

International Council for
the Exploration of the Sea

C.M. 1977/G:12
Demersal Fish (Southern) Committee

Discardings of Sparids in the Bottom
Trawl Fishery off Northwest Africa.



by

J.Bravo de-Laguna, M.A.R.Fernandez and J.C.Santana^{1/}

Summary

The Sparids are the demersal fishes most discarded in the cephalopods fishery off Northwest Africa. In the present paper, the results of discardings made in three cruises are presented. The area surveyed is comprised between the parallels 21° 30'N and 24°20'N. In this area are included two fishing zones of cephalopods. In the first one ("Villa Cisneros"), the diversity is bigger than in the second (Cabo Barbas). In general, *Pagellus coupei*, *Diplodus senegalensis*, *Spondyliosoma cantharus* and *Dentex macrophthalmus* are the main species of Sparids discarded. The most frequent lengths rejected into the sea are between 8 and 10.5 centimeters. The results of the species composition, proportion and lengths distributions, within these two zones, are presented and discussed.

Introduction.- Since early 1976, the laboratory of the Spanish Institute of Oceanography at the Canary Islands, is carrying out a research program for the study of the discardings of the cephalopods fishery off Northwest Africa. This program attempts to estimate the magnitude of these discardings, the species composition and their lengths frequencies distribution, as well as the possible quantitative and quantitative seasonal fluctuations.

The development of the cephalopods fishery in the waters off West Africa, related to the fish overexploitation, has been described in some previous papers (Garcia

^{1/} Instituto Español de Oceanografía
Laboratorio de Canarias
Av. Jose Antonio 3
SANTA CRUZ DE TENERIFE- SPAIN

Cabrera, 1968;—, 1969;—1970; Bas, Morales and San Feliu, 1970). The catch of Sparids and Sciaenids was the main target of the first Spanish artisanal and industrial fleets, fishing in this area. Afterwards, with the large development of the industrial fishery of the cephalopods, and the decrease of the yields of Sparids, the capture of them took a second plane for the industrial trawl fishery. Nevertheless, the Sparids still constitute the main target for the artisanal fishing fleet, which catch them for fresh human consumption.

In a previous paper (J.Bravo de-Laguna, M.A.R.Fernandez and J.C.Santana, 1976), preliminary results of the discardings of the cephalopods fishery were presented. In it can be observed how the Sparids constitute the main part of the fishes discarded. Usually, these catches are not reflected in the fishery statistics. The high diversity of fishes in the area, makes quite impossible for a commercial trawler to report all the fishes rejected, with a correct break down by species and areas. Given the commercial importance of this family for the human consumption, we have specially studied it.

This paper presents the results of the discardings of Sparids produced in 103 trawl stations of three cruises made on different fishing grounds and in two different seasons. There are also included the length frequencies distributions of the species most caught.

Method.— Samplings were made on board of commercial trawlers. How it was indicated in a previous paper (Bravo de Laguna, J., M.A.R. Fernandez and J.C. Santana, 1976), their fishing grounds are located in four main zones. In the present paper, we include the data of the so called "Villa Cisneros" (between 23°04'N and 24°N) and "Cabo Barbas" (22°06'N and 21°50'N).

The first cruise, FLIPPER 7601, was made on a freezer stern trawler of 37 meters L.O.A., 426 T.R.B. and 1100 H.P., in January-February 1976. In this cruise, 32 hauls in depths between 22 and 66 meters were made in "Villa Cisneros", and 10 hauls between 53 and 66 meters in "Cabo Barbas".

In the second cruise, FLIPPER 7701, a freezer stern trawler was also employed. Their main characteristics are: 35.5 m.L.O.A., 287 T.R.B and 1170 H.P.. This cruise took

place in January-February 1977 in both fishing zones. In "Villa Cisneros", 19 hauls were made at depths comprised between 22 and 33 meters, and in "Cabo Barbas" 19 hauls in depths between 57 and 110 meters.

The third cruise, FLIPPER 7705, was also done on board of a stern trawler of 36 m. L.O.A., 266 T.R.B. and 1200 H.P., in May 1977. The different trawl stations were made exclusively in "Villa Cisneros" and in shallow waters. Trawl stations were between 13 and 30 meters depth. The fishing gears employed on the different cruises were the same as the standard ones used by the Spanish cephalopods fishing fleet (40 mm. mesh size in the cod end).

After each haul, a certain quantity of the material ready to be discarded was sampled in baskets, counting the number of baskets of the sample, as well as the total number of those used to throw the discardings into the sea. The specimens of the sample were classified, weighed, counted and measured by species. The measurements of the total length were made to the nearest half centimeter. The total weight discarded by species was obtained by multiplying the weight of each species in the sample, by the ratio between the total weight discarded and the weight of the sample. The obtained values were classified by fishing zones, and those of the same zone accumulated.

Results.- The positions of the hauls done during the cruises FLIPPER 7701 and FLIPPER 7705 are shown on the map 1. The details of the trawl stations of the FLIPPER 7601 were presented in a former paper (Bravo de-Laguna, J., M.A.R. Fernandez and J.C. Santana, 1976). Table Ia shows the results obtained in the three cruises on the zone of "Villa Cisneros". In it are included the total catch - in kilograms-, the C.P.U.E. and the percentages of the different groups in relation with the total catch, the total catch excluding the invertebrates, the discardings and with the discardings excluding the invertebrates. Table Ib presents the same type of values computed for the zone of "Cabo Barbas".

The tables IIa and IIb include the percentages of the different species of Sparids in relation with the total catch, with and without invertebrates, and the discardings, including and excluding the invertebrates. In the same tables are the percentages of the different species of Sparids, in relation with the total catch of this family, in each cruise and fishing zone.

Figures 1 to 10 show the histograms representing the lengths frequencies distributions, of the most abundant Sparids caught in the different zones and cruises.

Discussion.- The three cruises covered almost all the fishing grounds of cephalopods in the zones of "Villa Cisneros" and "Cabo Barbas". The first two were in the same season and zones, but in different years. The third one was in Spring and covered the shallow waters of "Villa Cisneros". This can partially explain the differences of the table Ia. In any case, the Sparids were generally the family of fishes that most contributed to the discardings.

In the zone of "Villa Cisneros", and in shallow waters, the invertebrates dominate the discardings being the 50% of the total catch. The Sparids were 38.4% of the fishes rejected into the sea. The species most discarded were *Pagellus coupei* (46.6% of the total Sparids), *Diplodus senegalensis* (25.8%) and *Spondyliosoma cantharus* (22.0%). The most common lengths of *Pagellus coupei* were between 11 and 15.5 centimeters (Fig.8), of *Diplodus senegalensis*, between 12 and 15,5 centimeters (fig.4), and of *Spondyliosoma cantharus*, between 11 and 13.5 centimeters.

In deeper waters and in another season, when the FLIPPER 7701 and FLIPPER 7601 were made, the amount of invertebrates was lower, 9.5% and 8.7% of the total catch respectively. The proportion of Sparids in the discardings decreased from the first (41.7%) to the second (17,7%) cruise. The main species rejected in these two cruises were *Pagellus coupei* (58.9% and 54.9%), *Diplodus senegalensis* (26.1% and 33.5%), *Pagellus erythrinus* (11.9% in the second cruise), *Spondyliosoma cantharus* (2.8% and 5.9%) and *Boops boops* (2.9% and 3.7%). The most common lengths of the Sparids rejected were: in the case of *Pagellus coupei*, between 8 and 13 centimeters, the *Diplodus senegalensis* from 8.5 to 16.5 cm. and *Spondyliosoma cantharus*, between 9.5 and 13.5 centimeters. In the whole zone of "Villa Cisneros", the order of importance and the proportion of the different species of Sparids were quite constant during the three cruises.

The percentages of the different groups, in relation with the total catch and discardings, were almost constant in the two cruises made in "Cabo Barbas" (Table I b). Here, the proportion of Sparids discarded (6.8% and 8.2%) was also an important part of the fishes rejected into the sea. Nevertheless, the species composition and their diversity changed in relation with "Villa Cisneros" (Table IIb). In this case, Page-

llus coupei (66.1%, 27.6%) and *Pagellus acarne* (29.2%, 25.6%) were the two most caught and rejected species. During the second cruise, small *Dentex macrophthalmus* (30.1%) with total lengths comprised principally between 8 and 10.5 centimeters, were the most abundant Sparids in the discardings.

The differences between both zones can be related to the different bathymetry of the fishing grounds. While in the northern zone the trawlers operate in shallow waters, in "Cabo Barbas" the trawling operations are done starting from 50 meters depth.

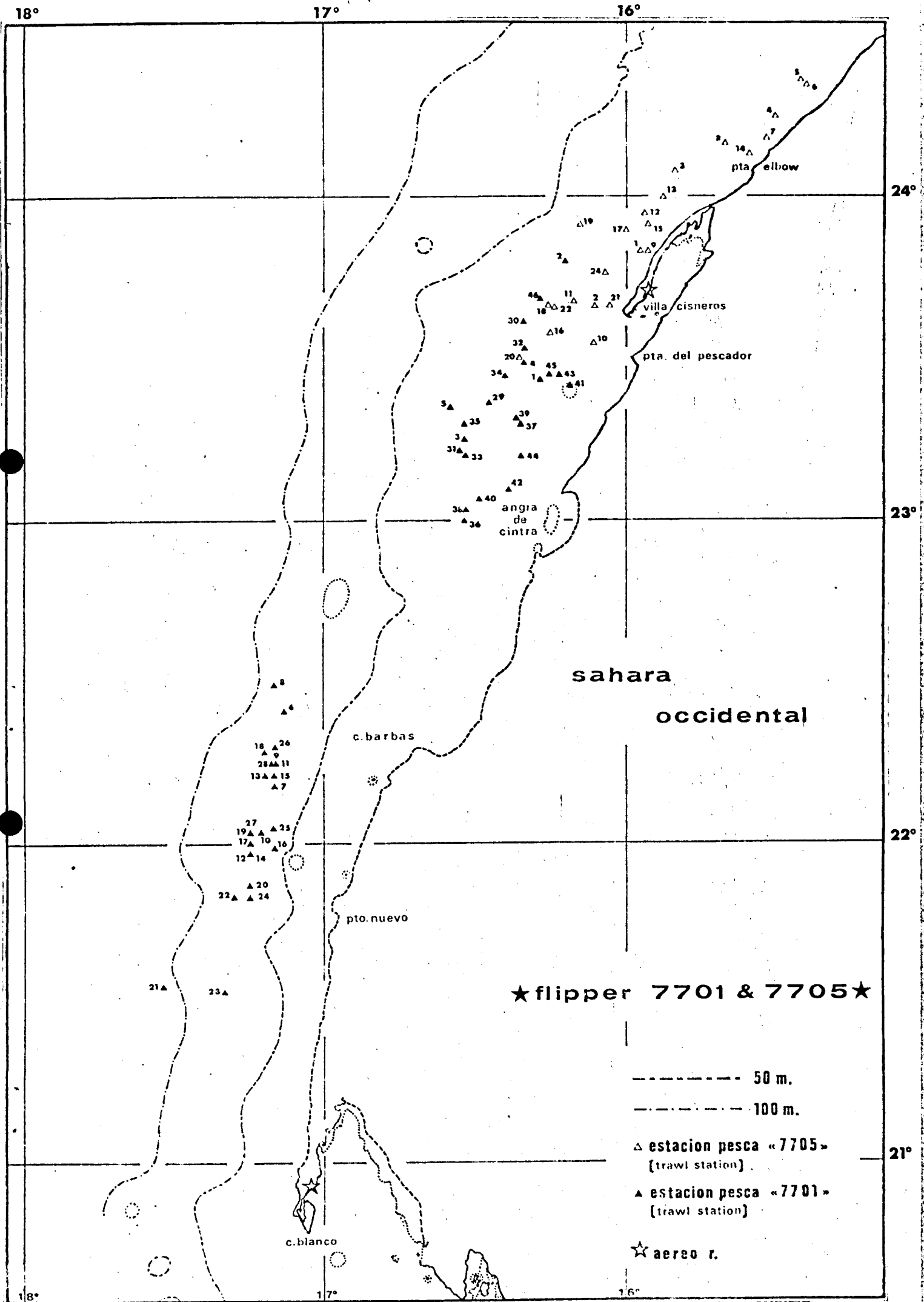
Conclusions.- 1. The species composition and diversity of Sparids discarded in the bottom trawl fishery for cephalopods off Northwest Africa, change in the different zones studied in this paper.

2. In "Villa Cisneros" *Pagellus coupei*, *Diplodus senegalensis* and *Spondyliosoma cantharus* are the Sparids most discarded. The commonest total lengths are, in general, between 11 and 15.5 centimeters.

3. In the zone of "Cabo Barbas" are *Pagellus coupei*, *Pagellus acarne* and *Dentex macrophthalmus* the main species of the Sparids discarded. Here the total lengths are normally between 7 and 10.5 centimeters.

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sahara
occidental

★ flipper 7701 & 7705 ★

----- 50 m.
----- 100 m.

△ estacion pesca «7705»
[trawl station]
▲ estacion pesca «7701»
[trawl station]

☆ aereo r.

	COMMERCIAL CATCH			DISCARDINGS								
	Cr.1	Cr.2	Cr.3	SPARIDS			OTHER FISHES			INVERTEBRATES		
Cr.1				Cr.2	Cr.3	Cr.1	Cr.2	Cr.3	Cr.1	Cr.2	Cr.3	Cr.1
Total catch	13491.0	5881.4	5173.5	5219.4	1220.0	2970.2	4762.1	5601.5	7289.6	2740.0	1213.4	12907.5
Kg/hour	67.4	56.1	35.3	26.1	11.6	20.3	36.4	54.1	32.5	13.7	11.6	68.1
% T.C.	45.9	42.0	20.1	18.1	8.7	11.5	25.4	40.6	18.4	9.5	8.7	50.0
% T.C.-Inv.	51.9	46.0	40.1	20.1	9.5	23.0	20.0	44.4	36.9	-	-	-
% Discard.	-	-	-	34.2	15.0	14.4	47.8	70.0	23.1	18.0	14.9	62.5
% Disc.-Inv.	-	-	-	41.7	17.7	38.4	50.3	82.3	61.6	-	-	-

a)

	DISCARDINGS								COMM.CATCH	
	OTHER FISHES		SPARIDS		INVERTEBRATES					
	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2
Total catch	4026.1	3834.5	465.1	536.0	2354.1	2141.9	5071.5	5741.9		
Kg/hour	78.3	38.1	9.0	5.3	45.8	21.3	98.6	57.1		
% T.C.	33.8	31.3	3.9	4.4	19.7	17.4	42.6	46.9		
% T.C.-Inv.	42.1	37.9	4.9	5.3	-	-	53.0	56.8		
% Discard.	53.8	58.9	6.8	8.2	34.4	32.9	-	-		
% Disc.-Inv.	89.6	87.7	10.4	12.3	-	-	-	-		

b)

Table I - Results by groups of the cruises Flipper 7601 (Cr.1), Flipper 7701 (Cr.2) and Flipper 7705 (Cr.3) in a) "Villa Cisneros" and b) "Cabo Barbas". Total catch in kilo — grams, catch per hour trawling (Kg/hour), percentages of the total catch (% TC), of the total catch excluding invertebrates (% TC-Inv.), of the discardings (% Discard.) and of the discardings excluding the invertebrates (% Disc. - Inv.).

	% Total Catch			% T.C. - Inv.			% Discardings			% Disc. - Inver			% Total Sparids		
	Cr.1	Cr.2	Cr.3	Cr.1	Cr.2	Cr.3	Cr.1	Cr.2	Cr.3	Cr.1	Cr.2	Cr.3	Cr.1	Cr.2	Cr.3
<i>Sparus caeruleostictus</i>	0.002	-	-	0.002	-	-	0.004	-	-	0.004	-	-	0.004	-	-
<i>Boops boops</i>	0.5	0.3	0.04	0.6	0.4	0.1	1.0	0.6	3.1	1.2	0.7	0.1	2.9	3.7	0.4
<i>Dentex canariensis</i>	0.2	0.05	0.02	0.2	0.05	0.03	0.3	0.1	0.02	0.4	3.1	0.1	1.0	0.5	0.1
<i>Dentex gibbosus</i>	0.03	0.1	0.1	0.04	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	1.0	0.5
<i>Diplodus sargus</i>	-	0.1	-	-	0.1	-	-	0.2	-	-	0.2	-	-	1.1	-
<i>Diplodus vulgaris</i>	0.3	-	-	0.3	-	-	0.6	-	-	0.7	-	-	1.7	-	-
<i>Diplodus senegalensis</i>	4.7	2.9	3.0	5.2	3.2	5.9	8.9	5.0	3.7	10.9	5.9	9.9	26.1	33.5	25.8
<i>Oblada melanura</i>	0.02	-	-	0.02	-	-	0.03	-	-	0.03	-	-	0.1	-	-
<i>Pagellus erythrinus</i>	-	1.0	0.2	-	1.1	0.4	-	1.8	0.3	-	2.1	0.7	-	11.9	1.8
<i>Pagellus acarne</i>	0.9	0.3	0.3	1.0	0.3	0.6	1.7	0.5	0.4	2.0	0.5	1.0	4.9	3.1	2.7
<i>Pagellus bojaraveo</i>	0.1	-	-	0.2	-	-	0.3	-	-	0.3	-	-	0.8	-	-
<i>Pagellus couplei</i>	10.7	4.8	5.4	11.2	5.2	10.7	20.1	8.2	6.7	24.6	2.7	17.9	53.9	54.9	46.6
<i>Sarpa salpa</i>	0.1	-	-	0.1	-	-	0.2	-	-	0.3	-	-	0.6	-	-
<i>Spondyliosoma cantharus</i>	0.5	0.5	2.5	0.6	0.6	5.1	1.0	1.0	3.2	1.2	1.0	8.5	2.8	5.9	22.0

a)

	% T. Catch		% T.C.-In.		% Discard.		% Ds.-In.		% T.Sparids	
	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2	Cr.1	Cr.2
<i>Boops boops</i>	-	0.9	-	0.4	-	0.7	-	1.1	-	8.7
<i>Dentex canariensis</i>	0.2	-	0.2	-	0.3	-	0.5	-	4.7	-
<i>Dentex macrophthalmus</i>	-	1.3	-	1.6	-	2.5	-	3.7	-	30.1
<i>Dentex gibbosus</i>	-	0.01	-	0.01	-	0.01	-	0.02	-	0.2
<i>Diplodus senegalensis</i>	-	0.3	-	0.4	-	0.6	-	1.0	-	7.9
<i>Pagellus acarne</i>	1.1	1.1	1.4	1.3	2.0	2.1	3.0	3.1	29.2	25.6
<i>Pagellus couplei</i>	2.6	1.2	3.2	1.5	4.5	2.3	6.8	3.4	66.1	27.0

b)

Table II - Percentages of the different species of Sparids in relation with the total catch, the total catch excluding the invertebrates (TC - Inv.), the discardings, the discardings excluding the invertebrates (Disc.-Inver.) and the total catch of Sparids in a) "Villa Cisneros" and b) "Cabo Barbas".

