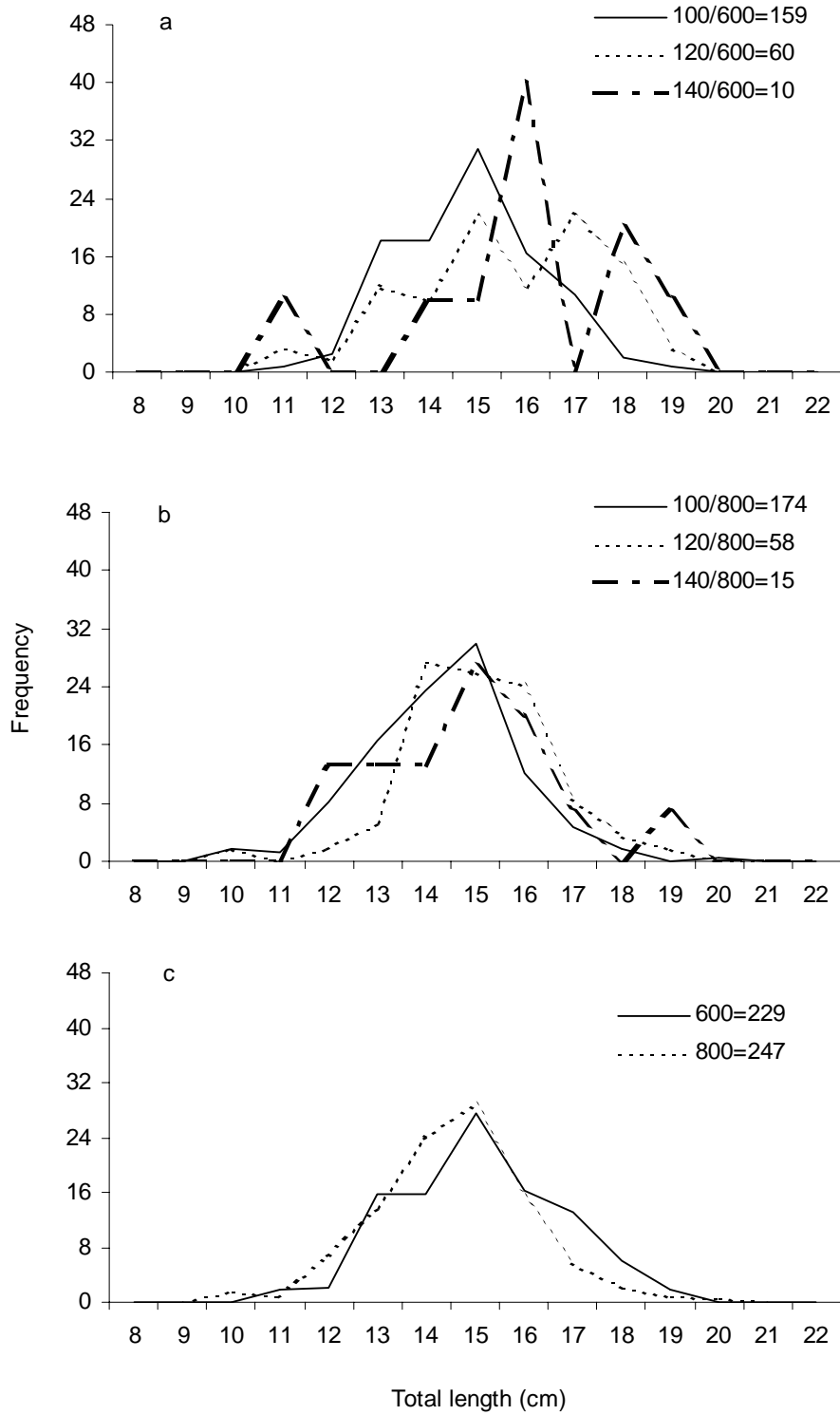
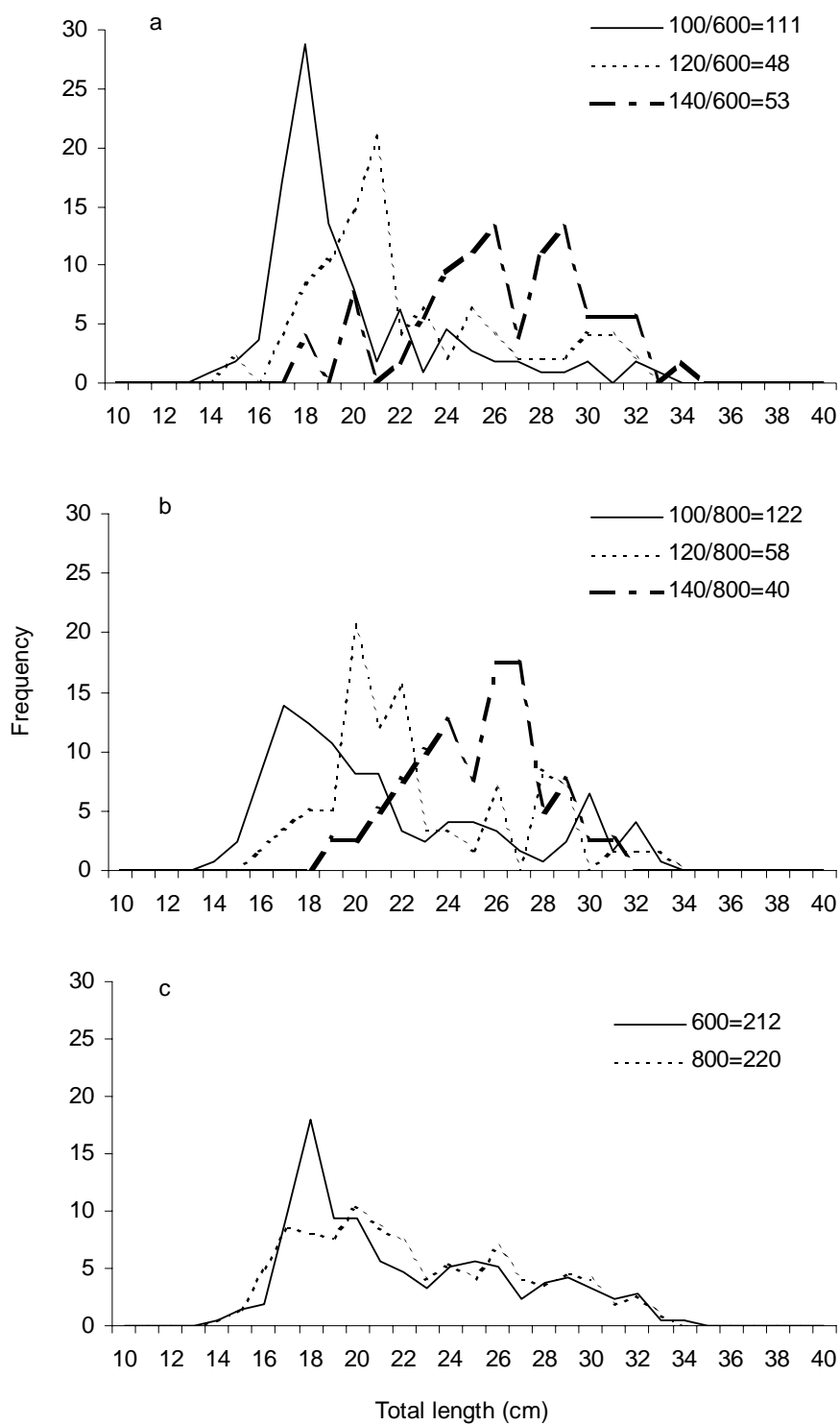


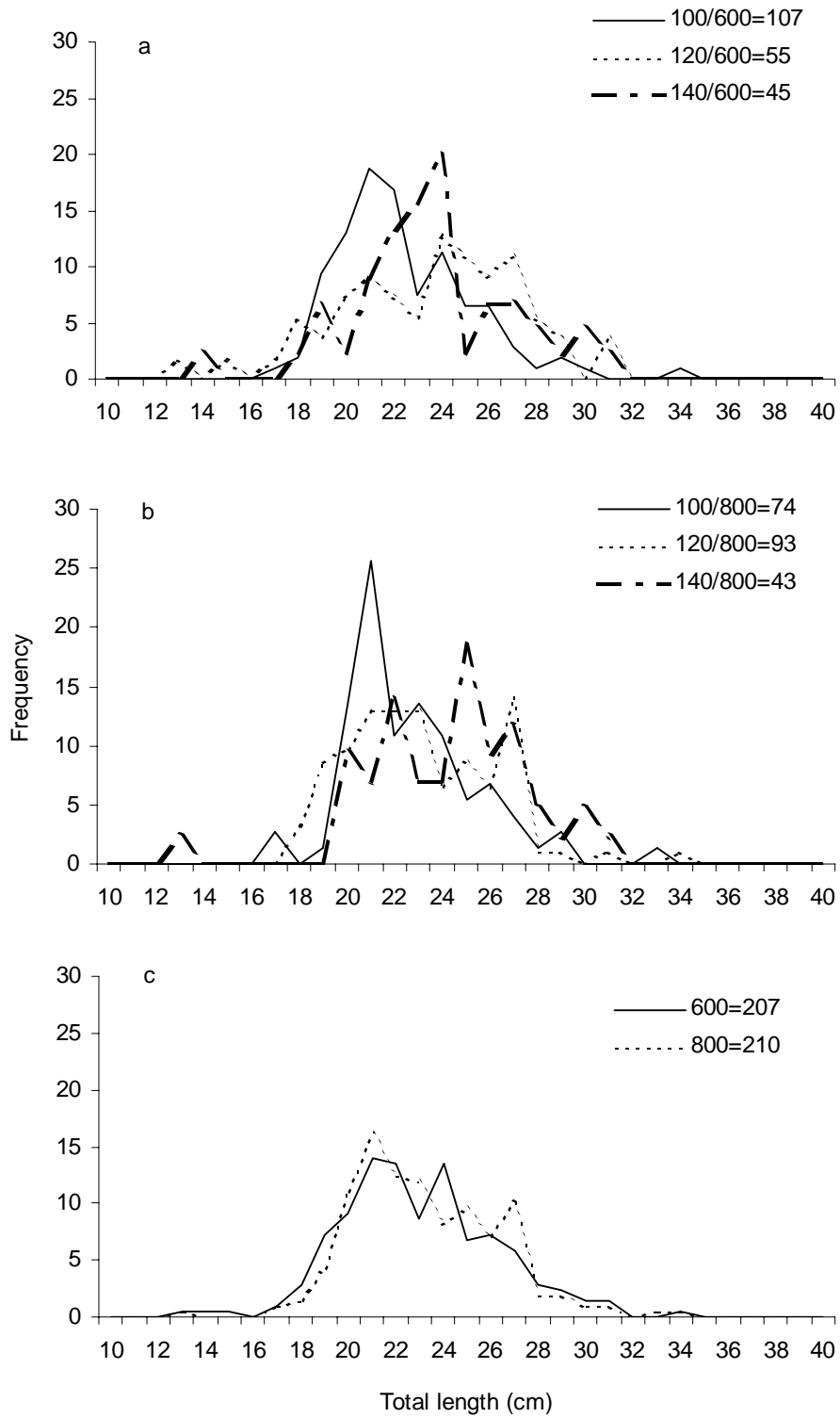
Figure 3.3.2.1.6. Algarve. Length frequency distributions of *Scorpaena notata* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.

*Pagellus acarne*



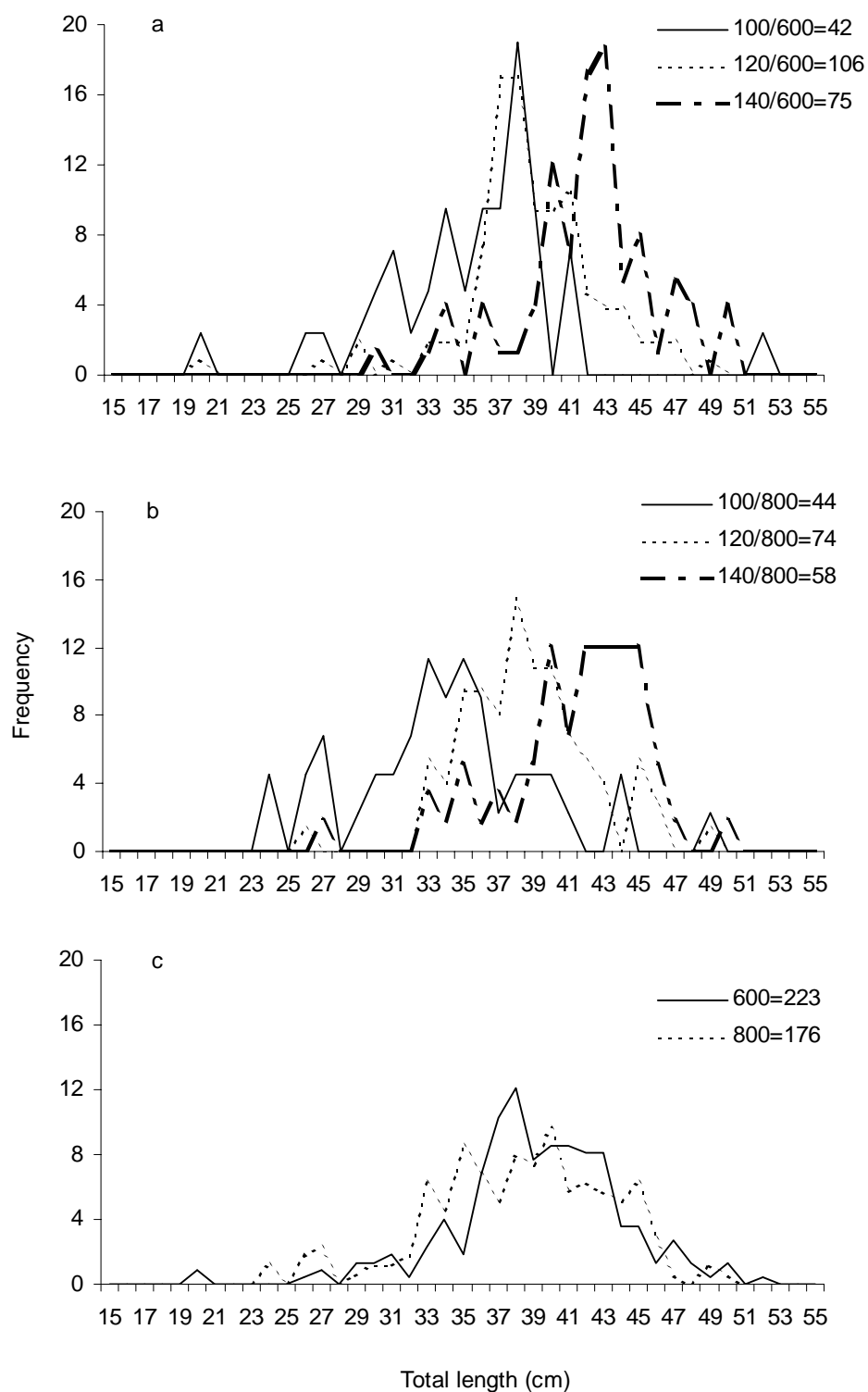
**Figure 3.3.2.1.7. Algarve. Length frequency distributions of *Pagellus acarne* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Chelidonichthys obscurus*



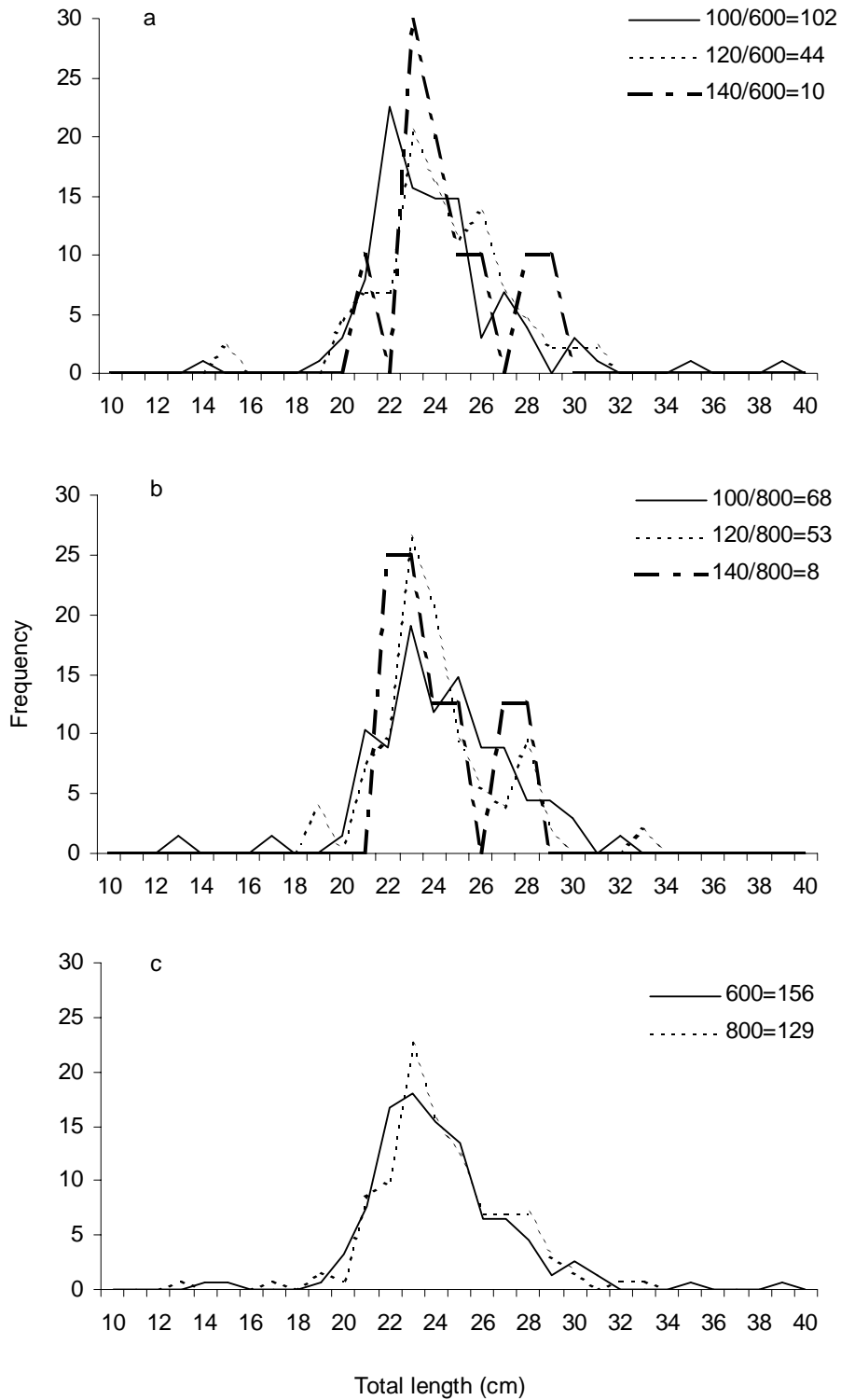
**Figure 3.3.2.1.8. Algarve. Length frequency distributions of *Chelidonichthys obscurus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Solea senegalensis*



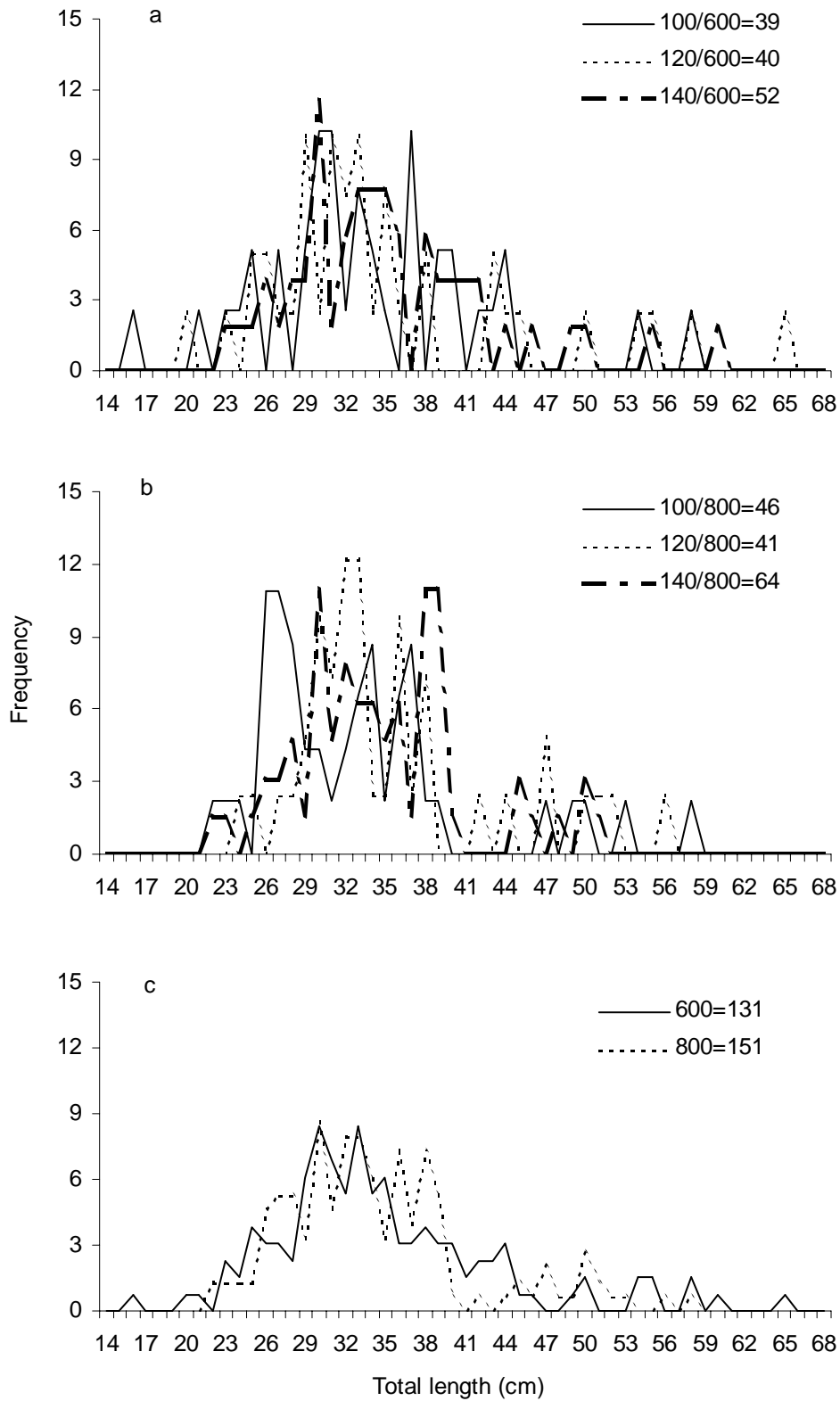
**Figure 3.3.2.1.9. Algarve. Length frequency distributions of *Solea senegalensis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Chelidonichthys lastoviza*



**Figure 3.3.2.1.10. Algarve. Length frequency distributions of *Chelidonichthys lastoviza* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Merluccius merluccius*



**Figure 3.3.2.1.11. Algarve. Length frequency distributions of *Merluccius merluccius* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

**Table 3.3.2.1.1. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Sepia officinalis*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Sepia officinalis</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	369	285	0.04	0.107 Ho not rejected
120/600 vs. 120/800	411	327	0.08	0.101 Ho not rejected
140/600 vs. 140/800	286	303	0.03	0.112 Ho not rejected
100/600 vs. 120/600	369	411	0.22	0.098 Reject Ho
100/600 vs. 140/600	369	286	0.4	0.107 Reject Ho
120/600 vs. 140/600	411	286	0.25	0.10473 Reject Ho
600 vs. 800	1066	915	0.02	0.06129 Ho not rejected
100/800 vs. 120/800	285	327	0.15	0.110 Reject Ho
100/800 vs. 140/800	285	303	0.38	0.112 Reject Ho
120/800 vs. 140/800	303	327	0.32	0.10845 Reject Ho

**Table 3.3.2.1.2. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Microchirus azevia*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Microchirus azevia</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	263	365	0.04	0.110 Ho not rejected
120/600 vs. 120/800	203	220	0.05	0.132 Ho not rejected
140/600 vs. 140/800	122	130	0.12	0.171 Ho not rejected
100/600 vs. 120/600	263	203	0.05	0.127 Ho not rejected
100/600 vs. 140/600	263	122	0.04	0.149 Ho not rejected
120/600 vs. 140/600	203	122	0.05	0.15579 Ho not rejected
600 vs. 800	588	715	0.04	0.07571 Ho not rejected
100/800 vs. 120/800	365	220	0.08	0.116 Ho not rejected
100/800 vs. 140/800	365	130	0.09	0.139 Ho not rejected
120/800 vs. 140/800	220	130	0.17	0.15045 Reject Ho

**Table 3.3.2.1.3. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Scomber japonicus*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Scomber japonicus</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	108	185	0.26	0.165 Reject Ho
120/600 vs. 120/800	187	220	0.25	0.135 Reject Ho
140/600 vs. 140/800	175	332	0.23	0.127 Reject Ho
100/600 vs. 120/600	78	187	0.26	0.183 Reject Ho
100/600 vs. 140/600	78	175	0.08	0.185 Ho not rejected
120/600 vs. 140/600	187	175	0.24	0.14304 Reject Ho
600 vs. 800	440	737	0.1	0.08193 Reject Ho
100/800 vs. 120/800	185	220	0.24	0.136 Reject Ho
100/800 vs. 140/800	185	332	0.11	0.125 Ho not rejected
120/800 vs. 140/800	220	332	0.16	0.11823 Reject Ho

**Table 3.3.2.1.4. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Trachinus draco*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Trachinus draco</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	115	126	0.06	0.175 Ho not rejected
120/600 vs. 120/800	103	104	0.08	0.189 Ho not rejected
140/600 vs. 140/800	67	54	0.08	0.249 Ho not rejected
100/600 vs. 120/600	115	103	0.1	0.185 Ho not rejected
100/600 vs. 140/600	115	67	0.09	0.209 Ho not rejected
120/600 vs. 140/600	103	67	0.08	0.21346 Ho not rejected
600 vs. 800	285	284	0.05	0.11403 Ho not rejected
100/800 vs. 120/800	126	104	0.05	0.180 Ho not rejected
100/800 vs. 140/800	126	54	0.04	0.221 Ho not rejected
120/800 vs. 140/800	104	54	0.05	0.22812 Ho not rejected

**Table 3.3.2.1.5. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Phycis phycis*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Phycis phycis</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	83	84	0.27	0.210 Reject Ho
120/600 vs. 120/800	106	112	0.15	0.184 Ho not rejected
140/600 vs. 140/800	66	49	0.14	0.256 Ho not rejected
100/600 vs. 120/600	83	106	0.17	0.199 Ho not rejected
100/600 vs. 140/600	83	66	0.42	0.224 Reject Ho
120/600 vs. 140/600	106	66	0.3	0.21324 Reject Ho
600 vs. 800	255	245	0.16	0.12167 Reject Ho
100/800 vs. 120/800	84	112	0.17	0.196 Ho not rejected
100/800 vs. 140/800	84	49	0.33	0.244 Reject Ho
120/800 vs. 140/800	112	49	0.19	0.23294 Ho not rejected

**Table 3.3.2.1.6. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Scorpaena notata*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Scorpaena notata</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	159	174	0.12	0.149 Ho not rejected
120/600 vs. 120/800	60	58	0.26	0.250 Reject Ho
140/600 vs. 140/800	10	14	0.41	0.563 Ho not rejected
100/600 vs. 120/600	159	60	0.27	0.206 Reject Ho
100/600 vs. 140/600	142	10	0.49	0.445 Reject Ho
120/600 vs. 140/600	47	10	0.32	0.47362 Ho not rejected
600 vs. 800	229	247	0.13	0.12476 Reject Ho
100/800 vs. 120/800	174	58	0.19	0.206 Ho not rejected
100/800 vs. 140/800	174	15	0.14	0.366 Ho not rejected
120/800 vs. 140/800	58	15	0.18	0.39395 Ho not rejected

**Table 3.3.2.1.7. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Pagellus acarne*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Pagellus acarne</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
100/600 vs. 100/800	111	120	0.17	0.179	Ho not rejected
120/600 vs. 120/800	45	58	0.16	0.270	Ho not rejected
140/600 vs. 140/800	53	40	0.26	0.285	Ho not rejected
100/600 vs. 120/600	111	46	0.4	0.238	Reject Ho
100/600 vs. 140/600	111	50	0.68	0.232	Reject Ho
120/600 vs. 140/600	48	53	0.52	0.27098	Reject Ho
600 vs. 800	212	220	0.1	0.13089	Ho not rejected
100/800 vs. 120/800	112	58	0.37	0.220	Reject Ho
100/800 vs. 140/800	122	40	0.55	0.248	Reject Ho
120/800 vs. 140/800	58	32	0.42	0.29948	Reject Ho

**Table 3.3.2.1.8. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Chelidonichthys obscurus*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Chelidonichthys obscurus</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
100/600 vs. 100/800	107	74	0.08	0.206	Ho not rejected
120/600 vs. 120/800	55	93	0.17	0.231	Ho not rejected
140/600 vs. 140/800	45	53	0.25	0.276	Ho not rejected
100/600 vs. 120/600	107	55	0.25	0.226	Reject Ho
100/600 vs. 140/600	107	45	0.25	0.242	Reject Ho
120/600 vs. 140/600	55	45	0.15	0.27337	Ho not rejected
600 vs. 800	207	210	0.05	0.1332	Ho not rejected
100/800 vs. 120/800	74	93	0.12	0.212	Ho not rejected
100/800 vs. 140/800	74	43	0.32	0.261	Reject Ho
120/800 vs. 140/800	93	43	0.21	0.2508	Ho not rejected

**Table 3.3.2.1.9. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Solea senegalensis*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Solea senegalensis</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	42	44	0.23	0.293 Ho not rejected
120/600 vs. 120/800	106	74	0.12	0.206 Ho not rejected
140/600 vs. 140/800	75	58	0.1	0.238 Ho not rejected
100/600 vs. 120/600	42	106	0.34	0.248 Reject Ho
100/600 vs. 140/600	42	75	0.73	0.262 Reject Ho
120/600 vs. 140/600	106	75	0.45	0.20521 Reject Ho
600 vs. 800	223	176	0.14	0.13712 Reject Ho
100/800 vs. 120/800	44	74	0.46	0.259 Reject Ho
100/800 vs. 140/800	44	58	0.63	0.272 Reject Ho
120/800 vs. 140/800	74	58	0.39	0.2385 Reject Ho

**Table 3.3.2.1.10. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Chelidonichthys lastoviza*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Chelidonichthys lastoviza</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)
Comb	m	n	D	
100/600 vs. 100/800	102	156	0.06	0.173 Ho not rejected
120/600 vs. 120/800	44	53	0.11	0.277 Ho not rejected
140/600 vs. 140/800	10	8	0.15	0.645 Ho not rejected
100/600 vs. 120/600	102	44	0.15	0.245 Ho not rejected
100/600 vs. 140/600	102	10	0.25	0.451 Ho not rejected
120/600 vs. 140/600	44	10	0.1	0.47644 Ho not rejected
600 vs. 800	156	129	0.07	0.16185 Ho not rejected
100/800 vs. 120/800	68	53	0.14	0.249 Ho not rejected
100/800 vs. 140/800	68	8	0.15	0.508 Ho not rejected
120/800 vs. 140/800	53	8	0.11	0.51585 Ho not rejected

**Table 3.3.2.1.11. Algarve. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Merluccius merluccius*, for the different trammel meshsize combinations. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Merluccius merluccius</i>				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liiv, Siegel and Castellan, 1988)	
Comb	m	n	D		
100/600 vs. 100/800	39	46	0.16	0.296	Ho not rejected
120/600 vs. 120/800	40	41	0.15	0.302	Ho not rejected
140/600 vs. 140/800	52	64	0.11	0.254	Ho not rejected
100/600 vs. 120/600	39	40	0.1	0.306	Ho not rejected
100/600 vs. 140/600	39	52	0.13	0.288	Ho not rejected
120/600 vs. 140/600	40	52	0.14	0.28602	Ho not rejected
600 vs. 800	131	151	0.08	0.16238	Ho not rejected
100/800 vs. 120/800	46	41	0.27	0.292	Ho not rejected
100/800 vs. 140/800	46	64	0.24	0.263	Ho not rejected
120/800 vs. 140/800	41	64	0.09	0.27205	Ho not rejected

### 3.3.2.2. Size selectivity

The GillNet software (ConStat 1998) was used to fit the following selectivity models: Normal scale, Normal location, Gamma, Log-normal, Bi-modal and Gamma-Wileman. Based on the examination of the plots of the catch size frequency distributions (Figures 3.3.2.1.1 to 3.3.2.1.11) and the results of the Kolmogorov-Smirnov tests (Tables 3.3.2.1.1 to 3.3.2.1.11), it was decided to carry out the analysis for the 600 mm and the 800 mm mesh outer panels separately. In addition, since the catches of the most abundant species *Sepia officinalis* were highly seasonal, the data for the Autumn and Winter seasons were analysed separately. The best model was chosen based on several criteria. The critical level for goodness of fit was P=0.05. Additionally, the best models had a small deviance that was similar in magnitude to the degrees of freedom. Finally, the estimated modal lengths had to be realistic.

For the cuttlefish, *Sepia officinalis*, none of the GillNet (ConStat 1998) software models resulted in satisfactory fits. Consequently, the logistic model was fitted based on the maximum likelihood method of Wulff (1986). Three different models were fitted to each data set: 1) the parameters b and L<sub>50</sub> are proportional to the inner panel mesh size:  $b = b_1 * M_i$ ,  $L_{50} = b_2 * M_i$ ; where M<sub>i</sub> is the inner panel mesh size, 2) both parameters assumed to be linear

functions of mesh size:  $b = (b_1 * M_i) + b_2$  and  $L_{50} = (b_3 * M_i) + b_4$ , and 3)  $b$  is constant while  $L_{50}$  is a linear function of mesh size: and  $L_{50} = (b_3 * M_i) + b_4$ .

In general, the model where both  $b$  and  $L_{50}$  are linear functions of mesh size gave the best fits for *Sepia officinalis* (Table 3.3.2.2.1). The fitted selectivity curves are given in Figure 3.3.2.2.1. As can be seen there is a sharp increase in size selectivity with increasing inner panel mesh size. Values for  $L_{50}$  range from 10.0 to 16.6 cm for the 100 mm inner panel mesh sizes to 20.5 to 22.7 for the 140 mm inner panel mesh sizes.

For *Microchirus azevia*, *Trachinus draco*, *Scorpaena notata*, *Chelidonichthys obscurus* and *Chelidonichthys lastoviza*, none of the models implemented in the GillNet software resulted in realistic modal lengths. For *Scomber japonicus* none of the models fitted any of the three data sets (600 mm, 800 mm and combined outer panel data) ( $P < 0.05$ ). For all these species no further attempts were made to fit alternative models such as the logistic model.

The parameters of selectivity models were successfully estimated for the remaining four species with the GillNet software. For the Senegal sole (*Solea senegalensis*) no fits were obtained for the pooled data (both sizes of outer panel combined). However the bi-modal model gave good results for the 600 mm outer panel trammel net data while the log-normal model was judged to be the best for the 800 mm outer panel trammel net data. The fitted selectivity curves are shown in Figures 3.3.2.2.2. The estimated parameters, the modal lengths and associated dispersion are given in Table 3.3.2.2.2.

For the hake (*Merluccius merluccius*), the bi-modal model gave the best fit for the 600 mm mesh outer panel trammel nets. For the 800 mm outer panel and the combined (600+800) trammel nets, the bi-modal models also gave the statistically best fits but the estimated dispersions were unrealistically small. Thus, the log-normal model was selected as the best for these data (Figures 3.3.2.2.3). The estimated parameters, the modal lengths and the associated dispersion are given in Table 3.3.2.2.2.

For *Phycis phycis*, a variety of uni-modal models gave good fits for the 600 mm inner panel mesh size data. However, no models could be fitted to the 800 mm or the combined data ( $P < 0.05$ ). The fitted Gamma-Wileman selectivity curves for the 600 mm data are given in Figure 3.3.2.2.4 and the estimated parameters, the modal lengths and the associated dispersion are given in Table 3.3.2.2.2.

The bi-modal model gave the best fits for the axillary sea bream (*Pagellus acarne*) for the 800 mm mesh outer panel trammel nets and for the combined data. No fits could be obtained for the 600 mm trammel nets. The fitted bi-modal selectivity curves are given in

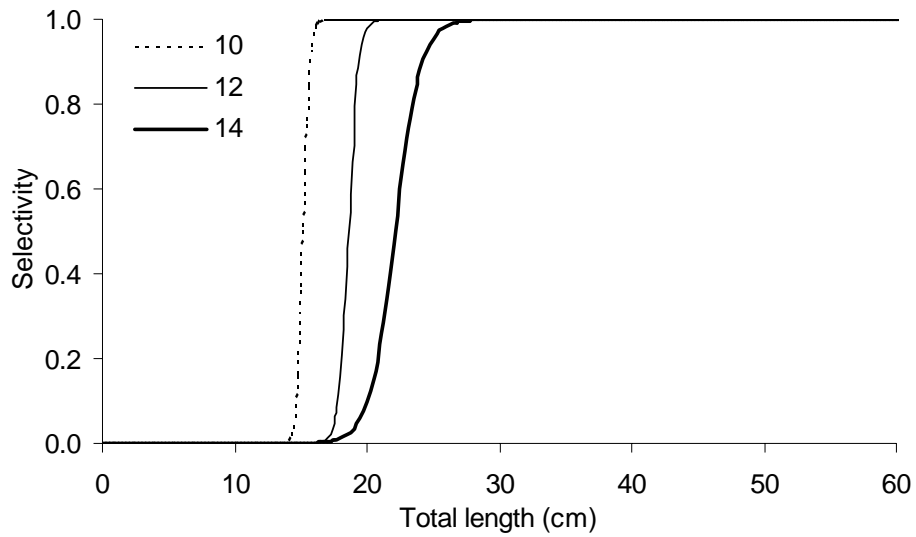
Figure 3.3.2.2.5 and the estimated parameters, the modal lengths and the associated dispersion are given in Table 3.3.2.2.2.

**Table 3.3.2.2.1. Results of the logistic model fitted to *Sepia officinalis* selectivity data based on the maximum likelihood method of Wulff (1986) (Algarve).**

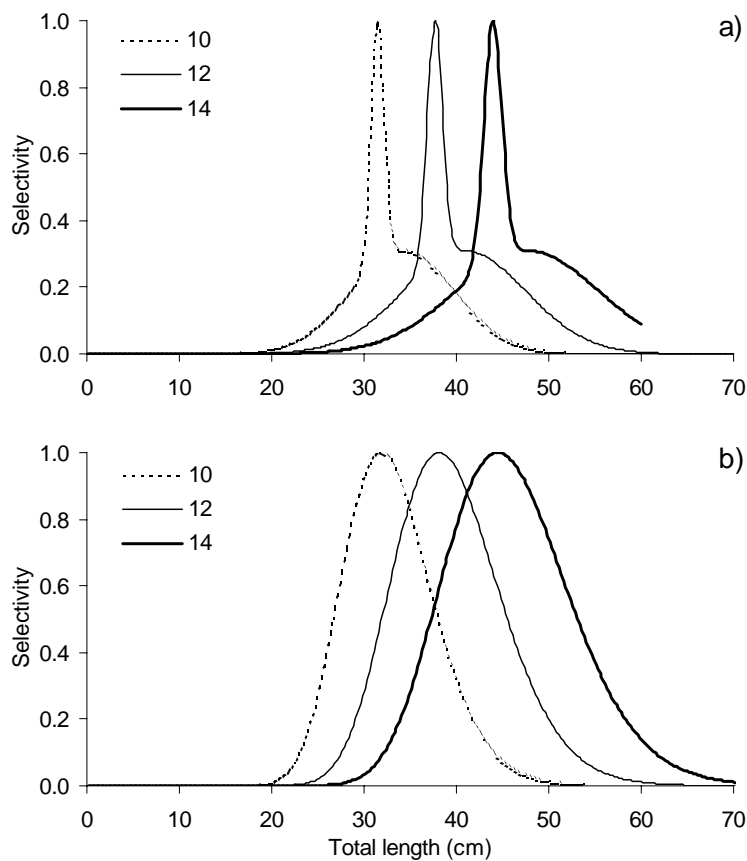
Season	Case	Model	100		120		140		Max. Likelihood
			b	L <sub>50</sub>	b	L <sub>50</sub>	b	L <sub>50</sub>	
All seasons	600	proportional	0.839	15.9	1.006	19.1	1.174	22.3	-1076.04
		b const; L50 linear	1.156	16.1	1.156	19.2	1.156	22.2	-1073.86
		linear	6.044	14.6	3.455	18.6	0.866	22.5	-1067.02
	800	proportional	1.210	15.6	1.452	18.7	1.694	21.8	-931.65
		b const; L50 linear	1.596	15.3	1.596	18.6	1.596	21.8	-930.83
		linear	3.247	15.1	2.304	18.5	1.361	21.9	-929.69
	All Data	proportional	0.987	15.7	1.184	18.9	1.382	22.0	-2009.78
		b const; L50 linear	1.336	15.8	1.336	18.9	1.336	22.0	-2006.85
		linear	4.401	15.1	2.729	18.6	1.057	22.1	-1999.33
Autumn	600	proportional	11.245	14.6	13.494	17.6	15.743	20.5	-179.10
		b const; L50 linear	25.309	13.9	25.309	17.2	25.309	20.5	-187.00
		linear	12.424	15.7	13.930	18.1	15.435	20.5	-187.00
	800	proportional	-	-	-	-	-	-	-
		b const; L50 linear	1.428	10.0	1.428	15.7	1.428	21.3	-194.21
		linear	2.636	10.0	2.024	15.7	1.413	21.3	-194.20
	All Data	proportional	10.916	14.6	13.099	17.6	15.283	20.5	-381.70
		b const; L50 linear	2.103	14.3	2.103	17.6	2.103	20.9	-381.71
		linear	12.607	15.2	13.174	17.9	13.741	20.5	-381.70
Winter	600	proportional	0.718	16.2	0.862	19.4	1.006	22.7	-749.08
		b const; L50 linear	1.012	16.6	1.012	19.6	1.012	22.5	-747.31
		linear	4.249	15.2	2.496	19.0	0.742	22.7	-742.88
	800	proportional	2.044	15.8	2.453	19.0	2.862	22.1	-602.56
		b const; L50 linear	2.664	15.1	2.664	18.7	2.664	22.3	-601.84
		linear	2.164	15.2	2.486	18.7	2.808	22.3	-601.81
	All Data	proportional	0.968	16.0	1.161	19.2	1.355	22.4	-1359.97
		b const; L50 linear	1.289	15.8	1.289	19.1	1.289	22.4	-1357.94
		linear	4.190	15.1	2.608	18.9	1.026	22.6	-1353.11

**Table 3.3.2.2.2. Algarve. Results of the selectivity models fitted with GillNet software. For each species and case (600mm and 800mm outer panel separately and combined data (All data)) the fitted model, effort mode, equation parameters, modal lengths for each inner panel (100, 120 and 140mm), model deviance and degrees of freedom (df) are shown.**

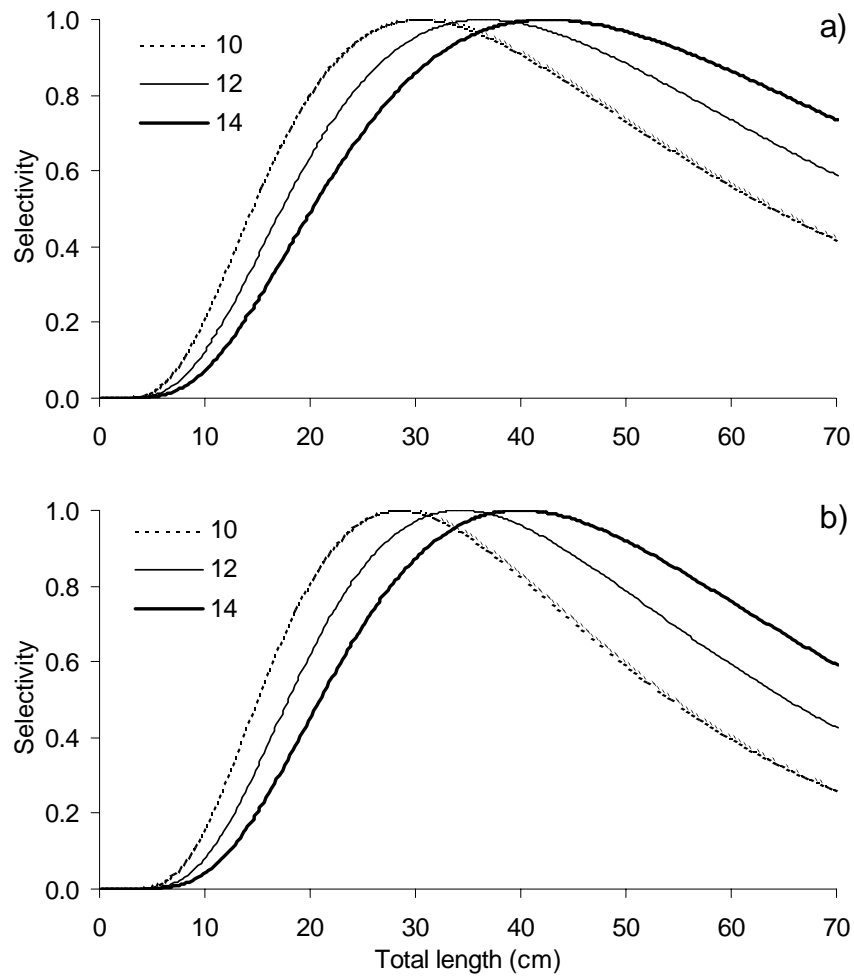
Species	Model	Effort	Case	Parameters	100	120	140	Model deviance	df
<i>Merluccius merluccius</i>	Log-Normal	Meshsize	600	$(a1,b1,a2,b2,w) = (4.7435, 1.0917, 9.4252, 2.4563, 1.3666)$	23.7	28.5	33.2	74.7	63
	Log-Normal	Meshsize	800	$(m,s) = (3.6613, 0.5483)$	28.5	34.2	39.9	76.3	62
<i>Pagellus acarne</i>	Bi-Modal	Equal	800	$(a1,b1,a2,b2,w) = (3.7558, 0.3709, 6.9031, 1.3072, 2.1506)$	18.8	22.5	26.3	43.0	35
	Bi-Modal	Meshsize All data		$(a1,b1,a2,b2,w) = (3.7901, 0.3683, 6.1113, 1.1637, 1.3142)$	19.0	22.7	26.5	49.5	37
<i>Phycis phycis</i>	Gamma Semi Wileman	Equal	600	$(k,a,c) = (0.1474, 34.2898, 129.1525)$	24.5	29.4	34.4	92.1	75
<i>Solea senegalensis</i>	Bi-Modal	Meshsize	600	$(a1,b1,a2,b2,w) = (6.2798, 0.1403, 6.8122, 1.1127, 0.4266)$	31.4	37.7	44.0	62.9	47
	Log-Normal	Equal	800	$(m,s) = (3.5039, 0.1508)$	32.5	39.0	45.5	51.2	46



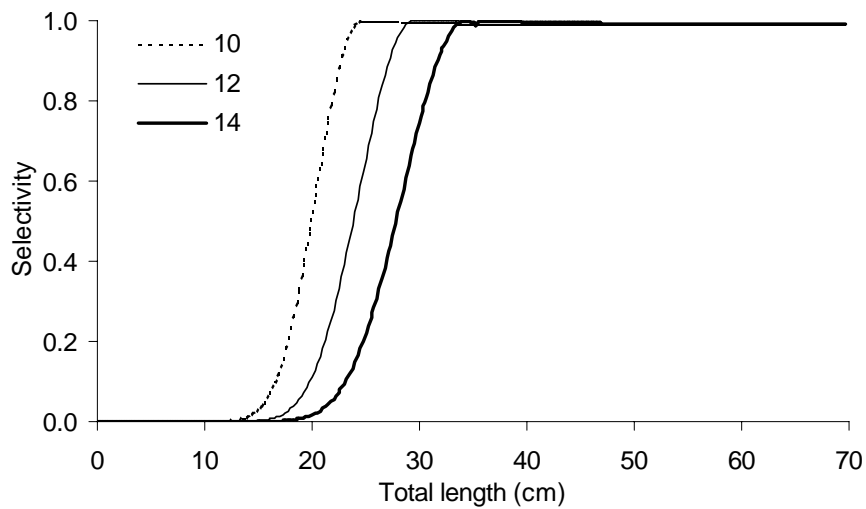
**Figure 3.3.2.2.1. Algarve. Standardized selectivity plots for *Sepia officinalis* caught by trammel nets (100, 120 and 140 mm mesh inner panel) and combined 600 + 800mm mesh outer panel.**



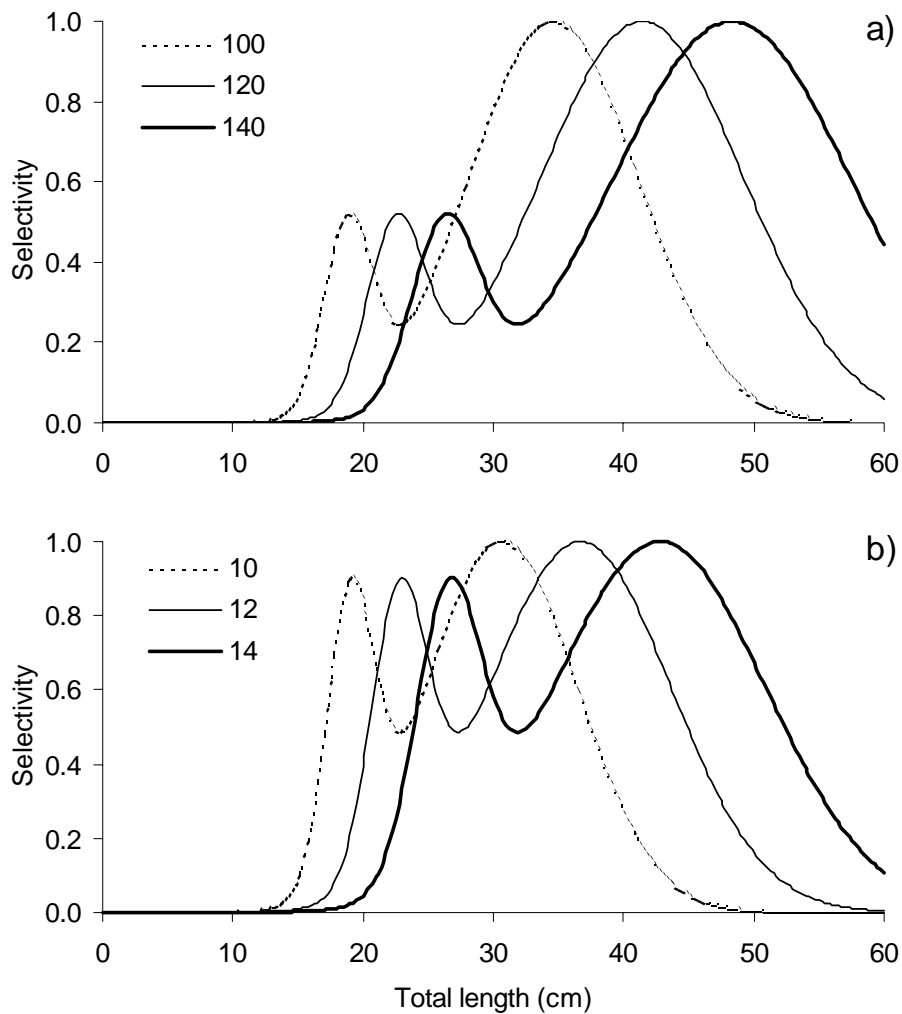
**Figure 3.3.2.2.2. Algarve. Standardized selectivity plots for *Solea senegalensis* caught by trammel nets (100, 120 and 140 mm mesh inner panel). a) 600mm mesh outer panel size and b) 800 mm mesh outer panel size.**



**Figure 3.3.2.2.3. Algarve. Standardized selectivity plots for *Merluccius merluccius* caught by trammel nets (100, 120 and 140 mm mesh inner panel). a) 600mm mesh outer panel size and b) 800 mm mesh outer panel size.**



**Figure 3.3.2.2.4. Algarve. Standardized selectivity plots for *Phycis phycis* caught by trammel nets (100, 120 and 140 mm mesh inner panel) and combined 600 + 800mm mesh outer panel.**



**Figure 3.3.2.2.5. Algarve. Standardized selectivity plots for *Pagellus acarne* caught by trammel nets (100, 120 and 140 mm mesh inner panel). a) 600mm mesh outer panel size and b) 800 mm mesh outer panel size.**

### 3.3.3. Gulf of Cádiz

#### 3.3.3.1. Catch size frequency distributions

The distributions of frequencies by size classes for the 4 main species caught in spring (i.e. *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*) are shown in Figures 3.3.3.1.1 to 3.3.3.1.4. In general, the distributions are wide for all the combinations of mesh size of inner and outer panels, with ranges from 30 to 40 cm., biased to the right and with very similar size ranges. The modal length of the 4 species increases gradually with the size of mesh of the inner panel. However, the result is very similar when

the distributions of frequencies for the outer panels are compared.

In most cases, the numbers caught decrease in line with increases in the mesh size of the inner panel, and are always more for the combination of nets with outer panel de 400 mm mesh, than for the combination of nets with outer panel of 300 mm mesh size. The 80/400 net is usually the combination accounting for the highest catches, and the 100/300 net for the lowest catches, by number.

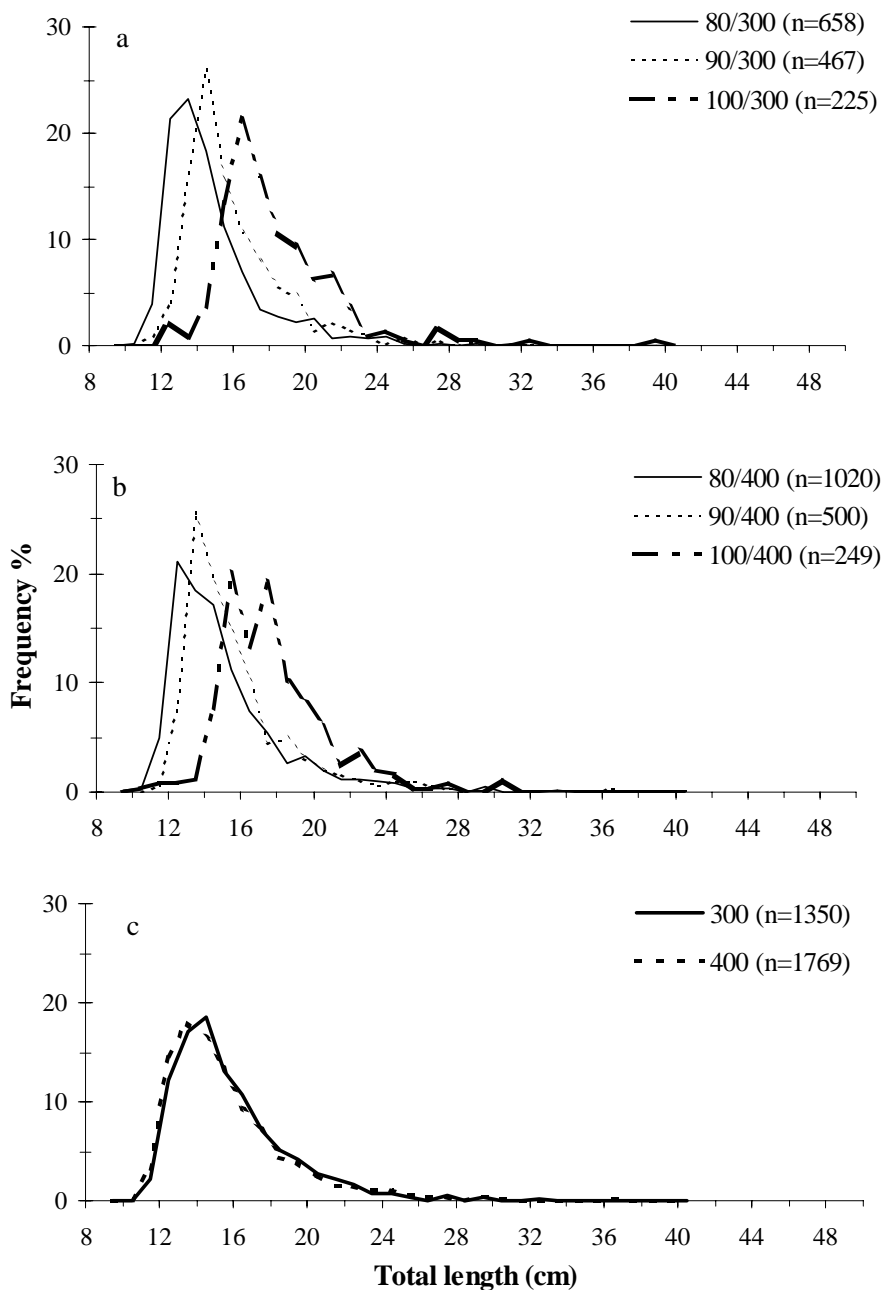
The modal length of *Sepia officinalis* (Figure 3.3.3.1.1.a, b) shows an increase from 12-14 cm, for the nets with inner panel of 80 mm mesh, to 16-18 cm, for the nets of 100 mm mesh. The highest number of specimens caught corresponds to the combinations of nets with inner panel of 80 mm, and the lowest number to those nets of 100 mm. The range of lengths of the combined catches using nets of equal outer panel size (300 and 400 mm) is very similar: from 9 to 41 cm (Figure 3.3.3.1.1c).

For *Solea senegalensis* (Figure 3.3.3.1.2a, b) the modal length is from 26 cm for the nets with inner panel of 80 mm mesh, to 32-34 cm for the nets of 100 mm. For all the nets, two or three notable peak values are observed in respect of different size classes, which continue to be reflected in the distribution for combined nets by outer panel. A first peak appears at 26-28 cm length, a second, accounting for the highest number of catches, at 30-32 cm, and a third, with less frequency, between 34 and 38 cm. A smaller peak is also found at 16-18 cm. The largest number of specimens were also caught using the nets with an inner panel of 80 mm, and the lowest number using nets with the 100 mm inner panel. The range of lengths for the two groups of nets (300 and 400 mm) is also very similar: in both from 12 to 46 cm (Figure 3.3.3.1.2c).

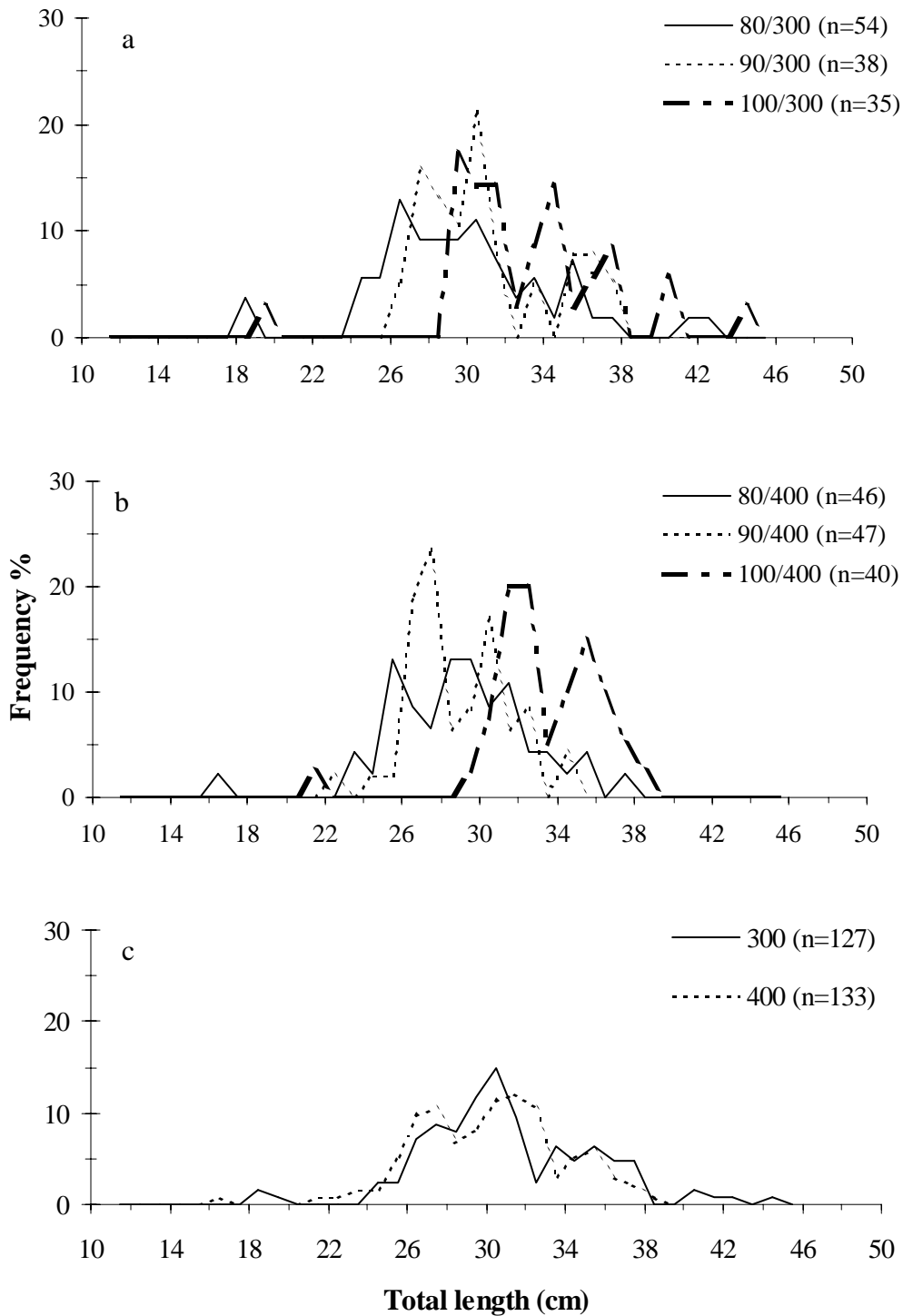
*Synaptura lusitanica* (Figure 3.3.3.1.3.) presents a distribution in which the modal lengths of the different combinations of inner and outer panel nets are concentrated between 32 and 34 cm (Figure 3.3.3.1.3a, b). These are multimodal distributions that may be explained as similar behaviour to the distribution of size frequencies for the combined catches using the nets with equal outer panels (Figure 3.3.3.1.3c). In this figure, a modal length at 34 cm can be observed, with two prior peaks at 26 and 30 cm. For the 100/300 and 100/400 mm nets, a fourth peak is observed to the right, corresponding to lengths of 38 cm and 40 cm, respectively. The largest number of specimens were also accounted for by nets with an 80 mm inner panel, and the lowest number by nets with a 100 mm inner panel. However, in this case the values are very similar to each other. The range of lengths caught using the two groups of nets (300 and 400 mm) is also very similar: from 14 to 50 cm (Figure 3.3.3.1.3c).

The catches of *Torpedo torpedo* in spring were very scarce, hence their distribution of

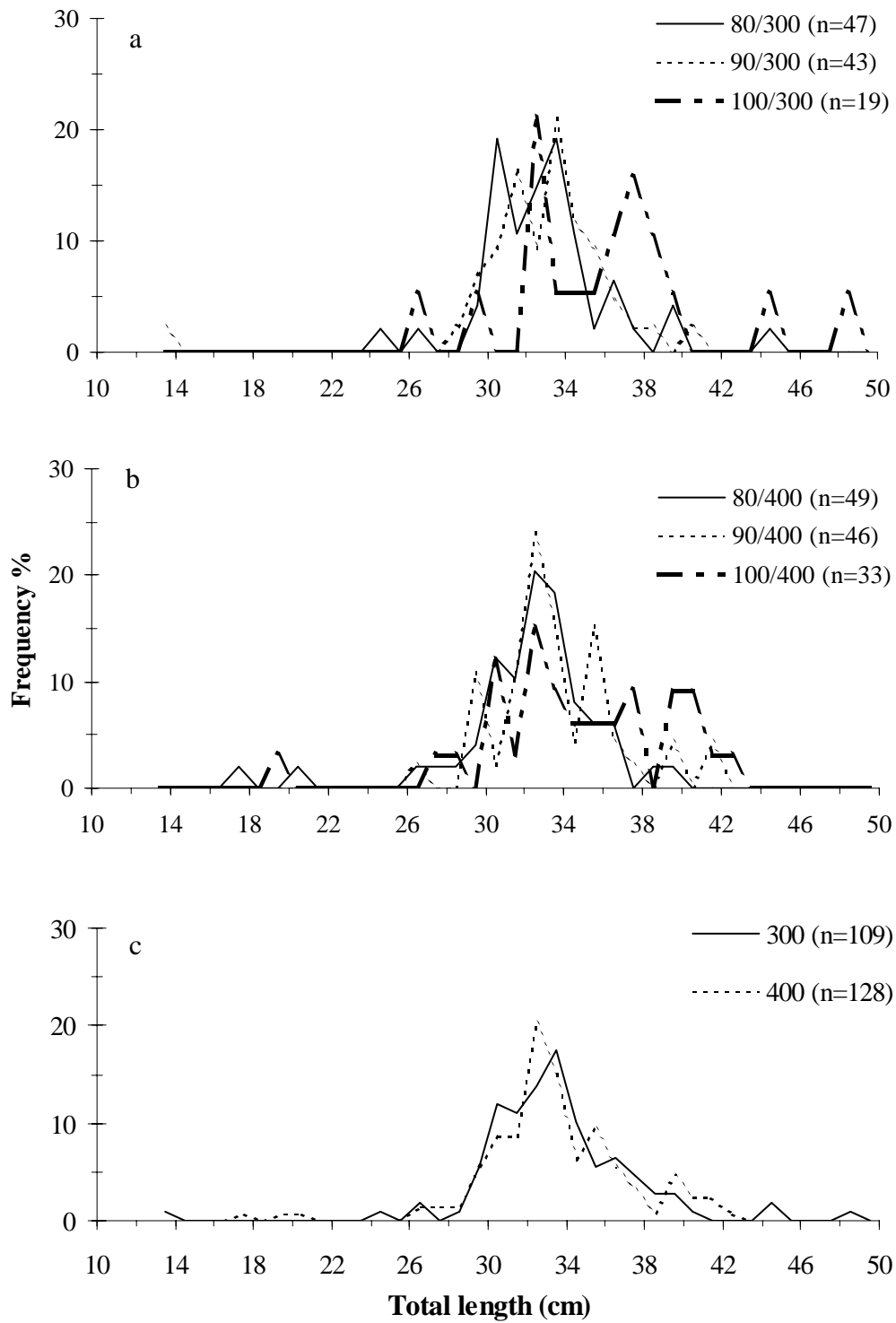
sizes is not representative (Figure 3.3.3.1.4a, b and c). The largest number of specimens caught corresponds, in contrast to the previous cases, to the nets with outer panel of 100 mm, with the combination of 100/400 mm being most notable. The range of lengths caught using the two groups of nets is from 12 to 48 cm (Figure 3.3.3.1.4c).



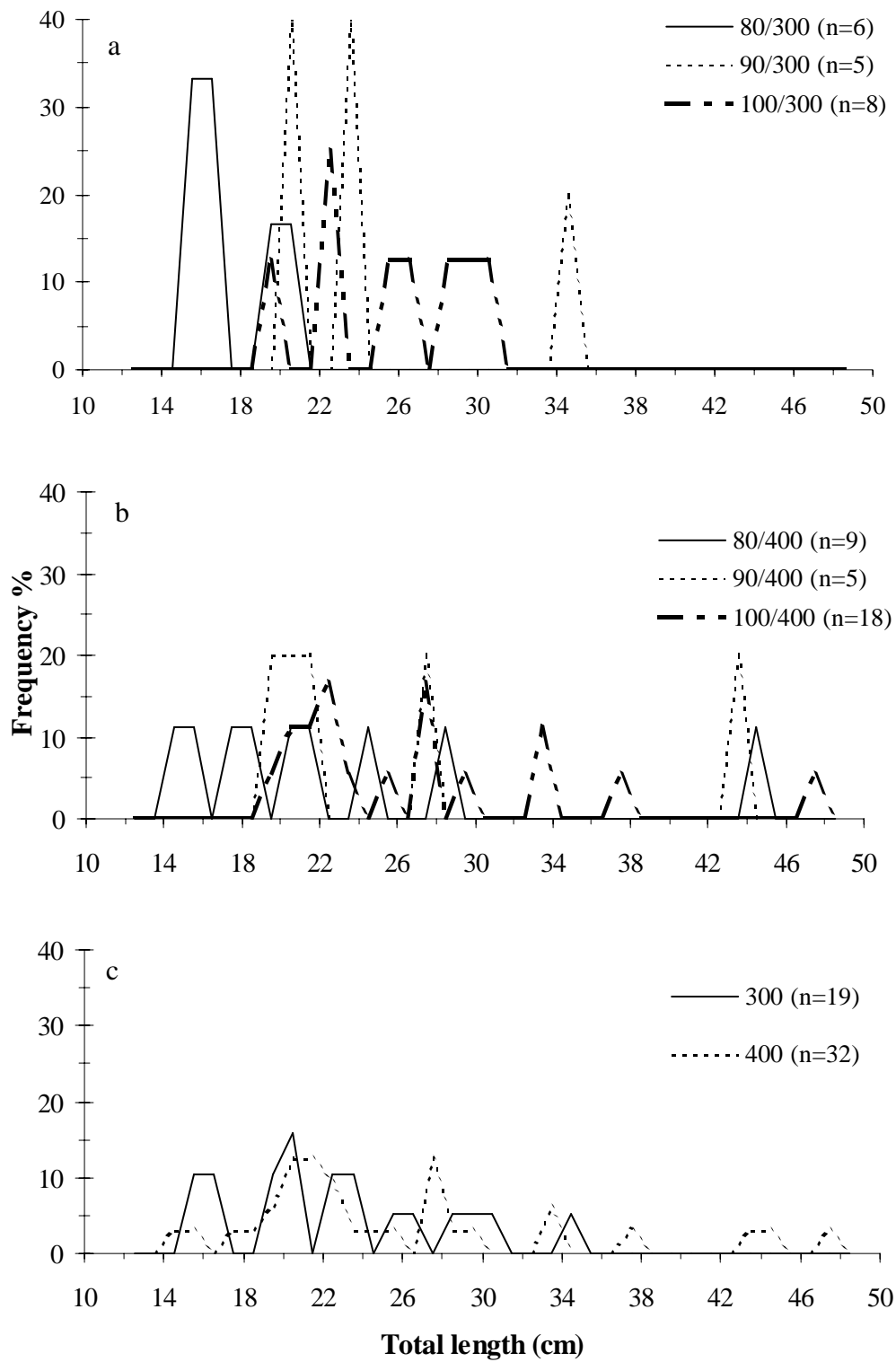
**Figure 3.3.3.1.1. Gulf of Cádiz. Length frequency distributions of *Sepia officinalis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Spring 2000.**



**Figure 3.3.3.1.2. Gulf of Cádiz. Length frequency distributions of *Solea senegalensis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Spring 2000.**



**Figure 3.3.3.1.3. Gulf of Cádiz. Length frequency distributions of *Synaptura lusitanica* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Spring 2000.**



**Figure 3.3.3.1.4. Gulf of Cádiz. Length frequency distributions of *Torpedo torpedo* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Spring 2000.**

The distributions of frequencies by size class for the 4 main species caught in autumn (i.e. *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*) are shown in Figures 3.3.3.1.5 to 3.3.3.1.8. In general, the distributions found for each sampling period are similar, as are the patterns of abundance by net types.

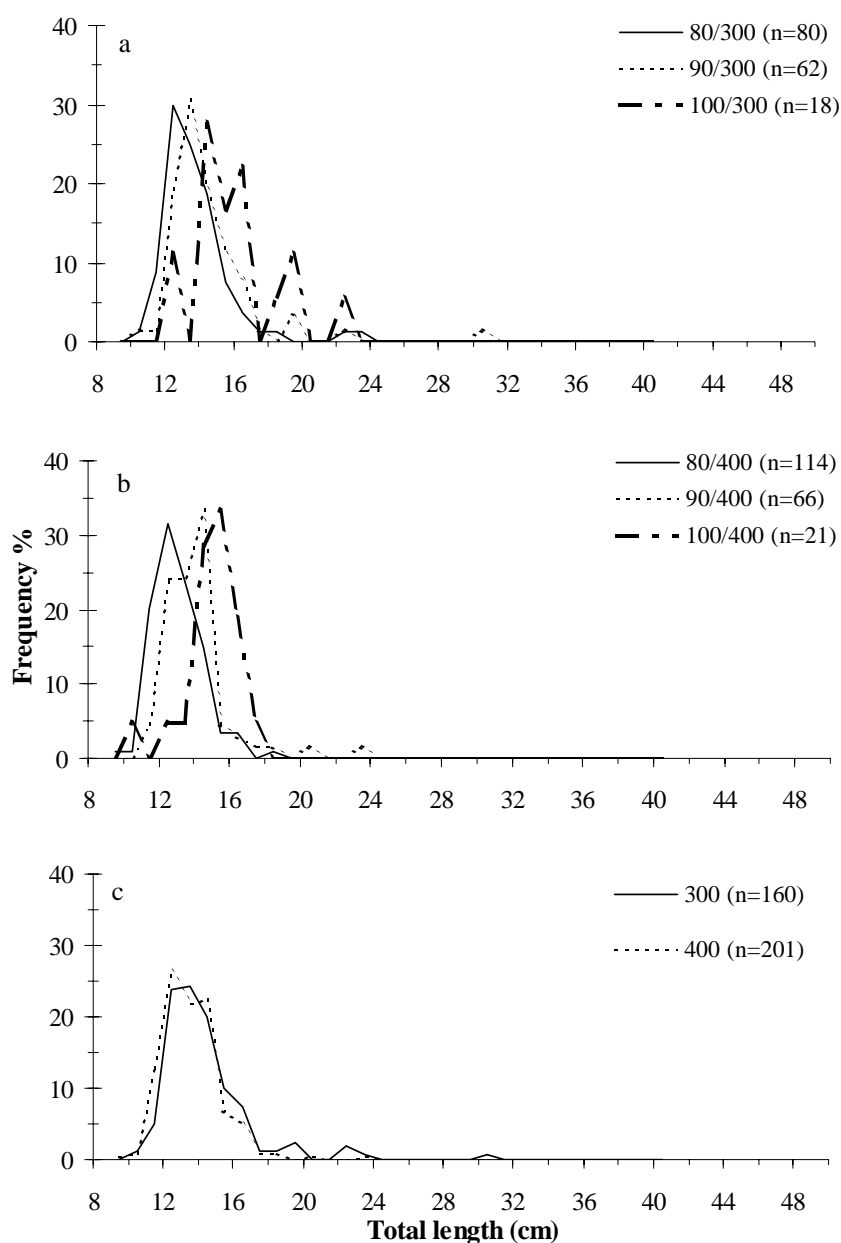
*Sepia officinalis* (Figure 3.3.3.1.5.a, b) present a slightly narrower range of sizes in the distribution compared with that of spring. The modal length shows higher values, at 12 cm for the nets with inner panel of 80 mm mesh, to 16 cm for the nets of 100 mm mesh. As in spring, the highest number of specimens caught corresponds to the net combinations with inner panel of 80 mm, and the lowest number to nets of 100 mm. The range of lengths from the combined catches using nets of equal size of outer panel mesh (300 and 400 mm) is very similar, ranging from 9 to 41 cm (Figure 3.3.3.1.5c).

For *Solea senegalensis* (Figure 3.3.3.1.6a, b), the modal lengths ranged from 26-28 cm for the nets with inner panel of 80 mm mesh, to 30-32 cm for the nets of 100 mm mesh. The modal lengths are better defined, and there was a greater difference between them. All the distributions present another peak value in addition to the modal length. The highest number of specimens caught again corresponds to the nets with an inner panel of 80 mm and the lowest number to the nets with a 100 mm inner panel. The range of lengths from the two groups of nets (300 and 400 mm) is also very similar and for both extends from 12 to 46 cm. The distribution from the 300 mm mesh size presents another peak at 24 cm, smaller than the modal length at 26 cm, whereas that from the 400 mm mesh size presents a second peak larger than the modal value, at 30 cm (Figure 3.3.3.1.6c)

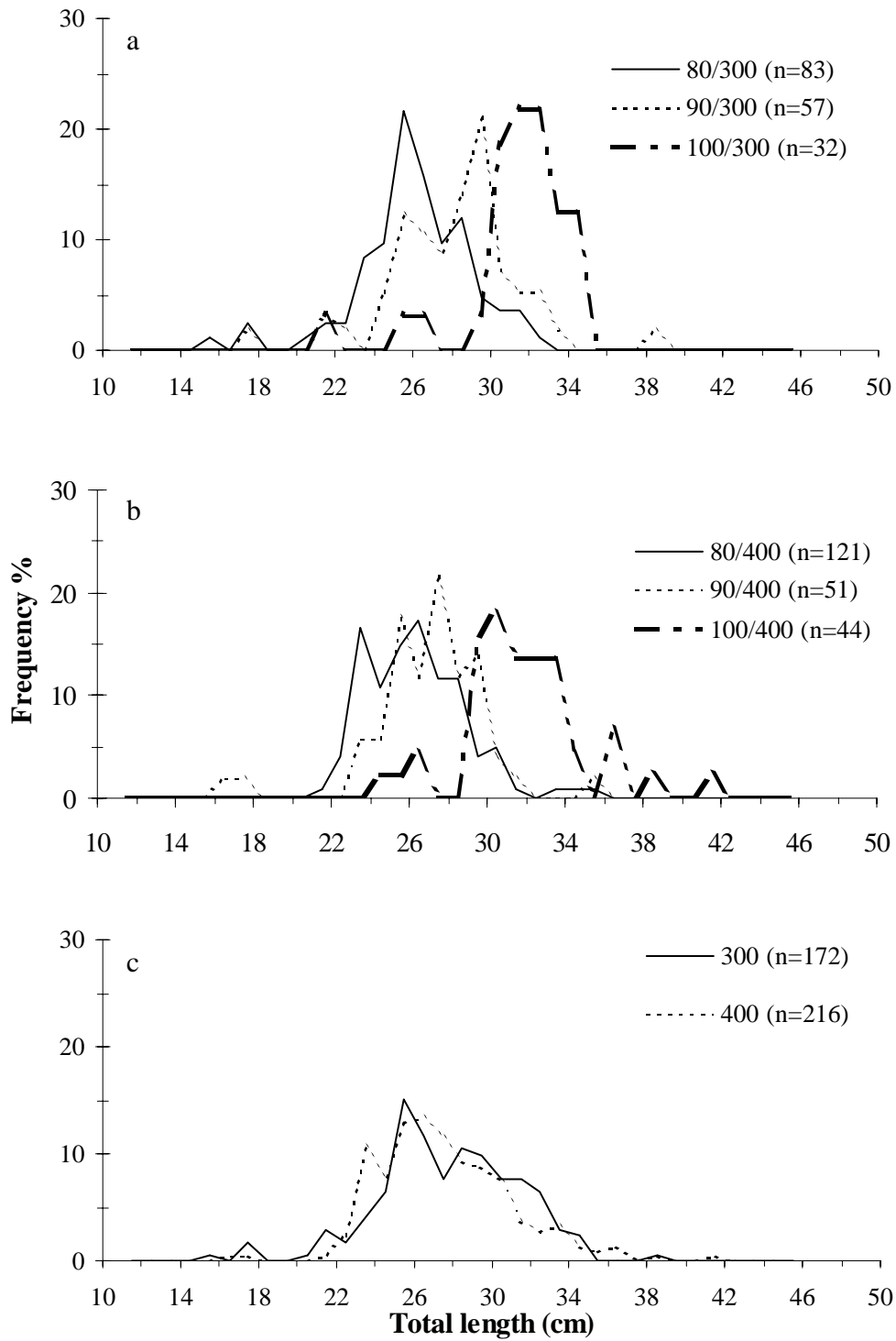
The distribution of *Synaptura lusitanica* in autumn (Figure 3.3.3.1.7a, b) is more irregular. Instead of presenting well-defined modal lengths, there are various peaks, in some distributions that are very similar in terms of frequencies. These modal lengths fall mainly between 24 and 34 cm. Neither is there a clear increase in modal length observed with the mesh size of the inner panel. In the distribution of size frequencies for the combined catches made using the nets of equal outer panel (Figure 3.3.3.1.7c), several significant peaks can be observed, displaced towards the right in the distribution from the nets of 400 mm. The modal length for nets of 300 mm is at 26 cm, and that for nets of 400 mm is at 28 cm. The largest number of specimens caught also corresponds to the nets with inner panel of 80 mm, and the lowest number to nets with 100 mm. The range of lengths for the two groups of nets (300 and 400 mm) is also very similar, from 14 to 50 cm (Figure 3.3.3.1.7c).

For *Torpedo torpedo* (Figure 3.3.3.1.8a, b), the modal length ranges from 16-18 cm for the nets with inner panel of 80 mm, to 22 cm for the 100/400 mm net, this being displaced

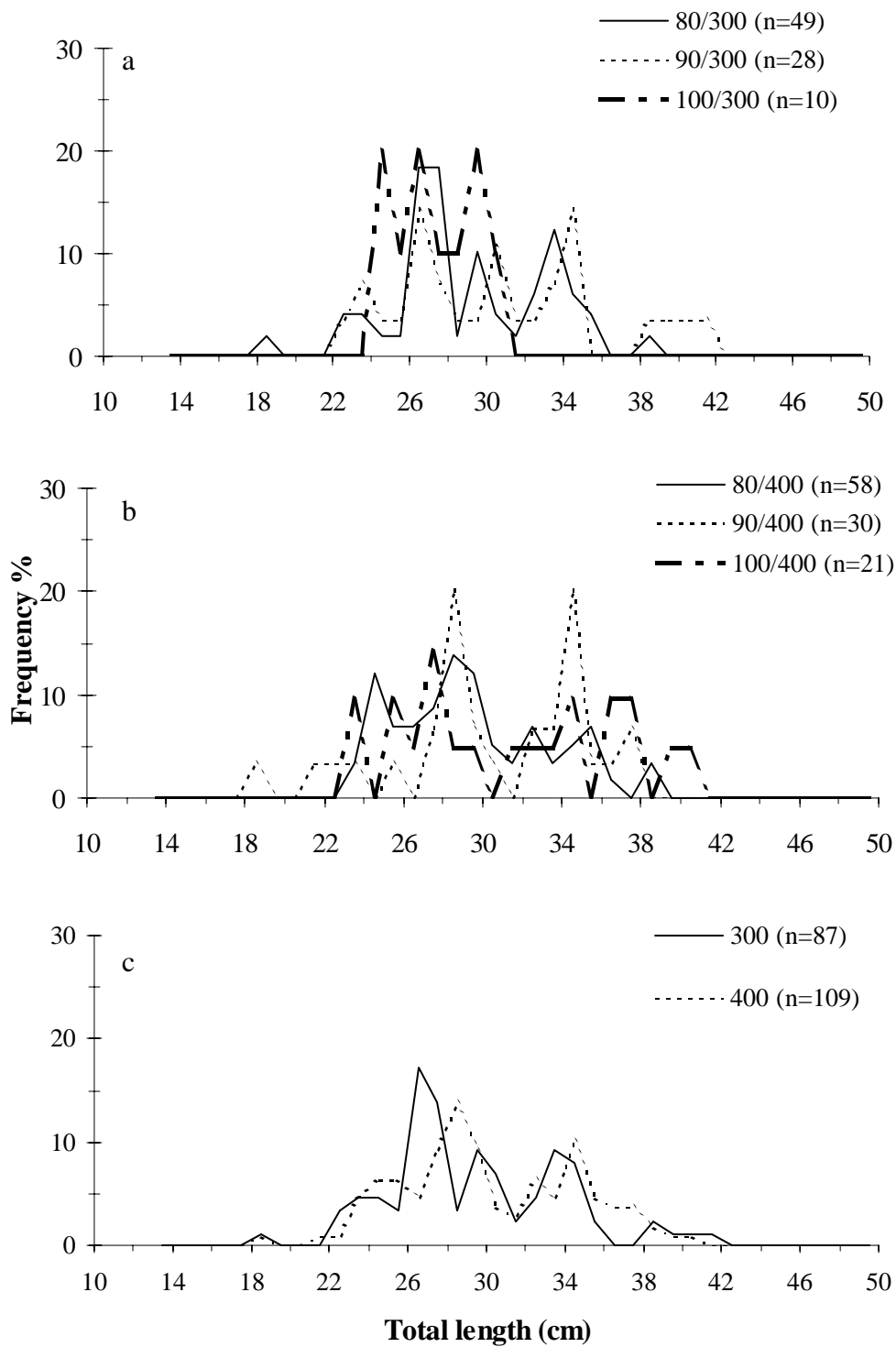
more to the right in comparison with the other two nets of equal outer panel mesh size than in the case of the nets with 300 mm outer panel. The largest number of specimens caught again corresponds to the nets with inner panels of 80 mm, with the exception of the 100/400 mm net, which in this case accounts for the highest number of specimens caught. The range of lengths from the two groups of nets extends from 12 to 48 cm (Figure 3.3.3.1.8c).



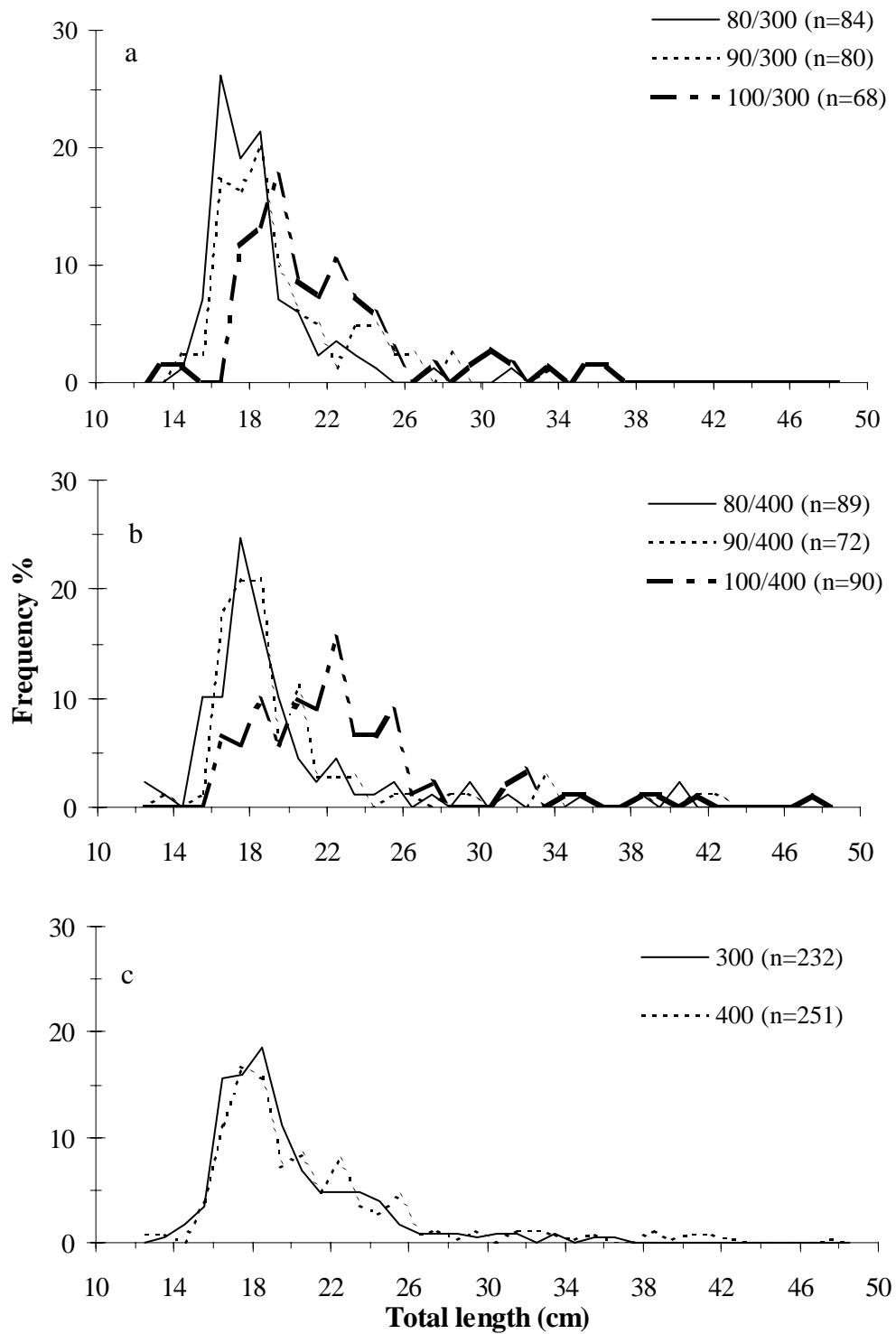
**Figure 3.3.3.1.5. Gulf of Cádiz. Length frequency distributions of *Sepia officinalis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Autumn 2000.**



**Figure 3.3.3.1.6. Gulf of Cádiz. Length frequency distributions of *Solea senegalensis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Autumn 2000.**



**Figure 3.3.3.1.7. Gulf of Cádiz. Length frequency distributions of *Synaptura lusitanica* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Autumn 2000.**



**Figure 3.3.3.1.8. Gulf of Cádiz. Length frequency distributions of *Torpedo torpedo* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations, Autumn 2000.**

For the total catches, the distributions of frequencies by size classes of the 4 main species caught (i.e. *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*) are shown in Figures 3.3.3.1.9 to 3.3.3.1.12. In general, the distributions are wide for all the combinations of mesh size of inner and outer net panels, with ranges from 30 to 40 cm, skewed towards the right, and with very similar size ranges. The modal length of each of the 4 species shows a gradual increase with the mesh size of the inner panel. However, the length is very similar on comparing the distributions of frequencies for outer panels.

In most cases, the numbers caught show a decrease with increasing mesh size of the inner panel, and numbers are always higher for the net combination with outer panel of 400 mm mesh than for the combination with outer panel of 300 mm mesh. The 80/400 net accounted for most of the catches in almost all the cases, and the 100/300 net for the smallest catches.

For *Sepia officinalis* (Figure 3.3.3.1.9.a, b), the modal length increased from 12-14 cm, for the nets with an inner panel of 80 mm, to 16-18 cm, for the nets of 100 mm mesh. The largest number of specimens caught corresponds to the combinations of nets with an inner panel of 80 mm, and the lowest numbers to nets with an inner panel of 100 mm. The range of lengths for the combined catches using nets of equal size of outer panel (300 and 400 mm) was very similar, from 9 to 41 cm (Figure 3.3.3.1.9c).

The modal lengths of *Solea senegalensis* (Figure 3.3.3.1.10a, b) varied between 26-28 cm for the nets with an inner panel of 80 mm mesh, and 32-34 cm for the nets of 100 mm. The largest number of specimens caught also corresponds to nets with an inner panel of 80 mm, and the lowest number to nets with 100 mm. The range of lengths from the two groups of nets (300 and 400 mm) was also very similar and in both extends from 12 to 46 cm (Figure 3.3.3.1.10c).

*Synaptura lusitanica* (Figure 3.3.3.1.11) was characterised by a very irregular distribution and at the same time similarity between the net combinations with the same outer panel and different inner panels (Figure 3.3.3.1.11a, b). Therefore, the behaviour of these nets must be explained by means of the frequency distributions of sizes obtained considering the total catches using the nets of equal outer panel (Figure 3.3.3.1.11c). From this it can be observed that there is a modal length at 34 cm, with two prior peaks at 26 and 30 cm. For the 100/300 and 100/400 mm nets, a fourth peak can be observed to the right, corresponding to 38 cm, that disappears when the nets with equal outer panel are combined. The highest number of specimens caught also corresponds to the nets with an inner panel of 80 mm, and the lowest number to the nets with 100 mm. The range of lengths from the two groups of nets (300 and

400 mm) is also very similar, from 14 to 50 cm (Figure 3.3.3.1.11c).

For *Torpedo torpedo* (Figure 3.3.3.1.12a,b), the distribution is the same as in autumn, since this is the season accounting for almost the entire catch of this species.

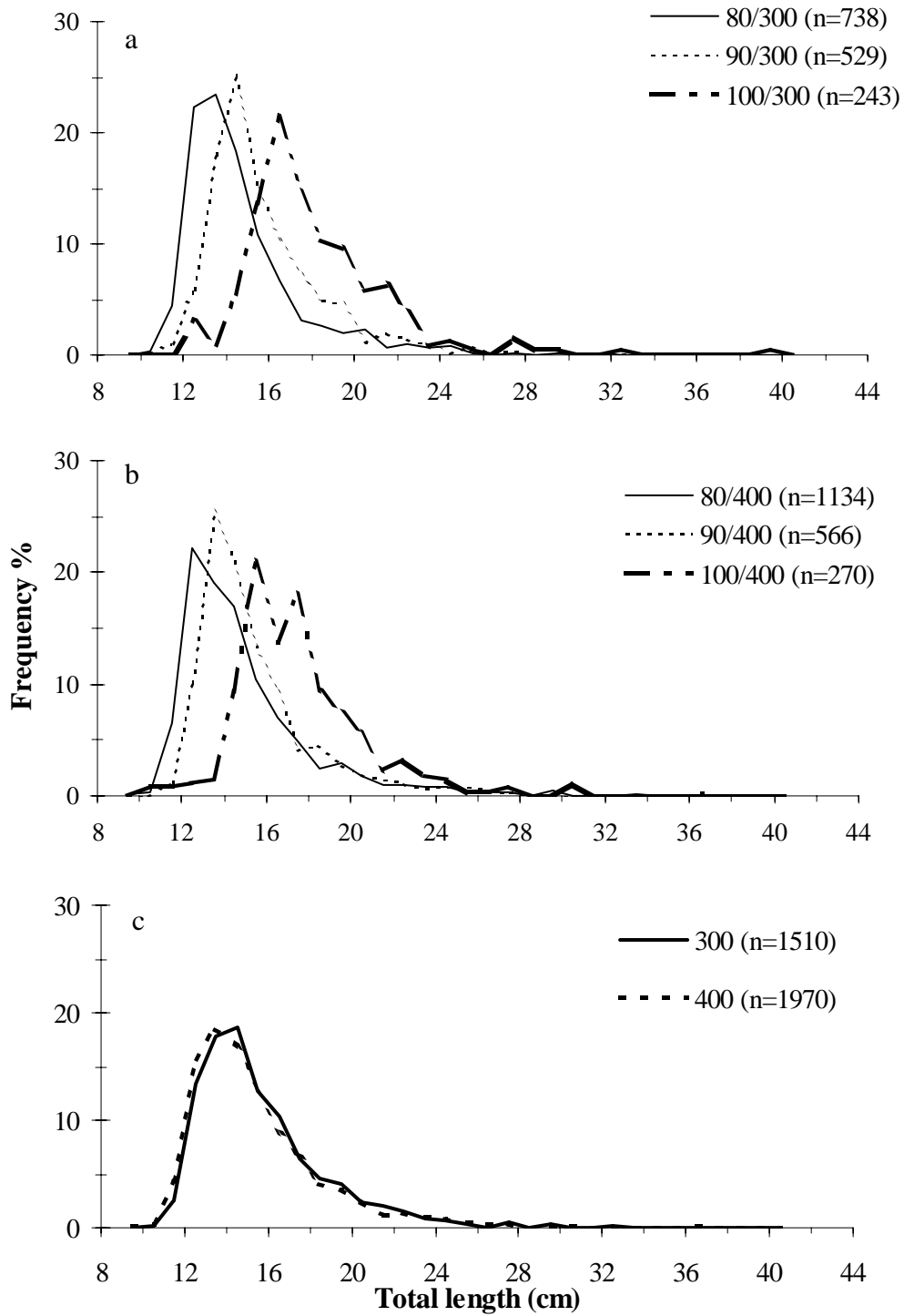
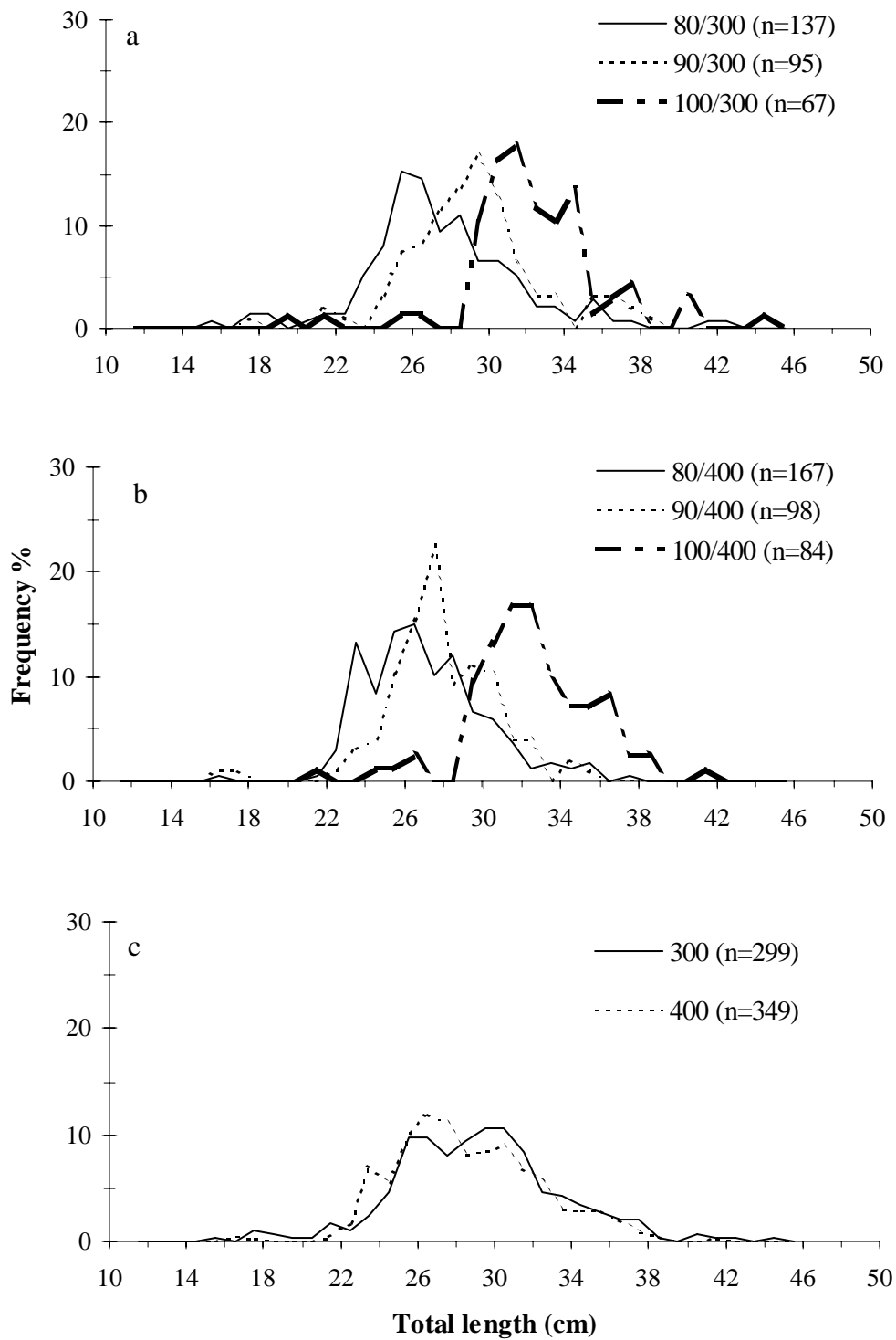
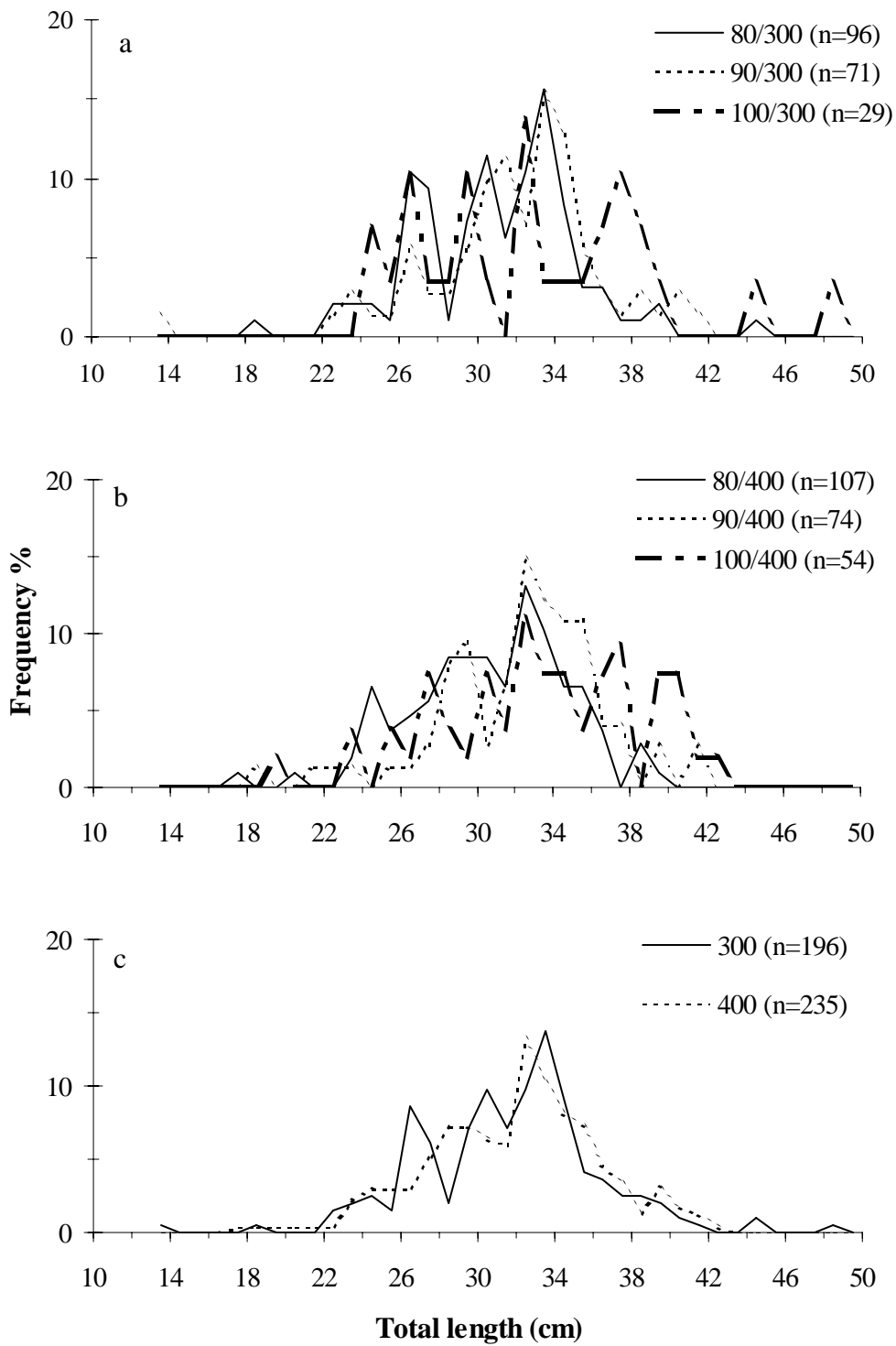


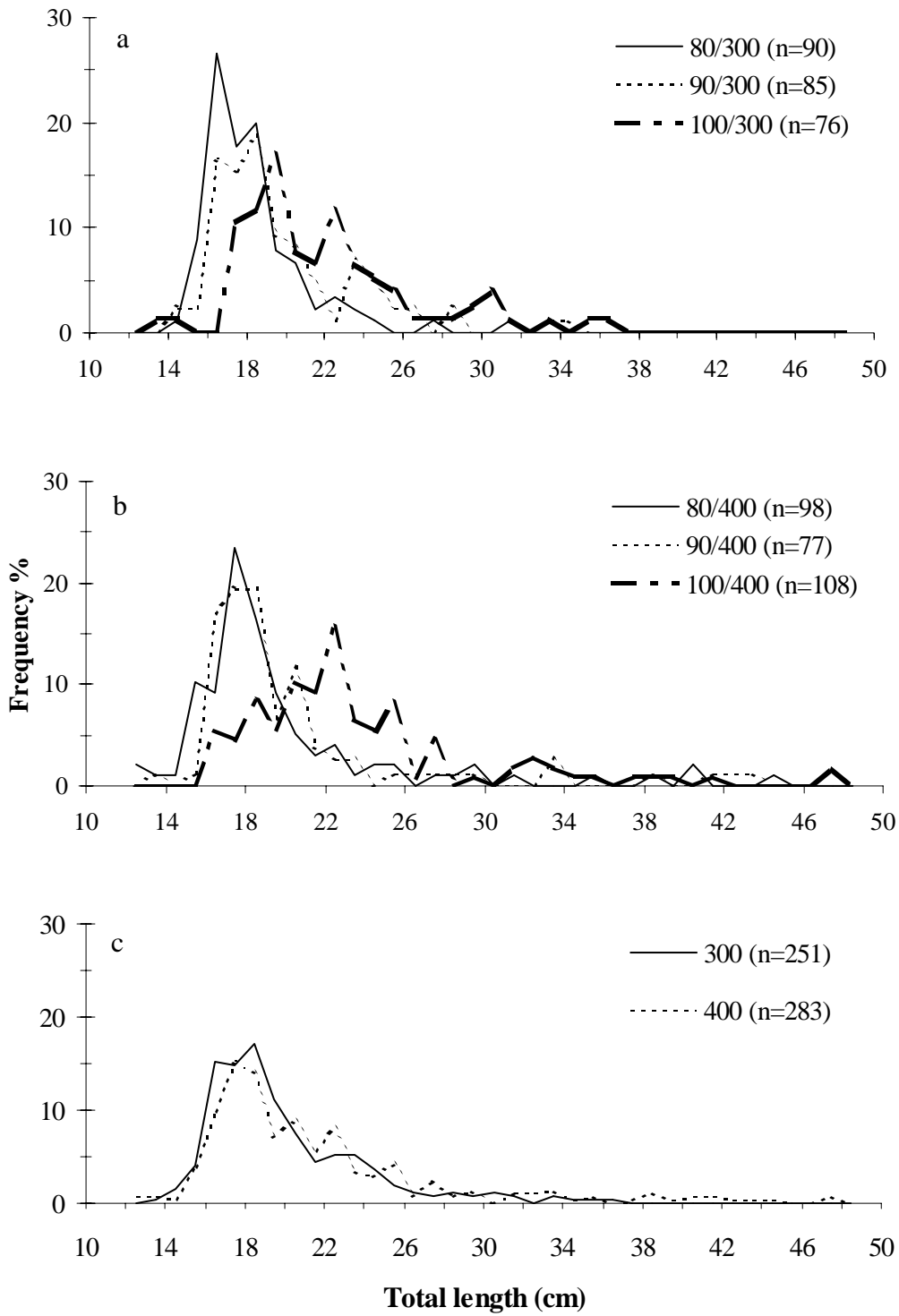
Figure 3.3.3.1.9. Gulf of Cádiz. Length frequency distributions of *Sepia officinalis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.



**Figure 3.3.3.1.10. Gulf of Cádiz. Length frequency distributions of *Solea senegalensis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**



**Figure 3.3.3.1.11. Gulf of Cádiz. Length frequency distributions of *Synaptura lusitanica* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**



**Figure 3.3.3.1.12. Gulf of Cádiz. Length frequency distributions of *Torpedo torpedo* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

The results of the application of the Kolmogorov-Smirnov test (K-S test) are shown in Tables 3.3.3.1.1 to 3.3.3.1.12. In the comparison between the size distributions found in spring and autumn, this test revealed the existence of significant differences for the 4 species studied (*Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*), with  $D_{\max} > 0.29$  in the 4 cases. Because of this, the subsequent Kolmogorov-Smirnov tests and the selectivity study were performed separately for each season's data.

However, when the comparison was made between the distributions of size between the outer panels of 300 and 400 mm mesh in each campaign, the K-S test results was for the acceptance of the null hypothesis in the majority of cases, both for the 80, 90 and 100 mm mesh panels separately (i.e. the 80/300 vs 80/400, 90/300 vs 90/400 and 100/300 vs 100/400 nets), and for the data of the three panels jointly (i.e. the 80+90+100/300 vs 80+90+100/400 nets). The only exceptions were the comparisons: 90/300 vs 90/400 nets and 80+90+100/300 vs 80+90+100/400 nets in spring for *Sepia officinalis*. If the data of the two campaigns are considered jointly, significant differences are also given by the K-S tests for the 90/300 vs 90/400 and 80+90+100/300 vs 80+90+100/400 nets, for *Sepia officinalis*; the test for the 90/300 vs 90/400 nets for *Solea senegalensis*; and the test for the 80+90+100/300 vs 80+90+100/400 nets for *Torpedo torpedo*. These results explain why the data for the catch using the nets with the same inner panel and different outer panel should be considered jointly in the selectivity study.

On checking the null hypothesis of equality of size distributions between the nets with inner panels of 80, 90 and 100 mm in each season, the K-S tests produced results of both equality and difference, without a clear predominance of one over the other. Nevertheless, the number of tests showing a difference slightly exceed those showing equality. In view of these results, which prevent the assumption of equality of catches in the different panels, the selectivity analysis was performed without grouping together the data of the panels of 80, 90 and 100 mm mesh size.

**Table 3.3.3.1.1. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Sepia officinalis*, for the different trammel meshsize combinations for all sampling periods. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<b><i>Sepia officinalis</i> Total</b>				<b>critical values of D<sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)</b>	
<b>Comb</b>	<b>m</b>	<b>n</b>	<b>D</b>		
80/300 vs 80/400	738	1134	0.04	0.064	Ho not rejected
90/300 vs 90/400	529	566	0.12	0.082	Reject Ho
100/300 vs 100/400	243	270	0.12	0.120	Ho not rejected
300 vs 400	1510	1970	0.05	0.047	Reject Ho
80/300 vs 90/300	738	529	0.26	0.077	Reject Ho
80/300 vs 100/300	738	243	0.60	0.101	Reject Ho
90/300 vs 100/300	529	243	0.42	0.105	Reject Ho
80/400 vs 90/400	1134	566	0.18	0.070	Reject Ho
80/400 vs 100/400	1134	270	0.52	0.092	Reject Ho
90/400 vs 100/400	566	270	0.44	0.101	Reject Ho
80 vs 90	1872	1095	0.19	0.052	Reject Ho
80 vs 100	1872	513	0.55	0.068	Reject Ho
90 vs 100	1095	513	0.43	0.073	Reject Ho

**Table 3.3.3.1.2. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Sepia officinalis*, for the different trammel meshsize combinations for Spring 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<b><i>Sepia officinalis</i> 1st</b>				<b>critical values of D<sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)</b>	
<b>Comb</b>	<b>m</b>	<b>n</b>	<b>D</b>		
80/300 vs 80/400	658	1020	0.05	0.068	Ho not rejected
90/300 vs 90/400	467	500	0.13	0.088	Reject Ho
100/300 vs 100/400	225	249	0.11	0.125	Ho not rejected
300 vs 400	1350	1769	0.05	0.049	Reject Ho
80/300 vs 90/300	658	467	0.28	0.082	Reject Ho
80/300 vs 100/300	658	225	0.61	0.105	Reject Ho
90/300 vs 100/300	467	225	0.43	0.110	Reject Ho
80/400 vs 90/400	1020	500	0.18	0.074	Reject Ho
80/400 vs 100/400	1020	249	0.51	0.096	Reject Ho
90/400 vs 100/400	500	249	0.43	0.105	Reject Ho
80 vs 90	1678	967	0.19	0.055	Reject Ho
80 vs 100	1678	474	0.55	0.071	Reject Ho
90 vs 100	967	474	0.42	0.076	Reject Ho

**Table 3.3.3.1.3. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Sepia officinalis*, for the different trammel meshsize combinations for Autumn 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<b>Comb</b>	<b>m</b>	<b>n</b>	<b>D</b>	<b>critical values of D<sub>m,n</sub></b>	
				<b>level of significance=0.05</b>	<b>(Table Liii, Siegel and Castellan, 1988)</b>
80/300 vs 80/400	80	114	0.14	0.198	Ho not rejected
90/300 vs 90/400	62	66	0.14	0.241	Ho not rejected
100/300 vs 100/400	18	21	0.22	0.437	Ho not rejected
300 vs 400	160	201	0.11	0.144	Ho not rejected
80/300 vs 90/300	80	62	0.17	0.230	Ho not rejected
80/300 vs 100/300	80	18	0.54	0.355	Reject Ho
90/300 vs 100/300	62	18	0.42	0.364	Reject Ho
80/400 vs 90/400	114	66	0.25	0.210	Reject Ho
80/400 vs 100/400	114	21	0.63	0.323	Reject Ho
90/400 vs 100/400	66	21	0.44	0.341	Reject Ho
80 vs 90	194	128	0.22	0.155	Reject Ho
80 vs 100	194	39	0.59	0.239	Reject Ho
90 vs 100	128	39	0.40	0.249	Reject Ho

**Table 3.3.3.1.4. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Solea senegalensis*, for the different trammel meshsize combinations for all sampling periods. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<b>Comb</b>	<b>m</b>	<b>n</b>	<b>D</b>	<b>critical values of D<sub>m,n</sub></b>	
				<b>level of significance=0.05</b>	<b>(Table Liii, Siegel and Castellan, 1988)</b>
80/300 vs 80/400	137	167	0.06	0.157	Ho not rejected
90/300 vs 90/400	95	98	0.23	0.196	Reject Ho
100/300 vs 100/400	67	84	0.08	0.223	Ho not rejected
300 vs 400	299	349	0.09	0.107	Ho not rejected
80/300 vs 90/300	137	95	0.27	0.182	Reject Ho
80/300 vs 100/300	137	67	0.65	0.203	Reject Ho
90/300 vs 100/300	95	67	0.49	0.217	Reject Ho
80/400 vs 90/400	167	98	0.20	0.173	Reject Ho
80/400 vs 100/400	167	84	0.71	0.182	Reject Ho
90/400 vs 100/400	98	84	0.63	0.202	Reject Ho
80 vs 90	304	193	0.23	0.125	Reject Ho
80 vs 100	304	151	0.68	0.135	Reject Ho
90 vs 100	193	151	0.56	0.148	Reject Ho

**Table 3.3.3.1.5. Gulf of Cádiz. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Solea senegalensis*, for the different trammel meshsize combinations for Spring 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Solea senegalensis</i> 1st				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	54	46	0.09	0.273	Ho not rejected
90/300 vs 90/400	38	47	0.28	0.297	Ho not rejected
100/300 vs 100/400	35	40	0.22	0.315	Ho not rejected
300 vs 400	127	133	0.10	0.169	Ho not rejected
80/300 vs 90/300	54	38	0.23	0.288	Ho not rejected
80/300 vs 100/300	54	35	0.43	0.295	Reject Ho
90/300 vs 100/300	38	35	0.32	0.319	Reject Ho
80/400 vs 90/400	46	47	0.15	0.282	Ho not rejected
80/400 vs 100/400	46	40	0.59	0.294	Reject Ho
90/400 vs 100/400	47	40	0.68	0.293	Reject Ho
80 vs 90	100	85	0.14	0.201	Ho not rejected
80 vs 100	100	75	0.47	0.208	Reject Ho
90 vs 100	85	75	0.51	0.215	Reject Ho

**Table 3.3.3.1.6. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Solea senegalensis*, for the different trammel meshsize combinations for Autumn 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Solea senegalensis</i> 2nd				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	83	121	0.06	0.194	Ho not rejected
90/300 vs 90/400	57	51	0.23	0.262	Ho not rejected
100/300 vs 100/400	32	44	0.13	0.316	Ho not rejected
300 vs 400	172	216	0.08	0.139	Ho not rejected
80/300 vs 90/300	83	57	0.31	0.234	Reject Ho
80/300 vs 100/300	83	32	0.79	0.283	Reject Ho
90/300 vs 100/300	57	32	0.66	0.300	Reject Ho
80/400 vs 90/400	121	51	0.19	0.227	Ho not rejected
80/400 vs 100/400	121	44	0.79	0.239	Reject Ho
90/400 vs 100/400	51	44	0.69	0.280	Reject Ho
80 vs 90	204	108	0.25	0.162	Reject Ho
80 vs 100	204	76	0.78	0.183	Reject Ho
90 vs 100	108	76	0.65	0.204	Reject Ho

**Table 3.3.3.1.7. Gulf of Cádiz. Results of the kolmogorov-Smirnov test used to compare frequency distributions for *Synaptura lusitanica*, for the different trammel meshsize combinations for all sampling periods. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Synaptura lusitanica</i> Total				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	96	107	0.06	0.191	Ho not rejected
90/300 vs 90/400	71	74	0.09	0.226	Ho not rejected
100/300 vs 100/400	29	54	0.14	0.313	Ho not rejected
300 vs 400	196	235	0.05	0.132	Ho not rejected
80/300 vs 90/300	96	71	0.13	0.213	Ho not rejected
80/300 vs 100/300	96	29	0.26	0.288	Ho not rejected
90/300 vs 100/300	71	29	0.22	0.300	Ho not rejected
80/400 vs 90/400	107	74	0.18	0.206	Ho not rejected
80/400 vs 100/400	107	54	0.28	0.227	Reject Ho
90/400 vs 100/400	74	54	0.22	0.243	Ho not rejected
80 vs 90	203	145	0.16	0.148	Reject Ho
80 vs 100	203	83	0.27	0.177	Reject Ho
90 vs 100	145	83	0.22	0.187	Reject Ho

**Table 3.3.3.1.8. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Synaptura lusitanica*, for the different trammel meshsize combinations for Spring 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Synaptura lusitanica</i> 1st				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	47	49	0.06	0.278	Ho not rejected
90/300 vs 90/400	43	46	0.11	0.288	Ho not rejected
100/300 vs 100/400	19	33	0.14	0.392	Ho not rejected
300 vs 400	109	128	0.04	0.177	Ho not rejected
80/300 vs 90/300	47	43	0.07	0.287	Ho not rejected
80/300 vs 100/300	47	19	0.41	0.370	Reject Ho
90/300 vs 100/300	43	19	0.41	0.375	Reject Ho
80/400 vs 90/400	49	46	0.14	0.279	Ho not rejected
80/400 vs 100/400	49	33	0.29	0.306	Ho not rejected
90/400 vs 100/400	46	33	0.24	0.310	Ho not rejected
80 vs 90	96	89	0.09	0.200	Ho not rejected
80 vs 100	96	52	0.33	0.234	Reject Ho
90 vs 100	89	52	0.31	0.237	Reject Ho

**Table 3.3.3.1.9. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Synaptura lusitanica*, for the different trammel meshsize combinations for Autumn 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Synaptura lusitanica</i> 2nd				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	49	58	0.13	0.264	Ho not rejected
90/300 vs 90/400	28	30	0.16	0.357	Ho not rejected
100/300 vs 100/400	10	21	0.52	0.523	Ho not rejected
300 vs 400	87	109	0.14	0.196	Ho not rejected
80/300 vs 90/300	49	28	0.17	0.322	Ho not rejected
80/300 vs 100/300	49	10	0.33	0.472	Ho not rejected
90/300 vs 100/300	28	10	0.44	0.501	Ho not rejected
80/400 vs 90/400	58	30	0.19	0.306	Ho not rejected
80/400 vs 100/400	58	21	0.23	0.346	Ho not rejected
90/400 vs 100/400	30	21	0.19	0.387	Ho not rejected
80 vs 90	107	58	0.16	0.222	Ho not rejected
80 vs 100	107	31	0.16	0.277	Ho not rejected
90 vs 100	58	31	0.14	0.303	Ho not rejected

**Table 3.3.3.1.10. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Torpedo torpedo*, for the different trammel meshsize combinations for all sampling periods. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Torpedo torpedo</i> Total				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	90	98	0.13	0.199	Ho not rejected
90/300 vs 90/400	85	77	0.07	0.214	Ho not rejected
100/300 vs 100/400	76	108	0.18	0.204	Ho not rejected
300 vs 400	251	283	0.12	0.118	Reject Ho
80/300 vs 90/300	90	85	0.19	0.206	Ho not rejected
80/300 vs 100/300	90	76	0.49	0.212	Reject Ho
90/300 vs 100/300	85	76	0.30	0.215	Reject Ho
80/400 vs 90/400	98	77	0.12	0.207	Ho not rejected
80/400 vs 100/400	98	108	0.48	0.190	Reject Ho
90/400 vs 100/400	77	108	0.42	0.203	Reject Ho
80 vs 90	188	162	0.13	0.146	Ho not rejected
80 vs 100	188	184	0.47	0.141	Reject Ho
90 vs 100	162	184	0.36	0.147	Reject Ho

**Table 3.3.3.1.11. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Torpedo torpedo*, for the different trammel meshsize combinations for Spring 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Torpedo torpedo</i> 1st				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	6	9	0.44	0.717	Ho not rejected
90/300 vs 90/400	5	5	0.20	0.860	Ho not rejected
100/300 vs 100/400	8	18	0.22	0.578	Ho not rejected
300 vs 400	19	32	0.16	0.394	Ho not rejected
80/300 vs 90/300	6	5	0.83	0.824	Reject Ho
80/300 vs 100/300	6	8	0.88	0.734	Reject Ho
90/300 vs 100/300	5	8	0.42	0.775	Ho not rejected
80/400 vs 90/400	9	5	0.44	0.759	Ho not rejected
80/400 vs 100/400	9	18	0.44	0.555	Ho not rejected
90/400 vs 100/400	5	18	0.32	0.688	Ho not rejected
80 vs 90	15	10	0.53	0.555	Ho not rejected
80 vs 100	15	26	0.58	0.441	Reject Ho
90 vs 100	10	26	0.27	0.506	Ho not rejected

**Table 3.3.3.1.12. Gulf of Cádiz. Results of the Kolmogorov-Smirnov test used to compare frequency distributions for *Torpedo torpedo*, for the different trammel meshsize combinations for Autumn 2000. D is the greatest difference in the cumulative distributions being compared. If D is greater than the critical value, the distributions are significantly different.**

<i>Torpedo torpedo</i> 2nd				critical values of D <sub>m,n</sub> level of significance=0.05 (Table Liii, Siegel and Castellan, 1988)	
Comb	m	n	D		
80/300 vs 80/400	84	89	0.11	0.207	Ho not rejected
90/300 vs 90/400	80	72	0.07	0.221	Ho not rejected
100/300 vs 100/400	68	90	0.18	0.219	Ho not rejected
300 vs 400	232	251	0.11	0.124	Ho not rejected
80/300 vs 90/300	84	80	0.16	0.212	Ho not rejected
80/300 vs 100/300	84	68	0.47	0.222	Reject Ho
90/300 vs 100/300	80	68	0.31	0.224	Reject Ho
80/400 vs 90/400	89	72	0.11	0.216	Ho not rejected
80/400 vs 100/400	89	90	0.48	0.203	Reject Ho
90/400 vs 100/400	72	90	0.41	0.215	Reject Ho
80 vs 90	173	152	0.11	0.151	Ho not rejected
80 vs 100	173	158	0.45	0.150	Reject Ho
90 vs 100	152	158	0.36	0.155	Reject Ho

### 3.3.3.2. Size selectivity

Based on the results obtained from the Kolmogorov-Smirnov tests (Tables 3.3.3.1.1 to 3.3.3.1.12), the analyses of the selectivity of the various trammel nets was carried out by season, for each of the following species: *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*. In these tables it was also demonstrated that, for *Sepia officinalis*, there were significant differences between the outer panels of 300 and 400 mm mesh, which explains why the selectivity analysis should be carried out separately for these panels.

For determining the best fit model for the distribution of frequencies of catch by sizes of *Sepia officinalis*, the GillNet (ConStat, 1998) software was applied using the unimodal distribution models (normal scale, normal location, lognormal and gamma) and the bi-modal model, but a good fit was not obtained. Based on these results, the possibility of obtaining a fit to a logistic function was studied. The fitting of three models was tested, maximizing the likelihood of the non-linear function by means of the method of Wulff (1986) using the SAS PROC NLP software. These models were:

1) Proportional model: The parameters  $b$  and  $L_{50}$  of the logistic selectivity curve are both considered to be proportional to mesh size:  $b = b_1 * M_i$  and  $L_{50} = b_2 * M_i$ , where  $M_i$  is the inner panel mesh size.

2) Linear model: Both parameters,  $b$  and  $L_{50}$ , are assumed to be linear functions of inner panel mesh size:  $b = (b_1 * M_i) + b_2$ , and  $L_{50} = (b_3 * M_i) + b_4$

3)  $b$  constant and  $L_{50}$  linear model:  $b$  is assumed to be constant for each of the inner panel mesh sizes, while  $L_{50}$  is considered to be a linear function of inner panel mesh size:  $L_{50} = (b_3 * M_i) + b_4$ .

The values of the parameters estimated for the 3 models are given in Table 3.3.3.2.1. Although the values of the maximum likelihood function are very similar for both the second and third models and all three gave good fits, the third model was chosen over the second for being the most simple (3 instead of 4 parameters).

**Table 3.3.3.2.1. Gulf of Cádiz. Parameter estimates for *Sepia officinalis* selectivity.**

Season	Model	b	s.e.	b1	s.e.	b2	s.e.	b3	s.e.	b4	s.e.	Max. Lik
<b>Spring</b>												
outer panel 300 mm	L50 Linear, B Constant	1.672	0.209					2.164	0.267	-5.896	2.581	-1192.046
	L50, B Linear			-0.061	0.520	2.247	4.830	2.193	0.256	-6.176	2.425	-1192.021
	L50, B Proportional			-2.728	0.182			3.996	0.004			-1480.812
outer panel 400 mm	L50 Linear, B Constant	1.394	0.319					2.239	0.355	-6.575	3.539	-1550.569
	L50, B Linear			-0.044	0.548	1.815	5.461	2.273	0.628	-6.908	6.316	-1550.552
	L50, B Proportional			-0.879	0.060			4.360	0.013			-1942.634
<b>Autumn</b>												
outer panel 300 mm	L50 Linear, B Constant	1.172	0.354					2.661	0.093	-11.285	0.747	-143.395
	L50, B Linear			0.488	0.174	-3.764	1.410	2.024	0.695	-4.211	7.253	-142.970
	L50, B Proportional			-0.637	0.068			3.595	0.004			-175.373
outer panel 400 mm	L50 Linear, B Constant	1.535	0.262					1.875	0.571	-3.879	5.531	-165.488
	L50, B Linear			-0.138	0.568	2.849	5.243	1.951	0.554	-4.626	5.300	-165.452
	L50, B Proportional			-1.418	0.104			2.765	0.002			-220.416

The estimated selectivity curves for *Sepia officinalis* for each net combination and season are given in Figure 3.3.3.2.1 and the values of  $b$  and  $L_{50}$  are given in Table 3.3.3.2.2. These demonstrate that the smaller the mesh size of the inner panel, the greater are the catches of smaller sized specimens, and that there is a more notable displacement towards the smaller sizes of specimens in autumn than in spring, for all the net combinations. These results demonstrate that the trammel nets that are most commonly used by these fishermen (80/400 mm mesh) for catching *Sepia officinalis* retain the specimens of 5 cm length and longer, and that the catches of specimens of 12 cm and more TL are maximized with the 80/300 mm combination, while catches of specimens of 20 cm TL are maximized with the 100/300 mm combination, where the function becomes asymptotic with  $L_{50}$  being situated at 11.4 cm and 10.0 cm, respectively, in spring and autumn. The mesh size of the inner panel for the net type that catches the largest sizes of specimen, in both seasons is 100 mm.

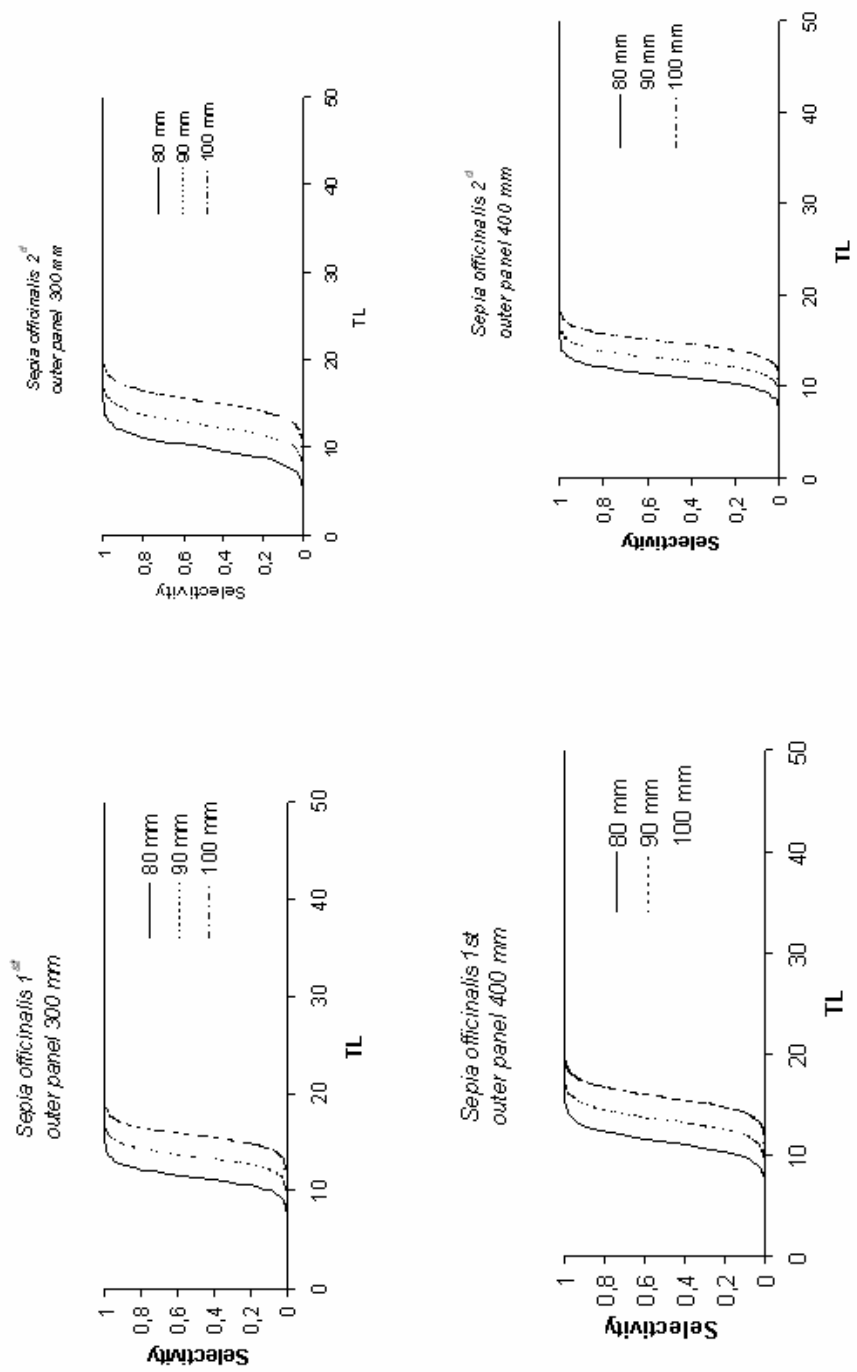
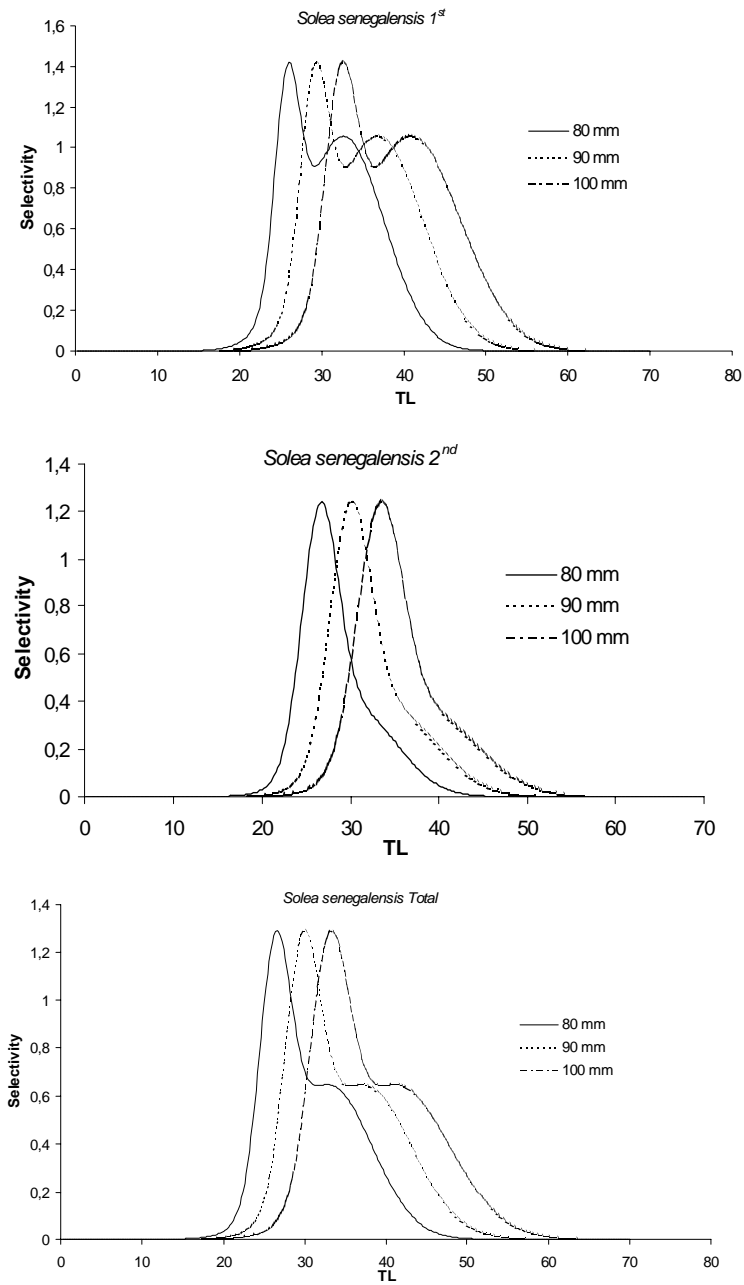


Figure 3.3.3.2.1. Gulf of Cádiz. Selectivity curves of *Sepia officinalis*.

**Table 3.3.3.2.2. Gulf of Cádiz. Parameter estimates for the *Sepia officinalis* logistic selectivity curve.**

Season	Model	Trammel net inner panel mesh size (mm)					
		80	90	100	80	90	100
		b			L50		
<b>Spring</b>							
outer panel 300 mm	L50 Linear, B Constant	1.672	1.672	1.672	11.413	13.577	15.741
	L50, B Linear	1.762	1.702	1.641	11.366	13.558	15.751
	L50, B Proportional	-21.824	-24.552	-27.280	31.970	35.966	39.962
outer panel 400 mm	L50 Linear, B Constant	1.394	1.394	1.394	11.340	13.580	15.819
	L50, B Linear	1.466	1.422	1.379	11.276	13.549	15.822
	L50, B Proportional	-7.031	-7.910	-8.789	34.882	39.242	43.602
<b>Autumn</b>							
outer panel 300 mm	L50 Linear, B Constant	1.172	1.172	1.172	10.000	12.661	15.321
	L50, B Linear	0.143	0.631	1.120	11.983	14.008	16.032
	L50, B Proportional	-5.096	-5.733	-6.370	28.762	32.357	35.952
outer panel 400 mm	L50 Linear, B Constant	1.535	1.535	1.535	11.122	12.998	14.873
	L50, B Linear	1.746	1.608	1.471	10.979	12.930	14.880
	L50, B Proportional	-11.340	-12.758	-14.175	22.120	24.885	27.650

The data for the other three species for which selectivity studies were carried out, *Solea senegalensis*, *Synaptura lusitanica* and *Torpedo torpedo*, were fitted to the bi-modal model (Figures 3.3.3.2.2 to 3.3.3.2.4 and Table 3.3.3.2.3). Regarding the modal lengths and the probabilities of capture of each species for the different inner panel mesh sizes (Table 3.3.3.2.4), these studies indicate that by increasing the mesh size of the inner panel, the size of specimen caught is increased, by values that vary between 6.44 cm and 6.58 cm for *Solea senegalensis*, between 5.01 cm and 8.24 cm for *Synaptura lusitanica*, and between 4.32 cm and 4.35 cm *Torpedo torpedo*. On comparing the results of the different inner panel mesh sizes seasonally, the modal lengths of *Solea senegalensis* are 0.8 – 1 cm greater in autumn than in spring, whereas those of *Synaptura lusitanica* are greater in the spring, by 12.28 cm for 80 mm inner panel mesh size, and by 15.36 cm for 100 inner panel mesh size.



**Figure 3.3.3.2.2. Gulf of Cádiz. Selectivity curves of *Solea senegalensis*.**

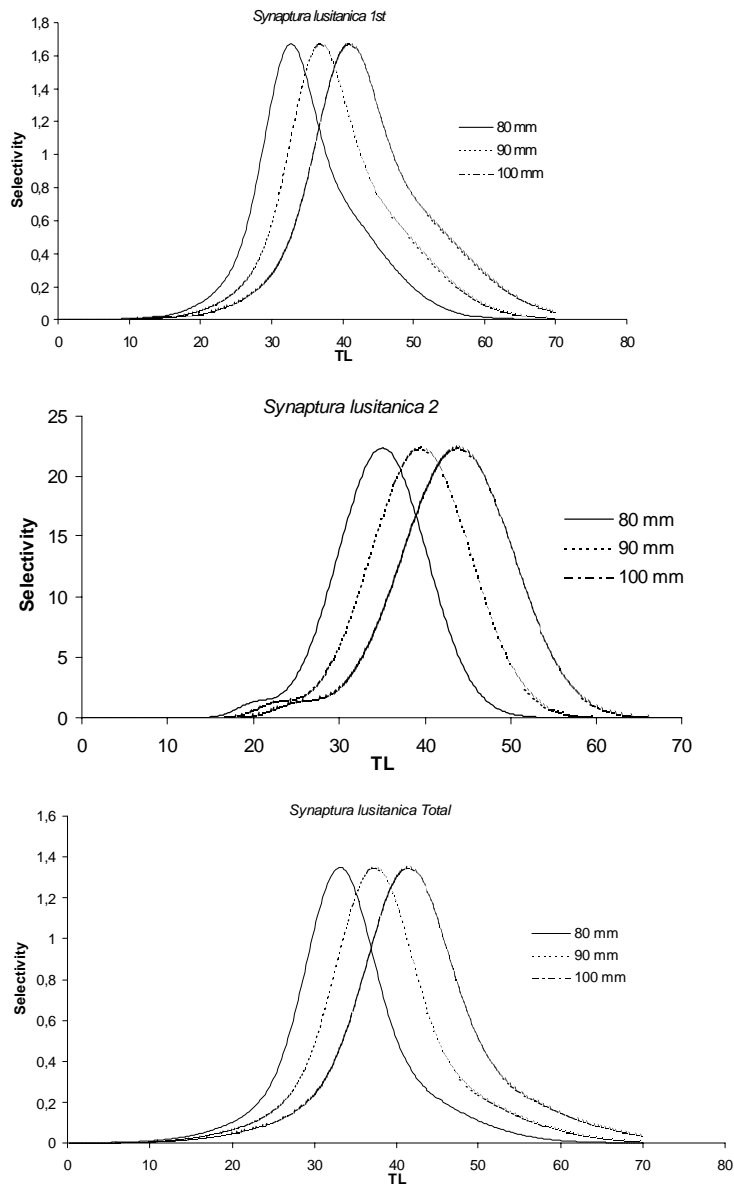
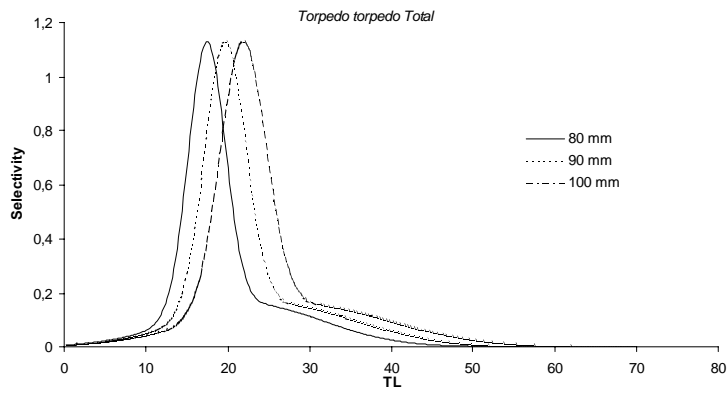
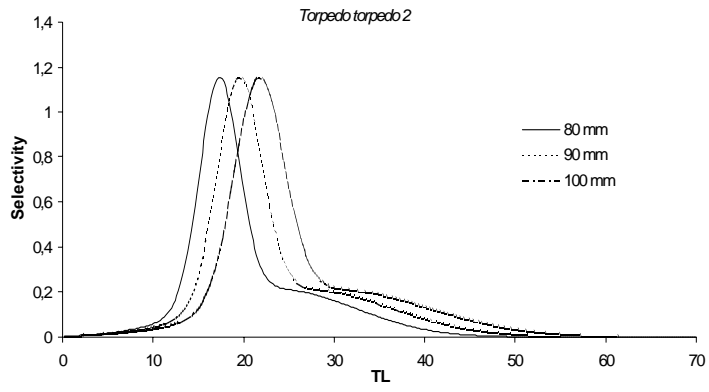


Figure 3.3.3.2.3. Gulf of Cádiz. Selectivity curves of *Synaptura lusitanica*.



**Figures 3.3.3.2.4. Gulf of Cádiz. Selectivity curves of *Torpedo torpedo*.**

**Table 3.3.3.2.3. Gulf of Cadiz. Parameter estimates for trammel net selectivity.**

Species	Season	Model	Fishing power $\alpha$ mesh-size		Model deviance	df
			Parameters			
<i>Solea senegalensis</i>	Spring	Bi-Modal	(a1,b1,a2,b2,w)=(3.2168, 0.1879, 4.0713, 0.6195, 1.0532)		47.37	45
	Autumn	Bi-Modal	(a1,b1,a2,b2,w)=(3.3167, 0.2523, 3.8363, 0.5796, 0.3540)		42.67	39
	Total	Bi-Modal	(a1,b1,a2,b2,w)=(3.2902, 0.2383, 4.1275, 0.6534, 0.6448)		62.41	51
<i>Synaptura lusitanica</i>	Spring	Bi-Modal	(a1,b1,a2,b2,w)=(4.0406, 0.4051, 4.5578, 1.0366, 0.7519)		36.35	43
	Autumn	Bi-Modal	(a1,b1,a2,b2,w)=(2.5053,0.2595, 4.3754, 0.6438, 22.3623)		23.28	39
	Total	Bi-Modal	(a1,b1,a2,b2,w)=(4.1232, 0.4799, 4.4172, 1.1861, 0.3609)		40.25	53
<i>Torpedo torpedo</i>	Autumn	Bi-Modal	(a1,b1,a2,b2,w)=(2.1597, 0.2701, 2.9749, 1.0566, 0.2105)		47.68	57
	Total	Bi-Modal	(a1,b1,a2,b2,w)=(2.1770, 0.2796, 2.8428, 1.1221, 0.1554)		55.01	63

**Table 3.3.3.2.4. Gulf of Cádiz. Modal length and spread for trammel net selectivity curves.**

Species	Season	Trammel net inner panel mesh size (mm)					
		80		90		100	
		Modal length	Spread	Modal length	Spread	Modal length	Spread
<i>Solea senegalensis</i>	Spring	25.73	1.50	28.95	1.69	32.17	1.88
	Autumn	26.53	2.02	29.85	2.27	33.17	2.52
	Total	26.32	1.91	29.61	2.14	32.90	2.38
<i>Synaptura lusitanica</i>	Spring	32.32	3.24	36.37	3.65	40.41	4.05
	Autumn	20.04	2.08	22.55	2.34	25.05	2.59
	Total	32.99	3.84	37.11	4.32	41.23	4.80
<i>Torpedo torpedo</i>	Autumn	17.28	2.16	19.44	2.43	21.60	2.70
	Total	17.42	2.24	19.59	2.52	21.77	2.80

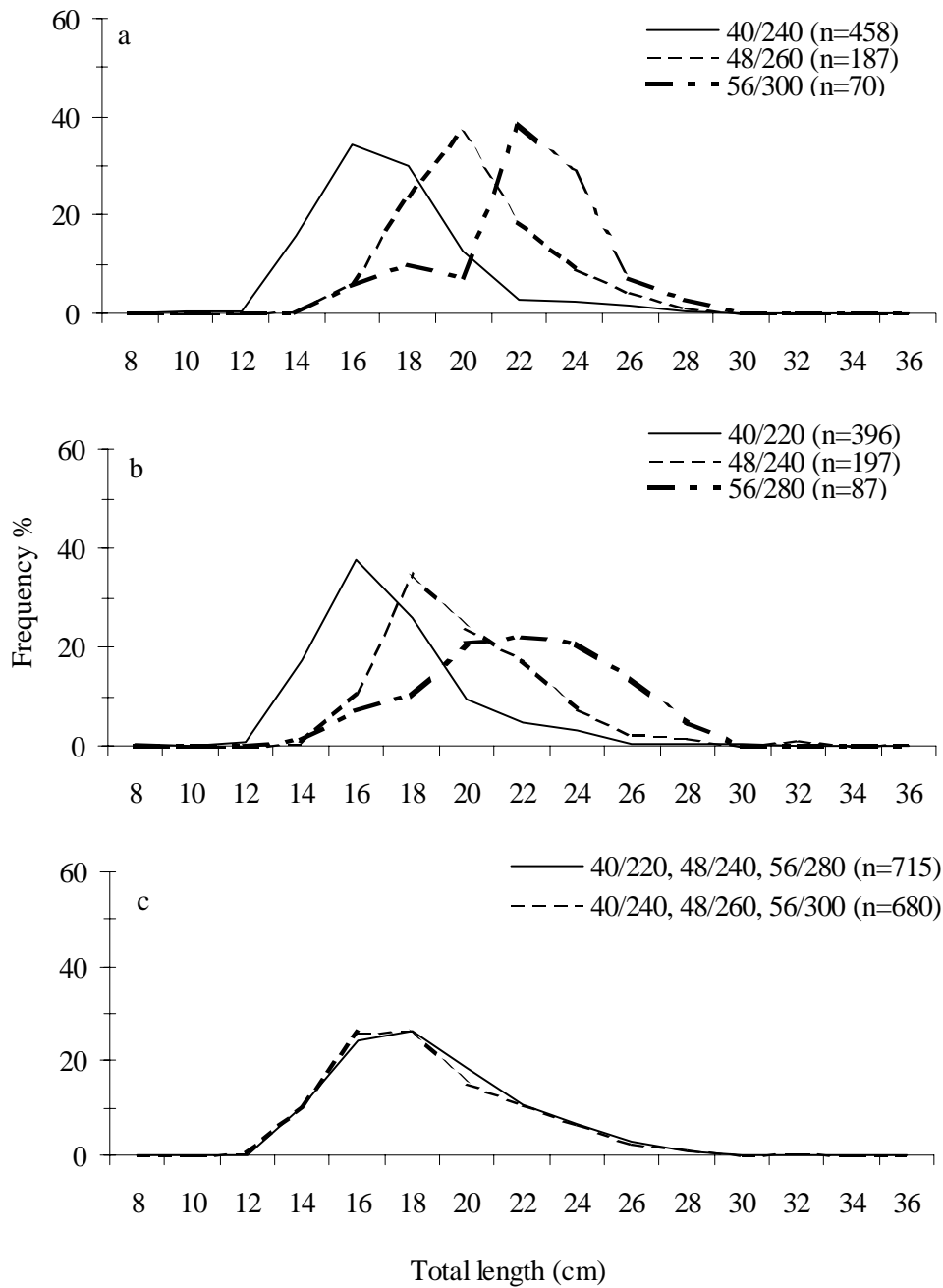
### 3.3.4. Cyclades

#### 3.3.4.1. Catch size frequency distributions

The length frequency distributions of the most abundant species caught (i.e., *Mullus surmuletus*, *Pagellus erythrinus*, *Diplodus annularis*, *Scorpaena porcus*, *Serranus cabrilla*, *Spicara maena*, *Boops boops*, *Pagellus acarne*, *Trachurus mediterraneus*, *Symphodus tinca* and *Diplodus vulgaris*) are shown in Figures 3.3.4.1 to 3.3.4.11. In general, all mesh sizes caught very wide, highly overlapping length ranges highly skewed to the right, although the modal lengths of the species caught gradually increased with increasing mesh size.

For *Mullus surmuletus* (Figure 3.3.4.1a, b) the modal length increased from 16-18 cm, for the 40 mm nets, to 22-26 cm, for the 28 mm nets whereas the number of individuals caught was higher for the 40 mm nets and lower for the 28 mm ones. The combined length frequencies for the two sets of trammel nets ranged from 8 to 38 cm (Figure 3.3.4.1c).

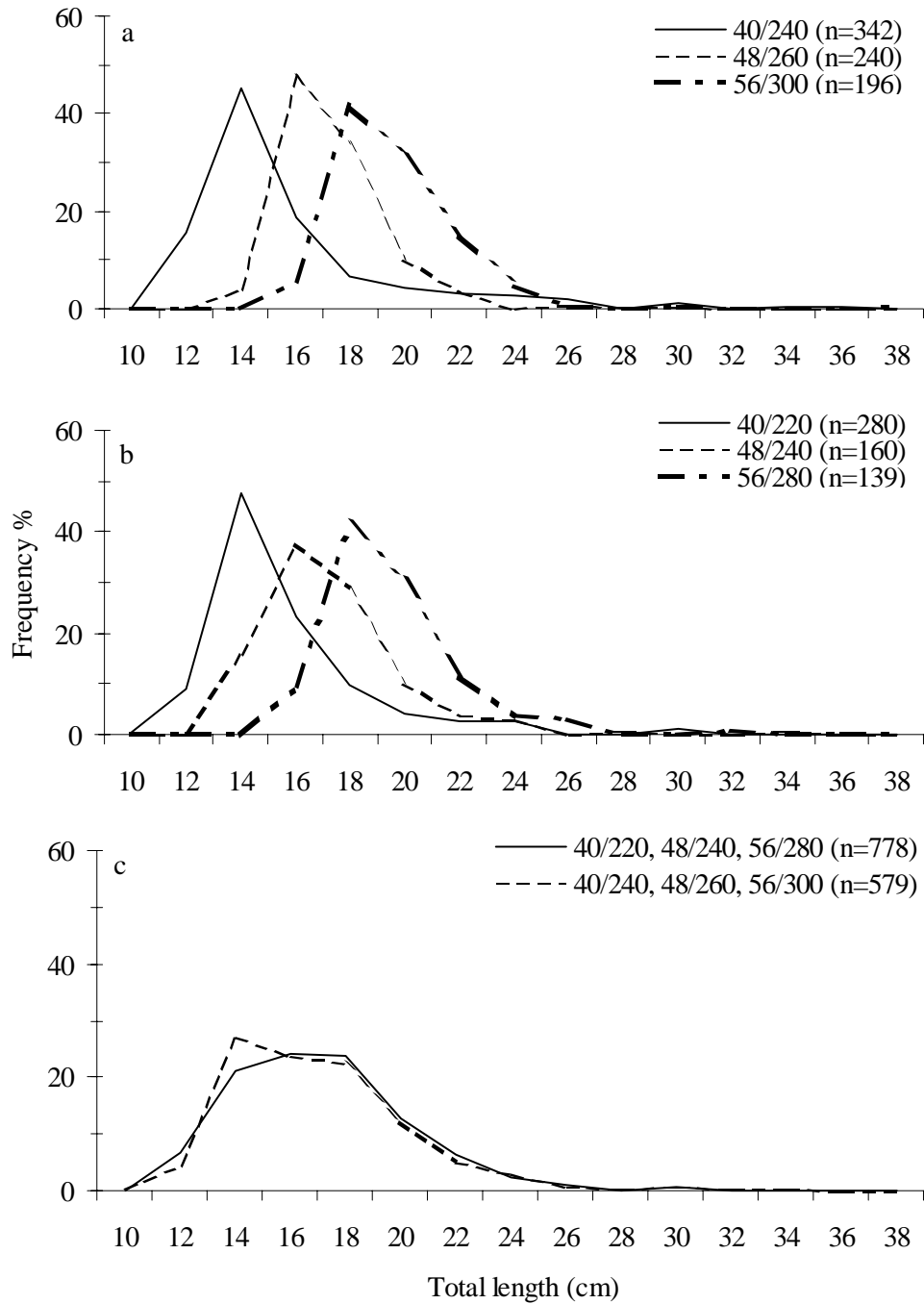
*Mullus surmuletus*



**Figure 3.3.4.1. Cyclades. Length frequency distributions of *Mullus surmuletus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

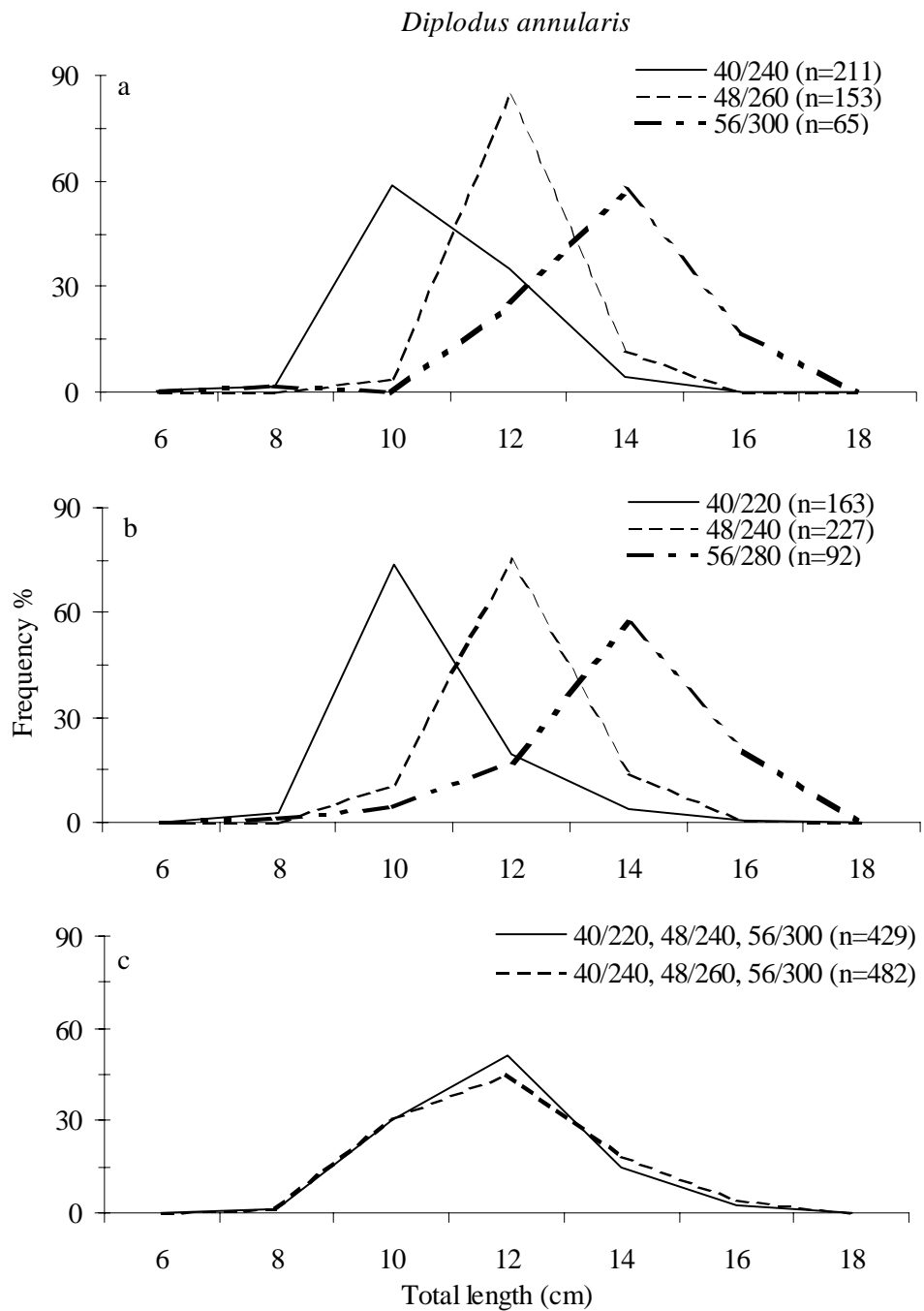
For *Pagellus erythrinus* (Figure 3.3.4.2a, b) the modal length increased from 14-16 cm, for the 40 mm nets, to 18-20 cm, for the 28 mm nets. The number of individuals caught was also higher for the 40 mm nets and lower for the 56 mm ones. The combined length frequencies distributions for the two sets of trammel nets ranged from 10 to 40 cm (Figure 3.3.4.2c).

*Pagellus erythrinus*



**Figure 3.3.4.2. Cyclades. Length frequency distributions of *Pagellus erythrinus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

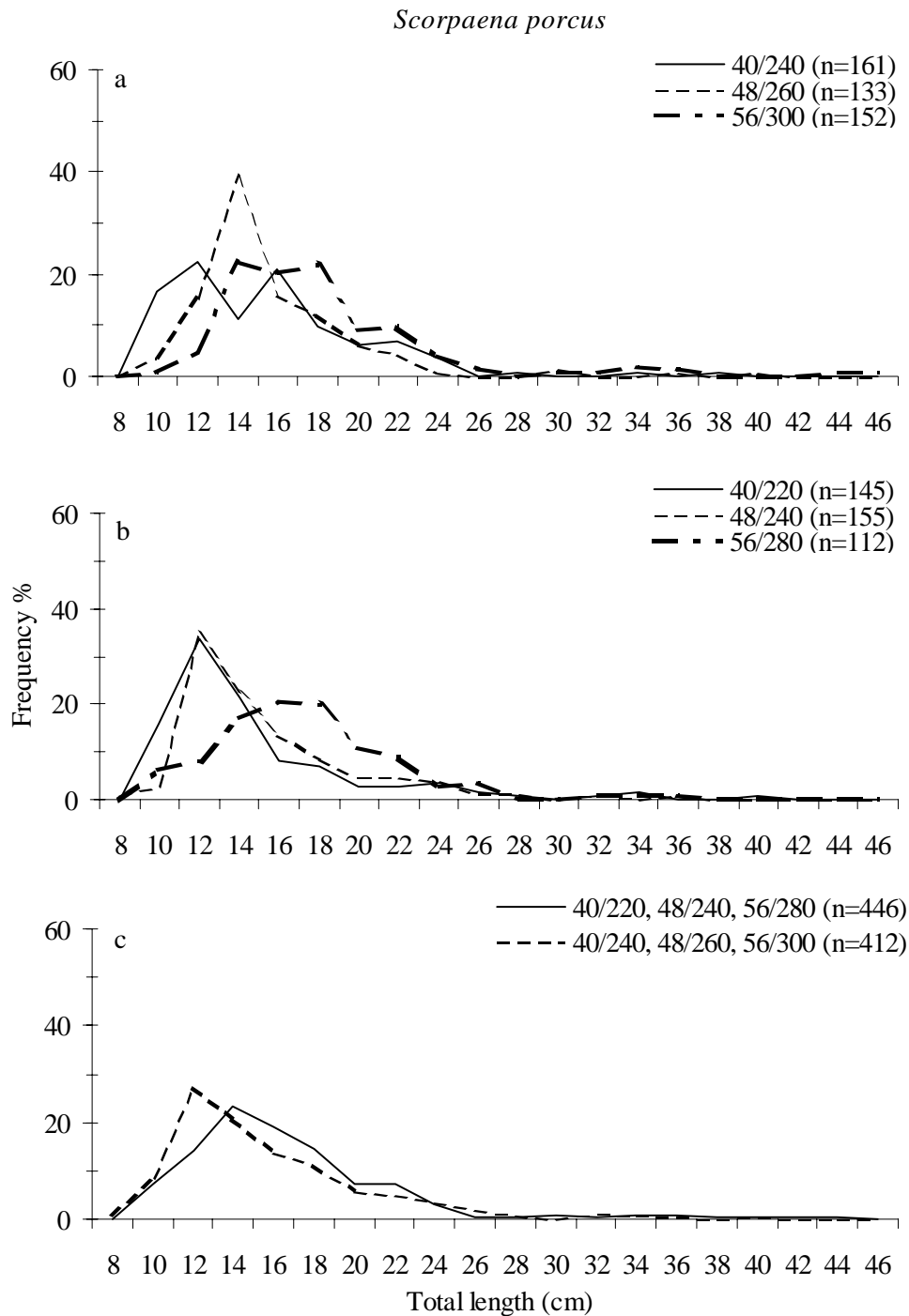
For *Diplodus annularis* (Figure 3.3.4.3a, b) the modal length increased from 10-12 cm for the 40 mm trammel nets to 14-16 cm for the 56 mm nets. The number of individuals caught declined with increasing inner panel mesh size. The combined length frequencies distributions for the two sets of trammel nets ranged from 6 to 20 cm (Figure 3.3.4.3c).



**Figure 3.3.4.3. Cyclades. Length frequency distributions of *Diplodus annularis* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

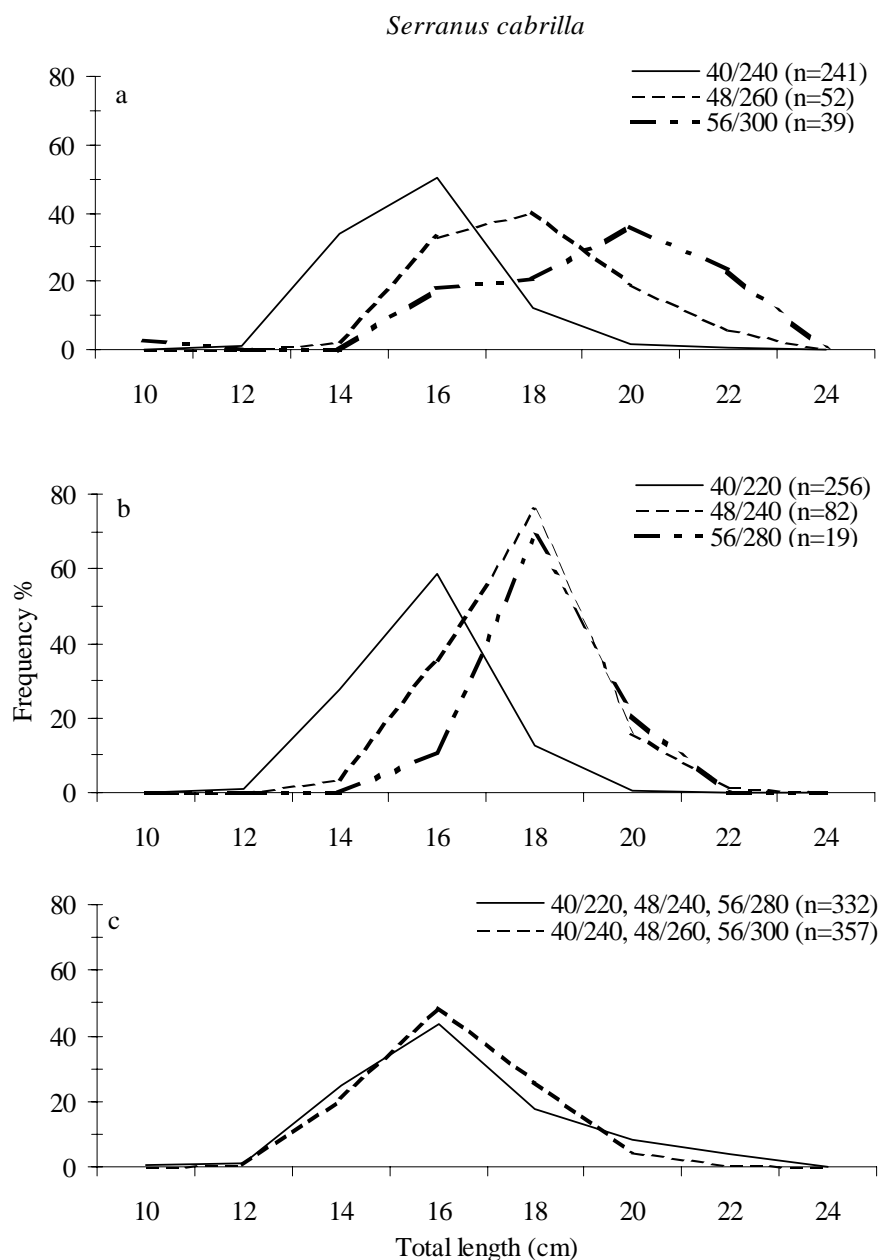
For *Scorpaena porcus* (Figure 3.3.4.4a, b), the modal length of the 40/220 mm and 48/240 mm nets was similar, 12-14 cm, and smaller than that of the 56/280 mm net, which was 16-20 cm. In contrast, the modal length of the individuals caught with the trammel nets mounting larger outer mesh size increased from 12-14 for the 40/240 mm net to 14-20 cm for the 56/300 mm net, with the length distribution of the 40/240 mm net being bimodal. All nets

generally caught a similar number of individuals. The combined length frequency distributions for the two sets of trammel nets exhibited different modes, at 12-14 cm and at 14-16 cm (Figure 3.3.4.4c). The lengths of the individuals caught ranged from 8 to 48 cm (Figure 3.3.4.4c).



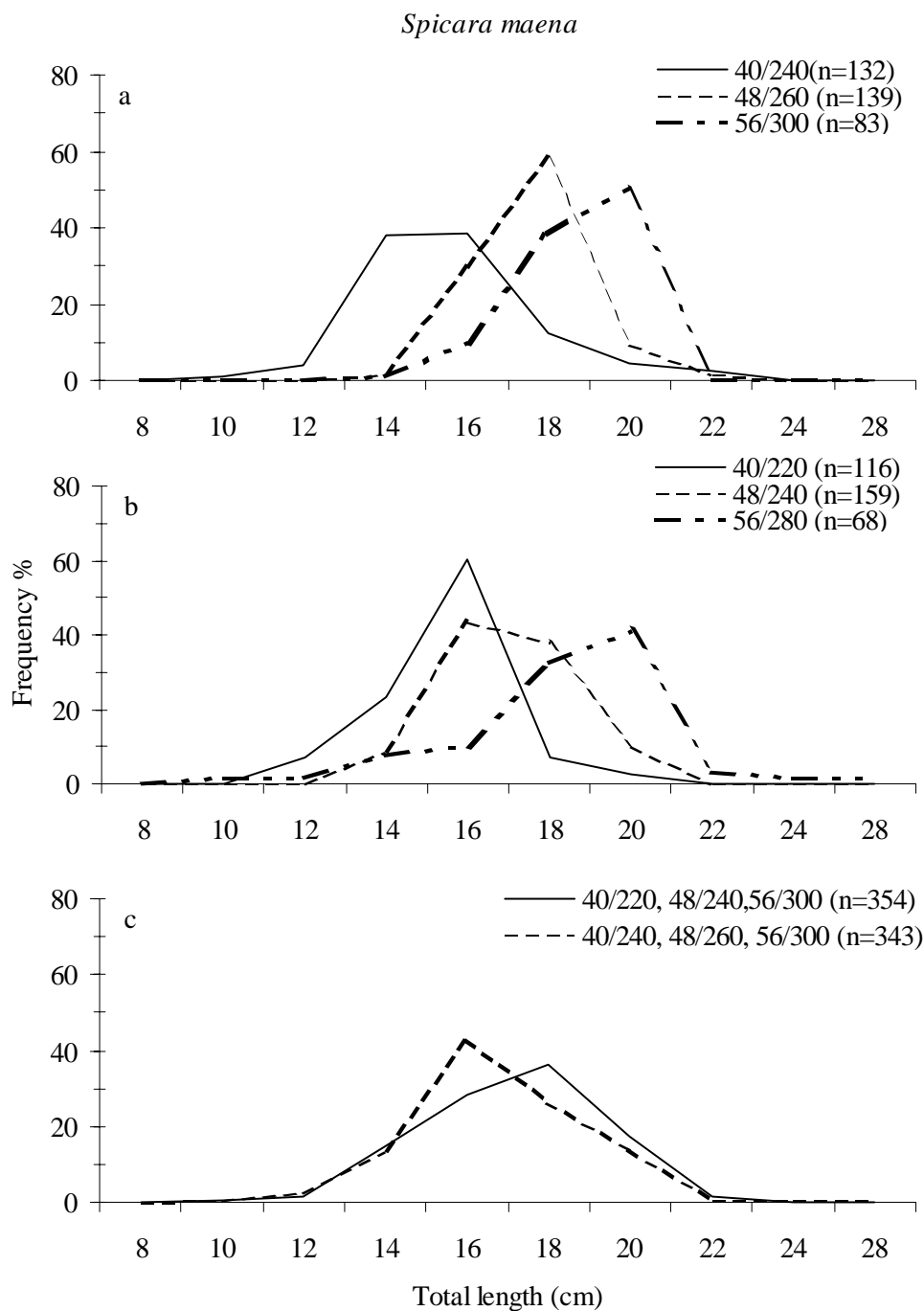
**Figure 3.3.4.4. Cyclades. Length frequency distributions of *Scorpaena porcus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

For *Serranus cabrilla* (Figure 3.3.4.5a, b) the modal length was 16-18 cm for the 40/220 mm net and 18-20 cm, for the 48/240 and 56/280 ones. In contrast, the modal length of the individuals caught with the trammel nets mounting larger outer panel mesh sizes increased from 16-18 cm for the 40/240 mm net to 20-22 cm for the 56/300 mm net, with the length distribution of the individuals caught with the 56/300 mm net being bimodal. The number of individuals caught was higher for the 40 mm nets. The combined length frequencies distributions of the two sets of trammel nets ranged from 10 to 26 cm (Figure 3.3.4.5c).



**Figure 3.3.4.5. Cyclades. Length frequency distributions of *Serranus cabrilla* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

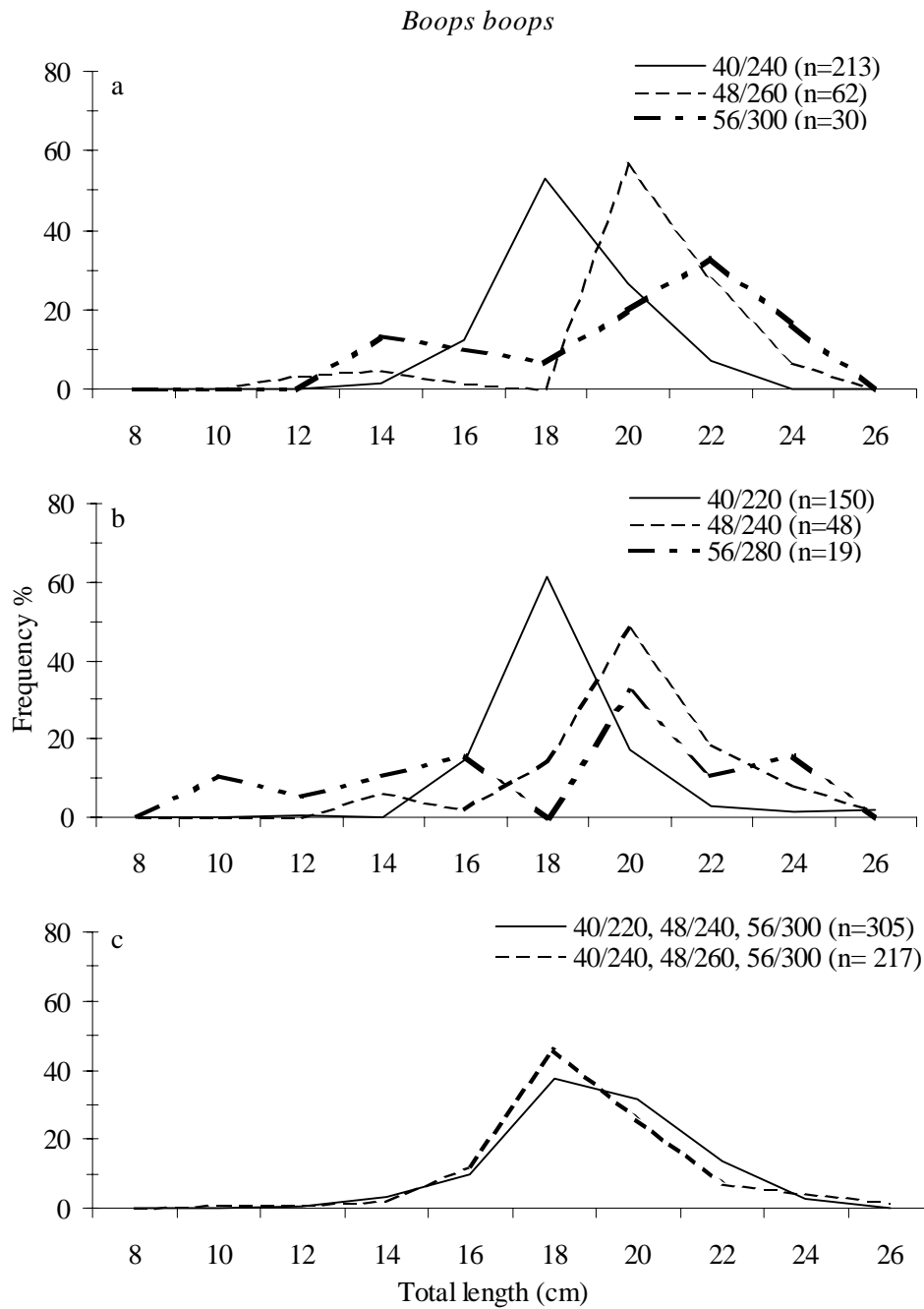
For *Spicara maena* (Figure 3.3.4.6a, b) the modal length was 16-18 cm for the 40/220 mm net, 16-20 cm for the 48/240 mm net and 20-22 cm for the 56/280 mm trammel net. In contrast, the modal length of the individuals caught with the trammel nets mounting a larger outer mesh size increased from 14-18 cm for the 40/240 mm net to 20-22 cm for the 56/300 mm net, with the distributions of most nets being bimodal. The number of individuals caught was higher for the 40 and 48 mm nets than for the 56 mm ones (Figure 3.3.4.6a, b). The combined length frequencies distributions of the individuals caught with the 40/220, 48/240 and 56/280 mm trammel nets displayed a mode at 16-18 cm, which was smaller than those caught with the 40/240, 48/260 and 56/300 mm trammel nets, 18-20 cm (Figure 3.3.4.6c). The total length of the individuals caught ranged from 8 to 30 cm (Figure 3.3.4.6c).



**Figure 3.3.4.6. Cyclades. Length frequency distributions of *Spicara maena* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

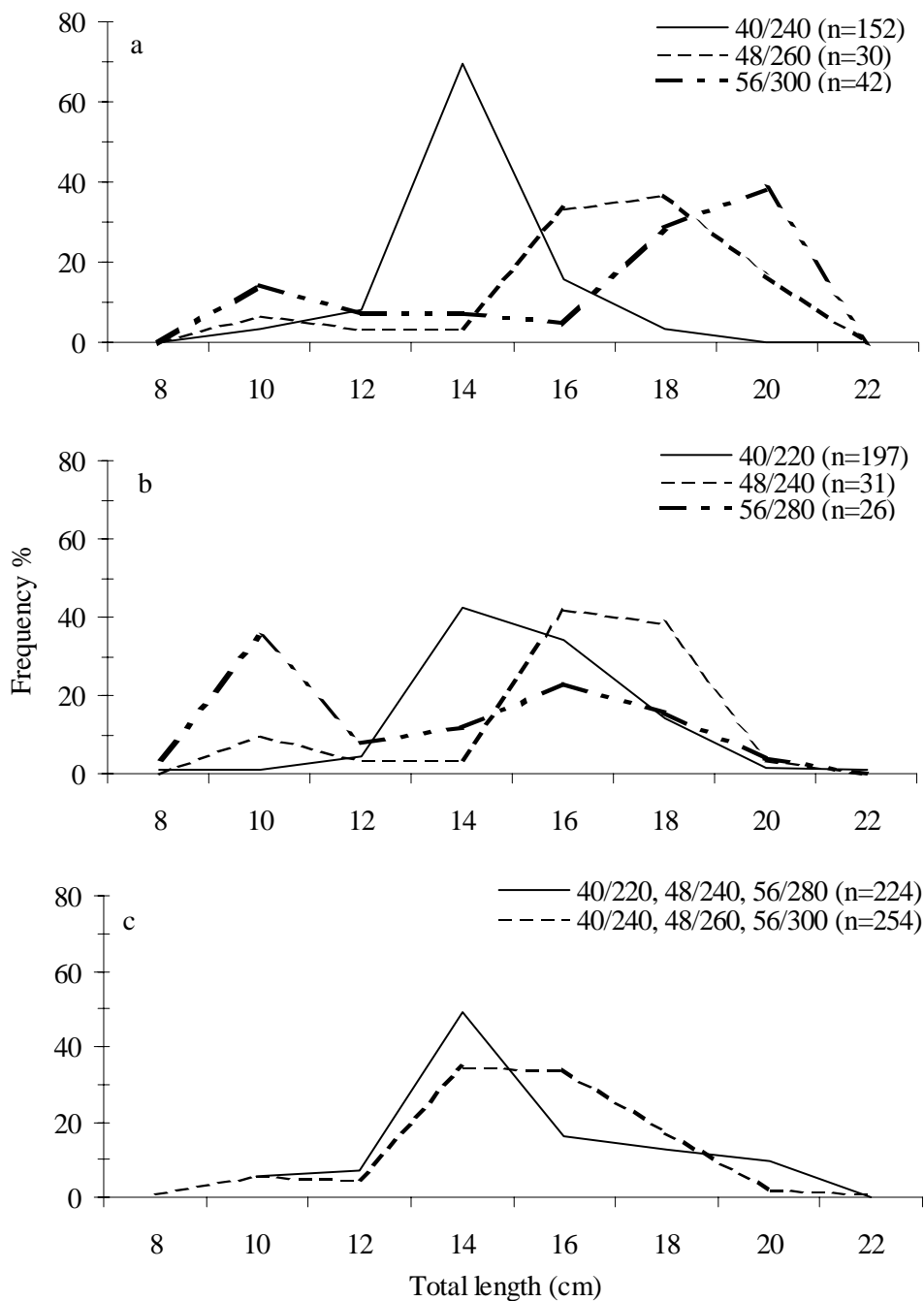
The length frequencies distributions of *Boops boops*, *Pagellus acarne*, *Trachurus mediterraneus*, *Symphodus tinca* and *Diplodus vulgaris*, the abundance of which was smaller than that of the above mentioned species, are shown in Figures 3.3.4.7 to 3.3.4.11 respectively. The lengths of the individuals caught ranged from 8 to 28 cm, 8 to 24 cm, 18 to 36 cm, 11 to 27 cm and 6 to 30 cm for *Boops boops*, *Pagellus acarne*, *Trachurus*

*mediterraneus*, *Symphodus tinca* and *Diplodus vulgaris*, respectively.



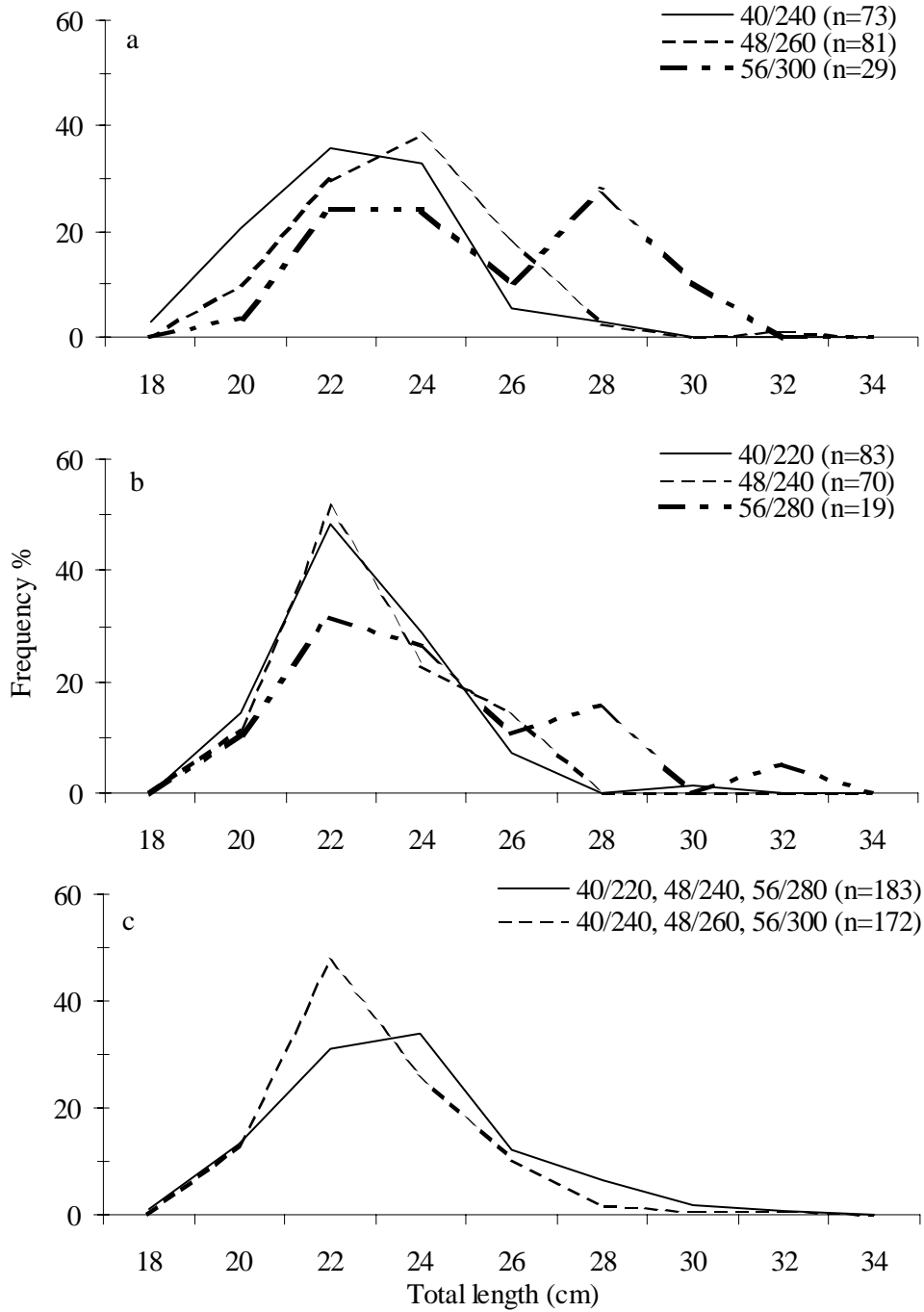
**Figure 3.3.4.7. Cyclades. Length frequency distributions of *Boops boops* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Pagellus acarne*



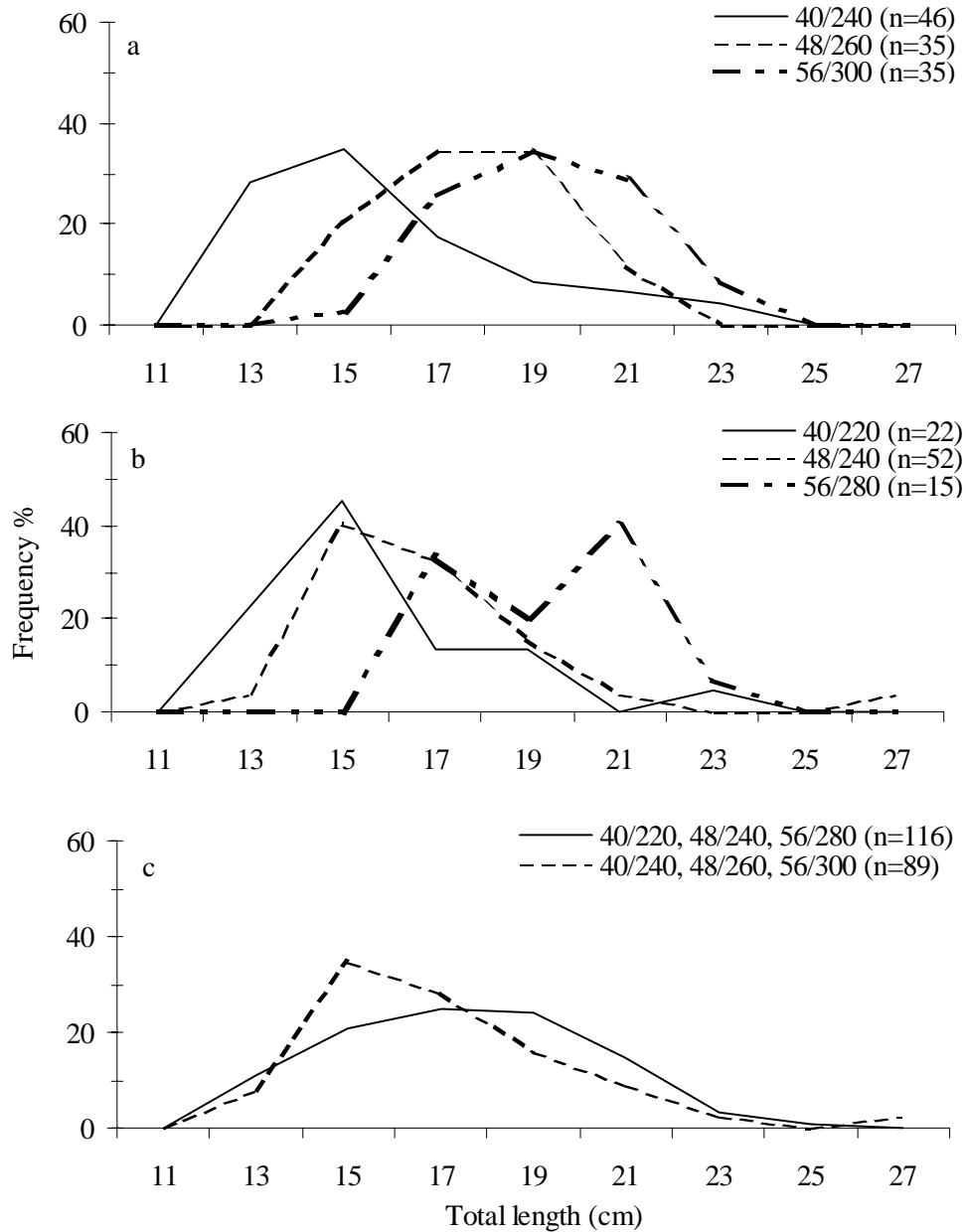
**Figure 3.3.4.8. Cyclades. Length frequency distributions of *Pagellus acarne* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Trachurus mediterraneus*

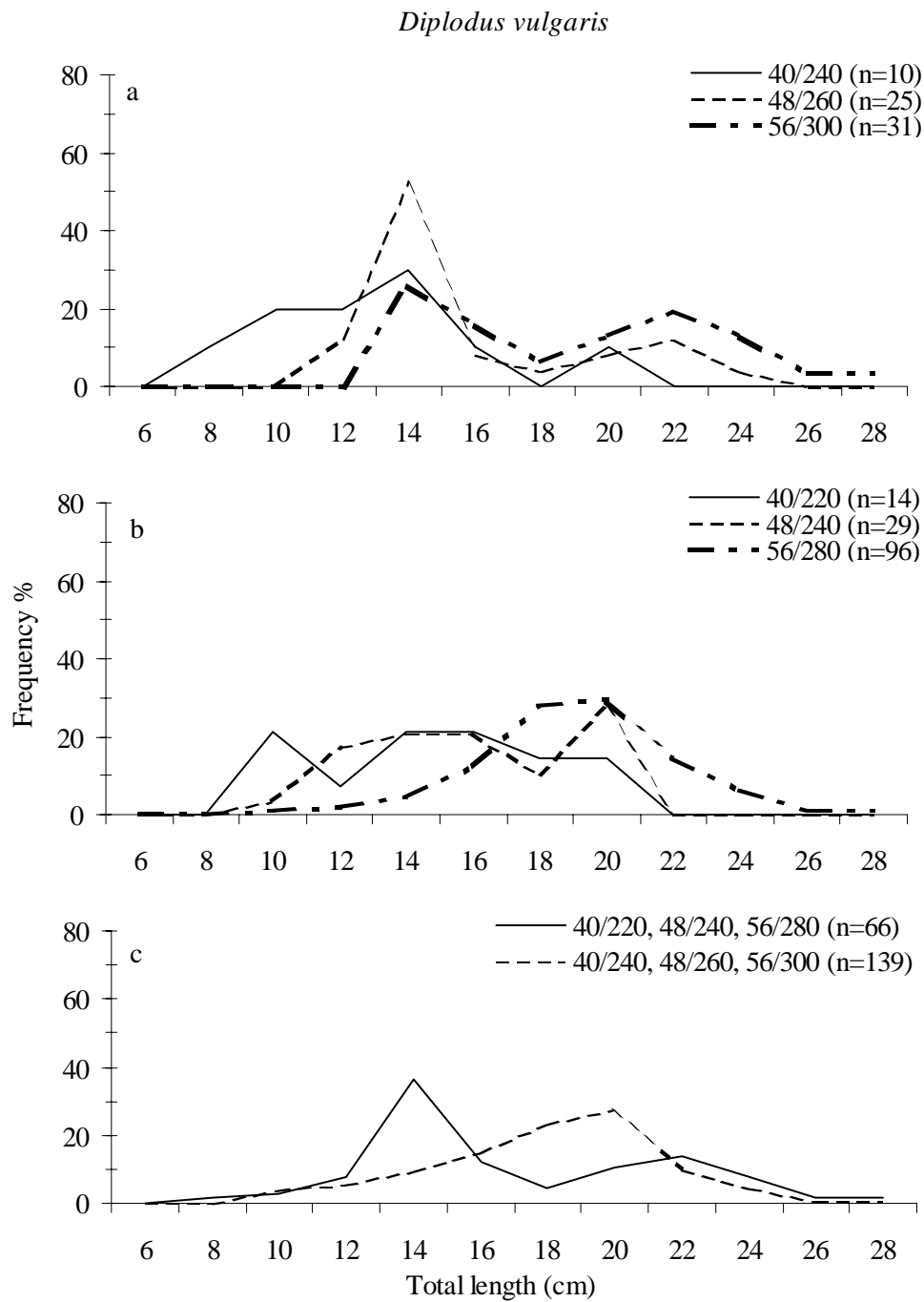


**Figure 3.3.4.9. Cyclades. Length frequency distributions of *Trachurus mediterraneus* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

*Symphodus tinca*



**Figure 3.3.4.10. Cyclades. Length frequency distributions of *Symphodus tinca* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**



**Figure 3.3.4.11. Cyclades. Length frequency distributions of *Diplodus vulgaris* for trammel nets of different inner/outer panel stretched (in mm) mesh size combinations.**

### 3.3.4.2. Size selectivity

For the Cyclades trammel net selectivity studies, three data sets were used for each species. The first consisted of data for the 40/240, 48/260 and 56/300 (inner/outer panel)

trammel nets, while the second consisted of the 40/220, 48/240 and 56/280 trammel nets. Because the larger mesh outer panels were assumed to have little or no effect on size selectivity, the data for the three inner panel mesh sizes were combined for the third data set: 40/240+40/220, 48/260+48/240 and 56/300+56/280.

For *Spicara maena*, none of the uni-modal selectivity curves fitted the three data sets ( $P \leq 0$ ). The only model that fit the data sets was the bi-modal. For the first and the third (combined) data sets, the fitted selectivity curves are characterised by a single peak with the right hand part of the curve strongly skewed to the right (Figure 3.3.4.2.1). However, for the second data set, there are two peaks in each selectivity curve, with the second peaks having modes that are far greater than the maximum sizes recorded for this species (Figure 3.3.4.2.1). Nevertheless, the estimated modal lengths for the three inner mesh sizes for all three data sets are remarkably similar (15.1, 18.1 and 21.1 cm TL). The estimated parameters and the modes and associated dispersions are given in Table 3.3.4.2.1.

None of the uni-modal models in the GillNet software package could fit data sets 1 and 2 for the common pandora (*Pagellus erythrinus*) ( $P \leq 0$ ). However, the bi-modal selectivity model satisfied the goodness of fit criteria (Figure 3.3.4.2.2). In both cases the estimated modal lengths for the three inner mesh sizes are very similar: 14.6 – 14.7, 17.6 and 20.5-20.6 (Table 3.3.4.2.1). For the combined data set the none of the models could be fitted. The estimated parameters and respective deviances are given in Table 3.3.4.2.1.

While some uni-modal models, especially the Gamma and the log-normal could be fitted to all three red mullet (*Mullus surmuletus*) data sets, the bi-modal model clearly was the best. The fitted bi-modal selectivity curves are given in Figure 3.3.4.2.3 and the estimated parameters and respective deviances are given in Table 3.3.4.2.1. As can be seen, all the selectivity curves have a smaller mode to the right of the main mode. The estimated modal lengths for the three inner mesh sizes for the three data sets are very similar: 17.2-17.6, 20.7-21.1 and 24.1-24.6 cm TL (Table 3.3.4.2.1).

None of the uni-modal models implemented in the GillNet software fitted the *Diplodus annularis* data sets. Only the bi-modal model satisfied the goodness of fit criteria. The fitted bi-modal selectivity curves are given in Figure 3.3.4.2.4 and the estimated parameters and their deviances are given in Table 3.3.4.2.1. For all three data sets, the selectivity curves are characterised by a smaller peak to the right of the main peak. The estimated modal lengths for the three inner panel mesh sizes for the three data sets are very similar: 10.5-10.7, 12.6-12.6 and 14.7-15.0 cm TL (Table 3.3.4.2.1).

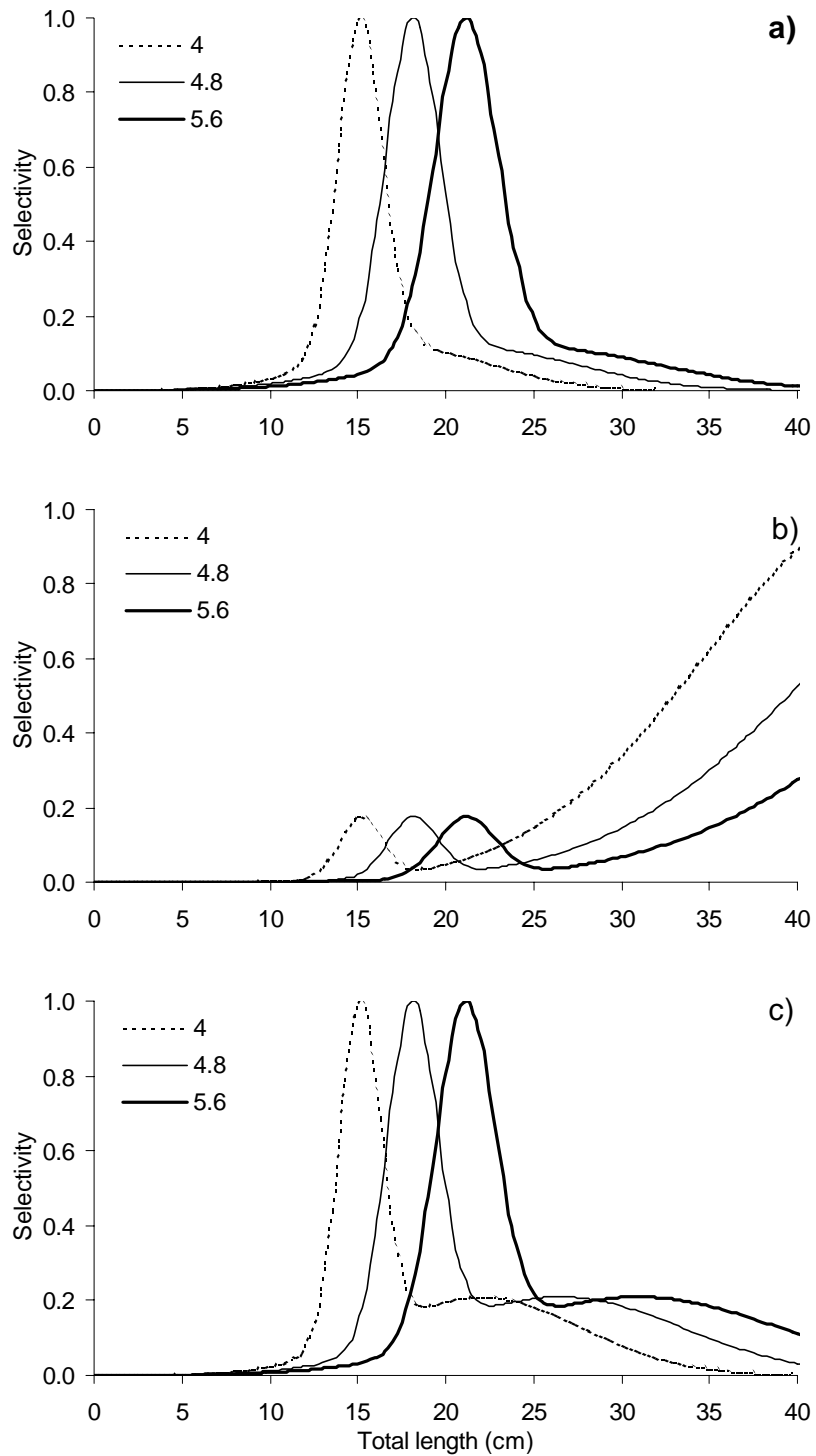
For *Scorpaena porcus* none of the models implemented in the GillNet software could

be fitted to data sets 2 and 3 and only the bi-modal model could be fit to data set 1, resulting in selectivity curves with a second and lower peak to the right of the main peak (Figure 3.3.4.2.5). The fitted bi-modal selectivity curves are shown in Figure 3.3.4.2.5 and the estimated parameters and their deviances are given in Table 3.3.4.2.1. The estimated modal lengths for inner mesh sizes 40, 48 and 56 mm are 12.7, 15.2 and 17.7 cm TL respectively (Table 3.3.4.2.1).

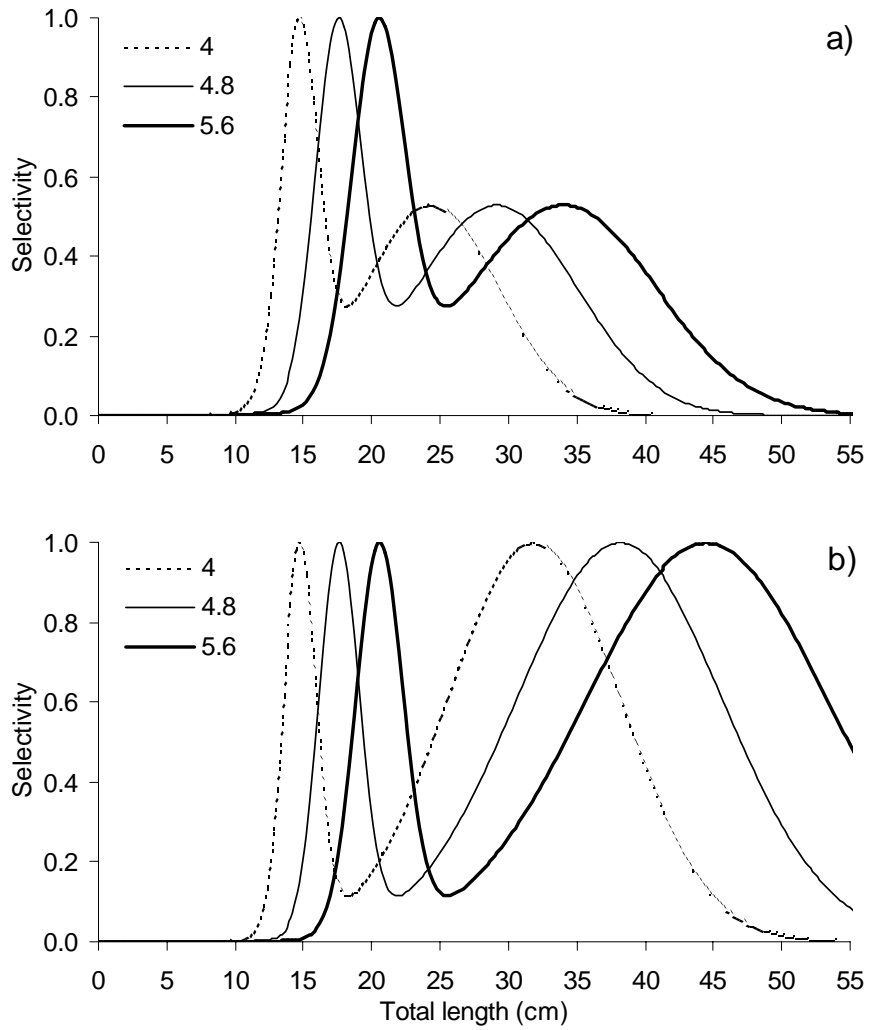
For *Serranus cabrilla* none of the models implemented in the GillNet software could be fitted to data sets 2 and 3. For data set 1, a variety of uni-modal as well as the bi-modal model could be fitted. However, the log-normal model was judged to be the best. The fitted log-normal selectivity curves are given in Figure 3.3.4.2.6 and the estimated parameters and associated deviances are given in Table 3.3.4.2.1. The estimated modal lengths for the three inner mesh sizes are 16.5, 19.8 and 23.1 cm TL (Table 3.3.4.2.1).

**Table 3.3.4.2.1. Cyclades. Results of the selectivity models fitted with GillNet software. For each species and case (Data set 1 = 40/240, 48/260 and 56/300, Data set 2 = 40/220, 48/240 and 56/280 and Data set 3 = 40/240+40/220, 48/260+48/240 and 56/300+56/280) the fitted model, effort mode, equation parameters, modal lengths for each inner panel (40, 48 and 56mm), model deviance and degrees of freedom (df) are shown.**

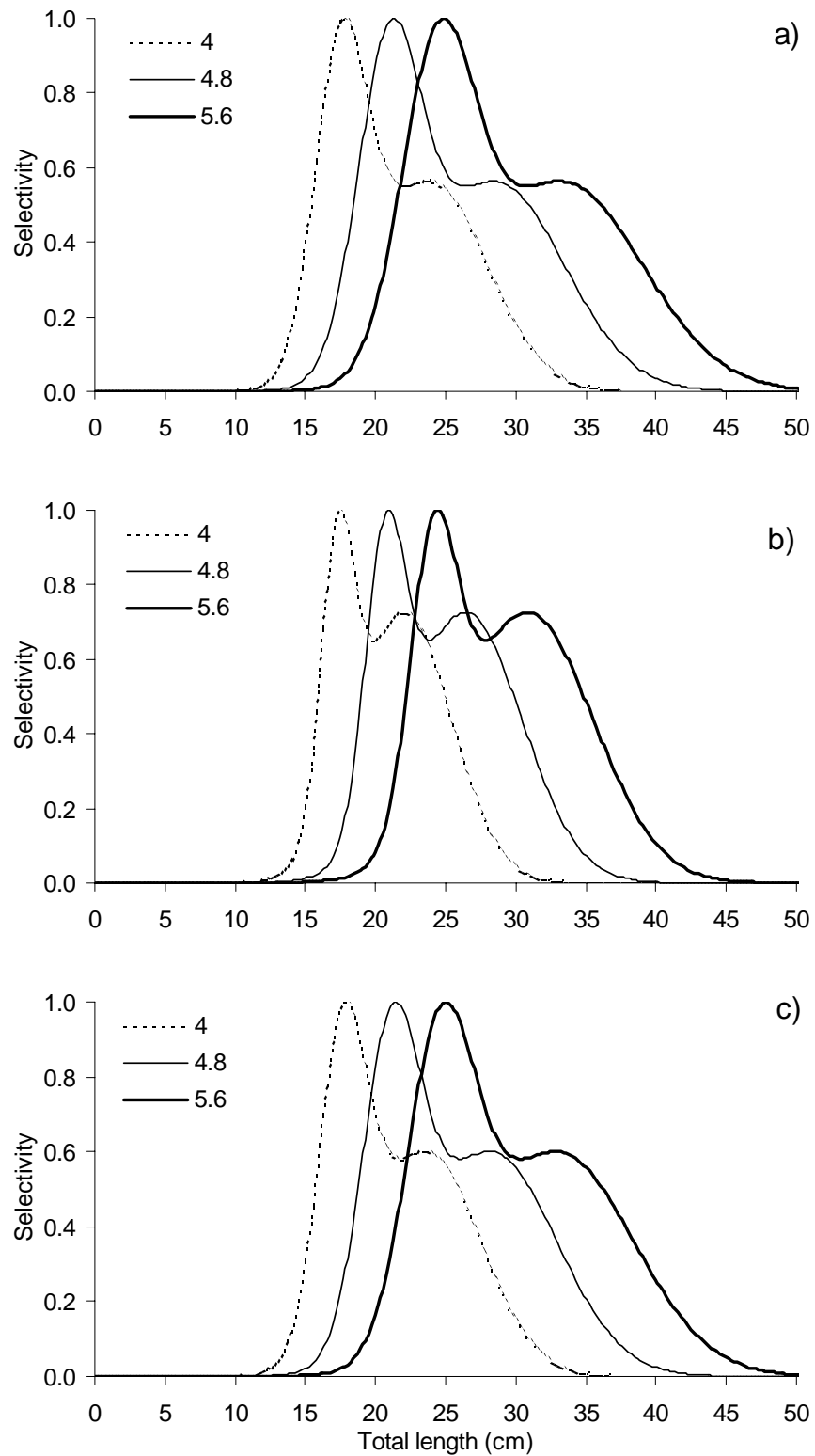
Species	Model	Effort	Data set	Parameters	40	48	56	Model deviance	df
<i>Spicara maena</i>	Bi-Modal	Meshsize	1	(a1,b1,a2,b2,w) = (3.7748, 0.3156, 4.4714, 1.2455, 0.1265)	15.1	18.1	21.1	27.5	23
	Bi-Modal	Meshsize	2	(a1,b1,a2,b2,w) = (3.7793, 0.2956, 11.1887, 2.5155, 6.1430)	15.1	18.1	21.2	27.9	21
	Bi-Modal	Meshsize	3	(a1,b1,a2,b2,w) = (3.7704, 0.2985, 5.5236, 1.4460, 0.2329)	15.1	18.1	21.1	37.3	25
<i>Pageiulus erythrinus</i>	Bi-Modal	Equal	1	(a1,b1,a2,b2,w) = (3.6598, 0.3443, 6.0698, 1.2182, 0.5717)	14.6	17.6	20.5	45.8	37
	Bi-Modal	Equal	2	(a1,b1,a2,b2,w) = (3.6755, 0.3056, 7.9443, 1.5785, 1.0243)	14.7	17.6	20.6	51.5	41
	Bi-Modal	Equal	1	(a1,b1,a2,b2,w) = (4.3667, 0.4680, 5.9586, 1.0085, 0.6754)	17.5	21.0	24.5	35.2	39
<i>Mullus surmuletus</i>	Bi-Modal	Equal	2	(a1,b1,a2,b2,w) = (4.3056, 0.2973, 5.5055, 0.8341, 0.9947)	17.2	20.7	24.1	42.1	29
	Bi-Modal	Equal	3	(a1,b1,a2,b2,w) = (4.3968, 0.4318, 5.8870, 0.9653, 0.7407)	17.6	21.1	24.6	49.8	41
	Bi-Modal	Equal	1	(a1,b1,a2,b2,w) = (2.6175, 0.1625, 3.0016, 0.5221, 0.1758)	10.5	12.6	14.7	22.1	15
<i>Diplodus annularis</i>	Bi-Modal	Equal	2	(a1,b1,a2,b2,w) = (2.6706, 0.1611, 3.1008, 0.4205, 0.3795)	10.7	12.8	15.0	11.4	17
	Bi-Modal	Equal	3	(a1,b1,a2,b2,w) = (2.6400, 0.1604, 3.0532, 0.4673, 0.2674)	10.6	12.7	14.8	22.4	17
	Bi-Modal	Equal	1	(a1,b1,a2,b2,w) = (3.1644, 0.5291, 7.4338, 3.0346, 0.5486)	12.7	15.2	17.7	61.2	47
<i>Serranus cabrilla</i>	Normal Scale	Equal	1	(k1,k2) = (4.1476, 0.3981)	16.6	19.9	23.2	26.1	18



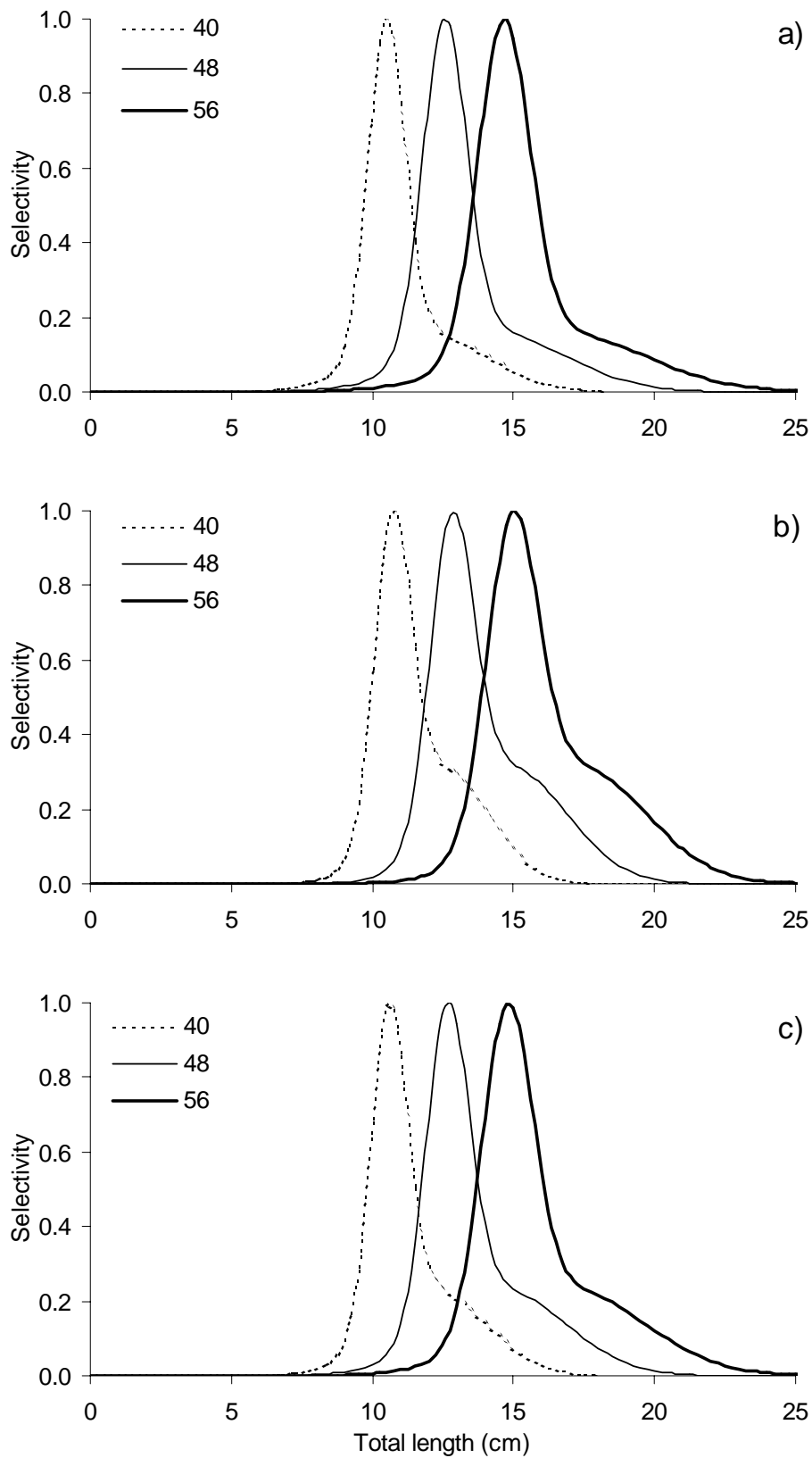
**Figure 3.3.4.2.1. Cyclades. Bi-modal selectivity plots for *Spicara maena*. a) 40/240, 48/260 and 56/300 trammel nets, b) 40/220, 48/240 and 56/280 trammel nets and c) combined 40/220+240, 48/240+260 and 56/280+300 trammel nets.**



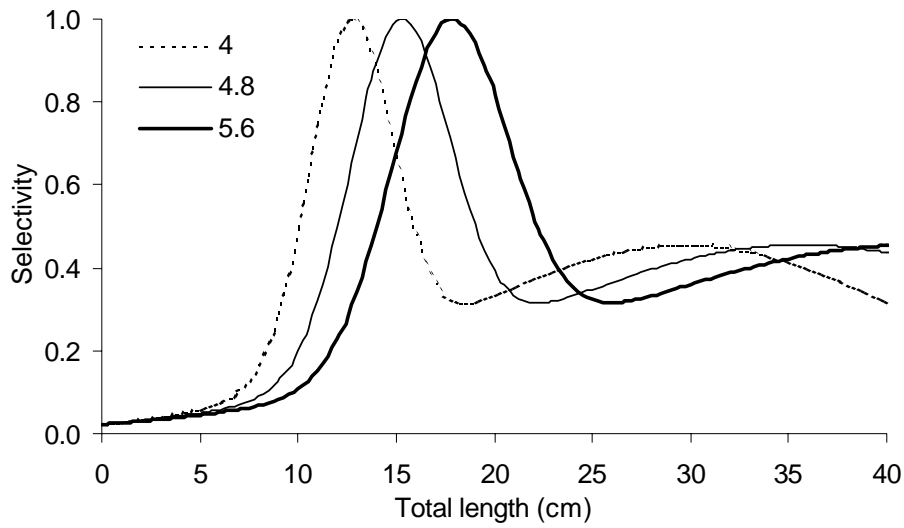
**Figure 3.3.4.2.2. Cyclades. Bi-modal selectivity plots for *Pagellus erythrinus*. a) 40/240, 48/260 and 56/300 trammel nets and b) 40/220, 48/240 and 56/280 trammel nets.**



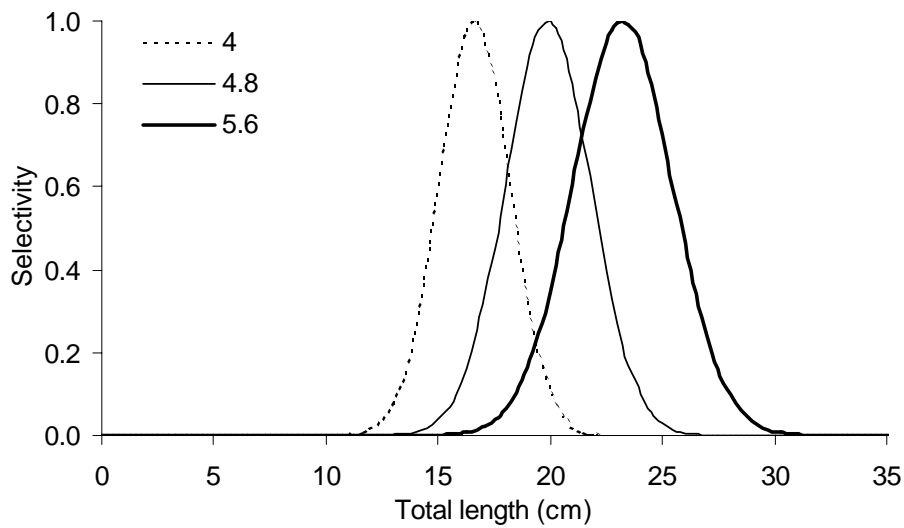
**Figure 3.3.4.2.3. Cyclades. Bi-modal selectivity plots for *Mullus surmuletus*. a) 40/240, 48/260 and 56/300 trammel nets, b) 40/220, 48/240 and 56/280 trammel nets and c) combined 40/220+240, 48/240+260 and 56/280+300 trammel nets.**



**Figure 3.3.4.2.4. Cyclades. Bi-modal selectivity plots for *Diplodus annularis*. a) 40/240, 48/260 and 56/300 trammel nets, b) 40/220, 48/240 and 56/280 trammel nets and c) combined 40/220+240, 48/240+260 and 56/280+300 trammel nets.**



**Figure 3.3.4.2.5. Cyclades. Bi-modal selectivity plots for *Scorpaena porcus* caught with 40/240, 48/260 and 56/300 trammel nets.**



**Figure 3.3.4.2.6. Cyclades. Bi-modal selectivity plots for *Serranus cabrilla* caught with 40/240, 48/260 and 56/300 trammel nets.**

### 3.4. Method of capture

#### 3.4.1. Basque Country

Table 3.4.1.1 shows the way of capture recorded for the most abundant species in the

catch of the all trammel net types combined.

According to the observations carried out, most of the species were caught by entanglement of the net twine in different parts of the fish body. Thus for all species altogether more than 90% of the individuals were entangled, whereas only 3.9% and 0.5% of them were wedged and gilled respectively.

All the species considered were caught by entanglement in more than 75% of the cases, except for *Dicentrarchus labrax* (32.4% entangled), where individuals were caught mainly with the body wedged in the opening of the inner panel mesh (59.7% wedged). Apart from *D . labrax*, only a few species were wedged with a significant frequency: *Pagellus acarne* (13.0% wedged), *Solea vulgaris* (11.1%) and *Sciaena umbra* (10.4%). Very few individuals were gilled in the mesh of the inner panel: *Dicentrarchus labrax* (5.8% gilled), *Pagellus acarne* (5.2%) and *Mullus surmuletus* (4.3%).

**Table 3.4.1.1. Basque Country. Percentage of individuals caught in the trammel nets by method of capture and total number of individuals (N) for the most relevant species (those with more than 50 individuals caught). Year 2000 (49 trials).**

Species	Method of capture				N
	Entangled (%)	Gilled (%)	Wedged (%)	Non Observed (%)	
<i>Solea vulgaris</i>	85.25	0.55	11.08	3.11	3248
<i>Trisopterus luscus</i>	87.56	1.32	3.33	7.79	2042
<i>Scomber scombrus</i>	96.15		0.59	3.27	1531
<i>Trachinus draco</i>	96.32		0.83	2.85	1439
<i>Sardina pilchardus</i>	90.13			9.87	983
<i>Merluccius merluccius</i>	96.10			3.90	975
<i>Trigla lucerna</i>	99.57			0.43	693
<i>Microchirus variegatus</i>	91.42			8.58	641
<i>Lophius piscatorius</i>	98.76			1.24	484
<i>Solea senegalensis</i>	88.72		8.09	3.19	470
<i>Sepia officinalis</i>	92.93		0.49	6.59	410
<i>Maja squinado</i>	99.21			0.79	380
<i>Aspitrigla obscura</i>	95.38		0.66	3.96	303
<i>Sciaena umbra</i>	85.97	3.60	10.43		278
<i>Solea lascaris</i>	94.14		3.91	1.95	256
<i>Trachurus trachurus</i>	98.03		0.39	1.57	254
<i>Micromesistius poutassou</i>	94.89			5.11	176
<i>Torpedo marmorata</i>	93.64			6.36	173
<i>Triglidae spp.</i>	98.10		0.63	1.27	158
<i>Dicentrarchus labrax</i>	32.37	5.76	59.71	2.16	139
<i>Pleuronectes platessa</i>	89.05	1.46	4.38	5.11	137
<i>Raja undulata</i>	96.99		0.75	2.26	133
<i>Raja montagui</i>	95.12		1.63	3.25	123
<i>Trisopterus minutus</i>	85.32			14.68	109
<i>Aspitrigla cuculus</i>	95.24			4.76	105
<i>Mullus surmuletus</i>	91.40	4.30		4.30	93
<i>Scorpaena porcus</i>	100.00				81
<i>Pagellus acarne</i>	76.62	5.19	12.99	5.19	77
<i>Diplodus sargus</i>	89.47	1.32	9.21		76
<i>Scophthalmus rhombus</i>	97.10		1.45	1.45	69
<i>Scomber japonicus</i>	97.06			2.94	68
<i>Raja clavata</i>	100.00				65
<i>Callionymus lyra</i>	98.25			1.75	57
<i>Scyliorhinus stellaris</i>	98.25			1.75	57
<i>Boops boops</i>	96.43			3.57	56
<b>Total</b>	<b>91.39</b>	<b>0.45</b>	<b>3.93</b>	<b>4.23</b>	<b>16339</b>

### 3.4.2. Algarve

The classification according to the method of capture for all the species caught in the trammel net experimental fishing trials is given in Table 3.4.2.1. Only two species were caught entirely by wedging (*Diplodus annularis* and *Sciaena umbra*) and only two were caught only by gilling (*Mugil* sp. and *Plectorhinchus mediterraneus*). However 42 species were always caught only by being entangled, including the most important commercial and target species, *Sepia officinalis*. Of the total number of species for which data was recorded, entangling was involved in the capture of 105. For many of the commercially important fin-fishes, entangling plus gilling and/or wedging were important in the capture process.

**Table 3.4.2.1. Algarve. Methods of capture (%) for all species caught in the experimental fishing trial.**

<b>Species</b>	<b>Entangled</b>	<b>Gilled</b>	<b>Wedged</b>	<b>Total</b>
<i>Anthias anthias</i>	100%	0%	0%	100%
<i>Argyrosomus regius</i>	100%	0%	0%	100%
<i>Balistes carolinensis</i>	27%	12%	61%	100%
<i>Bolinus brandaris</i>	100%	0%	0%	100%
<i>Boops boops</i>	69%	26%	5%	100%
<i>Bothus podas</i>	35%	45%	20%	100%
<i>Callionymus lyra</i>	59%	39%	2%	100%
<i>Charonia lampas</i>	100%	0%	0%	100%
<i>Chelidonichthys lastoviza</i>	77%	21%	2%	100%
<i>Chelidonichthys lucerna</i>	86%	7%	7%	100%
<i>Chelidonichthys obscurus</i>	84%	15%	1%	100%
<i>Chelidonichthys spp.</i>	100%	0%	0%	100%
<i>Chelon labrosus</i>	100%	0%	0%	100%
<i>Citharus linguatula</i>	92%	8%	0%	100%
<i>Conger conger</i>	93%	7%	0%	100%
<i>Dentex canariensis</i>	100%	0%	0%	100%
<i>Dentex dentex</i>	29%	29%	43%	100%
<i>Dentex gibbosus</i>	60%	27%	13%	100%
<i>Dentex macrophthalmus</i>	33%	22%	44%	100%
<i>Dentex maroccanus</i>	31%	15%	54%	100%
<i>Dentex sp.</i>	100%	0%	0%	100%
<i>Dicentrarchus labrax</i>	40%	50%	10%	100%
<i>Dicologlossa cuneata</i>	55%	45%	0%	100%
<i>Diplodus annularis</i>	0%	0%	100%	100%
<i>Diplodus bellottii</i>	85%	15%	0%	100%
<i>Diplodus cervinus</i>	50%	50%	0%	100%
<i>Diplodus puntazzo</i>	50%	50%	0%	100%
<i>Diplodus sargus</i>	27%	55%	18%	100%
<i>Diplodus vulgaris</i>	52%	37%	11%	100%
<i>Euthynnus sp.</i>	100%	0%	0%	100%
<i>Galeorhinus galeus</i>	100%	0%	0%	100%
<i>Halobatrachus didactylus</i>	62%	31%	7%	100%
<i>Helicolenus dactylopterus</i>	50%	0%	50%	100%
<i>Homarus gammarus</i>	100%	0%	0%	100%
<i>Isurus oxyrinchus</i>	100%	0%	0%	100%
<i>Labrus bergylta</i>	23%	50%	27%	100%
<i>Lepidotrigla cavillone</i>	93%	7%	0%	100%
<i>Lithognathus mormyrus</i>	53%	26%	21%	100%
<i>Liza aurata</i>	36%	45%	18%	100%
<i>Liza ramada</i>	25%	0%	75%	100%

(To be continued on next page)

**Table 3.4.2.1. Continued.**

<b>Species</b>	<b>Entangled</b>	<b>Gilled</b>	<b>Wedged</b>	<b>Total</b>
<i>Loligo vulgaris</i>	100%	0%	0%	100%
<i>Lophius piscatorius</i>	92%	0%	8%	100%
<i>Maja squinado</i>	98%	0%	2%	100%
<i>Merlangius merlangus</i>	100%	0%	0%	100%
<i>Merluccius merluccius</i>	93%	7%	0%	100%
<i>Microchirus azevia</i>	75%	22%	4%	100%
<i>Microchirus ocellatus</i>	50%	50%	0%	100%
<i>Micromesistius poutassou</i>	100%	0%	0%	100%
<i>Mola mola</i>	71%	0%	29%	100%
<i>Mugil cephalus</i>	100%	0%	0%	100%
<i>Mugil sp.</i>	0%	100%	0%	100%
<i>Mullus barbatus</i>	100%	0%	0%	100%
<i>Mullus surmuletus</i>	72%	17%	11%	100%
<i>Muraena helena</i>	100%	0%	0%	100%
<i>Myliobatis aquila</i>	100%	0%	0%	100%
<i>Octopus vulgaris</i>	100%	0%	0%	100%
<i>Pagellus acarne</i>	80%	12%	8%	100%
<i>Pagellus bogaraveo</i>	50%	0%	50%	100%
<i>Pagellus erythrinus</i>	75%	20%	5%	100%
<i>Pagrus auriga</i>	44%	22%	33%	100%
<i>Pagrus pagrus</i>	55%	22%	24%	100%
<i>Palinurus elephas</i>	100%	0%	0%	100%
<i>Parapristipoma octolineatum</i>	100%	0%	0%	100%
<i>Penaeus kerathurus</i>	100%	0%	0%	100%
<i>Phycis phycis</i>	67%	23%	10%	100%
<i>Plectorhinchus mediterraneus</i>	0%	100%	0%	100%
<i>Pontinus kuhlii</i>	100%	0%	0%	100%
<i>Prionace glauca</i>	100%	0%	0%	100%
<i>Psetta maxima</i>	78%	22%	0%	100%
<i>Pteromylaeus bovinus</i>	100%	0%	0%	100%
<i>Raja asterias</i>	100%	0%	0%	100%
<i>Raja brachyura</i>	100%	0%	0%	100%
<i>Raja clavata</i>	97%	0%	3%	100%
<i>Raja miraletus</i>	93%	0%	7%	100%
<i>Raja naevus</i>	100%	0%	0%	100%
<i>Raja oxyrinchus</i>	100%	0%	0%	100%
<i>Raja sp.</i>	100%	0%	0%	100%
<i>Raja undulata</i>	100%	0%	0%	100%
<i>Sarda sarda</i>	73%	9%	18%	100%
<i>Sardina pilchardus</i>	96%	3%	1%	100%
<i>Sarpa salpa</i>	0%	40%	60%	100%
<i>Sciaena umbra</i>	0%	0%	100%	100%

(To be concluded in next page)

**Table 3.4.2.1. Concluded.**

<b>Species</b>	<b>Entangled</b>	<b>Gilled</b>	<b>Wedged</b>	<b>Total</b>
<i>Scomber japonicus</i>	97%	2%	1%	100%
<i>Scomber scombrus</i>	95%	3%	2%	100%
<i>Scophthalmus rhombus</i>	59%	41%	0%	100%
<i>Scorpaena notata</i>	84%	11%	5%	100%
<i>Scorpaena porcus</i>	78%	4%	19%	100%
<i>Scorpaena scrofa</i>	80%	10%	10%	100%
<i>Scyliorhinus canicula</i>	98%	0%	2%	100%
<i>Sepia officinalis</i>	100%	0%	0%	100%
<i>Serranus atricauda</i>	100%	0%	0%	100%
<i>Serranus cabrilla</i>	83%	14%	3%	100%
<i>Serranus scriba</i>	100%	0%	0%	100%
<i>Solea impar</i>	100%	0%	0%	100%
<i>Solea lascaris</i>	54%	42%	4%	100%
<i>Solea senegalensis</i>	57%	39%	4%	100%
<i>Solea sp</i>	100%	0%	0%	100%
<i>Solea vulgaris</i>	85%	15%	0%	100%
<i>Sparus aurata</i>	18%	71%	12%	100%
<i>Spicara maena</i>	100%	0%	0%	100%
<i>Spondyliosoma cantharus</i>	54%	31%	15%	100%
<i>Symphodus bailloni</i>	100%	0%	0%	100%
<i>Torpedo marmorata</i>	100%	0%	0%	100%
<i>Torpedo nobiliana</i>	100%	0%	0%	100%
<i>Torpedo torpedo</i>	100%	0%	0%	100%
<i>Trachinus draco</i>	87%	13%	0%	100%
<i>Trachurus trachurus</i>	81%	15%	4%	100%
<i>Trisopterus luscus</i>	80%	20%	0%	100%
<i>Uranoscopus scaber</i>	88%	12%	0%	100%
<i>Zeus faber</i>	37%	18%	45%	100%
<b>Total</b>	<b>86%</b>	<b>11%</b>	<b>4%</b>	<b>100%</b>

### 3.4.3. Gulf of Cádiz

The various ways by which the specimens are entrapped or retained by the net have been classified under three different categories: Entangled, Gilled and Wedged, described in the preceding section on Material and methods. A fourth category, Unknown, has been used to include those specimens for which their form of entrapment in the net was not known, mainly as a result of being caught on days when bad weather prevented the normal sampling procedures from being followed. However, this Unknown group only comprises 3.5% of the total catch. Table 3.4.3.1 gives the proportion of specimens for each category, as a percentage of the total number of specimens of that species caught.

**Table 3.4.3.1. Gulf of Cádiz. Percentage (%) of individuals caught as entangled, gilled, wedged and unknown (for which this information was not observed) of individuals caught.**

<b>Species</b>	<b>Entangled (%)</b>	<b>Gilled (%)</b>	<b>Wedged (%)</b>	<b>Unknown (%)</b>
<i>Alosa alosa</i>	95.35	2.33	2.33	0.00
<i>Alosa fallax</i>	92.00	8.00	0.00	0.00
<i>Argyrosomus regius</i>	93.90	1.22	1.83	3.05
<i>Balistes carolinensis</i>	76.47	0.00	17.65	5.88
<i>Belone belone</i>	100.00	0.00	0.00	0.00
<i>Bothus podas</i>	100.00	0.00	0.00	0.00
<i>Caranx rhonchus</i>	100.00	0.00	0.00	0.00
<i>Chelon labrosus</i>	100.00	0.00	0.00	0.00
<i>Conger conger</i>	0.00	0.00	0.00	100.00
<i>Dentex canariensis</i>	80.00	0.00	0.00	20.00
<i>Dentex gibbosus</i>	100.00	0.00	0.00	0.00
<i>Dicentrarchus labrax</i>	89.29	7.14	3.57	0.00
<i>Dicentrarchus punctatus</i>	91.30	4.35	0.00	4.35
<i>Dicologlossa cuneata</i>	81.33	9.33	2.67	6.67
<i>Diplodus bellottii</i>	92.13	2.36	3.15	2.36
<i>Diplodus sargus</i>	94.87	2.56	1.28	1.28
<i>Engraulis encrasicolus</i>	100.00	0.00	0.00	0.00
<i>Galeorhinus galeus</i>	100.00	0.00	0.00	0.00
<i>Halobatrachus didactylus</i>	95.92	0.34	0.68	3.06
<i>Lithognathus mormyrus</i>	60.00	12.00	28.00	0.00
<i>Liza aurata</i>	100.00	0.00	0.00	0.00
<i>Liza saliens</i>	100.00	0.00	0.00	0.00
<i>Loligo vulgaris</i>	50.00	0.00	0.00	50.00
<i>Maja squinado</i>	50.00	0.00	0.00	50.00
<i>Melicertus kerathurus</i>	74.07	0.00	0.00	25.93
<i>Mugil cephalus</i>	92.25	1.41	5.63	0.70
<i>Mullus barbatus</i>	100.00	0.00	0.00	0.00
<i>Mullus surmuletus</i>	50.00	0.00	0.00	50.00
<i>Octopus vulgaris</i>	94.23	0.00	0.00	5.77
<i>Pagellus acarne</i>	100.00	0.00	0.00	0.00
<i>Pagellus erythrinus</i>	83.33	0.00	16.67	0.00
<i>Plectorhinchus mediterraneus</i>	20.00	20.00	60.00	0.00
<i>Pomadasys incisus</i>	75.86	3.45	10.34	10.34
<i>Pteromylaeus bovinus</i>	100.00	0.00	0.00	0.00
<i>Raja asterias</i>	100.00	0.00	0.00	0.00
<i>Raja brachyura</i>	100.00	0.00	0.00	0.00
<i>Raja montagui</i>	83.33	0.00	0.00	16.67
<i>Raja undulata</i>	99.53	0.00	0.00	0.47
<i>Salpa salpa</i>	100.00	0.00	0.00	0.00
<i>Sardina pilchardus</i>	98.17	0.33	0.17	1.33
<i>Sciaena umbra</i>	100.00	0.00	0.00	0.00

(To be concluded on next page)

**Table 3.4.3.1. Concluded.**

<b>Species</b>	<b>Entangled (%)</b>	<b>Gilled (%)</b>	<b>Wedged (%)</b>	<b>Unknown (%)</b>
<i>Scomber japonicus</i>	97.37	0.00	2.63	0.00
<i>Scomber scomber</i>	100.00	0.00	0.00	0.00
<i>Scophthalmus maximus</i>	80.00	13.33	0.00	6.67
<i>Scophthalmus rhombus</i>	66.67	9.01	0.90	23.42
<i>Scorpaena scrofa</i>	100.00	0.00	0.00	0.00
<i>Sepia officinalis</i>	99.94	0.00	0.00	0.06
<i>Seriola dumerili</i>	83.33	0.00	16.67	0.00
<i>Solea kleinii</i>	0.00	0.00	0.00	100.00
<i>Solea lascaris</i>	3.46	18.87	46.54	31.13
<i>Solea senegalensis</i>	4.62	60.09	24.96	10.32
<i>Solea vulgaris</i>	10.00	40.00	50.00	0.00
<i>Sparus aurata</i>	85.71	0.00	0.00	14.29
<i>Spondyliosoma cantharus</i>	60.00	0.00	20.00	20.00
<i>Squilla mantis</i>	100.00	0.00	0.00	0.00
<i>Stromateus fiatola</i>	40.00	40.00	20.00	0.00
<i>Synaptura lusitanica</i>	3.22	57.24	33.79	5.75
<i>Torpedo marmorata</i>	99.37	0.00	0.00	0.63
<i>Torpedo torpedo</i>	99.81	0.00	0.00	0.19
<i>Trachinotus ovatus</i>	100.00	0.00	0.00	0.00
<i>Trachinus draco</i>	78.95	1.75	12.28	7.02
<i>Trigla lucerna</i>	76.74	0.00	23.26	0.00
<i>Umbrina canariensis</i>	70.00	20.00	10.00	0.00

Overall, 80.89% of the total catch of all species are Entangled in the mesh of the nets, followed by 9.17 % Gilled and 6.43% Wedged.

Of the total of 63 species caught, in 43 of these more than 80 % of the specimens were Entangled. With these can be grouped a further 6 species in which the proportion Entangled does not reach 80% because there is a considerable proportion in the Unknown category, that may well also have been Entangled. In addition, for another 6 species the percentage Entangled is relatively high, with values between 60% and 80 %. In total, a majority (more than 50%) of all the specimens caught in 57 out of the 63 species were Entangled. Among these species, *Sepia officinalis*, *Torpedo torpedo*, *Torpedo marmorata*, *Halobatrachus didactylus*, *Raja asterias*, *Raja undulata*, and *Octopus vulgaris* present proportions approaching 100% of total specimens caught by this form of entrapment in the trammel nets.

For the remaining species, in which the most frequent forms of entrapment recorded are Wedged and Gilled, the higher proportions are not as predominant as in the case of Entanglement, and in none of these species exceeded 60%.

The two species most frequently caught by being Gilled are *Solea senegalensis* and *Synaptura lusitanica*. Nevertheless in both the percentage of Wedged is relatively high. In

*Solea senegalensis* 60.09% are Gilled and 24.96% are Wedged; in *Synaptura lusitanica*, 57.24 % are Gilled and 33.79 % Wedged.

*Solea lascaris*, *Solea vulgaris* and *Plectorhincus mediterraneus* are the species in which the greater proportion are caught by being Wedged. But as in the preceding case, the proportion Wedged was not predominant in any of the three species: in *Solea lascaris*, 46.54% were Wedged and 18.87% Gilled; in *Solea vulgaris*, 50% were Wedged and 40% Gilled; and in *Plectorhincus mediterraneus*, 60 % were Wedged, with 20% Gilled and 20% Entangled.

The species *Sardina pilchardus*, *Engraulis encrasicolus*, *Scomber sp.* and *Alosa sp.* are included in the group of Entangled, although in the majority of cases, these specimens are caught first by the mouth. As they swim with the mouth open, when they encounter the thread of the net they bite this and are held trapped. They are included in this group to facilitate the task of classification, since they cannot realistically be included in either of the other two categories. In fact, after being trapped by the mouth, they usually remain Entangled in the mesh through their own movements in trying to escape.

The mean lengths of the groups caught by each of these forms, by species, do not show any clear pattern of behaviour.

#### **3.4.4. Cyclades**

The way of capture was recorded for the 30 numerically most abundant species (Table 3.4.4.1). The individuals of only two species were caught as 100% entangled, *Octopus vulgaris* and *Sepia officinalis*, whereas for the species *Labrus viridis*, *Merluccius merluccius*, *Raja radula*, *Scomber japonicus*, *Scorpaena porcus*, *Serranus scriba*, *Sparisoma cretense*, *Synodus saurus*, *Trachinus draco*, *Uranoscopus scaber* and *Zeus faber* entangling was the main way of capture, representing more than 50%. Finally, the percentage of specimens wedged was as high as that of those entangled only for *Lithognathus mormyrus* (Table 3.4.4.1). Finally, the mean TL of all specimens entangled was larger than those of specimens both gilled and wedged (Table 3.4.4.1).

**Table 3.4.4.1. Cyclades. Percentage (%n) of individuals caught as entangled, gilled and wedged, mean total length (TL, in cm) per category, percentage of individuals (%n) for which this information was not observed, and total number (N) of individuals caught.**

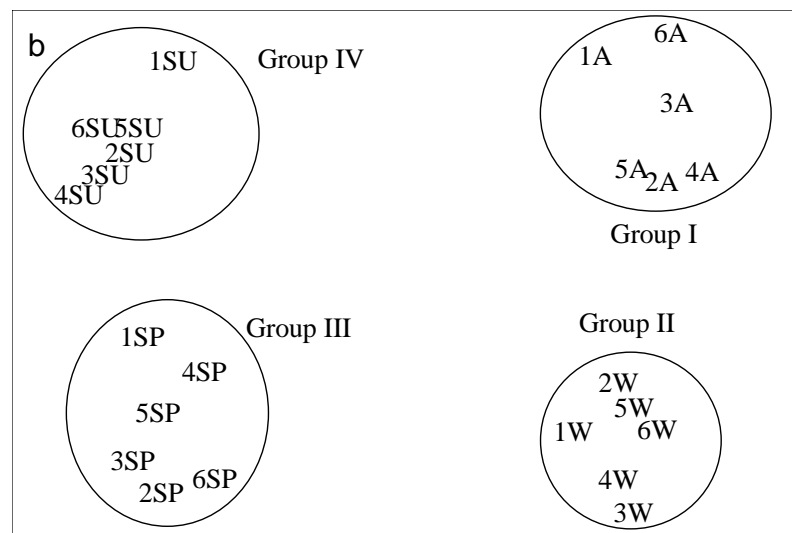
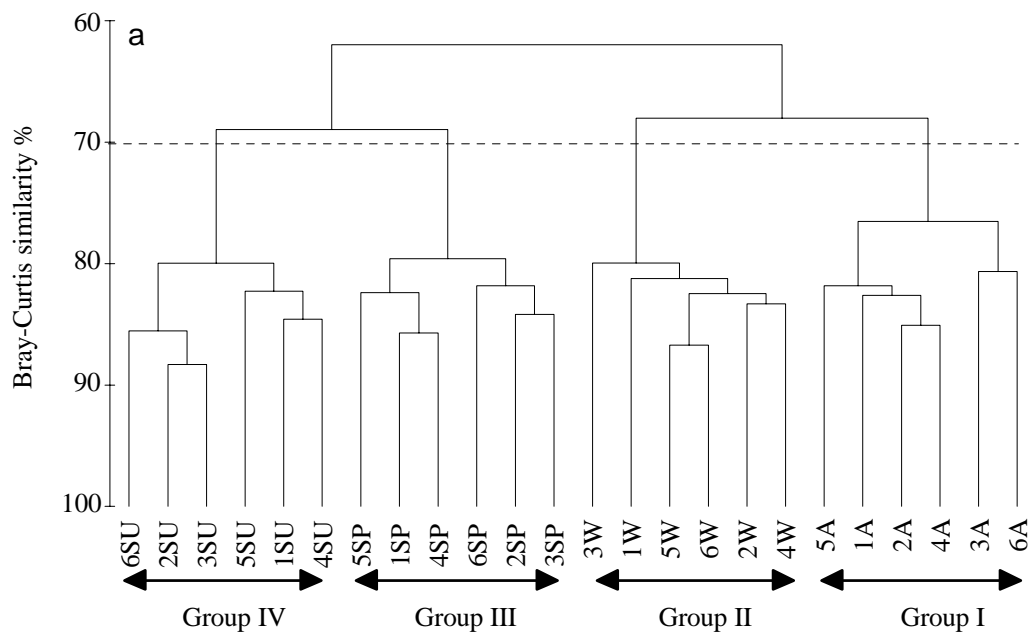
Species	Entangled		Gilled		Wedged		Non observed		N
	% n	TL	% n	TL	% n	TL	% n	TL	
<i>Boops boops</i>	<b>32.76</b>	20.3	<b>24.52</b>	20.0	<b>22.80</b>	19.3	<b>19.92</b>	19.5	522
<i>Chelidonichthys lastoviza</i>	<b>44.23</b>	16.4	<b>0.00</b>	-	<b>21.15</b>	13.9	<b>34.62</b>	17.1	52
<i>Diplodus annularis</i>	<b>36.22</b>	13.5	<b>17.45</b>	13.2	<b>28.21</b>	11.6	<b>18.11</b>	12.5	911
<i>Diplodus vulgaris</i>	<b>40.00</b>	18.3	<b>8.29</b>	17.2	<b>9.76</b>	15.4	<b>41.95</b>	19.7	205
<i>Labrus viridis</i>	<b>52.38</b>	24.2	<b>0.00</b>	-	<b>16.67</b>	20.4	<b>30.95</b>	21.6	42
<i>Lithognathus mormyrus</i>	<b>40.91</b>	15.9	<b>8.18</b>	14.1	<b>47.27</b>	13.7	<b>3.64</b>	15.1	110
<i>Merluccius merluccius</i>	<b>82.12</b>	28.9	<b>9.27</b>	23.9	<b>8.61</b>	22.2	<b>0.00</b>	-	151
<i>Mullus barbatus</i>	<b>48.37</b>	18.6	<b>14.67</b>	18.5	<b>23.91</b>	17.9	<b>13.04</b>	17.6	184
<i>Mullus surmuletus</i>	<b>26.88</b>	21.2	<b>21.58</b>	19.2	<b>18.49</b>	17.7	<b>33.05</b>	19.3	1395
<i>Octopus vulgaris</i>	<b>100.00</b>	-	<b>0.00</b>	-	<b>0.00</b>	-	<b>0.00</b>	-	72
<i>Pagellus acarne</i>	<b>36.19</b>	16.7	<b>28.45</b>	16.5	<b>28.24</b>	15.0	<b>7.11</b>	15.1	478
<i>Pagellus erythrinus</i>	<b>33.09</b>	19.5	<b>28.30</b>	18.3	<b>34.78</b>	16.3	<b>3.83</b>	18.8	1357
<i>Phycis phycis</i>	<b>38.46</b>	31.2	<b>0.00</b>	-	<b>0.00</b>	-	<b>61.54</b>	23.3	39
<i>Raja radula</i>	<b>85.00</b>	37.5	<b>0.00</b>	-	<b>0.00</b>	-	<b>15.00</b>	45.5	40
<i>Sardinella aurita</i>	<b>43.84</b>	23.7	<b>27.40</b>	22.1	<b>27.40</b>	20.2	<b>1.37</b>	15.2	73
<i>Sarpa salpa</i>	<b>42.42</b>	19.6	<b>0.00</b>	-	<b>30.30</b>	15.7	<b>27.27</b>	23.1	33
<i>Scomber japonicus</i>	<b>74.07</b>	28.7	<b>0.00</b>	-	<b>20.37</b>	26.1	<b>5.56</b>	25.1	54
<i>Scorpaena porcus</i>	<b>72.38</b>	17.2	<b>0.00</b>	-	<b>0.00</b>	-	<b>27.62</b>	16.7	858
<i>Sepia officinalis</i>	<b>100.00</b>	-	<b>0.00</b>	-	<b>0.00</b>	-	<b>0.00</b>	-	121
<i>Serranus cabrilla</i>	<b>36.14</b>	18.4	<b>27.72</b>	17.0	<b>20.03</b>	16.4	<b>16.11</b>	16.4	689
<i>Serranus scriba</i>	<b>62.92</b>	18.6	<b>0.00</b>	-	<b>20.22</b>	16.2	<b>16.85</b>	17.0	89
<i>Sparisoma cretense</i>	<b>50.00</b>	21.7	<b>2.63</b>	12.7	<b>23.68</b>	17.6	<b>23.68</b>	15.2	76
<i>Spicara maena</i>	<b>30.13</b>	18.5	<b>23.67</b>	17.9	<b>34.15</b>	17.1	<b>12.05</b>	18.4	697
<i>Spondyliosoma cantharus</i>	<b>31.76</b>	15.6	<b>0.00</b>	-	<b>21.18</b>	14.5	<b>47.06</b>	15.6	85
<i>Symphodus tinca</i>	<b>46.83</b>	19.1	<b>4.39</b>	16.8	<b>28.78</b>	16.5	<b>20.00</b>	18.3	205
<i>Synodus saurus</i>	<b>82.01</b>	27.5	<b>5.76</b>	18.7	<b>0.00</b>	-	<b>12.23</b>	25.7	139
<i>Trachinus draco</i>	<b>75.00</b>	22.5	<b>1.92</b>	14.5	<b>15.38</b>	16.7	<b>7.69</b>	20.9	52
<i>Trachurus mediterraneus</i>	<b>36.96</b>	25.1	<b>22.64</b>	23.2	<b>19.77</b>	22.9	<b>20.63</b>	24.5	349
<i>Uranoscopus scaber</i>	<b>64.63</b>	18.3	<b>0.00</b>	-	<b>0.00</b>	-	<b>35.37</b>	20.9	82
<i>Zeus faber</i>	<b>74.47</b>	20.4	<b>0.00</b>	-	<b>0.00</b>	-	<b>25.53</b>	16.0	47

### **3.5. Multivariate analyses**

#### **3.5.1. Basque Country**

The classification and ordination of the numerical matrix (all species)(6 inner/outer mesh size combinations X 4 seasons), based on double square root transformation, both indicated that, at the 70% similarity level, the 24 mesh-size/season combinations fall into four main groups, one for each sampling season (Figure 3.5.1.1). The resulting stress value for the two-dimensional plot was low (0.12), implying the adequacy of the MDS representations in these two dimensions.

Within the four main groups, the two different combinations per inner mesh size were generally grouped together, with the striking exception of the 90/500 and 90/600 mm trammel nets in summer and autumn (Figure 3.5.1.1).



**Figure 3.5.1.1. Basque Country. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch numbers per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=90/500, 2=100/500, 3=110/500, 4=90/600, 5=100/600 and 6=110/600) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).**

The four most important species contributing to the average Bray-Curtis similarity within the four groups, corresponding to the four seasons, were (Table 3.5.1.1): (a) *Trisopterus luscus*, *Solea vulgaris*, *Merluccius merluccius* and *Trigla lucerna* (cumulative contribution 26.2%) for autumn; (b) *Solea vulgaris*, *Scomber scombrus*, *Trisopterus luscus* and *Sardina pilchardus* (cumulative contribution 26.2%) for winter; (c) *Solea vulgaris*, *Trachinus draco*, *Lophius piscatorius* and *Trisopterus luscus* (cumulative contribution 18.0 %) for spring; and (d) *Trachinus draco*, *Solea vulgaris*, *Solea senegalensis* and *Sardina pilchardus* (cumulative contribution 18.5%) for summer. The main species contributing to the average Bray-Curtis dissimilarity of all possible combinations between the four groups are also shown in Table 3.5.1.1.

**Table 3.5.1.1. Basque Country. Contribution of each species to the average Bray-Curtis dissimilarity between the four groups of combinations as well as to the similarity within each of the four groups indicated by multivariate analysis.**

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 Transform: Fourth root  
 Cut off for low contributions: 40.00%

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 Autumn (Average similarity: 79.24%)

Species	Av.Abundance	Av.Sim	Sim/SD	Contrib%	Cum.%
Trisopterus luscus	14.97	5.93	15.14	7.48	7.48
Solea vulgaris	9.00	5.39	30.71	6.81	14.29
Merluccius merluccius	7.11	5.01	25.40	6.32	20.61
Trigla lucerna	4.44	4.39	17.54	5.54	26.16
Trachinus draco	3.29	4.00	17.89	5.05	31.21
Maja squinado	2.32	3.72	9.59	4.70	35.91
Microchirus variegatus	2.58	3.66	10.36	4.62	40.53

Winter (Average similarity: 81.64%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Solea vulgaris	23.53	5.93	24.68	7.26	7.26
Scomber scombrus	21.76	5.85	18.38	7.16	14.42
Trisopterus luscus	10.92	4.82	36.08	5.90	20.32
Sardina pilchardus	10.74	4.80	14.82	5.88	26.20
Microchirus variegatus	6.01	3.66	9.85	4.48	30.68
Merluccius merluccius	3.33	3.59	24.60	4.40	35.09
Trigla lucerna	2.11	3.14	24.71	3.85	38.94
Dicentrarchus labrax	1.71	2.99	28.39	3.66	42.59

Spring (Average similarity: 80.99%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Solea vulgaris	6.70	3.88	17.33	4.79	4.79
Trachinus draco	7.94	3.85	9.74	4.75	9.54
Lophius piscatorius	4.85	3.65	14.72	4.50	14.05
Trisopterus luscus	3.11	3.22	13.10	3.98	18.03
Aspitrigla obscura	2.84	3.18	18.74	3.92	21.95
Torpedo marmorata	2.12	2.93	10.24	3.61	25.56
Solea senegalensis	1.96	2.93	21.99	3.61	29.18
Merluccius merluccius	2.16	2.89	16.32	3.57	32.74
Solea lascaris	2.52	2.82	14.14	3.49	36.23
Sepia officinalis	1.60	2.72	13.93	3.35	39.58
Trigla lucerna	1.56	2.65	17.22	3.27	42.85

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(To be continued in next page)

**Table 3.5.1.1. Continued.**

Summer (Average similarity: 81.88%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Trachinus draco	10.26	4.08	15.95	4.98	4.98
Solea vulgaris	8.63	4.03	16.38	4.92	9.91
Solea senegalensis	5.94	3.68	18.36	4.49	14.40
Sardina pilchardus	5.35	3.37	11.17	4.12	18.51
Trisopterus luscus	2.93	2.94	11.26	3.59	22.10
Trigla lucerna	2.82	2.90	11.03	3.54	25.64
Trachurus trachurus	1.92	2.78	21.32	3.40	29.04
Maja squinado	1.68	2.78	38.22	3.39	32.43
Sepia officinalis	1.61	2.66	24.08	3.25	35.68
Sciaena umbra	3.12	2.64	4.64	3.22	38.90
Merluccius merluccius	1.34	2.46	13.21	3.01	41.91

Autumn and Winter (Average dissimilarity = 31.97%)

Species	Autumn		Winter		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Scomber scombrus	0.12	21.76	2.57	5.19	8.04	8.04
Sardina pilchardus	0.30	10.74	1.93	3.12	6.05	14.09
Scyliorhinus stellaris	0.91	0.00	1.35	5.15	4.23	18.32
Pleuronectes platessa	0.00	0.84	1.33	3.83	4.16	22.48
Triglidae spp.	0.04	1.76	1.27	2.91	3.98	26.46
Callionymus lyra	0.00	0.22	1.00	21.13	3.13	29.59
Aspitrigla cuculus	0.39	0.06	0.85	1.84	2.65	32.24
Dicentrarchus labrax	0.13	1.71	0.82	6.10	2.55	34.79
Solea lascaris	0.09	0.90	0.81	1.73	2.54	37.33
Solea vulgaris	9.00	23.53	0.69	5.93	2.17	39.51
Scophthalmus rhombus	0.21	0.45	0.67	1.24	2.09	41.59

Autumn and Spring (Average dissimilarity = 37.67%)

Species	Autumn		Spring		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Solea senegalensis	0.01	1.96	1.54	5.73	4.08	4.08
Diplodus sargus	0.00	0.92	1.36	11.40	3.60	7.69
Pleuronectes platessa	0.00	0.91	1.31	3.88	3.48	11.16
Scyliorhinus stellaris	0.91	0.00	1.30	5.11	3.45	14.61
Dicologlossa cuneata	0.00	0.66	1.24	7.69	3.28	17.90
Callionymus lyra	0.00	0.54	1.19	11.35	3.17	21.07
Solea lascaris	0.09	2.52	1.16	2.46	3.08	24.15
Torpedo marmorata	0.10	2.12	1.01	2.82	2.69	26.84
Sciaena umbra	1.19	0.12	0.95	1.60	2.52	29.36
Scorpaena porcus	0.00	0.35	0.93	2.12	2.47	31.83
Mugil chelo	0.00	0.34	0.92	2.07	2.43	34.27
Trisopterus luscus	14.97	3.11	0.89	4.10	2.36	36.63
Scomber japonicus	0.23	0.02	0.80	2.38	2.13	38.75
Scyliorhinus canicula	0.04	0.37	0.78	1.84	2.08	40.83

(To be continued in next page)

**Table 3.5.1.1. Continued.**

Winter and Spring (Average dissimilarity = 36.08%)

Species	Winter		Spring		Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Av.Abund			
<i>Scomber scombrus</i>	21.76	0.16	2.51	4.51	6.97	6.97	
<i>Sardina pilchardus</i>	10.74	0.10	1.96	3.70	5.44	12.40	
<i>Diplodus sargus</i>	0.00	0.92	1.26	10.94	3.50	15.91	
Triglidae spp.	1.76	0.06	1.11	2.46	3.09	18.99	
<i>Dicologoglossa cuneata</i>	0.02	0.66	1.03	3.32	2.85	21.85	
<i>Dicentrarchus labrax</i>	1.71	0.06	1.02	2.63	2.82	24.66	
<i>Aspitrigla cuculus</i>	0.06	0.92	1.01	2.44	2.80	27.47	
<i>Solea senegalensis</i>	0.11	1.96	1.01	2.29	2.80	30.27	
<i>Trisopterus minutus</i>	1.14	0.07	0.96	2.33	2.67	32.93	
<i>Scomber japonicus</i>	0.44	0.02	0.91	2.79	2.53	35.46	
<i>Mugil chelo</i>	0.00	0.34	0.85	2.07	2.37	37.83	
<i>Raja undulata</i>	0.04	0.43	0.80	1.96	2.21	40.04	

Autumn and Spring (Average dissimilarity = 40.13%)

Species	Autumn		Summer		Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Av.Abund			
<i>Solea senegalensis</i>	0.01	5.94	2.04	6.95	5.08	5.08	
<i>Microchirus variegatus</i>	2.58	0.00	1.74	9.13	4.33	9.40	
<i>Sardina pilchardus</i>	0.30	5.35	1.38	2.21	3.44	12.84	
<i>Scorpaena porcus</i>	0.00	0.74	1.29	18.64	3.22	16.06	
<i>Scylliorhinus stellaris</i>	0.91	0.00	1.28	5.20	3.20	19.26	
Boops boops	0.00	0.81	1.19	3.97	2.96	22.22	
<i>Lithognatus mormyrus</i>	0.00	0.40	1.08	7.61	2.69	24.91	
<i>Mola mola</i>	0.02	0.57	1.04	2.80	2.59	27.50	
<i>Raja undulata</i>	0.10	1.21	0.96	1.91	2.40	29.90	
<i>Trisopterus luscus</i>	14.97	2.93	0.93	3.21	2.33	32.23	
<i>Pagellus erythrinus</i>	0.03	0.60	0.93	2.16	2.31	34.54	
<i>Trisopterus minutus</i>	0.32	0.00	0.91	2.15	2.27	36.81	
<i>Scorpaena notata</i>	0.00	0.27	0.85	2.05	2.11	38.91	
<i>Merluccius merluccius</i>	7.11	1.34	0.79	4.27	1.97	40.88	

Winter and Summer (Average dissimilarity = 38.16%)

Species	Winter		Summer		Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Av.Abund			
<i>Scomber scombrus</i>	21.76	0.01	2.71	8.85	7.10	7.10	
<i>Microchirus variegatus</i>	6.01	0.00	1.95	7.21	5.12	12.22	
<i>Solea senegalensis</i>	0.11	5.94	1.48	3.17	3.88	16.10	
<i>Trisopterus minutus</i>	1.14	0.00	1.33	14.79	3.50	19.59	
<i>Pagellus erythrinus</i>	0.00	0.60	1.09	4.84	2.85	22.44	
<i>Scorpaena porcus</i>	0.01	0.74	1.08	4.28	2.83	25.28	
<i>Raja undulata</i>	0.04	1.21	1.08	2.47	2.83	28.11	
<i>Dicentrarchus labrax</i>	1.71	0.15	1.04	2.15	2.73	30.84	
<i>Lithognatus mormyrus</i>	0.00	0.40	1.01	7.50	2.64	33.48	
<i>Mola mola</i>	0.02	0.57	0.97	2.84	2.54	36.03	
<i>Trachinus draco</i>	1.44	10.26	0.90	3.02	2.37	38.40	
Boops boops	0.03	0.81	0.88	1.98	2.31	40.71	

(To be concluded in next page)

**Table 3.5.1.1. Concluded.**


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Spring and Summer (Average dissimilarity = 31.04%)

Species	Spring	Summer	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Sardina pilchardus</i>	0.10	5.35	1.46	2.77	4.71	4.71
<i>Sciaena umbra</i>	0.12	3.12	1.15	1.97	3.72	8.43
<i>Microchirus variegatus</i>	0.75	0.00	1.15	14.98	3.70	12.13
<i>Mola mola</i>	0.00	0.57	1.06	5.86	3.40	15.53
<i>Lophius piscatorius</i>	4.85	0.62	0.78	4.07	2.52	18.05
<i>Scomber japonicus</i>	0.02	0.27	0.75	2.49	2.42	20.47
<i>Mugil chelo</i>	0.34	0.10	0.73	1.69	2.36	22.84
<i>Dicologlossa cuneata</i>	0.66	0.14	0.70	1.57	2.25	25.08
<i>Callionymus lyra</i>	0.54	0.07	0.69	1.71	2.22	27.30
<i>Scorpaena notata</i>	0.03	0.27	0.68	1.69	2.20	29.50
<i>Spondiliosoma cantharus</i>	0.17	0.01	0.66	2.44	2.12	31.62
<i>Engraulis encrasicolus</i>	0.00	0.15	0.65	2.06	2.10	33.72
<i>Cancer pagurus</i>	0.41	0.05	0.62	1.56	2.01	35.73
<i>Diplodus sargus</i>	0.92	0.16	0.62	1.46	2.00	37.73
Triglidae spp.	0.06	0.41	0.61	1.44	1.98	39.71
<i>Lithognatus mormyrus</i>	0.08	0.40	0.61	1.51	1.95	41.66

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### 3.5.2. Algarve

The classification and ordination of the numerical matrix (all species)(6 inner/outer mesh size combinations X 4 seasons), based on double square root transformation, generally indicated that, at the 67% similarity level, the 24 mesh-size/season combinations fall into four main groups, corresponding to the four sampling seasons (Figure 3.5.2.1). A similar pattern was revealed from the classification and ordination of the weight matrix (Figure 3.5.2.2), also at the 67% similarity level. The stress values for the two-dimensional plots were low, 0.13 and 0.14 for numbers and weights respectively, implying the adequacy of the MDS representation in two dimensions.

Within the four main groups, the two different combinations per inner mesh size were generally grouped together, with few exceptions (i.e., 100/600 and 100/800 mm trammel nets in autumn in terms of both numbers and weight; 140/600 and 140/800 mm trammel nets in winter, spring and summer in terms of numbers and in summer and spring in terms of weight; Figure 3.5.2.1 and 3.5.2.2).

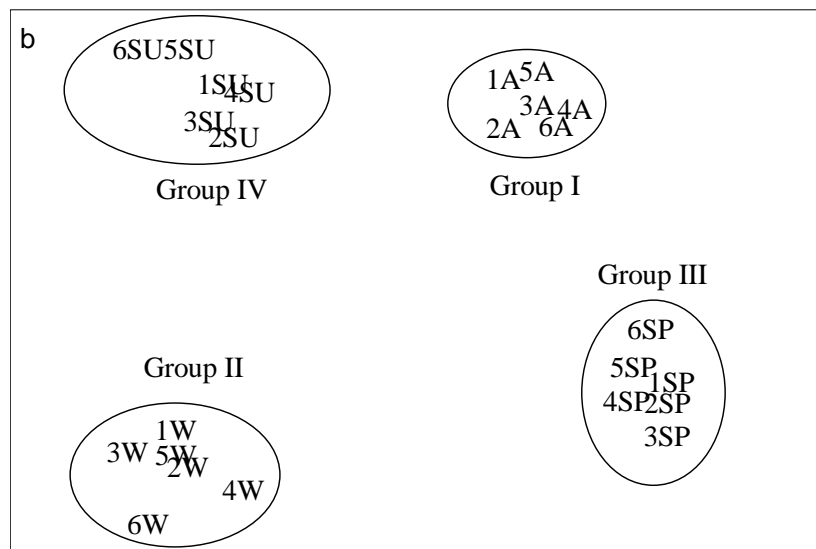
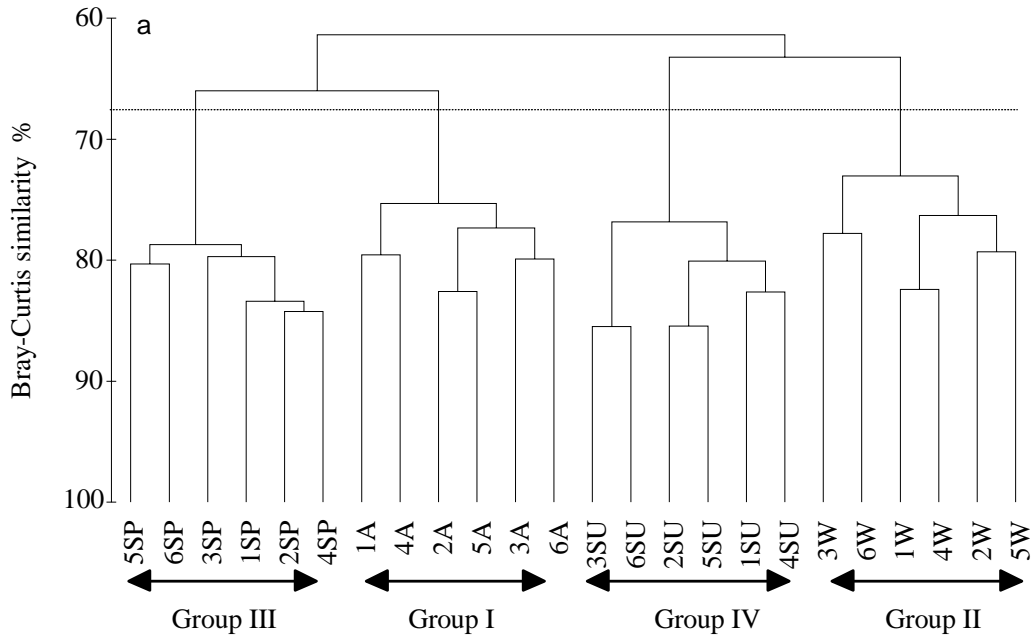
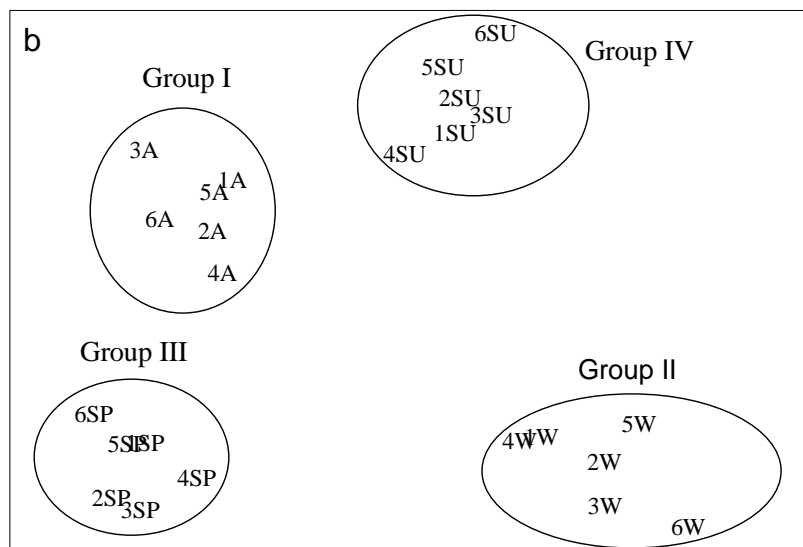
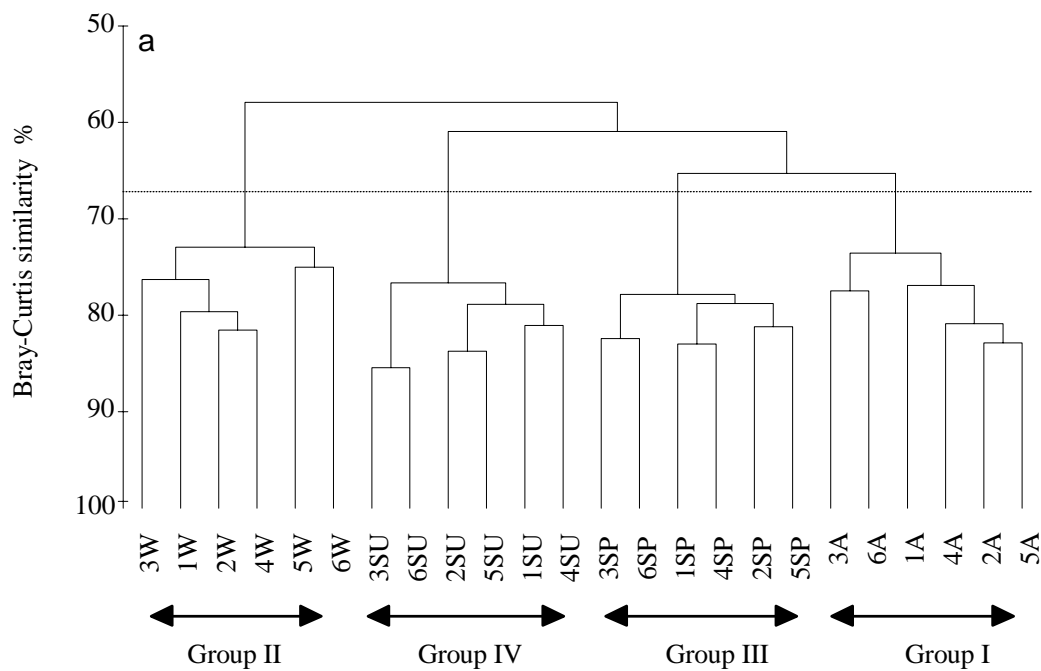


Figure 3.5.2.1. Algarve. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch numbers per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=100/600, 2=120/600, 3=140/600, 4=100/800, 5=120/800 and 6=140/800) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).



**Figure 3.5.2.2. Algarve. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch weights (g) per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=100/600, 2=120/600, 3=140/600, 4=100/800, 5=120/800 and 6=140/800) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).**

The four most important species contributing to the average Bray-Curtis similarity of the four groups, corresponding to the four sampling seasons, were (Table 3.5.2.1): (a) *Scomber japonicus*, *Sardina pilchardus*, *Sepia officinalis* and *Microchirus azevia* (cumulative contribution 16.7%) for autumn; (b) *Trachinus draco*, *Microchirus azevia*, *Solea senegalensis*

and *Sepia officinalis* (cumulative contribution 17.2%) for winter; (c) *Phycis phycis*, *Scomber scombrus*, *Scomber japonicus* and *Microchirus azevia* (cumulative contribution 16.1 %) for spring; and (d) *Sepia officinalis*, *Scomber japonicus*, *Microchirus azevia* and *Sardina pilchardus* (cumulative contribution 22.1%). The main species contributing to the average Bray-Curtis dissimilarity of all possible combinations between the four seasons are also shown in Table 3.5.2.1.

**Table 3.5.2.1. Algarve. Contribution of each species to the average Bray-Curtis dissimilarity between the four groups of combinations as well as to the similarity within each of the four groups indicated by multivariate analysis.**

Transform: Fourth root

Cut off for low contributions: 40.00%

Autumn (Average similarity: 76.92%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Scomber japonicus</i>	14.91	3.85	8.48	5.01	5.01
<i>Sardina pilchardus</i>	8.64	3.16	7.15	4.10	9.11
<i>Sepia officinalis</i>	4.85	2.95	8.99	3.84	12.95
<i>Microchirus azevia</i>	4.37	2.87	21.95	3.74	16.68
<i>Boops boops</i>	6.00	2.52	4.98	3.28	19.96
<i>Pagellus acarne</i>	2.32	2.44	21.41	3.17	23.13
<i>Phycis phycis</i>	2.05	2.38	14.82	3.10	26.23
<i>Maja squinado</i>	1.41	2.19	10.58	2.85	29.08
<i>Merluccius merluccius</i>	1.31	2.17	15.17	2.83	31.90
<i>Scorpaena notata</i>	3.44	2.11	4.27	2.75	34.65
<i>Chelidonichthys lastoviza</i>	2.33	2.01	4.69	2.61	37.26
<i>Chelidonichthys obscurus</i>	1.03	1.92	23.07	2.50	39.76
<i>Trachurus trachurus</i>	1.65	1.89	5.49	2.46	42.22

Winter (Average similarity: 75.27%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Trachinus draco</i>	6.36	3.63	19.75	4.82	4.82
<i>Microchirus azevia</i>	3.44	3.17	16.87	4.21	9.04
<i>Solea senegalensis</i>	3.61	3.07	11.95	4.07	13.11
<i>Sepia officinalis</i>	3.04	3.04	26.00	4.04	17.15
<i>Scomber japonicus</i>	2.09	2.61	7.03	3.47	20.62
<i>Raja undulata</i>	1.91	2.51	5.67	3.33	23.95
<i>Chelidonichthys obscurus</i>	1.57	2.50	7.27	3.33	27.28
<i>Pagellus erythrinus</i>	1.20	2.39	10.85	3.17	30.45
<i>Scorpaena notata</i>	2.40	2.37	6.99	3.14	33.60
<i>Halobatrachus didactylus</i>	1.69	2.26	6.37	3.00	36.60
<i>Spondyliosoma cantharus</i>	0.88	2.23	18.16	2.96	39.55
<i>Balistes carolinensis</i>	0.84	2.18	7.16	2.89	42.44

Spring (Average similarity: 80.01%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Phycis phycis</i>	4.32	3.42	18.89	4.27	4.27
<i>Scomber scombrus</i>	3.19	3.23	13.25	4.03	8.30
<i>Scomber japonicus</i>	7.08	3.16	5.44	3.95	12.25
<i>Microchirus azevia</i>	3.19	3.08	10.61	3.85	16.10
<i>Pagellus acarne</i>	1.87	2.87	27.23	3.59	19.69
<i>Merluccius merluccius</i>	1.68	2.80	31.52	3.50	23.19
<i>Trachinus draco</i>	1.48	2.60	18.29	3.26	26.45
<i>Boops boops</i>	1.41	2.49	13.50	3.11	29.56
<i>Trachurus trachurus</i>	1.51	2.46	6.16	3.08	32.64
<i>Sardina pilchardus</i>	1.44	2.36	4.93	2.95	35.60
<i>Chelidonichthys obscurus</i>	0.89	2.31	9.84	2.88	38.48
<i>Sepia officinalis</i>	0.84	2.29	9.95	2.86	41.34

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**Table 3.5.2.1. Continued.**

Summer (Average similarity: 79.23%)						
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%	
<i>Sepia officinalis</i>	19.17	5.20	14.76	6.56	6.56	
<i>Scomber japonicus</i>	10.29	4.39	7.79	5.54	12.11	
<i>Microchirus azevia</i>	8.76	4.02	14.96	5.08	17.18	
<i>Sardina pilchardus</i>	8.61	3.90	9.01	4.92	22.10	
<i>Chelidonichthys obscurus</i>	3.84	3.13	10.81	3.94	26.05	
<i>Solea vulgaris</i>	2.53	2.91	8.42	3.67	29.72	
<i>Solea senegalensis</i>	1.47	2.68	7.33	3.38	33.10	
<i>Merluccius merluccius</i>	1.41	2.65	8.77	3.35	36.45	
<i>Trachinus draco</i>	1.35	2.61	10.45	3.29	39.74	
<i>Octopus vulgaris</i>	1.15	2.47	10.17	3.12	42.86	

Autumn and Winter (Average dissimilarity = 38.98%)						
Species	Autumn	Winter	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Boops boops</i>	6.00	0.12	1.05	2.21	2.69	2.69
<i>Solea senegalensis</i>	0.16	3.61	1.02	2.32	2.62	5.32
<i>Trachinus draco</i>	0.29	6.36	0.97	5.43	2.49	7.81
<i>Sardina pilchardus</i>	8.64	0.52	0.96	2.83	2.46	10.27
<i>Halobatrachus didactylus</i>	0.07	1.69	0.89	2.03	2.29	12.56
<i>Scomber japonicus</i>	14.91	2.09	0.86	3.15	2.22	14.78
<i>Labrus bergylta</i>	0.51	0.01	0.82	3.12	2.10	16.88
<i>Solea lascaris</i>	0.03	0.75	0.80	2.19	2.04	18.93
<i>Raja clavata</i>	0.44	0.01	0.77	2.61	1.97	20.90
<i>Lithognathus mormyrus</i>	0.01	0.33	0.75	2.80	1.92	22.81
<i>Callionymus lyra</i>	0.03	0.53	0.71	2.09	1.83	24.65
<i>Scorpaena porcus</i>	0.29	0.00	0.69	2.06	1.76	26.41
<i>Hexaplex trunculus</i>	0.32	0.00	0.68	1.98	1.75	28.16
<i>Liza aurata</i>	0.28	0.00	0.68	2.08	1.75	29.91
<i>Diplodus bellottii</i>	0.03	0.40	0.65	1.91	1.67	31.59
<i>Trisopterus luscus</i>	0.32	0.03	0.64	2.00	1.63	33.22
<i>Scomber scombrus</i>	0.72	0.05	0.61	1.55	1.55	34.77
<i>Raja brachyura</i>	0.52	0.05	0.59	1.63	1.52	36.29
<i>Bothus podas</i>	0.05	0.41	0.57	1.38	1.47	37.77
<i>Chelidonichthys lastoviza</i>	2.33	0.52	0.55	1.23	1.40	39.17
<i>Solea vulgaris</i>	0.37	0.05	0.54	1.57	1.40	40.57

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**Table 3.5.2.1. Continued.**

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Autumn and Spring (Average dissimilarity = 34.00%)

Species	Autumn	Spring	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Labrus bergylta	0.51	0.00	0.94	7.51	2.76	2.76
Scyliorhinus canicula	0.03	0.79	0.87	2.61	2.56	5.31
Sparus aurata	0.25	0.00	0.80	6.90	2.35	7.67
Solea vulgaris	0.37	0.01	0.78	2.96	2.29	9.96
Raja brachyura	0.52	0.04	0.71	1.95	2.08	12.04
Hexaplex trunculus	0.32	0.00	0.70	1.99	2.05	14.08
Pagrus auriga	0.24	0.01	0.70	2.91	2.05	16.13
Sardina pilchardus	8.64	1.44	0.69	1.93	2.04	18.17
Liza aurata	0.28	0.00	0.69	2.09	2.04	20.22
Balistes carolinensis	0.20	0.00	0.64	2.03	1.89	22.10
Chelidonichthys lastoviza	2.33	0.28	0.63	1.47	1.86	23.96
Halobatrachus didactylus	0.07	0.55	0.62	1.50	1.82	25.78
Mola mola	0.16	0.00	0.62	1.98	1.82	27.60
Scomber japonicus	14.91	7.08	0.61	1.62	1.80	29.40
Dentex macrophthalmus	0.00	0.16	0.61	2.05	1.80	31.20
Sepia officinalis	4.85	0.84	0.60	3.30	1.78	32.97
Scomber scombrus	0.72	3.19	0.59	2.21	1.74	34.71
Pagellus bogaraveo	0.00	0.08	0.53	2.14	1.56	36.27
Charonia lampas	0.79	0.08	0.53	1.86	1.55	37.82
Scorpaena notata	3.44	0.89	0.52	1.55	1.53	39.34
Torpedo marmorata	0.16	0.03	0.49	1.49	1.45	40.80

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Winter and Spring (Average dissimilarity = 41.35%)

Species	Winter	Spring	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Scomber scombrus	0.05	3.19	1.29	3.60	3.12	3.12
Balistes carolinensis	0.84	0.00	1.17	8.14	2.84	5.96
Scyliorhinus canicula	0.00	0.79	1.15	7.95	2.77	8.73
Callionymus lyra	0.53	0.00	1.00	5.67	2.41	11.14
Solea lascaris	0.75	0.01	0.98	2.92	2.36	13.50
Diplodus bellottii	0.40	0.00	0.92	5.53	2.23	15.73
Trisopterus luscus	0.03	0.57	0.84	2.38	2.04	17.78
Scorpaena porcus	0.00	0.23	0.80	4.41	1.93	19.71
Lithognathus mormyrus	0.33	0.03	0.80	2.60	1.93	21.64
Phycis phycis	0.53	4.32	0.74	3.36	1.80	23.44
Mullus surmuletus	0.01	0.23	0.72	2.56	1.75	25.18
Dentex maroccanus	0.00	0.27	0.71	1.89	1.73	26.91
Boops boops	0.12	1.41	0.70	2.16	1.70	28.61
Bothus podas	0.41	0.00	0.70	1.38	1.70	30.31
Scophthalmus rhombus	0.25	0.01	0.68	1.73	1.63	31.94
Solea senegalensis	3.61	0.47	0.66	3.41	1.61	33.55
Dentex macrophthalmus	0.00	0.16	0.66	2.05	1.59	35.13
Raja undulata	1.91	0.29	0.65	1.50	1.58	36.71
Trachurus trachurus	0.12	1.51	0.61	2.97	1.48	38.19
Torpedo torpedo	0.20	0.00	0.60	1.32	1.44	39.63
Merluccius merluccius	0.21	1.68	0.59	4.34	1.44	41.07

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(To be continued in next page)

**Table 3.5.2.1. Algarve. Continued.**

Autumn and Summer (Average dissimilarity = 34.60%)						
Species	Autumn	Summer	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Labrus bergylta	0.51	0.03	0.84	2.60	2.42	2.42
Sparus aurata	0.25	0.00	0.81	6.38	2.34	4.76
Raja miraletus	0.20	0.00	0.75	5.01	2.18	6.94
Solea senegalensis	0.16	1.47	0.75	1.69	2.16	9.10
Boops boops	6.00	0.49	0.74	1.59	2.13	11.22
Callionymus lyra	0.03	0.56	0.73	2.04	2.11	13.33
Scorpaena porcus	0.29	0.00	0.71	2.05	2.05	15.38
Sepia officinalis	4.85	19.17	0.71	4.26	2.04	17.42
Hexaplex trunculus	0.32	0.00	0.71	1.98	2.04	19.46
Pagrus auriga	0.24	0.01	0.70	2.87	2.03	21.50
Halobatrachus didactylus	0.07	0.81	0.70	1.64	2.02	23.51
Scorpaena notata	3.44	0.59	0.68	1.37	1.97	25.48
Palinurus elephas	0.21	0.01	0.68	2.65	1.96	27.44
Lepidotrigla cavillone	0.00	0.23	0.67	2.03	1.94	29.38
Maja squinado	1.41	0.13	0.66	2.49	1.91	31.29
Liza aurata	0.28	0.01	0.64	1.78	1.85	33.14
Pagrus pagrus	0.23	0.01	0.63	1.80	1.81	34.95
Torpedo torpedo	0.03	0.21	0.62	1.65	1.78	36.73
Raja brachyura	0.52	0.05	0.61	1.64	1.78	38.51
Dicologlossa cuneata	0.00	0.17	0.60	2.04	1.73	40.24

Winter and Summer (Average dissimilarity = 36.77%)						
Species	Winter	Summer	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Solea vulgaris	0.05	2.53	1.19	2.89	3.23	3.23
Sardina pilchardus	0.52	8.61	1.07	3.07	2.90	6.12
Sepia officinalis	3.04	19.17	0.97	5.11	2.63	8.75
Lithognathus mormyrus	0.33	0.00	0.93	6.37	2.54	11.29
Palinurus elephas	0.39	0.01	0.85	2.93	2.31	13.61
Balistes carolinensis	0.84	0.07	0.82	1.96	2.23	15.83
Scomber japonicus	2.09	10.29	0.76	2.72	2.06	17.90
Scomber scombrus	0.05	0.63	0.73	1.89	1.99	19.89
Lepidotrigla cavillone	0.00	0.23	0.72	2.03	1.96	21.85
Bothus podas	0.41	0.01	0.68	1.38	1.85	23.70
Pagrus pagrus	0.24	0.01	0.68	1.81	1.85	25.56
Spondylisoma cantharus	0.88	0.16	0.68	1.45	1.84	27.40
Raja clavata	0.01	0.16	0.66	2.39	1.79	29.19
Psetta maxima	0.15	0.00	0.65	2.04	1.78	30.97
Conger conger	0.13	0.01	0.65	2.36	1.77	32.74
Trachinus draco	6.36	1.35	0.64	2.95	1.75	34.49
Scorpaena notata	2.40	0.59	0.62	1.25	1.69	36.18
Diplodus bellottii	0.40	0.07	0.61	1.48	1.66	37.83
Pagellus erythrinus	1.20	0.20	0.59	1.45	1.61	39.44
Trisopterus luscus	0.03	0.24	0.57	1.46	1.56	41.00

(To be concluded in next page)

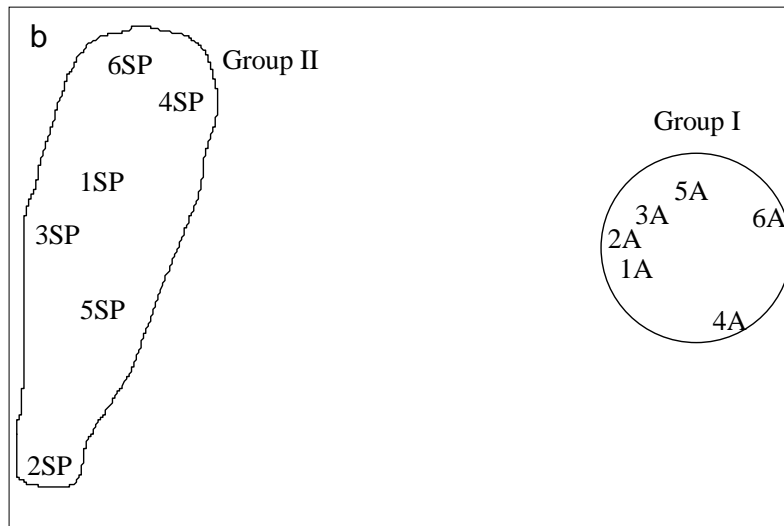
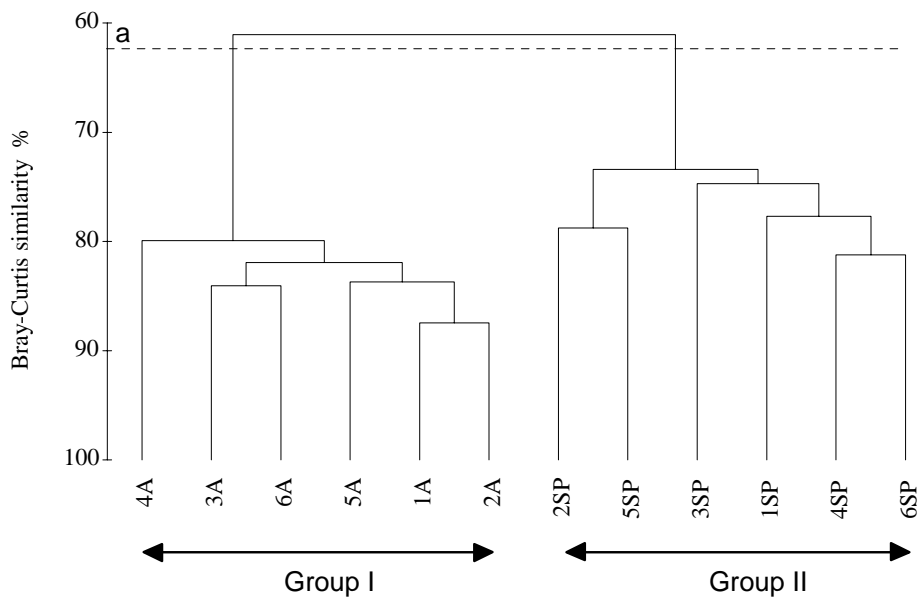
**Table 3.5.2.1. Algarve. Concluded.**

Spring and Summer (Average dissimilarity = 39.53%)							
Species	Spring		Summer		Av.Diss	Diss/SD	Contrib% Cum.%
	Av.Abund	Av.Abund	Av.Abund	Av.Abund			
<i>Solea vulgaris</i>	0.01	2.53	1.46	4.53	3.69	3.69	
<i>Sepia officinalis</i>	0.84	19.17	1.45	9.44	3.66	7.35	
<i>Scyliorhinus canicula</i>	0.79	0.00	1.19	7.39	3.00	10.35	
<i>Callionymus lyra</i>	0.00	0.56	1.02	5.48	2.58	12.93	
<i>Pagrus pagrus</i>	0.48	0.01	0.92	2.96	2.34	15.27	
<i>Scophthalmus rhombus</i>	0.01	0.36	0.85	2.62	2.15	17.43	
<i>Scorpaena porcus</i>	0.23	0.00	0.83	4.30	2.09	19.52	
<i>Palinurus elephas</i>	0.29	0.01	0.82	2.94	2.06	21.58	
<i>Raja miraletus</i>	0.17	0.00	0.80	6.00	2.03	23.61	
<i>Phycis phycis</i>	4.32	0.49	0.79	3.25	2.01	25.62	
<i>Sardina pilchardus</i>	1.44	8.61	0.77	2.05	1.95	27.57	
<i>Torpedo torpedo</i>	0.00	0.21	0.76	2.12	1.93	29.50	
<i>Dentex maroccanus</i>	0.27	0.00	0.74	1.88	1.87	31.37	
<i>Lepidotrigla cavillone</i>	0.00	0.23	0.74	2.04	1.86	33.23	
<i>Dentex macrophthalmus</i>	0.16	0.00	0.68	2.04	1.72	34.95	
<i>Dicologlossa cuneata</i>	0.00	0.17	0.65	2.06	1.65	36.60	
<i>Mullus surmuletus</i>	0.23	0.03	0.64	1.76	1.62	38.22	
<i>Citharus linguatula</i>	0.67	0.11	0.61	1.34	1.53	39.75	
<i>Lophius piscatorius</i>	0.09	0.00	0.60	2.08	1.53	41.28	

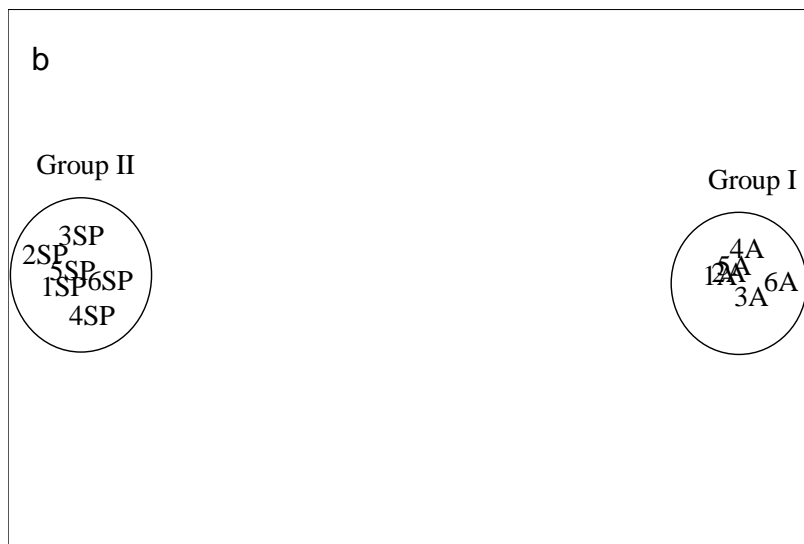
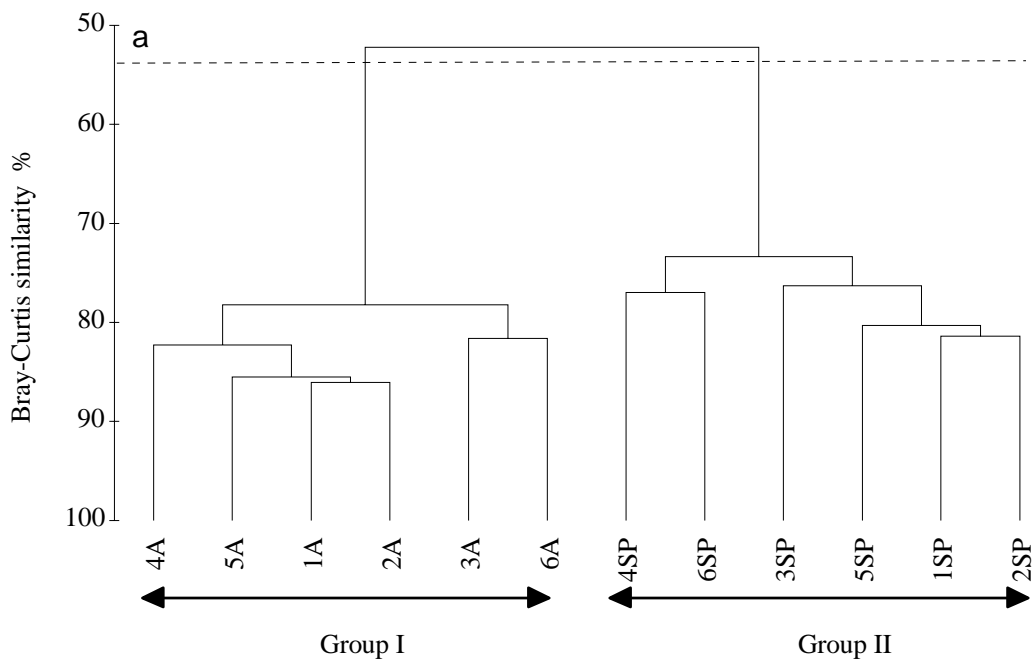
### 3.5.3. Gulf of Cádiz

The classification and ordination of the numerical matrix (all species)(6 inner/outer mesh size combinations X 2 seasons), based on double square root transformation, indicated that, at the 62% similarity level, the 12 mesh-size/season combinations fall into two main groups, corresponding to the autumn and spring sampling periods (Figure 3.5.3.1). A similar pattern was revealed from the classification and ordination of the weight matrix (Figure 3.5.3.2), at the 54% similarity level. The stress values for the two-dimensional plots were very low, 0.01 and 0.06 for the numerical and weight matrices respectively, implying the adequacy of the MDS representations in two dimensions.

Within the two groups, the two different combinations per inner mesh size were generally grouped together, with the exception of the 100/300 and 100/400 mm trammel nets in both seasons in terms of numbers (Figure 3.5.1.1).



**Figure 3.5.3.1. Cadiz. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch numbers per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=80/300, 2=90/300, 3=100/300, 4=80/400, 5=90/400 and 6=100/400) per season (A=Autumn, and SP=Spring).**



**Figure 3.5.3.2. Cadiz. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch weights (g) per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=80/300, 2=90/300, 3=100/300, 4=80/400, 5=90/400 and 6=100/400) per season (A=Autumn, and SP=Spring).**

The four most important species contributing to the average Bray-Curtis similarity within the two groups, corresponding to spring and autumn, were (Table 3.5.3.1): (a) *Sepia officinalis*, *Solea senegalensis*, *Synaptura lusitanica* and *Sardina pilchardus* (cumulative contribution 32.9%) for spring; and (b) *Torpedo torpedo*, *Sardina pilchardus*, *Solea senegalensis* and *Sepia officinalis* (cumulative contribution 22.0%) for autumn. The main species contributing to the average Bray-Curtis dissimilarity between the two groups are also shown in Table 3.5.3.1.

**Table 3.5.3.1. Gulf of Cádiz. Contribution of each species to the average Bray-Curtis dissimilarity between the four groups of combinations as well as to the similarity within each of the four groups indicated by multivariate analysis.**

Transform: Fourth root

Cut off for low contributions: 40.00%

Spring (Average similarity: 75.11%)

Species	Av. Abund	Av. Sim	Sim/SD	Contrib%	Cum. %
<i>Sepia officinalis</i>	33.68	9.15	9.53	12.19	12.19
<i>Solea senegalensis</i>	2.81	5.39	14.55	7.18	19.37
<i>Synaptura lusitanica</i>	2.56	5.10	10.55	6.79	26.16
<i>Sardina pilchardus</i>	2.34	5.05	14.43	6.72	32.88
<i>Diplodus bellottii</i>	1.02	3.93	10.45	5.23	38.11
<i>Torpedo marmorata</i>	0.85	3.69	10.88	4.91	43.02

Autumn (Average similarity: 82.01%)

Species	Av. Abund	Av. Sim	Sim/SD	Contrib%	Cum. %
<i>Torpedo torpedo</i>	5.21	5.03	24.50	6.13	6.13
<i>Sardina pilchardus</i>	4.13	4.49	12.41	5.47	11.60
<i>Solea senegalensis</i>	4.20	4.41	22.45	5.37	16.98
<i>Sepia officinalis</i>	3.90	4.08	7.41	4.98	21.96
<i>Halobatrachus didactylus</i>	2.73	4.04	16.29	4.93	26.89
<i>Solea lascaris</i>	3.37	3.86	7.31	4.71	31.60
<i>Raja asterias</i>	1.77	3.72	9.63	4.54	36.13
<i>Argyrosomus regius</i>	1.72	3.69	21.67	4.50	40.63

Spring and Autumn (Average dissimilarity = 38.95%)

Species	Spring		Autumn		Contrib%	Cum. %
	Av. Abund	Av. Abund	Av. Diss	Diss/SD		
<i>Sepia officinalis</i>	33.68	3.90	1.88	2.61	4.83	4.83
<i>Solea lascaris</i>	0.06	3.37	1.77	2.58	4.56	9.38
<i>Argyrosomus regius</i>	0.05	1.72	1.63	2.67	4.17	13.56
<i>Diplodus sargus</i>	0.02	0.82	1.49	2.79	3.83	17.39
<i>Scophthalmus rhombus</i>	0.04	1.16	1.41	3.05	3.63	21.02
<i>Mugil cephalus</i>	0.10	1.44	1.33	2.14	3.41	24.43
<i>Dicentrarchus punctatus</i>	0.00	0.25	1.26	6.21	3.23	27.67
<i>Torpedo torpedo</i>	0.56	5.21	1.26	5.28	3.23	30.90
<i>Pagellus acarne</i>	0.31	0.01	1.25	3.30	3.20	34.10
<i>Alosa fallax</i>	0.01	0.26	1.15	2.72	2.96	37.06
<i>Sciaena umbra</i>	0.00	0.11	1.06	8.75	2.73	39.80
<i>Dicentrarchus labrax</i>	0.02	0.28	1.04	1.96	2.66	42.46

### 3.5.4. Cyclades

The classification of the numerical matrix (all species) (6 inner/outer mesh size combinations X 4 seasons), based on double square root transformation, generally indicated that, at the 62% similarity level, the 24 mesh-size/season combinations fall into two main groups (Figure 3.5.4.1a). Group I was composed of all mesh size combinations in winter and autumn, with the exception of the 40/220 and 40/240 mm trammel nets in winter and autumn

that were grouped with Group II, which included all inner/outer panel mesh size combinations for spring and summer. The result of the ordination of the numerical matrix generally agreed with those of the cluster analysis (Figure 3.5.4.1b). From the two-dimensional plot was evident that the 40/220 and 40/240 mm trammel nets in winter and autumn made up a subgroup by themselves.

A similar pattern was identified from the classification and ordination of the weight matrix (Figure 3.5.4.2) also at the 62% similarity level. The only exception was that in this case the 40/220 and 40/240 mm trammel nets in winter made up a third group by themselves. For the purposes of the present analysis we considered the 40/220 mm and 40/240 mm trammel nets in winter and autumn as a separate group (i.e., Group III). In all cases, the resulting stress values for the two-dimensional plots were low, 0.16 and 0.18 for the numerical and weight plots respectively, implying the adequacy of the MDS representations in these two dimensions. Within the main groups identified, the two combinations for each of the two inner mesh sizes were always grouped together (Figures 3.5.4.1 and 3.5.4.2).

The four most important species contributing to the average Bray-Curtis similarity between the three groups, shown in figure 3.5.4.2, were (Table 3.5.4.1): (a) *Diplodus annularis*, *Mullus surmuletus*, *Scorpaena porcus* and *Spicara maena* (cumulative contribution 31.9%) for the winter-autumn group (Group I); (b) *Mullus surmuletus*, *Serranus cabrilla*, *Diplodus annularis* and *Boops boops* (cumulative contribution 31.3%) for the 40/220-240 mm trammel net group (Group III; the *Mullus surmuletus* métier); and (c) *Pagellus erythrinus*, *Scorpaena porcus*, *Diplodus annularis* and *Mullus surmuletus* (cumulative contribution 26.0%) for the spring-summer group (Group II). The main species contributing to the average Bray-Curtis dissimilarity of all possible combinations of groups are also shown in Table 3.5.4.1.

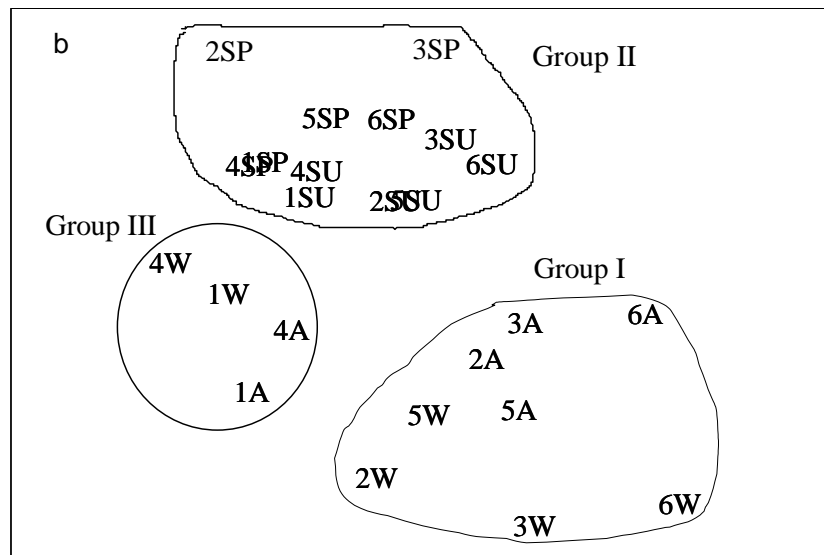
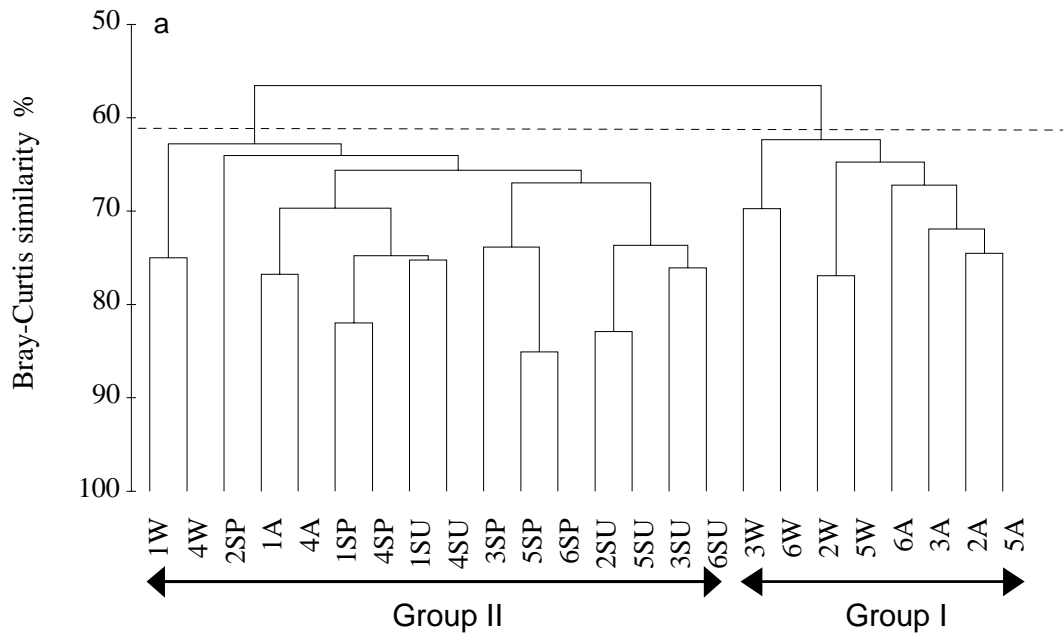


Figure 3.5.4.1. Cyclades. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch numbers per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched, mm; 1=40/220, 2=48/240, 3=56/280, 4=40/240, 5=48/260 and 6=56/300) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).

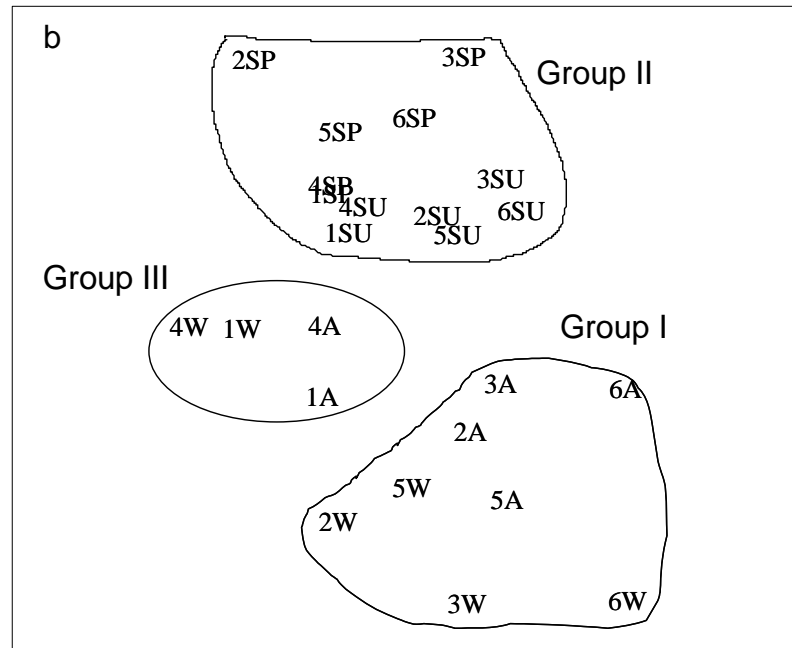
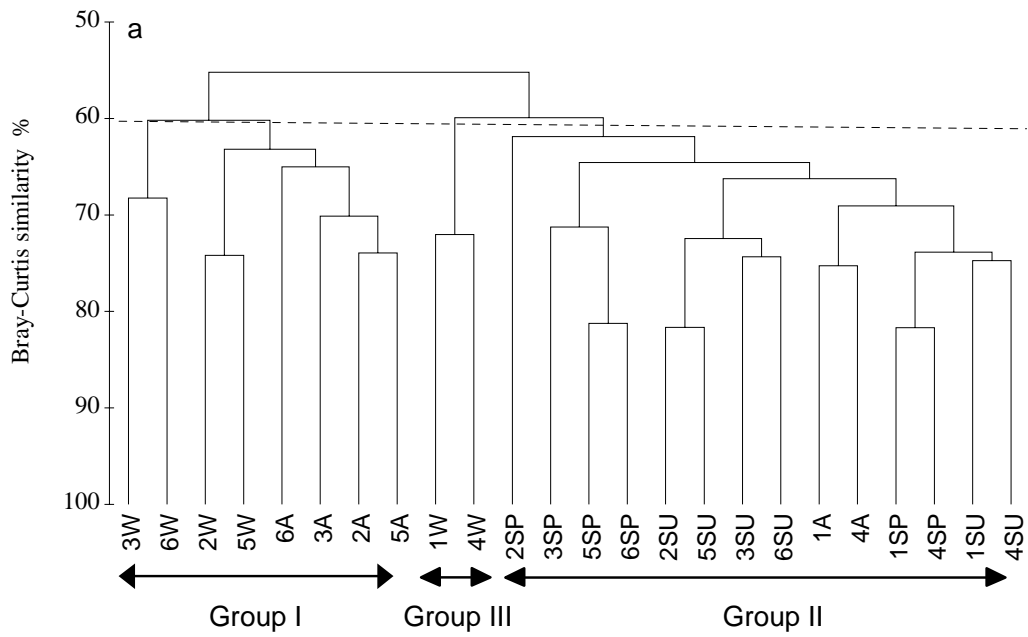


Figure 3.5.4.2. Cyclades. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch weights (g) per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes (stretched in mm; 1=40/220, 2=48/240, 3=56/280, 4=40/240, 5=48/260 and 6=56/300) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).

**Table 3.5.4.1. Cyclades. Contribution of each species to the average Bray-Curtis dissimilarity between the four groups of combinations as well as to the similarity within each of the four groups indicated by multivariate analysis.**

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Transform: Fourth root  
 Cut off for low contributions: 40.00%  
 Factor name: GROUP OF CLUSTERS

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40/220-240 mm (Average similarity: 67.43%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Mullus surmuletus	17.20	6.90	15.09	10.24	10.24
Serranus cabrilla	5.90	5.32	12.64	7.90	18.14
Diplodus annularis	4.55	4.55	9.83	6.75	24.89
Boops boops	3.60	4.30	14.21	6.38	31.27
Spicara maena	4.20	4.19	6.32	6.22	37.48
Scorpaena porcus	2.15	3.83	5.73	5.68	43.16

Winter-Autumn (Average similarity: 65.44%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Diplodus annularis	3.84	5.63	7.46	8.60	8.60
Mullus surmuletus	5.15	5.54	7.52	8.47	17.07
Scorpaena porcus	2.58	5.08	6.30	7.76	24.83
Spicara maena	3.65	4.60	3.66	7.03	31.85
Sepia officinalis	1.32	4.22	4.32	6.45	38.30
Symphodus tinca	1.51	3.90	5.28	5.96	44.26

Spring-Summer (Average similarity: 69.53%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Pagellus erythrinus	10.70	5.10	6.95	7.33	7.33
Scorpaena porcus	5.70	4.43	9.01	6.37	13.71
Diplodus annularis	5.38	4.29	6.08	6.18	19.88
Mullus surmuletus	6.52	4.28	9.35	6.16	26.04
Spicara maena	4.03	4.11	6.76	5.91	31.95
Serranus cabrilla	4.64	3.77	6.30	5.43	37.37
Pagellus acarne	3.60	3.52	5.95	5.06	42.43

(To be concluded in next page)

**Table 3.5.4.1. Concluded.**

40/220-240 mm and Winter-Autumn (Average dissimilarity = 41.92%)

Species	40/220-240mm		Winter-Autumn		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Serranus cabrilla	5.90	0.34	1.91	2.24	4.55	4.55
Spondyliosoma cantharus	0.05	1.05	1.47	2.02	3.51	8.05
Mullus barbatus	1.10	0.00	1.38	1.24	3.30	11.35
Xyrichthys novacula	0.60	0.15	1.34	1.82	3.20	14.55
Pagellus acarne	1.85	0.08	1.34	1.21	3.19	17.75
Synodus saurus	1.10	0.10	1.30	1.82	3.10	20.84
Sardinella aurita	1.30	0.05	1.22	1.10	2.92	23.76
Mullus surmuletus	17.20	5.15	1.18	1.83	2.81	26.57
Sparisoma cretense	0.68	0.08	1.17	1.36	2.79	29.36
Serranus scriba	0.60	0.11	1.06	1.27	2.52	31.89
Trachurus mediterraneus	2.22	0.61	1.06	1.61	2.52	34.40
Bothus podas	0.22	0.05	1.04	1.71	2.49	36.89
Zeus faber	0.05	0.35	1.01	1.34	2.40	39.30
Symphodus mediterraneus	0.15	0.00	1.01	1.67	2.40	41.70

40/220-240 mm and Spring-Summer (Average dissimilarity = 37.37%)

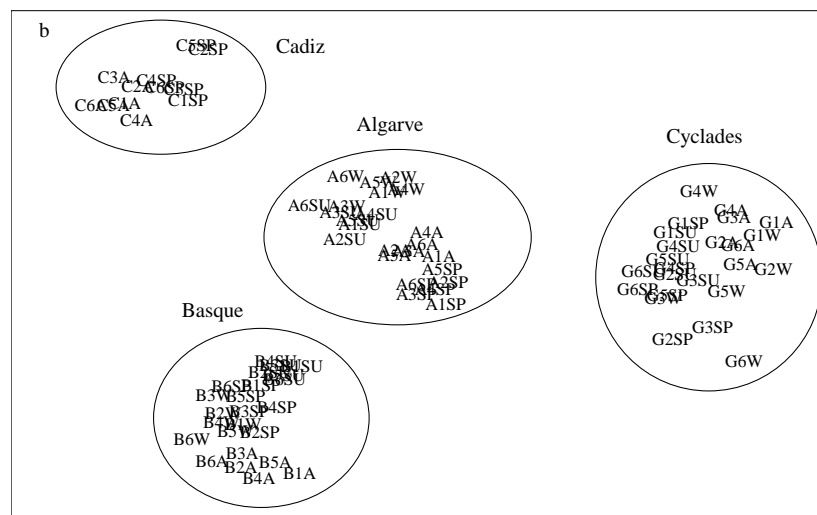
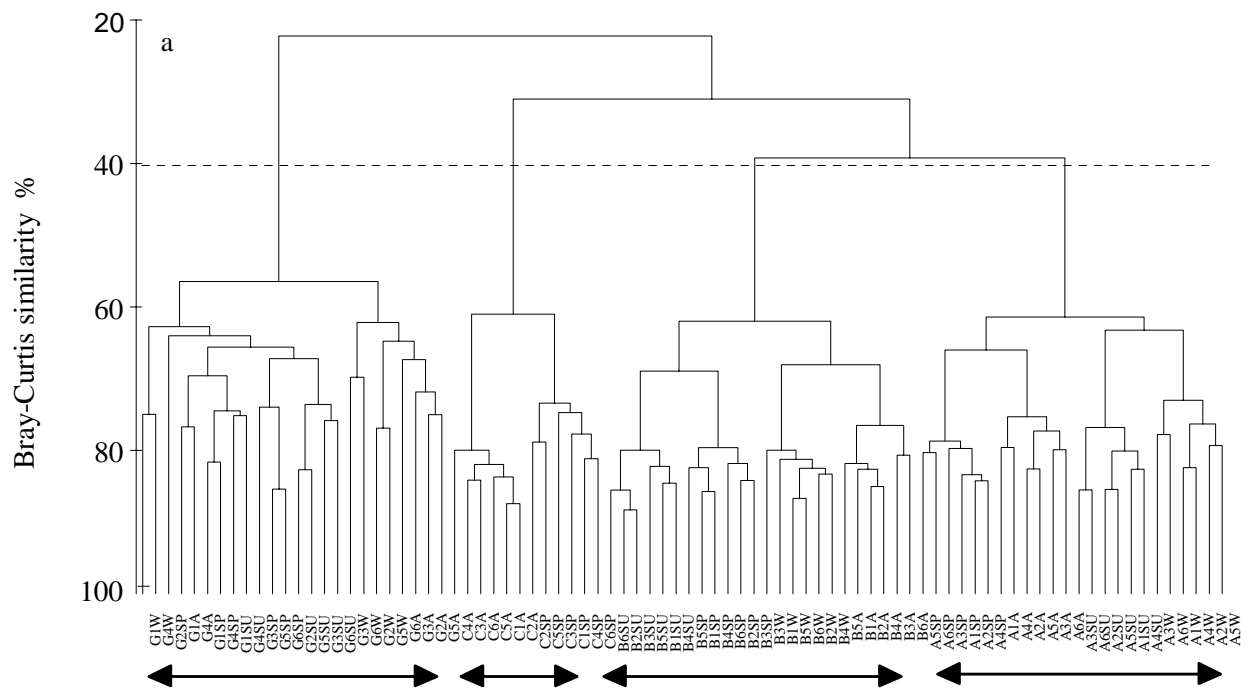
Species	40/220-240 mm		Spring-Summer		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Merluccius merluccius	0.00	1.46	1.68	3.26	4.50	4.50
Pagellus acarne	1.85	3.60	1.28	1.41	3.43	7.93
Pagellus erythrinus	1.18	10.70	1.24	2.79	3.31	11.24
Xyrichthys novacula	0.60	0.03	1.16	2.36	3.09	14.34
Sardinella aurita	1.30	0.38	1.06	1.29	2.82	17.16
Mullus barbatus	1.10	1.60	1.04	1.34	2.80	19.96
Trachurus mediterraneus	2.22	2.48	0.94	1.32	2.52	22.47
Phycis phycis	0.15	0.28	0.92	1.77	2.48	24.95
Coris julis	0.22	0.01	0.87	1.58	2.33	27.28
Mullus surmuletus	17.20	6.52	0.87	1.66	2.33	29.61
Scomber japonicus	0.40	0.38	0.83	1.46	2.21	31.82
Chromis chromis	0.38	0.34	0.81	1.05	2.17	33.98
Trachinus draco	0.28	0.42	0.79	1.29	2.11	36.10
Lithognathus mormyrus	0.18	1.02	0.77	0.99	2.07	38.16
Symphodus mediterraneus	0.15	0.02	0.76	1.52	2.05	40.21

Winter-Autumn and Spring Summer (Average dissimilarity = 43.98%)

Species	Winter-Autumn		Spring-Summer		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Pagellus acarne	0.08	3.60	1.89	2.41	4.29	4.29
Merluccius merluccius	0.00	1.46	1.85	3.15	4.21	8.50
Pagellus erythrinus	0.72	10.70	1.64	2.77	3.74	12.24
Serranus cabrilla	0.34	4.64	1.44	1.65	3.27	15.51
Mullus barbatus	0.00	1.60	1.36	1.22	3.09	18.60
Spondyliosoma cantharus	1.05	0.26	1.13	1.56	2.57	21.18
Sparisoma cretense	0.08	0.48	1.09	1.78	2.49	23.66
Trachinus draco	0.05	0.42	1.05	1.76	2.39	26.06
Raja radula	0.02	0.28	1.04	1.71	2.37	28.43
Synodus saurus	0.10	0.94	1.04	1.43	2.36	30.79
Scomber japonicus	0.05	0.38	1.03	1.62	2.35	33.14
Pagrus pagrus	0.38	0.03	1.03	1.39	2.35	35.49
Serranus scriba	0.11	0.59	1.00	1.43	2.28	37.77
Dentex dentex	0.44	0.05	0.93	1.23	2.12	39.89
Phycis phycis	0.09	0.28	0.89	1.40	2.02	41.90

### **3.5.5. Between- area comparisons**

The classification and ordination of the numerical matrix (all species)(6 inner/outer mesh size combinations X 4 seasons X 4 areas), based on double square root transformation, generally indicated that, at the 40% similarity level, the 84 mesh-size/season/area combinations fall into four main groups, corresponding to the four study areas (Figure 3.5.5.1). The resulting stress value for the two-dimensional plot was very low ( $<0.08$ ). From Figure 3.5.5.1 becomes also apparent that the trammel net catch species compositions and rates in Cyclades waters differ from those in Basque, Algarve and Cadiz waters as a group.



**Figure 3.5.5.1. All areas combined. (a) Dendrogram for group-average clustering and (b) multidimensional scaling ordination, based on Bray-Curtis similarities between mean catch numbers per 1000 m of net (double square root transformation) for all species caught for 6 combinations of inner/outer mesh sizes per different area (A=Algarve, C=Cadiz, B=Basque and G=Cyclades) per season (A=Autumn, W=Winter, SP=Spring and SU=Summer).**

The most important species contributing to the average Bray-Curtis similarity within the four groups, corresponding to the four geographic areas, were (Table 3.5.5.1): (a) *Scomber japonicus*, *Microchirus azevia*, *Sepia officinalis*, *Sardina pilchardus*, *Chelidonichthys obscurus*, *Pagellus acarne*, *Trachinus draco* and *Phycis phycis* (cumulative contribution 31.9%) for the Algarve; (b) *Solea vulgaris*, *Trisopterus luscus*, *Trachinus draco*, *Merluccius*

*merluccius*, *Trigla lucerna*, *Sepia officinalis*, *Maja squinado* and *Lophius piscatorius* (cumulative contribution 39.0%) for Basque waters; (c) *Sepia officinalis*, *Solea senegalensis*, *Sardina pilchardus*, *Synaptura lusitanica*, *Torpedo torpedo*, *Raja asterias* and *Torpedo marmorata* (cumulative contribution 43.6%) for Cadiz waters; and (d) *Mullus surmuletus*, *Diplodus annularis*, *Scorpaena porcus*, *Spicara maena*, *Pagellus erythrinus* and *Boops boops* (cumulative contribution 41.3%) for Cyclades. The main species contributing to the average Bray-Curtis dissimilarity for all possible combinations between the four geographic areas are also shown in Table 3.5.5.1.

**Table 3.5.5.1. Area comparisons. Contribution of each species to the average Bray-Curtis dissimilarity between the four groups of combinations as well as to the similarity within each of the four groups indicated by multivariate analysis.**

Transform: Fourth root

Cut off for low contributions: 40.00%

Algarve (Average similarity: 65.81%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Scomber japonicus</i>	8.59	3.30	4.18	5.02	5.02
<i>Microchirus azevia</i>	4.94	3.22	8.62	4.89	9.90
<i>Sepia officinalis</i>	6.98	2.90	3.81	4.41	14.31
<i>Sardina pilchardus</i>	4.80	2.49	3.15	3.78	18.09
<i>Chelidonichthys obscurus</i>	1.83	2.37	6.49	3.60	21.69
<i>Pagellus acarne</i>	1.79	2.32	5.65	3.52	25.21
<i>Trachinus draco</i>	2.37	2.24	3.49	3.40	28.61
<i>Phycis phycis</i>	1.85	2.14	4.65	3.26	31.86
<i>Merluccius merluccius</i>	1.15	2.10	3.73	3.19	35.05
<i>Scorpaena notata</i>	1.83	1.86	2.65	2.83	37.88
<i>Trachurus trachurus</i>	0.97	1.79	4.01	2.72	40.60

Basque (Average similarity: 67.81%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Solea vulgaris</i>	11.96	4.54	7.58	6.70	6.70
<i>Trisopterus luscus</i>	7.98	3.86	4.18	5.69	12.39
<i>Trachinus draco</i>	5.73	3.42	5.66	5.04	17.43
<i>Merluccius merluccius</i>	3.48	3.22	4.90	4.75	22.18
<i>Trigla lucerna</i>	2.73	3.16	6.82	4.65	26.84
<i>Sepia officinalis</i>	1.62	2.89	10.15	4.26	31.10
<i>Maja squinado</i>	1.52	2.75	6.58	4.06	35.16
<i>Lophius piscatorius</i>	2.00	2.63	4.57	3.87	39.03
<i>Aspitrigla obscura</i>	1.19	2.32	6.42	3.42	42.46

Cadiz (Average similarity: 68.99%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Sepia officinalis</i>	18.79	5.81	2.86	8.43	8.43
<i>Solea senegalensis</i>	3.50	4.87	11.11	7.06	15.48
<i>Sardina pilchardus</i>	3.24	4.71	11.84	6.82	22.31
<i>Synaptura lusitanica</i>	2.35	4.32	6.55	6.27	28.57
<i>Torpedo torpedo</i>	2.89	3.66	4.42	5.30	33.87
<i>Raja asterias</i>	1.14	3.37	7.96	4.88	38.75
<i>Torpedo marmorata</i>	0.86	3.37	9.79	4.88	43.63

Cyclades (Average similarity: 61.81%)

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Mullus surmuletus</i>	7.85	4.97	5.99	8.04	8.04
<i>Diplodus annularis</i>	4.72	4.76	5.77	7.70	15.74
<i>Scorpaena porcus</i>	4.06	4.44	5.84	7.18	22.92
<i>Spicara maena</i>	3.92	4.29	4.60	6.94	29.86
<i>Pagellus erythrinus</i>	5.79	3.70	3.64	5.99	35.85
<i>Boops boops</i>	2.56	3.38	4.73	5.47	41.31

(To be continued in next page)

**Table 3.5.5.1. Continued.**

Algarve and Basque (Average dissimilarity = 60.77%)							
Species	Algarve		Basque		Contrib%	Cum.%	
	Av.Abund	Av.Abund	Av.Diss	Diss/SD			
Microchirus azevia	4.94	0.00	1.85	6.73	3.04	3.04	
Trigla lucerna	0.00	2.73	1.61	5.92	2.64	5.68	
Solea vulgaris	0.74	11.96	1.56	2.15	2.56	8.25	
Chelidonichthys obscurus	1.83	0.00	1.41	4.84	2.32	10.57	
Phycis phycis	1.85	0.00	1.35	3.79	2.23	12.79	
Trisopterus luscus	0.29	7.98	1.31	2.03	2.15	14.95	
Scomber japonicus	8.59	0.24	1.31	2.15	2.15	17.10	
Aspitrigla obscura	0.00	1.19	1.24	4.90	2.05	19.15	
Microchirus variegatus	0.00	2.34	1.18	1.54	1.94	21.08	
Lophius piscatorius	0.05	2.00	1.12	2.23	1.85	22.93	
Chelidonichthys lastoviza	1.14	0.00	1.11	2.58	1.82	24.75	
Scomber scombrus	1.15	5.51	1.06	1.60	1.74	26.49	
Scorpaena notata	1.83	0.08	1.04	1.89	1.72	28.21	
Raja montagui	0.00	0.46	1.03	5.16	1.69	29.90	
Halobatrachus didactylus	0.78	0.00	1.00	2.13	1.64	31.54	
Micromesistius poutassou	0.01	0.64	0.97	3.00	1.60	33.14	
Sciaena umbra	0.02	1.18	0.92	1.63	1.52	34.66	
Sardina pilchardus	4.80	4.12	0.89	1.39	1.47	36.13	
Charonia lampas	0.40	0.00	0.89	2.71	1.47	37.60	
Boops boops	2.01	0.26	0.83	1.43	1.37	38.97	
Citharus linguatula	0.34	0.00	0.83	2.25	1.36	40.33	

Algarve and Cadiz (Average dissimilarity = 67.13%)							
Species	Algarve		Cadiz		Contrib%	Cum.%	
	Av.Abund	Av.Abund	Av.Diss	Diss/SD			
Microchirus azevia	4.94	0.00	2.14	6.51	3.18	3.18	
Synaptura lusitanica	0.00	2.35	1.79	7.14	2.67	5.86	
Chelidonichthys obscurus	1.83	0.00	1.63	4.73	2.43	8.28	
Phycis phycis	1.85	0.00	1.56	3.76	2.33	10.61	
Scomber japonicus	8.59	0.20	1.48	2.16	2.21	12.82	
Merluccius merluccius	1.15	0.00	1.46	4.17	2.17	14.99	
Scorpaena notata	1.83	0.00	1.45	2.97	2.16	17.15	
Boops boops	2.01	0.00	1.38	2.51	2.06	19.21	
Trachurus trachurus	0.97	0.00	1.32	3.59	1.96	21.17	
Torpedo torpedo	0.11	2.89	1.28	1.92	1.91	23.08	
Chelidonichthys lastoviza	1.14	0.00	1.28	2.59	1.90	24.98	
Serranus cabrilla	0.71	0.00	1.19	2.85	1.77	26.75	
Scomber scombrus	1.15	0.00	1.18	1.84	1.76	28.51	
Charonia lampas	0.40	0.00	1.03	2.69	1.53	30.05	
Mugil cephalus	0.01	0.77	1.02	1.79	1.52	31.57	
Zeus faber	0.35	0.00	1.00	2.61	1.49	33.06	
Pagellus acarne	1.79	0.16	0.99	1.84	1.48	34.53	
Sepia officinalis	6.98	18.79	0.98	1.33	1.46	35.99	
Diplodus vulgaris	0.41	0.00	0.97	1.98	1.44	37.44	
Pagellus erythrinus	0.64	0.03	0.96	2.05	1.43	38.86	
Citharus linguatula	0.34	0.00	0.96	2.24	1.42	40.29	

(To be continued in next page)

**Table 3.5.5.1. Continued.**

Basque and Cadiz (Average dissimilarity = 70.85%)						
Species	Basque	Cadiz	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Solea vulgaris</i>	11.96	0.05	2.57	3.51	3.63	3.63
<i>Trisopterus luscus</i>	7.98	0.00	2.56	3.87	3.61	7.24
<i>Merluccius merluccius</i>	3.48	0.00	2.10	4.20	2.97	10.21
<i>Synaptura lusitanica</i>	0.00	2.35	1.93	7.13	2.73	12.93
<i>Torpedo torpedo</i>	0.00	2.89	1.85	3.91	2.61	15.54
<i>Lophius piscatorius</i>	2.00	0.00	1.76	4.17	2.49	18.03
<i>Halobatrachus didactylus</i>	0.00	1.58	1.59	3.94	2.25	20.28
<i>Raja asterias</i>	0.00	1.14	1.57	6.23	2.22	22.49
<i>Aspitrigla obscura</i>	1.19	0.00	1.55	4.94	2.18	24.67
<i>Trachurus trachurus</i>	1.09	0.00	1.50	5.02	2.11	26.79
<i>Microchirus variegatus</i>	2.34	0.00	1.49	1.54	2.10	28.89
<i>Maja squinado</i>	1.52	0.02	1.46	3.33	2.06	30.95
<i>Diplodus bellottii</i>	0.00	0.68	1.38	4.25	1.95	32.90
<i>Trachinus draco</i>	5.73	0.31	1.35	2.11	1.91	34.81
<i>Micromesistius poutassou</i>	0.64	0.00	1.32	4.69	1.87	36.68
<i>Sepia officinalis</i>	1.62	18.79	1.23	1.36	1.74	38.42
<i>Scomber scombrus</i>	5.51	0.00	1.16	0.85	1.64	40.06

Algarve and Cyclades (Average dissimilarity = 69.51%)						
Species	Algarve	Cyclades	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
<i>Microchirus azevia</i>	4.94	0.00	2.09	6.00	3.00	3.00
<i>Diplodus annularis</i>	0.02	4.72	1.93	4.44	2.78	5.78
<i>Sardina pilchardus</i>	4.80	0.00	1.86	3.03	2.67	8.45
<i>Spicara maena</i>	0.01	3.92	1.81	3.50	2.61	11.06
<i>Mullus surmuletus</i>	0.12	7.85	1.77	2.67	2.55	13.61
<i>Scomber japonicus</i>	8.59	0.27	1.64	1.91	2.37	15.98
<i>Chelidonichthys obscurus</i>	1.83	0.00	1.59	4.52	2.29	18.27
<i>Scorpaena porcus</i>	0.13	4.06	1.52	2.45	2.19	20.45
<i>Scorpaena notata</i>	1.83	0.00	1.42	2.91	2.04	22.49
<i>Trachurus mediterraneus</i>	0.03	1.80	1.37	2.54	1.97	24.46
<i>Symphodus tinca</i>	0.00	1.15	1.37	3.20	1.97	26.43
<i>Solea senegalensis</i>	1.43	0.00	1.36	2.27	1.96	28.38
<i>Raja undulata</i>	0.87	0.00	1.27	2.88	1.83	30.21
<i>Trachurus trachurus</i>	0.97	0.01	1.21	2.80	1.74	31.95
<i>Scomber scombrus</i>	1.15	0.00	1.20	1.90	1.73	33.68
<i>Halobatrachus didactylus</i>	0.78	0.00	1.12	2.11	1.62	35.30
<i>Maja squinado</i>	0.59	0.00	1.12	3.22	1.61	36.91
<i>Charonia lampas</i>	0.40	0.00	1.00	2.65	1.45	38.36
<i>Trachinus draco</i>	2.37	0.26	1.00	1.36	1.44	39.79
<i>Synodus saurus</i>	0.00	0.68	0.94	1.59	1.35	41.15

(To be concluded in next page)

**Table 3.5.5.1. Concluded.**

Basque and Cyclades (Average dissimilarity = 80.92)							
Species	Basque		Cyclades		Contrib%	Cum.%	
	Av.Abund	Av.Abund	Av.Diss	Diss/SD			
<i>Solea vulgaris</i>	11.96	0.00	2.81	5.49	3.47	3.47	
<i>Trisopterus luscus</i>	7.98	0.00	2.49	3.74	3.08	6.55	
<i>Diplodus annularis</i>	0.00	4.72	2.22	6.44	2.75	9.30	
<i>Spicara maena</i>	0.00	3.92	2.08	4.57	2.57	11.87	
<i>Trigla lucerna</i>	2.73	0.00	1.95	5.21	2.41	14.28	
<i>Lophius piscatorius</i>	2.00	0.00	1.72	4.00	2.12	16.40	
<i>Maja squinado</i>	1.52	0.00	1.69	5.20	2.09	18.49	
<i>Sardina pilchardus</i>	4.12	0.00	1.57	1.48	1.94	20.43	
<i>Trachinus draco</i>	5.73	0.26	1.54	1.85	1.90	22.33	
<i>Pagellus erythrinus</i>	0.19	5.79	1.52	1.75	1.88	24.22	
<i>Aspitrigla obscura</i>	1.19	0.00	1.51	4.66	1.86	26.08	
<i>Scorpaena porcus</i>	0.28	4.06	1.49	1.90	1.84	27.92	
<i>Symphodus tinca</i>	0.00	1.15	1.47	3.19	1.81	29.73	
<i>Microchirus variegatus</i>	2.34	0.00	1.45	1.53	1.79	31.52	
<i>Trachurus trachurus</i>	1.09	0.01	1.38	3.39	1.71	33.23	
<i>Merluccius merluccius</i>	3.48	0.72	1.37	1.49	1.70	34.93	
<i>Mullus surmuletus</i>	0.41	7.85	1.36	2.01	1.68	36.61	
<i>Serranus cabrilla</i>	0.09	3.42	1.32	1.84	1.63	38.23	
<i>Trachurus mediterraneus</i>	0.04	1.80	1.31	2.01	1.61	39.85	
<i>Micromesistius poutassou</i>	0.64	0.00	1.29	4.45	1.59	41.44	

Cadiz and Cyclades (Average dissimilarity = 87.93%)							
Species	Cadiz		Cyclades		Contrib%	Cum.%	
	Av.Abund	Av.Abund	Av.Diss	Diss/SD			
<i>Mullus surmuletus</i>	0.02	7.85	2.75	3.71	3.13	3.13	
<i>Diplodus annularis</i>	0.00	4.72	2.66	5.93	3.02	6.16	
<i>Scorpaena porcus</i>	0.00	4.06	2.52	6.25	2.87	9.02	
<i>Solea senegalensis</i>	3.50	0.00	2.49	7.63	2.84	11.86	
<i>Spicara maena</i>	0.00	3.92	2.49	4.33	2.83	14.69	
<i>Sardina pilchardus</i>	3.24	0.00	2.44	7.24	2.78	17.47	
<i>Synaptura lusitanica</i>	2.35	0.00	2.26	5.78	2.57	20.03	
<i>Torpedo torpedo</i>	2.89	0.00	2.15	3.76	2.45	22.48	
<i>Boops boops</i>	0.00	2.56	2.08	4.33	2.36	24.84	
<i>Pagellus erythrinus</i>	0.03	5.79	2.07	2.34	2.35	27.19	
<i>Serranus cabrilla</i>	0.00	3.42	2.06	2.47	2.34	29.54	
<i>Halobatrachus didactylus</i>	1.58	0.00	1.85	3.79	2.11	31.65	
<i>Trachurus mediterraneus</i>	0.00	1.80	1.85	2.92	2.10	33.75	
<i>Raja asterias</i>	1.14	0.00	1.83	5.45	2.08	35.83	
<i>Sepia officinalis</i>	18.79	0.75	1.83	1.60	2.08	37.91	
<i>Raja undulata</i>	1.14	0.00	1.77	4.42	2.01	39.93	
<i>Symphodus tinca</i>	0.00	1.15	1.76	3.10	2.00	41.92	

### 3.6. Length-girth relationships in Cyclades

Overall, data on girth and TL, derived from the experimental fishing conducted during the current project and during an earlier one referring to gill nets and longlines in the same area (Erzini *et al.*, 1999), were analysed for the following 18 fish species: *Boops boops*, *Diplodus annularis*, *Diplodus vulgaris*, *Lithognathus mormyrus*, *Merluccius merluccius*, *Mullus barbatus*, *Mullus surmuletus*, *Pagellus acarne*, *Pagellus erythrinus*, *Scorpaena porcus*, *Serranus scriba*, *Sparisoma cretense*, *Spicara maena*, *Spondylisoma cantharus*, *Symphodus tinca*, *Synodus saurus*, *Trachurus mediterraneus*, and *Zeus faber*.

The relationships between TL and G1, G2 and G3 for each studied species are summarized in Tables 3.6.1 to 3.6.3, respectively. The slopes of the regressions were all statistically significant ( $P < 0.05$ ) and all  $r^2$  values were higher than 0.61. G1 was linearly related to TL for 12 species and log-linearly for six species (Table 3.6.1, Figure 3.6.1). G2 was linearly related to TL for 13 species and log-linearly for five species (Table 3.6.2, Figure 3.6.2). Finally, G3 was linearly related to TL for 12 species and log-linearly for six species (Table 3.6.3, Figure 3.6.3).

**Table 3.6.1. Cyclades. Relationship between girth across the vertical eye diameter (G1, cm) and total length (TL, cm) of 18 fish species from the waters off Naxos Island caught during 1997-2000. N: number of individuals per species examined; SE (b): standard error of slope; and  $r^2$ : coefficient of determination.**

Species	N	Y = a + bX	SE (b)	$r^2$
<i>Boops boops</i>	251	G1 = 0.070 + 0.345TL	0.015	0.67
<i>Diplodus annularis</i>	283	G1 = -1.109 + 0.619TL	0.018	0.80
<i>Diplodus vulgaris</i>	205	Log (G1) = -0.347 + 1.048Log (TL)	0.023	0.91
<i>Lithognathus mormyrus</i>	65	G1 = -1.394 + 0.582TL	0.042	0.76
<i>Merluccius merluccius</i>	90	G1 = 0.389 + 0.301TL	0.014	0.81
<i>Mullus barbatus</i>	105	Log (G1) = -0.131 + 0.811Log (TL)	0.046	0.75
<i>Mullus surmuletus</i>	288	G1 = -1.429 + 0.513TL	0.014	0.83
<i>Pagellus acarne</i>	175	Log (G1) = -0.369 + 0.998Log (TL)	0.037	0.81
<i>Pagellus erythrinus</i>	269	G1 = -0.951 + 0.540TL	0.009	0.93
<i>Scorpaena porcus</i>	250	G1 = -1.250 + 0.658TL	0.011	0.93
<i>Serranus scriba</i>	125	G1 = 0.097 + 0.391TL	0.020	0.75
<i>Sparisoma cretense</i>	70	Log (G1) = 0.470 + 0.025TL	0.001	0.95
<i>Spicara maena</i>	174	Log (G1) = 0.312 + 0.039TL	0.001	0.72
<i>Spondyliosoma cantharus</i>	124	G1 = 0.371 + 0.472TL	0.016	0.87
<i>Symphodus tinca</i>	245	G1 = -2.183 + 0.570TL	0.017	0.83
<i>Synodus saurus</i>	121	Log (G1) = -1.039 + 1.292Log (TL)	0.061	0.79
<i>Trachurus mediterraneus</i>	245	G1 = -0.304 + 0.357TL	0.015	0.71
<i>Zeus faber</i>	46	G1 = 0.719 + 0.665TL	0.022	0.95

**Table 3.6.2. Cyclades. Relationship between girth behind the gillcover (G2, cm) and total length (TL, cm) of 18 fish species from the waters off Naxos Island caught during 1997-2000. N: number of individuals per species examined; SE (b): standard error of slope; and r<sup>2</sup>: coefficient of determination.**

Species	N	Y = a + bX	SE (b)	r <sup>2</sup>
<i>Boops boops</i>	242	G2 = -0.016 + 0.435TL	0.016	0.75
<i>Diplodus annularis</i>	269	G2 = -0.146 + 0.711TL	0.018	0.86
<i>Diplodus vulgaris</i>	186	Log (G2) = -0.160 + 1.008Log (TL)	0.016	0.95
<i>Lithognathus mormyrus</i>	65	G2 = 0.279 + 0.581TL	0.042	0.75
<i>Merluccius merluccius</i>	114	G2 = -1.449 + 0.441TL	0.021	0.80
<i>Mullus barbatus</i>	110	Log (G2) = -0.005 + 0.756Log (TL)	0.058	0.61
<i>Mullus surmuletus</i>	304	G2 = -1.309 + 0.589TL	0.016	0.82
<i>Pagellus acarne</i>	143	Log (G2) = -0.406 + 1.111Log (TL)	0.044	0.82
<i>Pagellus erythrinus</i>	268	G2 = -0.938 + 0.649TL	0.008	0.97
<i>Scorpaena porcus</i>	222	G2 = -0.094 + 0.734TL	0.012	0.94
<i>Serranus scriba</i>	105	G2 = -0.945 + 0.608TL	0.038	0.71
<i>Sparisoma cretense</i>	72	Log (G2) = 0.609 + 0.024TL	0.001	0.95
<i>Spicara maena</i>	182	G2 = -2.776 + 0.687TL	0.022	0.84
<i>Spondylisoma cantharus</i>	114	G2 = -0.342 + 0.669TL	0.016	0.94
<i>Symphodus tinca</i>	231	G2 = -2.557 + 0.708TL	0.021	0.83
<i>Synodus saurus</i>	117	Log (G2) = -0.596 + 1.112Log (TL)	0.043	0.85
<i>Trachurus mediterraneus</i>	234	G2 = -1.743 + 0.487TL	0.019	0.73
<i>Zeus faber</i>	46	G2 = 1.056 + 0.761TL	0.023	0.96

**Table 3.6.3. Cyclades. Relationship between girth in front of the first dorsal fin (G3, cm) and total length (TL, cm) of 18 fish species from the waters off Naxos Island caught during 1997-2000. N: number of individuals per species examined; SE (b): standard error of slope; and r<sup>2</sup>: coefficient of determination. (\* G2 = G3).**

Species	N	Y = a + bX	SE (b)	r <sup>2</sup>
<i>Boops boops</i>	188	G3 = -1.748 + 0.579TL	0.017	0.86
<i>Diplodus annularis</i>	221	G3 = -1.523 + 0.897TL	0.020	0.90
<i>Diplodus vulgaris</i>	110	Log (G3) = -0.094 + 0.996Log (TL)	0.018	0.97
<i>Lithognathus mormyrus</i>	65	G3 = 0.443 + 0.607TL	0.040	0.79
<i>Merluccius merluccius</i>	73	G3 = 0.039 + 0.426TL	0.026	0.79
<i>Mullus barbatus</i>	103	Log (G3) = -0.319 + 1.040Log (TL)	0.063	0.73
<i>Mullus surmuletus</i>	234	G3 = -1.384 + 0.642TL	0.016	0.88
<i>Pagellus acarne</i>	97	G3 = -0.270 + 0.598TL	0.024	0.87
<i>Pagellus erythrinus</i>	195	G3 = -0.740 + 0.676TL	0.008	0.98
<i>Scorpaena porcus</i> *	-	-	-	-
<i>Serranus scriba</i>	74	Log (G3) = -0.298 + 1.075Log (TL)	0.068	0.78
<i>Sparisoma cretense</i>	67	Log (G3) = 0.697 + 0.021TL	0.001	0.95
<i>Spicara maena</i>	166	G3 = -2.891 + 0.755TL	0.025	0.85
<i>Spondylisoma cantharus</i>	83	G3 = 0.099 + 0.711TL	0.038	0.82
<i>Symphodus tinca</i>	169	G3 = -2.486 + 0.744TL	0.027	0.83
<i>Synodus saurus</i> *	-	-	-	-
<i>Trachurus mediterraneus</i>	192	G3 = -3.265 + 0.580TL	0.028	0.69
<i>Zeus faber</i>	41	G3 = 2.329 + 0.733TL	0.025	0.96

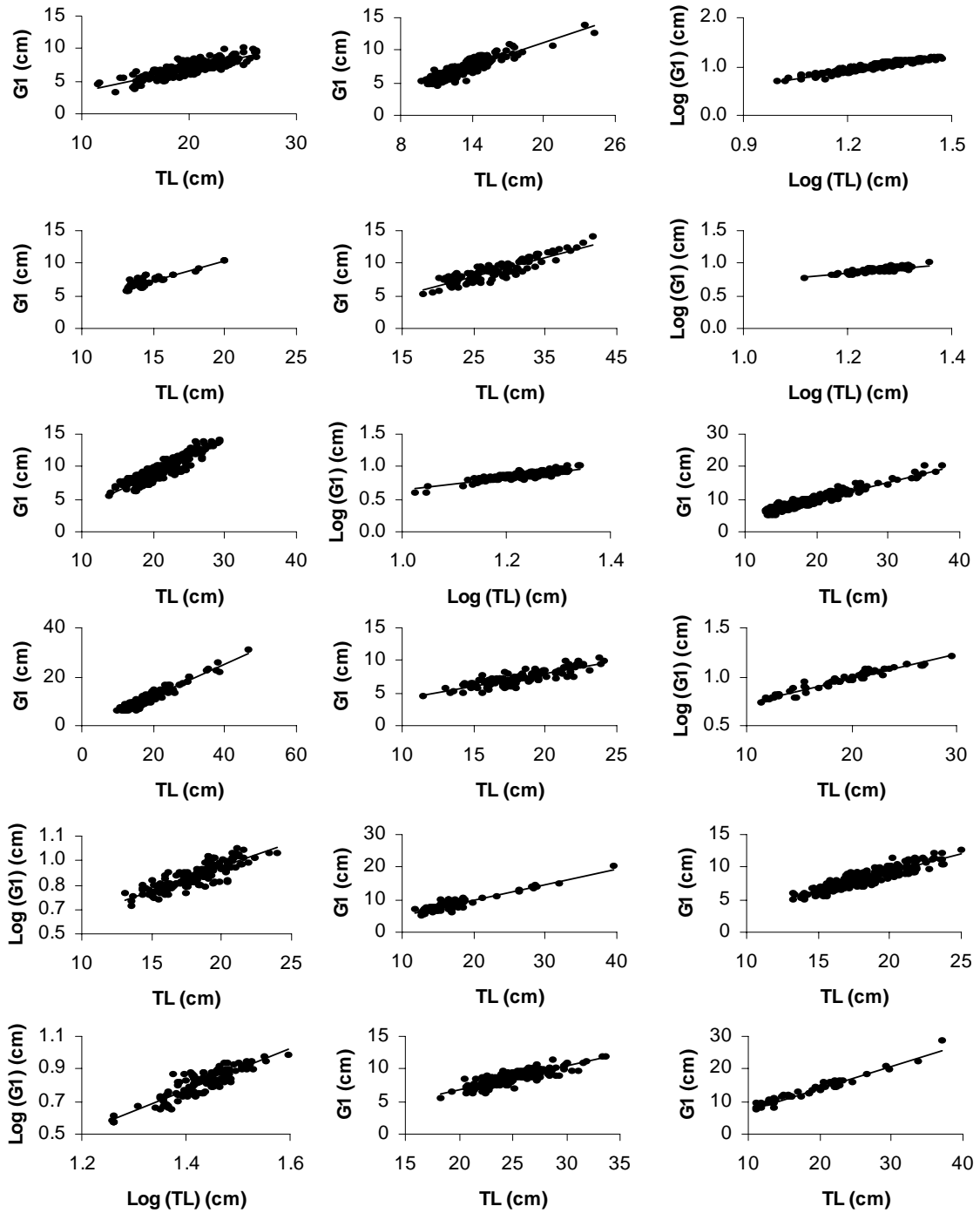


Figure 3.6.1. Cyclades. Relationships between total length (TL, cm) and girth across the vertical eye diameter (G1, cm) for *Boops boops*, *Diplodus annularis*, *Diplodus vulgaris*, *Lithognathus mormyrus*, *Merluccius merluccius*, *Mullus barbatus*, *Mullus surmuletus*, *Pagellus acarne*, *Pagellus erythrinus*, *Scorpaena porcus*, (k) *Serranus scriba*, *Sparisoma cretense*, *Spicara maena*, *Spondylisoma cantharus*, *Symphodus tinca*, *Synodus saurus*, *Trachurus mediterraneus*, and *Zeus faber* (from left to right by row).

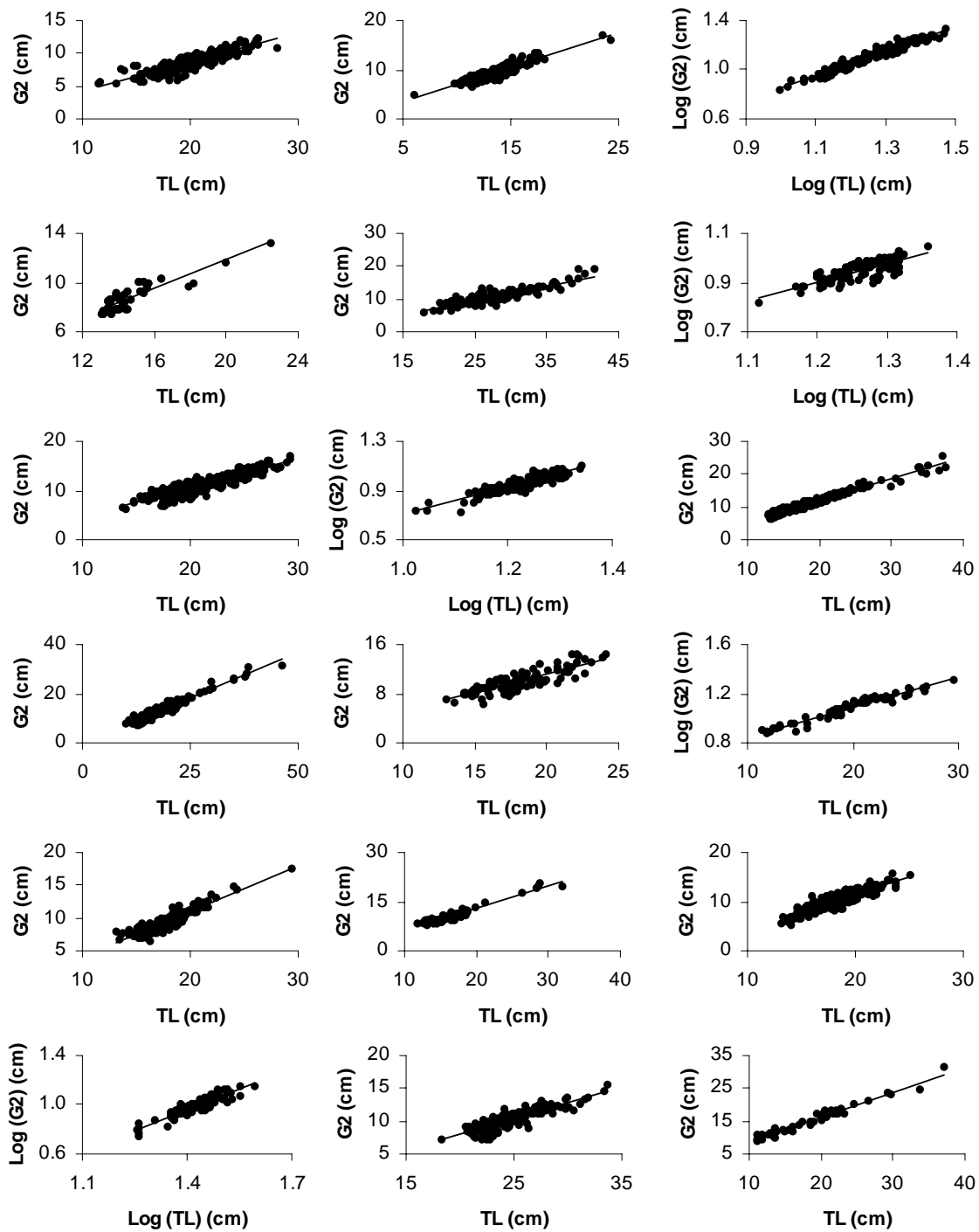


Figure 3.6.2. Cyclades. Relationships between total length (TL, cm) and girth behind the gill-cover (G2, cm) for *Boops boops*, *Diplodus annularis*, *Diplodus vulgaris*, *Lithognathus mormyrus*, *Merluccius merluccius*, *Mullus barbatus*, *Mullus surmuletus*, *Pagellus acarne*, *Pagellus erythrinus*, *Scorpaena porcus*, *Serranus scriba*, *Sparisoma cretense*, *Spicara maena*, *Spondyliosoma cantharus*, *Symphodus tinca*, *Synodus saurus*, *Trachurus mediterraneus*, and *Zeus faber* (from left to right by row).

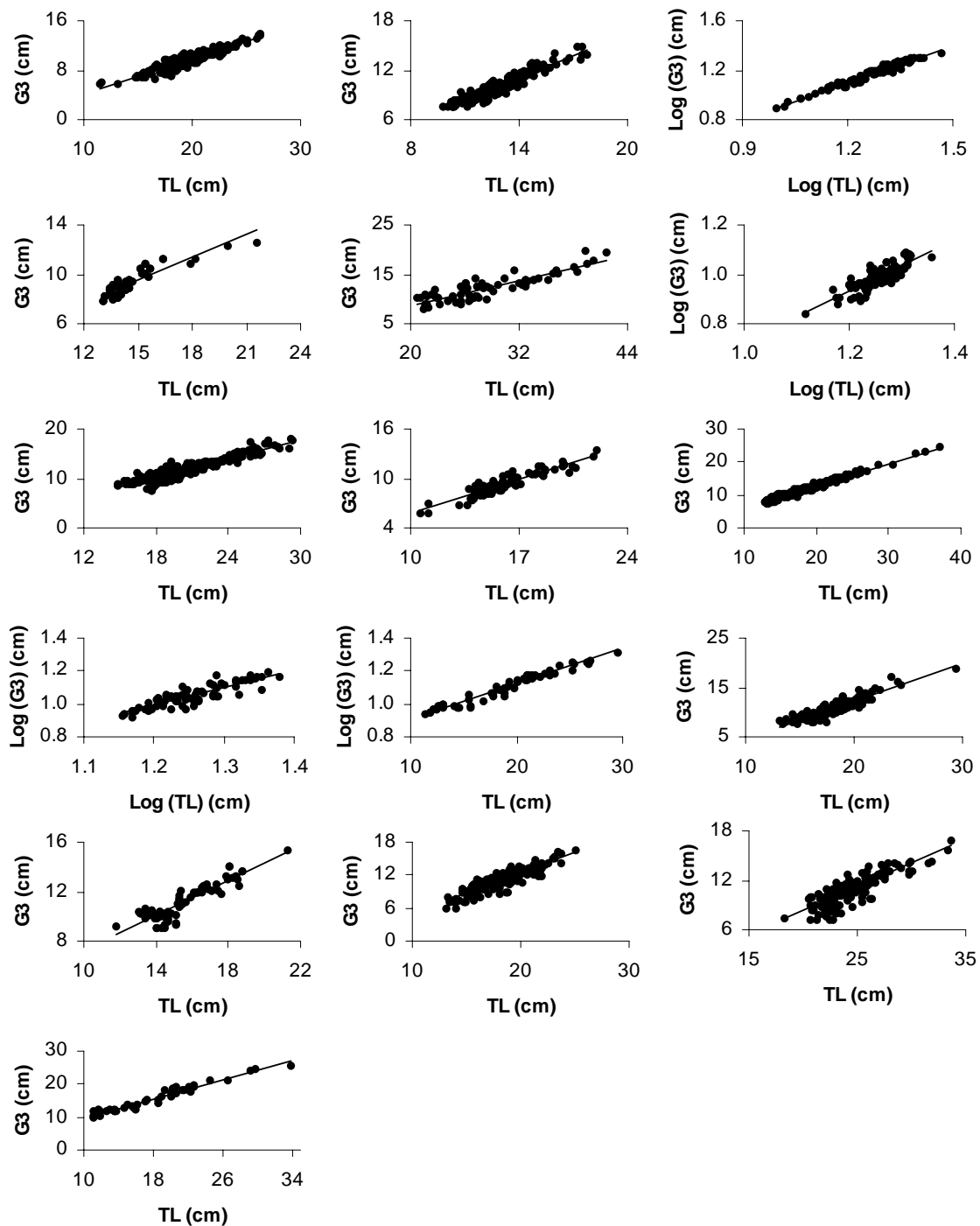


Figure 3.6.3. Cyclades. Relationships between total length (TL, cm) and girth in front of the first dorsal fin (G3, cm) for *Boops boops*, *Diplodus annularis*, *Diplodus vulgaris*, *Lithognathus mormyrus*, *Merluccius merluccius*, *Mullus barbatus*, *Mullus surmuletus*, *Pagellus acarne*, *Pagellus erythrinus*, *Serranus scriba*, *Sparisoma cretense*, *Spicara maena*, *Spondylisoma cantharus*, *Symphodus tinca*, *Trachurus mediterraneus*, and *Zeus faber*. (from left to right by row).

#### 4. DISCUSSION

Trammel nets are widely used in Spain, Portugal and Greece. In the Basque country approximately 40% of the vessels of the artisanal fishing fleet use trammel nets during part of the year, while in the Algarve trammel net licences accounted for 17.6% and 14.8% of all the licences for the “local” and “coastal” category fishing vessels, with only longline licenses being more important. In the Gulf of Cádiz, a total of 436 fishing vessels, representing 47.4% of the total number of fishing vessels use trammel nets. In the Cyclades 47 out of the 225 registered boats used trammel and gill nets as the main gear and 161 boats as a secondary fishing gear in 1997.

The widespread use of trammel nets is largely due to their great versatility, catching a greater variety of species than gill nets. In general trammel nets also catch a wider size range than gill nets. Thus, trammel net fishers can adapt to changes in abundance of the main target species more readily than can those using more species and size-specific gears.

While the size selective characteristics of other static gears, especially gill nets and to a lesser extent longlines have been fairly well studied, there is little information for trammel nets. No studies of trammel net size selectivity have been carried out in any of the areas involved in this project.

The numbers of trammel net *métiers* identified in each area were considerable, with 7 in the Basque country, 5 in the Algarve and 9 in the Gulf of Cádiz. In the Cyclades, a wide range of inner panel mesh size trammel nets were used to target a variety of species. In all areas, the same trammel net type could be used for different fishing *métiers*. Thus, in the Algarve and Gulf of Cádiz for example, the same trammel nets are used to target cuttlefish in highly seasonal fisheries and to target flatfish, red mullet and assorted Sparidae at other times of the year and/or at different depths. The characteristics of the trammel nets, especially regarding buoyancy and hanging ratios were quite variable within the same *métier*, reflecting the fact that in many cases, especially for the smaller vessels, the nets are constructed by the fishermen themselves and are therefore not of a standard type.

The catches of the experimental fishing trials in all four areas were characterised by large numbers of species. A total of 79, 128, 63 and 79 species were caught overall in the Basque Country, the Algarve, Gulf of Cádiz and in the Cyclades. Compared to other static gears, the number of species caught with trammel nets is far greater than longlines or gill nets in the case of the Algarve (Martins et al. 1992, Erzini *et al.* 1999).

In three of the four areas, soles were among the most important species in numbers

and biomass: *Solea vulgaris* in the Basque country and *Solea senegalensis* in the Algarve and the Gulf of Cádiz. The cuttlefish, *Sepia officinalis*, was the most important species in numbers and biomass in the Algarve and the Gulf of Cádiz. In the Cyclades, flatfishes were relatively unimportant and the catches were dominated by a variety of demersal species.

In most cases there was a strong seasonal effect that was reflected in the catch compositions. Some of the most important fisheries in most of the areas were highly seasonal in nature (e.g. *Sepia officinalis* in the Algarve and the Gulf of Cádiz). The changes in catch composition were clearly shown in the multivariate analysis where 4 distinct groups were found in the Basque country and in the Algarve, corresponding to fishing trials carried out in the four seasons over a one year period. In contrast, only two groups each were formed in the Gulf of Cádiz and in the Cyclades. In the case of the former, this was due to the fact that fishing trials were carried out during two periods of the year only, rather than over the whole year. In the case of the Cyclades, the results suggest that seasonal changes in the inshore fish communities are not as pronounced in the eastern Mediterranean as they are in the eastern Atlantic.

In addition to differences in catch rates due to season, catch rates also differed significantly as a function of mesh size. While outer panel mesh size had little or no effect on the catch rates, the smaller mesh inner panels clearly affected catch rates, with a general decrease in catch rate with increasing inner panel mesh size.

With the exception of the Gulf of Cádiz where all fishing trials took place at less than 20 m, relatively wide depth ranges were fished in the other areas: to 80, 100 and 81 m in the Basque country, Algarve and Cyclades respectively. Clear depth preferences as reflected in the catch rates as a function of depth were found for the majority of the most abundant species. Seasonal changes in distribution with depth were also found for some of the species.

Discarding was significant in terms of the number of species, numbers discarded and biomass discarded in all the fisheries studied. In the Basque country for example, discards ranged from 39% to 28% for the smallest to the largest inner panel mesh sizes, while in the Gulf of Cádiz discards accounted for 49% of the total catch in numbers. The smallest number of species (32) were discarded in the Cyclades trammel net trials, with 8-9 species accounting for 95% of the discards in number in each season. Greater numbers of species (11, 16 and 15) accounted for 95% of the discards in numbers in the Basque country, the Algarve and the Gulf of Cádiz. While in the Cyclades fish were discarded largely because they were either undersized or of no commercial value, in the other areas poor condition was an important reason, especially when soak time was longer than usual due to bad weather. Thus there was

significant discarding of commercially important species due to spoilage.

Discarding was related to the inner panel mesh size, with a decrease in the number discarded with increasing inner panel mesh size. On the one hand this is due to the capture of greater proportions of undersized commercial species, while on the other hand more species were caught with the smaller mesh sizes and in many cases these had no commercial value. In the case of species that under normal circumstances do have commercial value, such as the sardine, these were either not caught in sufficient quantities to warrant sale or were not in a fit condition to be sold.

Trammel net catch size frequency distributions were generally skewed to the right, with a wide range of sizes caught for each species. In many cases, the distributions were highly overlapped, with little evidence for size selectivity. In general, the larger mesh outer panel had no significant effect on the size selectivity of the experimental trammel nets. In contrast, size selectivity was clearly a function of smaller mesh inner panels, with modal length increasing with inner panel mesh size for many species.

Consequently, the estimation of selectivity parameters was based on the catch frequency distributions for the small mesh inner panels, with three data sets for most species: three inner panel catch distributions for outer panel A, three inner panel catch distributions for outer panel B, and three pooled inner panel catch distributions (outer panels A+B). For some species, there were clearly differences in the catch frequency distributions between seasons and in these cases separate analyses were carried out for seasons where sufficient numbers were caught.

Apart from the cuttlefish where entangling was the only method of capture, the vast majority of the fish species were caught by two or more methods (entangling, gilling and wedging). These combinations of capture processes were reflected in the shapes of the catch distributions (skewed to the right or bi-modal) and in the selectivity models that gave the best fits.

Uni-modal selectivity curves (normal-scale, normal-location, Gamma, log-normal) generally proved unsuitable for these data. This was largely due to the wide range of sizes caught with the trammel nets, the typically skewed distributions and also possibly to over-dispersion. Ideally, selectivity parameters should be estimated for individual sets of gear such as trammel nets to avoid over-dispersion due to pooling of data from different areas and/or times. However, this was not possible due to the insufficient numbers of individuals of even the most important species caught per set. In order to obtain sufficient numbers the amount of gear fished per trial would have to be increased considerably and more than one vessel would

have to be used in each area.

The bi-modal selectivity model proved to give the best fits for the majority of the species where size selectivity parameters could be estimated. This is not surprising given the shape of the majority of the catch frequency distributions and where the two modes of the selectivity curve often correspond to two methods of capture. Thus, the smaller mode may correspond to the smaller individuals that are gilled or wedged and the larger mode is associated with the entangling of larger individuals.

For some species, especially cuttlefish, none of the uni-modal or bi-modal selectivity models implemented in the GILLNET software could be fitted to the data. However, the Gamma-Wileman model did in some cases provide the best fit, resulting in selectivity curves that approximated the shape of the logistic selectivity curve. Consequently, the logistic model was fitted by maximum likelihood, with the parameters  $b$  and  $L_{50}$  functions of inner panel mesh size.

To the best of our knowledge, this is the first time that models other than the usual uni-modal models used in gill net selectivity studies have been used in trammel net size selectivity studies. The use of the logistic model to describe the size selectivity of trammel nets for *Sepia officinalis* is a particularly interesting result. In the case of species such as the cuttlefish, where almost all individuals are caught by entanglement in the pocket formed by the small mesh inner panel passing through one of the larger mesh outer panels, the type of selectivity is similar to “bag” type gear such as trawls or encircling gear such as seines. The very small individuals can pass through the trammel net but larger individuals are retained in the pocket and above a certain size, no individuals pass through the inner panel mesh and are all retained in the pocket.

## 5. REFERENCES

- Anón. 1991. El sector pesquero en la provincia de Cádiz. Diputación Provincial de Cádiz: 491 pp.
- Anón. 1994. Las artes de pesca en el litoral gaditano. Diputación Provincial de Cádiz: 307 pp.
- Baranov, F. I., 1914. The capture of fish by gillnets. *Mater. Poznaniyu Russ. Rybolov.*, 3(6): 56-99. (Partially translated from Russian by W. E. Ricker).
- Baro, J., Sobrino, I., Millán, M., Ramos, F., Jiménez, M.P. and Herrera, M.A. 1993. Fisheries of the Spanish South Atlantic Region. 1<sup>st</sup> Part, Final Report, Cooperative Project IEO/EC-DG XIV/C/1/1992/8, 59pp + Tables & Figures + Annexes I-VI.
- Boje, J., Holst, R., and A. Woll. 1998. Selectivity in longline fishery for Greenland halibut. ICES FTFB WG Meeting, 20-23 April 1998, La Coruña. Working Document.
- Bravo, R., Soriguer, M.C., Villar, N., Gómez-Cama, M. & Hernando, J.A. 2000. An approach to studying the selectivity of the voraz (*Pagellus bogaraveo*, Brünch, 1768) fishing technique used in Tarifa (Spain). Proceedings 2<sup>nd</sup>. International Congress on Maritime Technological Innovations and Reserachs. Publicaciones de la Universidad de Cádiz (ISBN 84-7786-669-4; Paperback). Vol 2: 1324 - 1329.
- Bray, J.R. and J.T. Curtis. 1957. An ordination of the upland forest communities of southern Wisconsin. *Ecol. Monogr.*, 27: 325-349.
- Cadigan, N.G. and R.B. Millar. 1992. Reliability of selection curves obtained from trouser trawl or alternate haul experiments. *Can. J. Fish. Aquat. Sci.* 49: 1624-1632.
- Carr, M.R. 1997. PRIMER User Manual. Plymouth Marine Laboratory. 36 pp + Appendices.
- Clarke, K.R. and R.H. Green. 1988. Statistical design and analysis for a 'biological effects' study. *Mar. Ecol. Prog. Ser.* 46: 213-226.
- Clarke, K.R. and R.M. Warwick. 1989. Lecture notes prepared for the training workshop on the statistical treatment and interpretation of marine community data. FAO/IOC/UNEP, Athens, Hellas, September 1989, Part II.
- CONSTAT 1998. GILLNET software, Denmark
- Datapescas. 1999. Datapescas. *MADRP-DGPA* <http://www.dg-pescas.pt/> 2000(45).
- DGP. 1994. Recursos da pesca. Série Estatística 1993. *Direcção-Geral das Pescas* Vol. 7A-B: 173.
- DGP. 1995. Recursos da pesca. Série Estatística 1994. *Direcção-Geral das Pescas* Vol. 8 A-B: 167.

- DGP. 1996. Recursos da pesca. Série Estatística 1995. *Direcção-Geral das Pescas* Vol. 9 A-B: 167.
- DGPA. 1997. Recursos da pesca. Série Estatística 1996. *Direcção-Geral das Pescas e Aquicultura* Vol. 10 A-B: 172.
- DGPA. 1997. Recursos da pesca. Série Estatística 1997. *Direcção-Geral das Pescas e Aquicultura* Vol. 11 A-B: 172.
- DGPA. 1999. Recursos da pesca. Série Estatística 1998. *Direcção-Geral das Pescas e Aquicultura* Vol. 12 A-B: 172.
- DGPA. 2000. Recursos da pesca. Série Estatística 1999. *Direcção-Geral das Pescas e Aquicultura* Vol. 13 A-B: 170.
- Erzini, K., J. Gonçalves, L. Bentes, P.G. Lino and J. Cruz. 1996a. Species and size selectivity in a multispecies Portuguese artisanal longline fishery. *ICES J. Mar. Sci.* 53:811-819.
- Erzini, K., M.N. Santos, C.C. Monteiro, J.M.S. Gonçalves, L. Bentes and P.G. Lino. 1996b. A comparison of monofilament gillnet and small hook longline selectivity in a multispecies artisanal fishery in the Algarve (South of Portugal). *NAGA, the ICLARM QUARTERLY* 19: 29-32.
- Erzini, K., J. Gonçalves, L. Bentes and P. Lino. 1997. Fish mouth dimensions and size selectivity in a Portuguese longline fishery. *J. Appl. Ichthyol.* 13:41-44.
- Erzini, K., C.C. Monteiro, J. Ribeiro, M.N. Santos, M. Gaspar, P. Monteiro and T.C. Borges. 1997. An experimental study of gill net and trammel net “ghost fishing” in the Algarve (southern Portugal). *Mar. Ecol. Prog. Ser.* 158: 257-265.
- Erzini, K., J.M.S. Gonçalves, L. Bentes, P.G. Lino and J. Ribeiro. 1998a. Species and size selectivity in a ‘red’ sea bream longline métier in the Algarve (southern Portugal). *Aquat. Living Resour.* 11:1-11.
- Erzini, K. and M. Castro. 1998. An alternative methodology for fitting selectivity curves to pre-defined distributions. *Fish. Res.* 34:307-313.
- Erzini, K., J.M.S. Gonçalves, L. Bentes, P.G. Lino and J. Ribeiro. 1999. Catch composition, catch rates and size selectivity of three longline métiers in the Algarve (southern Portugal). In: *Oceanography of the Iberian Continental Margin*. Bol. Inst. Español Oceanografía. 15: 313-323.
- Erzini K., K. I. Stergiou, L. Bentes, P. S. Economidis, J.M.S. Gonçalves, P.G. Lino, D. Moutopoulos, G. Petrakis, J. Ribeiro and P. Vulgaridou. 1999. Comparative fixed gear selectivity studies in Portugal and Greece. DG XIV. Commission of the European Union. Final Report 96/065. 134 pp + Appendix.

- Erzini, K., J.M.S. Gonçalves, L. Bentes, P.G. Lino and J. Ribeiro. 2001. The hake semi-pelagic ( "pedra - bola" ) longline fishery in Algarve (southern Portugal). *Fish. Res.* 51: 327-336.
- Fernández, A., Fariña, A.C. 1984. Contribución al conocimiento del sustrato y especies acompañantes de la cigala (*Nephrops norvegicus* L.) en el Golfo de Cádiz. *Bol. Inst. Esp. Oceanogr.*, 1(2): 126-133.
- Field, J.G., K.R. Clark and R.M. Warwick. 1982. A practical strategy for analysing multispecies distribution patterns. *Mar. Ecol. Prog. Ser.* 8: 37-52.
- Gonzalez et al. 1986.
- GILLNET software. 1998. ConStat, Denmark.
- Hamley, J.M. and H.A. Regier. 1973. Direct estimates of gillnet selectivity to walleye (*Stizostedion vitreum vitreum*). *J. Fish. Res. Board Can.* 30: 817-830.
- Hamley, J.M. 1975. Review of gillnet selectivity. *J. Fish. Res. Board Can.* 32: 1943-1969.
- Hartman W. M. (no date). The NLP Procedure: Release 6.10. Extended User's Guide. SAS Institute, Inc. 325pp.
- Hernando, J.A., M.C. Soriguer, C. Zabala. 2001. Estudio de la selectividad del arte de pesca del "voraz" (*Pagellus bogaraveo*) de Tarifa. Consejería de Agricultura y Pesca. Junta de Andalucía. Informe Técnico. 38 pp.
- Holst, R. and T. Moth-Poulsen. 1995. Numerical recipes and statistical methods for gill net selectivity. *ICES CM 1995B/18*, 22pp.
- Holst, R., N. Madsen, T. Moth-Poulsen, P. Fonseca and A. Campos. *In press*. Manual for gillnet selectivity.
- Huse , I. and K. Nedreaas. 1995. Preliminary length selection curves of trawl fishing for Greenland halibut (*Reinhardtius hippoglossoides*). *NAFO Sci. Counc. Res. Doc. No.* 95/22, 7pp.
- JJAA. Consejería de Agricultura y Pesca. Dirección General de Pesca. 1996. Cartografía de especies y caladeros "Golfo de Cádiz". *Informaciones técnicas*, 45/96: 44 pp.
- Kirkwood, G.P. and T.I. Walker 1986. Gill net selectivities for gummy shark, *Mustelus antarcticus* Günther, taken in south-eastern Australian waters. *Austr. J. Mar. Freshw. Res.* 37: 689-697.
- Kurhilahti, M., M. Appelberg, E. Bergstrand and O. Enderlein. 1998. An indirect estimate of bimodal gillnet selectivity of smelt. *J. Fish Biol.* 52:243-254.
- Kyrtatos, N.1982. On the fishery and biology of the most important fishery resources of the Aegean Island Tinos. Institute of Oceanographic and Fisheries Research, Special

Publication 5:88 pp.

- Lambhead, P.J.D., H.M. Platt and K.M. Shaw. 1983. The detection of differences among assemblages of marine benthic species based on an assessment of dominance and diversity. *J. Nat Hist.* 17: 859-874.
- Madsen, N., Holst, R., Wileman, D. and Moth- Poulsen, T. 1999. Size selectivity of sole gill nets fished in the North Sea. *Fisheries Research*, 44: 59-73.
- Maguran, A.E. 1988. *Ecological diversity and its measurement*. London: Groom Helm, 179 pp.
- Marín and Cuvillos, L. 1806. Representación dirigida al rey nuestro señor, en defensa de las pesquerías de barcas parejas con artes al bou, por el gremio de pescadores de las dotaciones de El Puerto de Santa María, Plaza de Cádiz, Isla de León y Villa de Rota, a cuyas expensas se da a luz pública. Tomás Albán, Madrid: 282 pp.
- Martínez de Mora, M. 1779. Memoria sobre la decadencia de la pesca en las costas de Andalucía y modo de repararla. *Memorias de la Sociedad Económica de Amigos del País de Sevilla, 1779-1782*: 499-536.
- Martins, R., M.N. Santos, C.C. Monteiro and M. de L. Paes da Franca. 1992. Contribuição para o estudo da selectividade das redes de emalhar de um pano fundeadas na costa Portuguesa no biénio 1990-1991. *INIP, Relatórios Técnicos e Científicos, No. 62*, 26pp.
- Massutí, M. 1959. La gamba (*Parapenaeus longirostris*, Lucas). Primeras observaciones en los caladeros del Golfo de Cádiz y África Occidental. *Inv. Pesq.*, 15: 51-80.
- Millar, R.B. and S.J. Walsh. 1990. Analysis of trawl selectivity studies with an application to trouser trawls. *ICES-CM-1990/B:14*.
- Millar, R.B. and S.J. Walsh. 1992. Analysis of trawl selectivity studies with an application to trouser trawls. *Fisheries Research* 13:205-220.
- Millar, R.B. and R. Holst. 1997. Estimation of gillnet and hook selectivity using log-linear models. *ICES J. Mar. Sci.* 54:471-477.
- Millar, R.B. and R.J. Fryer. 1999. Estimating the size-selection curves of towed gears, traps, nets and hooks. *Rev. Fish Biol. Fish.* 9:89-116.
- Millar, R.B. 1991. Estimation of asymmetric selection curves for trawls. *ICES-CM-1991/B:56*.
- Millar, R.B. 1991. Estimating the size-selectivity of fishing gear by conditioning on the total catch: the SELECT (Share Each Lengthclass's Catch Total) model *ICES-CM-1991/B:57*.

- Millar, R.B. 1992. Analysis of trawl selectivity studies: Implementation in SAS. ICES-CM-1992/B:28
- Millar, R.B. 1992. Estimating the size-selectivity of fishing gear by conditioning on the total catch. *J. Amer. Stat. Assoc.* 87:962-968.
- Millar, R.B. 1995. The functional form of hook and gillnet selection curves can not be determined from comparative catch data alone. *Can. J. Fish. Aquat. Sci.* 52:883-891.
- Millar, R.B. *In press*. Untangling the confusion surrounding the estimation of gillnet selectivity.
- Mirabent and Soler, J. 1850. Memorias sobre las pescas que se cultivan en las costas meridionales de España desde el Cabo de San Vicente hasta el Estrecho de Gibraltar. Sociedad Económica Maritense de Amigos del País: 90 pp.
- Muñoz, J. 1972. La pesca en la desembocadura del Guadalquivir. II Premio "José de las Cuevas". Instituto de Estudios Gaditanos. Diputación Provincial de Cádiz: 321 pp.
- NSSH, 1990-1999. Results of the sea fishery survey by motor vessels for the years 1989-1996. National Statistical Service of Hellas, Section G-48, Athens, Hellas.
- Papaconstantinou, C., E. Caragitsou, V. Vassilopoulou, G. Petrakis and K.I. Stergiou. 1988. The coastal fisheries in Kastellorizo area. National Centre for Marine Resesarch, Athens, Hellas, Special Publication, 15: 106 pp.
- Petrakis, G. and K. I. Stergiou. 1995. Gill net selectivity for *Diplodus annularis* and *Mullus surmuletus* in the Greek waters. *Fish. Res.* 21: 455-464.
- Petrakis, G. and K. I. Stergiou 1996. Gill net selectivity for four species (*Mullus barbatus*, *Pagellus erythrinus*, *Pagellus acarne* and *Spicara flexuosa*) in Greek waters. *Fish. Res.* 27: 17-27.
- Petrakis, G., K.I. Stergiou, E. Christou, C.-Y. Politou, M. Karkani, N. Simboura, and P. Kouyoufas. 1993. Small scale fishery in the South Euboikos Gulf. National Centre for Marine Research. Technical Report (Contract No XIV-1/MED-91/007), July 1993, Athens, Hellas, 83 pp.
- Petrakis, G. C.-Y. Politou, A. Fourtouni, P. Bekas, G. Christidis, M. Karkani and T. Madurell. 1998. Description of small scale fisheries and of some 'metiers' in Greek waters. National Centre for Marine Research, Interim Report (SelMed, Contract 95/C/76/12), 25 pp.
- Puente, E. 1990. La pesca con redes fijas de fondo en aguas costeras vascas. Servicio de publicaciones del Gobierno Vasco, (Colección Itxaso nº 7). 121 pp.
- Puente, E. 1993. La pesca artesanal en aguas costeras vascas. Servicio de publicaciones del

- Gobierno Vasco, (Colección Itxaso nº 11).191 pp.
- Rodríguez, A. 1977. Contribución al conocimiento de la biología y pesca del langostino, *Penaeus kerathurus* (Forskäl, 1775) del golfo de Cádiz (Región Suratlántica Española). Inv. Pesq., 41 (3): 603-635.
- Santos, M.N. 1997. Ichthyofauna of the artificial reefs of the Algarve coast. Exploitation strategies and management of local fisheries. PhD Dissertation, Universidade do Algarve, 223 pp + annexes.
- Santos, M.N. and C.C. Monteiro. 1995. Estudo da selectividade da rede de emalhar de um pano fundeada na costa sul Algarvia. Bol. Inst. Port. Invest. Marít., Lisboa. 3:37-48.
- Santos, M., C. C. Monteiro and K. Erzini. 1995. Aspects of the biology and gillnet selectivity of the axillary seabream (*Pagellus acarne*) and the common pandora (*Pagellus erythrinus*) from the Algarve (South Portugal).Fish. Res. 23:223-236.
- Santos, M., C. C. Monteiro, K. Erzini and G. Lasserre. 1998. Maturation and gill-net selectivity of two small sea breams (genus *Diplodus*) from the Algarve coast (South Portugal). Fish. Res. 36:185-194.
- Sardá, F., Fernández, A. 1981. Biología y pesca de la cigala *Nephrops norvegicus* (L.). Inf. Técn. Inv. Pesq., 84 and 85.
- SAS Institute Inc. 1988. SAS/STAT™ User's Guide, Release 6.03 Edition. Cary, NC. 1028pp.
- Siegel S. and N.J. Castellan. 1988. Nonparametric statistics for the behavioral sciences. Statistics Series, 2nd Edition, McGraw-Hill, New York, 399 p.
- Sobrinho, I., Jiménez, M.P., Ramos, F., Baro, J. 1994a. Descripción de las pesquerías demersales de la región Suratlántica española. Inf. Técn. Inst. Esp. Oceanogr., 151: 79 pp.
- Sobrinho, I., Baro, J., Millán, M., F., Jiménez, M.P. and Ramos,F. 1994b. Fisheries of the Spanish South Atlantic Region. 2<sup>nd</sup> Part, Final Report (2 vols), Cooperative Project IEO/EC-DG XIV/C/1/BIOECO/93/009. Vol. I:85 pp.; Vol II (Data Record): 16 pp. + Annexes I-III.
- Sobrinho, I., Ramos, F., Jiménez, M.P., Baro, J. 1996. Study on the Spanish trawling fleet components and mapping of resources exploited by this fleet off the Gulf of Cádiz. Final Report, Cooperative Project IEO/EC-DG XIV/C/1/STUDY /92/029: 134 pp.
- Sobrinho, I. 1998. Biología y pesca de la gamba blanca (*Parapenaeus longirostris*, Lucas 1846) en el atlántico nororiental. Tesis Doctoral. Universidad de Sevilla: 218 pp.
- Sobrinho, I., García, T. 1998. Aspects on reproductive biology of the deep-water rose shrimp *Parapenaeus longirostris* (Lucas, 1846) from the gulf of cadiz waters (SW Spain).

- Proceeding and Abstracts, Fourth International Crustacean Congress: p.194.
- Sobrinho, I., García, T. and Baro, J. 2000. Trawl gear selectivity and the effect of mesh size on the deep-water rose-shrimp (*Parapeneus longirostris*, Lucas 1846) fishery of the gulf of Cádiz (SW Spain). *Fisheries Research* 44: 235-245.
- Soriguer, M.C., Zabala, C., Gómez-Cama, M, Cabrera, R. & Hernando, J.A. 2000. Variations in the growth of *Sardina pilchardus* (Walbaum, 1792), landed at three ports in the Gulf of Cádiz (ICES IXA) Proceedings 2<sup>nd</sup> International Congress on Maritime Technological Innovations and Research. Publicaciones de la Universidad de Cádiz (ISBN 84-7786-669-4; Paperback). Vol 2: 1316-1323.
- Soriguer, M-C., Vallespín, C., Hernando, J.A. 2000. Peces de la península Ibérica. Claves para su determinación. Servicio de Publicaciones Universidad de Cádiz: 198 pp.
- Sparre, P., E. Ursin and S.C. Venema. 1989. Introduction to tropical fish stock assessment. Part 1 - Manual. FAO Fish. Tech. Pap., 301(1): 337 pp.
- Sparre, P. and S.C. Venema. 1992.
- Stergiou K.I. and D. Pollard. 1994. A spatial analysis of the commercial fisheries catches from the Hellenic Aegean Sea. *Fish. Res.* 20: 109-135.
- Stergiou K.I., G. Petrakis and C.-Y Politou. 1996. Small-scale fisheries in the south Euboikos Gulf (Greece): species composition and gear competition. *Fish. Res.* 26: 325-336.
- Stergiou, K. I. and G. Petrakis. 1993. Description, assessment of the state and management of the demersal and inshore fisheries resources in the Hellenic seas. *Fres. Envir. Bull.* 2: 312-319.
- Stergiou, K.I., C. Christou, D. Georgopoulos, A. Zenetos and C. Souvermezoglou 1997. Hellenic waters: physics, chemistry, biology and fisheries. *Ocean. Mar. Biol. - Ann. Rev.* 35: 415-538.
- Stergiou, K.I., A. Economou, C. Papacnstantinou, N. Tsimenides and S. Kavadas. 1998. Estimates of discards in the Hellenic trawl fishery. *Rapp. Comm. int. Mer Medit.* 35: 490-491.
- Stergiou, K.I., C. Papaconstantinou, and G. Petrakis. 1989. Fisheries production in the Patraikos and Korinthiakos Gulfs and the Ionian Sea, 1980-1985. Proceedings of the 2nd Hellenic Symposium on Oceanography and Fisheries, 2: 571-576 (in Hellenic, with English abstract).
- Suuronen, P., A. Jaervik and R.B. Millar. 1991. Some results on herring selectivity in diamond and hexagonal mesh pelagic trawls. ICES-CM-1991/B:16.
- Trujillo, V., Meixide, M., Porteiro, C., Pérez, N., Pereiro, F.J. 1993. Cambio de malla y

- esfuerzo en las pesquerías multiespecíficas en aguas atlánticas de la península Ibérica. Bol. Inst. Esp. Oceanogr. 9(1): 23-40.
- Wulff, A. 1986. Mathematical model for selectivity of gill nets. Arch. FishWiss. 37:101-106.
- Xu, X. and R.B. Millar.1993. Estimation of trap selectivity for male snow crab (*Chionoecetes opilio*) using the SELECT modeling approach with unequal effort data. Can. J. Fish. Aquat. Sci. 50:2485-2490.
- Zar, J.H. 1984. Biostatistical analysis. Prentice-Hall: New Jersey.
- Zuñiga, L. 1967. Sobre la selectividad del arte del trasmallo. Inv. Pesq. 32.: 139-147.
- Zuñiga, L. 1966. Selectividad del arte del trasmallo para *Mullus barbatus* (L.). Inv. Pesq., 30: 529-539.

# Annex I

Table 1. Fishing *métier* survey form (STATIC GEAR FISHING).

PORT: ..... VESSEL: ..... DATE: ..... F. ACTIVITY/YEAR: .. months

<b>FISHING MÉTIER</b> <i>Characteristics</i>	<b>MÉTIER #</b>	<b>MÉTIER #</b>	<b>MÉTIER #</b>
<i>Type of net</i>			
<i>Fishing season</i>			
<i>Target species</i>			
<i>Fishing ground (depth, type)</i>			
<i>Soak time (hours, days)</i>			
<i>Number of shootings/day</i>			
<i>Number of soaked nets</i>			
<b>FISHING MÉTIER</b> <i>Characteristics</i>	<b>MÉTIER #</b>	<b>MÉTIER #</b>	<b>MÉTIER #</b>
<i>Type of net</i>			
<i>Fishing season</i>			
<i>Target species</i>			
<i>Fishing ground (depth, type)</i>			
<i>Soak time (hours, days)</i>			
<i>Number of shootings/day</i>			
<i>Number of soaked nets</i>			
<b>Comments:</b>			

# Annex II

**Table 1. Example of fishing gear technical data collected to define the characteristics of a trammel net (A) and results obtained from these data (B). Notes: The height of the trammel net is determined by the outer panel and is calculated from the product of its number of meshes deep and the vertical size of each mesh when open at the estimated hanging ratio; The length of the trammel net is determined by the length of the mounted inner panel.**

<b>A. COLLECTED DATA</b>			<b>B. CALCULATED DATA</b>	
<b>A.1 NETTING</b>			<b>NET MOUNTED</b>	
<b>Inner panel</b>	Material	PA monof.	Buoyancy (Kgf/100 metres)	2.5
	Diameter (mm)	0.35	Ballast (kg/100 m)	8
	Height (n° meshes)	35		
	Stretched mesh size (mm)	100	<b>INNER PANEL:</b>	
<b>Outer panel</b>	Material	PA monof.	Length (m)	46.7
	Diameter (mm)	0.6	H1: Height (m)	3.10
	Height (n° meshes)	4.5	<b>OUTER PANEL:</b>	
	Stretched mesh size (mm)	550	Length (m)	50.9
<b>A.2 ROPES &amp; NETTING PANNEL</b>			H2: Height (m)	2.10
<b>Headline</b>	Type	twisted	<b>VERTICAL SLACK</b>	
	Material	PE		0.68
	Diameter (mm)	11	<b>HANGING RATIO (Horizontal)</b>	
	Staple length (cm)	28	<b>INNER PANEL:</b>	
	N° meshes INNER/staple	6	Headline	0.47
	N° meshes OUTER/staple	1	Footrope	0.47
<b>Footrope</b>	Type	braided	<b>OUTER PANEL:</b>	
	Material	PA	Headline	0.51
	Diameter (mm)	8	Footrope	0.51
	Ballast (kg/100 m)	8		
	Staple length (cm)	28		
	N° meshes INNER/staple	6		
N° meshes OUTER/staple	1			
<b>A.3 FLOATS</b>				
	Type	rounded		
	Buoyancy (gf)	28		
	N° staples/float	4		