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## **Estimates of Spanish bottom otter trawl boarfish (*Capros aper*) discards by area in the Northeast Atlantic area**

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### **Abstract**

*Discard estimates for the Spanish bottom otter trawl fleets fishing in the Northeast Atlantic are presented for boarfish (*Capros aper*). Information was obtained by observers on board under different discard sampling programmes carried out by the Spanish research institute IEO. Raising based on effort (number of trips) was used to estimate total discards in weight and associated coefficients of variation (CV) and number for the fleet. Discards length distributions are presented by year and fishing area. Total estimates indicates different trends in discarding, showing a decreasing trend in north coastal Spanish waters and a increasing trend in western Ireland waters.*

*Keywords: Boarfish, Discards, Northeast Atlantic waters, Bottom Otter Trawl.*

### **1. Introduction**

The boarfish (*Capros aper*) is a pelagic shoaling species distributed from Norway to Senegal and captured mainly by trawling fleets (Whitehead *et al.*, 1986; White *et al.*, 2011). . From 2001 boarfish has been targeted in pelagic trawl fisheries in Europe reaching high levels on landings in 2010. In 2011, ICES was asked by the European Commission to provide advice in 2012 for first time.

There are not Spanish fisheries targeting boarfish but it is known the discarding by the Spanish bottom trawl vessels (Perez *et al.*, 1996). The main objective of this working document is to present boarfish discard estimates for the Spanish bottom otter trawl in ICES areas.

### **2. Material and methods**

The sampling strategy and the estimation methodology used in the “Spanish Discards Sampling Programme” started in 1988, and are in accordance with the “*Workshop on Discard Sampling Methodology and Raising Procedures*” guidelines (ICES, 2003). Time series does not cover every year due to lack of funding in several years before 2003. The information included in this paper includes results from following national and European research projects: Proyecto Descartes 88-89, EC Project Pem/93/005, EC

Project 95/ 094, EC Project, 98/095, EC Project 99/063, EC Data Collection Regulation Programme (Spain).

The observers-on-board programme is based on a stratified random sampling design. Métier is the stratum and trips (the sampling units) are randomly selected for sampling within métiers. DCF asked for annual estimates and, hence, sampling was organised so as to obtain annual results. Raising to effort (instead of landings, as has been done in the past) is used in this paper based on recommendation from ICES (2007).

Discard data for the Spanish fleet operating in the ICES Subareas VI and VII and ICES divisions VIIIc and north IXaN are presented. Results here are showed for the entire bottom trawl fleet, with métiers combined.

For each trip sampled, several hauls are, in turn, sampled as follows. A random sample of discarded fish is selected. Boarfish in the discards sample is measured for length and the weight is calculated using a length/weight relationship. The resulting weight in the discards sample is raised to haul level according to the total discarded weight of the haul and the proportion of boarfish in the sample. Haul-raised data are further raised to trip level taking into account the total number of hauls in the trip. The Coefficients of Variation (CV) are presented for discards in weight.

### **3. Results**

Discard estimates and associated coefficients of variation (CV) are presented in Table 1. Figures 1, 2 and 3 shows series trends of boarfish discarding by the Spanish trawling fleet at Western Ireland (ICES VI and VII) and north Spanish waters (ICES VIIIc and IXaN). A progressive discard reduction is observed in north Iberian waters while discarding at western Ireland showed a high variability with the highest discard volumes of the series in 2003 and 2008 and an increasing trend in discards since the last pick. Estimated CVs presented a high variability along the data series both areas.

Annual length compositions of discards are shown in tables 2 and 3. Figures 4 and 5 present discard size composition in each fishing area by year.

This species is completely discarded for Spanish fleets in both areas.

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Year	ICES VI-VII		Sampled trips	ICES VIIIc-IXa		Sampled trips	All areas		
	Total discard (t)	CV		Total discard (t)	CV		Total discard (t)	CV	Sampled trips
1988	17	97.2	14			0	17	97.2	14
1989	373	99.9	8			0	373	99.9	8
1994	995	36.9	20	590	41.9	67	1585	27.8	87
1997			0	810	47.2	95	810	47.2	95
1999	1610	68.3	6	223	30.9	61	1833	60.2	67
2000	1857	42.3	10	371	32.6	140	2228	35.7	150
2003	8413	44.8	9	399	65.5	51	8813	42.8	60
2004	3278	30.3	11	301	57.1	53	3579	28.2	64
2005	4887	36.3	10	120	46.6	97	5007	35.5	107
2006	3689	33.8	13	244	64.7	74	3933	31.9	87
2007	2555	47.9	12	62	24.3	95	2618	46.7	107
2008	8219	20.5	11	191	38.2	109	8410	20.0	120
2009	4921	25.5	15	126	23.3	115	5047	24.9	130
2010	5745	31.5	13	202	35.6	116	5947	30.4	129
2011	5136	48.9	12	325	21.0	112	5461	46.0	124

Table 1. Boarfish weight in ICES Subareas VI, VII, VIII, IX discarded by Spanish bottom trawling by area. Total discards in tonnes and CV.

	1994	1999	2000	2003	2004	2005	2006	2007	2008	2009	2010
2	0	0	0	0	0	0	0	22	0	0	0
3	0	0	0	0	8	0	0	44	0	0	0
4	0	13	0	28	50	9	65	187	0	0	0
5	19	0	0	360	132	224	100	296	271	61	30
6	90	171	29	1429	857	1543	1300	413	1588	394	184
7	219	514	117	2341	2362	2584	2752	1485	1562	107	404
8	288	375	303	1402	1717	4544	1800	2200	1690	254	644
9	657	749	1428	6455	1160	3304	3192	6625	3048	1723	17456
10	1572	2100	2085	27011	1672	2038	11940	11050	12149	6004	8053
11	3424	4005	3387	48665	13062	6319	6083	11443	21024	17939	28323
12	4975	8199	7139	41633	24608	43681	10296	11234	35475	17398	28576
13	4919	8498	11471	31707	14250	31269	18658	8819	23067	16803	20433
14	4272	6656	8066	28300	9200	15932	17100	7775	34256	21272	16537
15	2215	3579	3969	16892	5837	3628	9103	5156	19216	12505	12506
16	182	955	1567	3641	2477	2462	2759	1093	10353	7424	5777
17	41	63	85	396	219	140	198	92	652	697	821
18	0	0	9	11	32	66	0	8	2	37	11
19	0	0	0	2	34	47	63	0	0	45	0
20	37	0	0	2	166	13	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	9	0
22	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	7	0
24	0	0	0	0	0	0	0	6	0	0	0

Table 2. Boarfish (*Capros aper*) in ICES subareas VI and VII. Annual length compositions of discards

	1994	1997	1999	2000	2003	2004	2005	2006	2007	2008	2009	2010
2	0	0	0	0	0	0	0	0	0	0	0	0
3	34	16	0	0	0	0	0	0	0	0	0	1
4	469	902	15	0	0	2	0	0	0	0	28	38
5	3983	3302	123	27	17	0	0	546	1	13	34	80
6	5664	7059	1890	692	136	37	46	199	138	64	87	212
7	2056	7189	1569	1387	332	366	89	196	485	255	285	267
8	4621	3628	776	1317	474	368	201	426	516	402	522	760
9	4214	3781	487	1039	981	236	540	70	1187	234	639	400
10	895	2334	1141	798	1484	152	481	128	937	424	481	572
11	781	2050	953	1262	1386	201	209	367	562	494	511	369
12	4179	5323	924	1567	1949	301	212	422	1029	443	551	907
13	1716	3078	780	2428	3092	385	436	2084	503	257	571	408
14	1043	853	819	1667	2548	627	729	1107	619	130	892	511
15	1513	751	163	440	616	409	193	299	164	94	388	173
16	46	136	4	112	102	140	106	81	93	10	100	2
17	0	34	0	16	92	32	6	0	35	15	1	0
18	0	0	0	0	0	18	0	0	0	1	4	0
19	0	2	0	5	11	0	1	0	5	7	2	0
20	0	0	0	2	0	0	0	0	0	0	0	0
21	0	0	0	5	0	0	0	0	0	0	0	0
22	0	0	0	4	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Boarfish (*Capros aper*) in ICES Divisions VIIIc and IXa. Annual length compositions of discards.

Figure 1. Histogram of boarfish weigh in ICES Subareas VI, VII discarded by Spanish bottom trawling by area. Total discards in tonnes and CV.

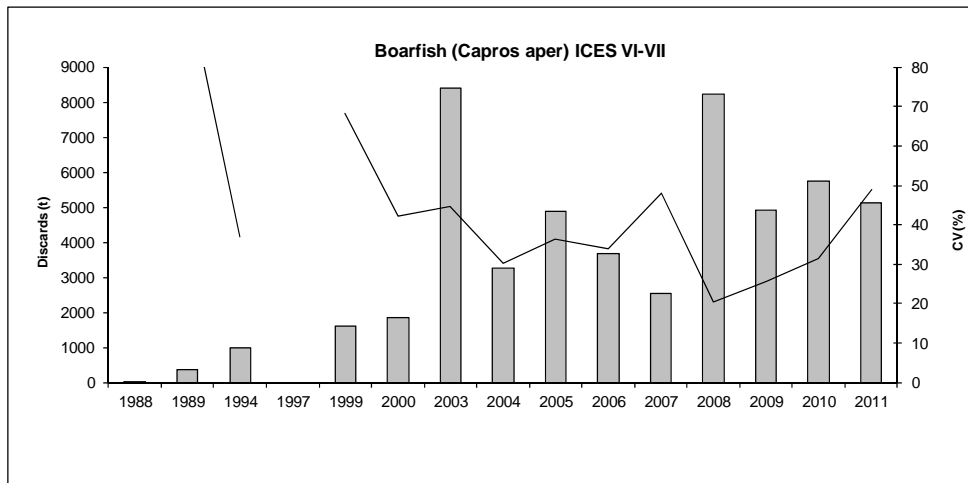


Figure 2. Histogram of boarfish weigh in ICES Divisions VIIIc and IXaN discarded by Spanish bottom trawling metiers. Total discards in tonnes and CV.

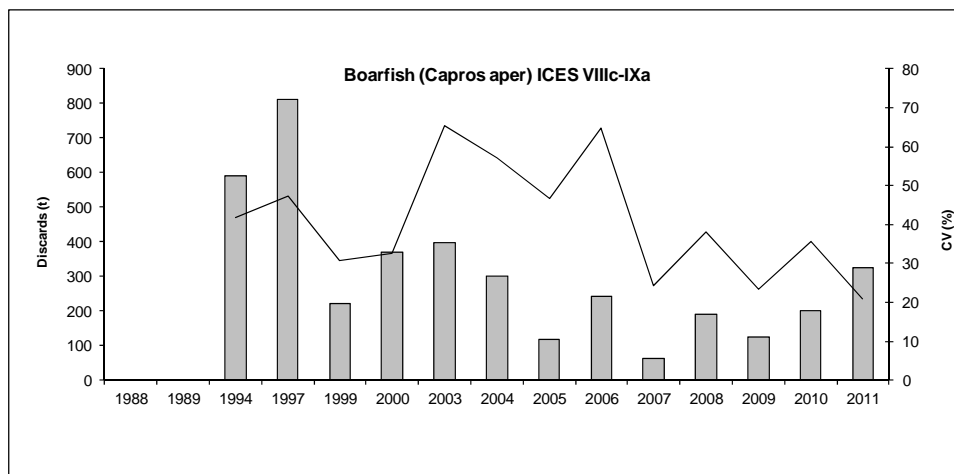


Figure 3. Boardfish in ICES discarded by Spanish bottom trawling metiers. Total discards in tonnes and CV.

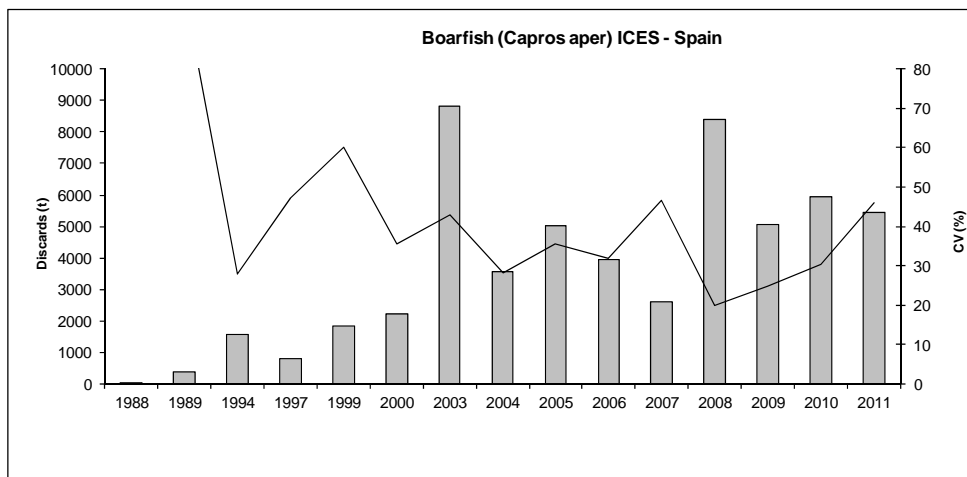


Figure 4. Boarfish in ICES subareas VI and VII. Annual length compositions of discards

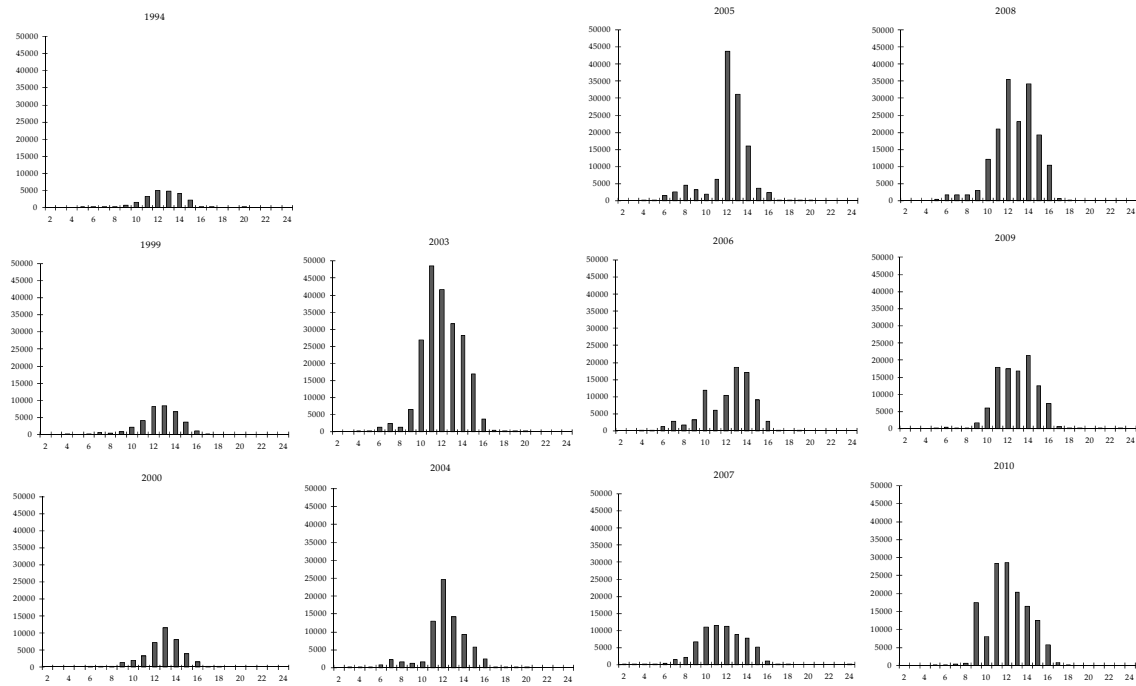


Figure 5. Boarfish in ICES Divisions VIIIc and IXa. Annual length compositions of discards

