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Discards for Southern Hake Stock, a First Approach to Iberian Data

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ABSTRACT

This document presents sampling levels obtained with Portuguese and Spanish Discard Sampling Programmes, both included in National Sampling Programmes, and some preliminary results for the Iberian Southern Hake discards. These programs consist on onboard-observer sampling schemes, with co-operative vessels, quasi-random selected, in the ICES Division VIIIc and IXa. The methodology used to estimate hake discards for Portugal and Spain since 2003 was based on the one proposed in the *Workshop on Discard Sampling Methodology and Raising Procedures* (PGCCDBS, Denmark, 2003). Spain presents results for the years 1994, 1997, 1999, 2000, 2003 and 2004. In the Portuguese Program, 2004 is the first year with an analysis of discard data. The number of trips sampled by the Spanish program for 2004 was 53, distributed by three trawl fleets- BACA trawl, Pair trawl and WHVO trawl. Portuguese onboard-observers sampled 40 trips distributed by Crustacean and Fish trawl fleets. The estimated percentages of discarded hake in relation to total catch were of 19,9 (C.V. = 22.6%) and 46,7 (C.V. = 72.1%) for the Spanish and Portuguese fleets respectively. The confidence interval for the Portuguese discard estimate is very large which denotes the very low precision of the obtained value. A co-operation in the analysis of this kind of data, between the two countries, could be the next step, since a standardisation of the methods would be of great importance for a realistic comparison of results obtained from both programs.

Introduction

The at-sea discarding of fish and its associated mortalities have been recognized and noted by fisheries scientists as inherent problem in the management of world fisheries (Alverson, 1995).

Various studies revealed that discard data show that discarding occurs at both high and variable rates, and therefore that stock assessments based only on landings would be significantly improved by knowledge of discarded numbers-at-age (Armstrong et al., 1995).

The Spanish Discard Sampling Program in Divisions VIIIc and IXa started in 1994, however it did not cover the whole period until present. Its implementation was depended on several European and national investigation projects which had not an annual continuity. The lack of continuity in the time series make it probably not suitable for being used in the assessment, however the

~~objective of this paper is to present~~ ~~The main objective of this paper is to present~~ the available information on the Spanish and Portuguese discards of Southern hake to the WGHMM.

Sampling

The Spanish observers-on-board programme is based on a stratified random sampling, considering the Fishery Unit as stratum and the trip as sampling unit. Instead of effort, landings are used in the raising procedure due to the best quality of information.

Until 2003, the standard procedure used to calculate Spanish total discards was estimated on a haul basis as described by Trenkel (SGDBI, 2001). From 2003 onwards and following the recommendation of the %Workshop on Discard Sampling Methodology and Raising Procedures+ (PGCCDBS, Denmark, 2003), general guidelines on appropriate sampling strategies and methodologies were described and the primary sampling unit was defined as the fishing trip instead of haul.

The Portuguese Discard Sampling Programme is based on a quasi-random sampling of co-operative commercial vessels (17 totals). Quasi-random sampling results from the fact that not always the vessels are available to take observers onboard for different reasons (p.e. new crew, too many days at sea, vessel/engine damages, etc.). The sampling levels for 2004 are presented in Table I.

The raising variable used to estimate total discards (D) was the total landings (L). A discard ratio ($r = d/l$) was estimate for each sampled trip and calculated its mean. The obtained mean ratio was very different from the median, so all the ratios were logarithmized. The new mean and variance were estimated and, from them, is calculated a ratio estimate (r_{est}) and its variance ($Var r_{est}$). The total discard is given by:

$$D = r_{est} * L$$

Lower and upper limits of this estimate were calculated as the respective variance (Var), coefficient of variation (CV), and discard percentage in relation to total catch from the Portuguese trawl fleet.

Length composition of discards and discarded numbers-at-age were also calculated for both Discard Sampling Programmes.

Table 1. Sampling levels per year obtained for the Spanish and Portuguese Discard Sampling Programs.

Spanish Discard Program

BACA TRAWL	Trips	Sampling Hauls	Fishing hours	PAIR TRAWL	Trips	Sampling Hauls	Fishing hours	WHVO	Trips	Sampling Hauls	Fishing hours
1993	3	8	53,9	1993	1	1	9,0	1993			
1994	53	447	2096,0	1994	8	7	47,0	1994	7	14	60,2
1995				1995				1995			
1996				1996				1996			
1997	67	439	1883,0	1997	31	39	315,6	1997	1	2	7,5
1998				1998				1998			
1999	44	250	944,0	1999	20	18	175,0	1999			
2000	70	367	1327,0	2000	42	42	320,0	2000	14	35	118,5
2001	11	43	145,1	2001	7	7	59,7	2001	3	6	25,2
2002				2002				2002			
2003 *	23	100	384,4	2003	11	11	102,9	2003	18	56	175,4
2004 **	26	121	382,7	2004	10	11	94,6	2004	17	46	139,4

Portuguese Discard Program

CRUST TRAWL	Trips	Sampling Hauls	Fishing hours	FISH TRAWL	Trips	Sampling Hauls	Fishing hours
2004	16	101	613,5	2004	24	106	376,7

* Both gears used in 6 trips.

** Both gears used in 9 trips.

Results

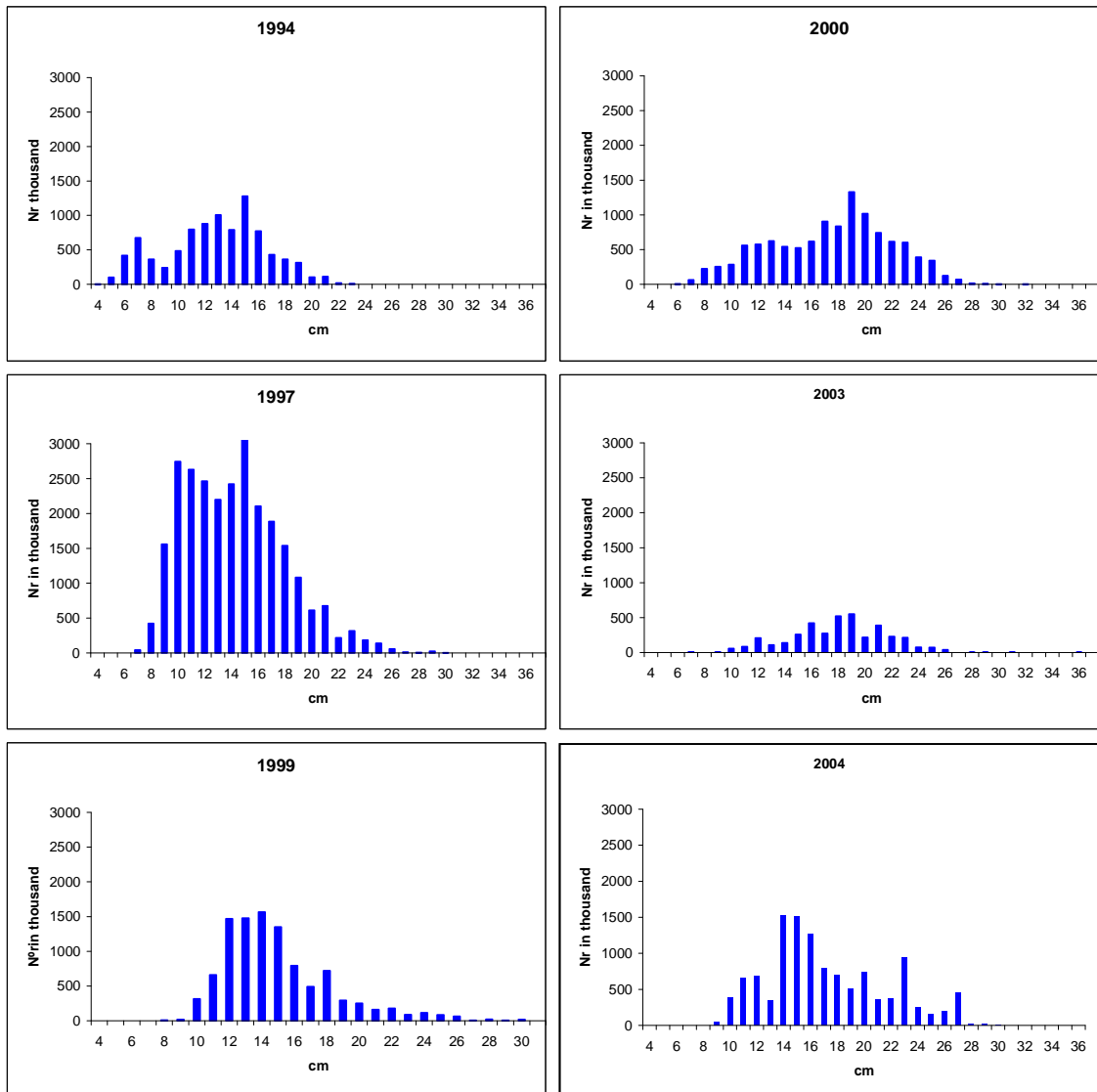
The estimated total discard from both Discard Sampling Programmes are presented in Table 2. It also shows the precision levels and the percentages of discard in weight and number in relation to the total catch of trawl fleets.

Table 2. Hake Discard (ton) of the Spanish trawlers in Divisions VIIIc and IXa and of the Portuguese trawlers in Division IXa, estimated with on board observers. Percentages in Weight and in number are in relation to Total Catch.

	Spain						Portugal
Total Discard	1994	1997	1999	2000	2003	2004	2004
Tn	242,3	688,5	298,5	554,8	192,2	554,7	588,5
CV	39,5	38,4	25,4	20,6	126,9	22,6	63,9
Lower Limit	-	-	-	-	-	-	208,5
Upper Limit	-	-	-	-	-	-	968,5
% in Weight	8,2	20,3	12,5	22,0	9,0	19,9	47,5
% in Number	34,3	67,6	58,3	60,4	35,2	55,2	-

	Spain						Portugal
Total Discard	1994	1997	1999	2000	2003	2004	2004
Tn	242,3	688,5	298,5	554,8	192,2	554,7	664,2
CV	39,5	38,4	25,4	20,6	126,9	22,6	72,1
Lower Limit	-	-	-	-	-	-	235,3
Upper Limit	-	-	-	-	-	-	1093,1
% in Weight	8,2	20,3	12,5	22,0	9,0	19,9	47,5
% in Number	34,3	67,6	58,3	60,4	35,2	55,2	84

Spain



Portugal

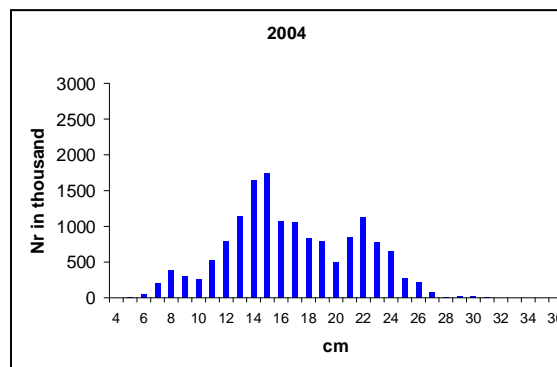


Figure 1 - Length composition of Hake Discard (number in thousands) of the Spanish and the Portuguese trawlers.

TABLE IV Ë Hake Discard numbers-at-age (number in thousands), mean weight (kg), mean length (cm).

Spain					
1994	Age	N°	Mean weight	Mean length	Otholits sampled
	0	5842	0,013	11,5	ALK Combined
	1	3253	0,033	16,5	97-99-00-03
	2	70	0,069	21,4	
	3	0	0,145	27,5	
1997	Age	N°	Mean weight	Mean length	Otholits sampled
	0	18163	0,016	12,9	134
	1	7722	0,044	18,2	
	2	576	0,100	24,2	
	3	21	0,175	29,2	
1999	Age	N°	Mean weight	Mean length	Otholits sampled
	0	6079	0,017	13,4	49
	1	3577	0,039	17,5	
	2	448	0,102	24,4	
	3	45	0,179	29,4	
2000	Age	N°	Mean weight	Mean length	Otholits sampled
	0	833	0,006	9,4	56
	1	5691	0,030	15,8	
	2	4612	0,074	21,8	
	3	146	0,147	27,5	
2003	Age	N°	Mean weight	Mean length	Otholits sampled
	0	694	0,018	13,5	153
	1	2748	0,050	19,0	
	2	427	0,091	23,5	
	3	13	0,231	31,9	
2004	Age	N°	Mean weight	Mean length	Otholits sampled
	0	5857	0,013	11,5	47
	1	3171	0,032	16,5	
	2	137	0,062	20,7	
	3				

Portugal					
2004	Age	N°	Mean weight	Mean length	Otholits read
	0	3379	0,015	12,4	427
	1	11287	0,048	18,2	
	2	616	0,116	25,4	
	3	12	0,174	29,2	

This table shows that in 2004 the most part of discarded fish were of age 0 (64%) for the Spanish fleet and of age 1 (74%) for the Portuguese fleet. Also the mean length and weight differ for the two fleets.

Final Comments

Alverson et al. (1994) refer that non-pelagic trawlers usually discard as much as they land. Although it seems to happen in the Portuguese case, the fact is that the low precision obtained for the total discard estimate disables us to accept that same value as a realistic one.

The Spanish results since 1994 show that discard rates have high variability in time, what is referred in Alverson et al. (1994) and Kennelly (1995).

Differences between discard length distributions from the two programmes are scarce. The exception is for the bigger abundance of Portuguese smaller individuals. Thus, the differences observed, especially between the 0 and 1 ages, may be related with differences of the Age Length Keys from the two countries.

A co-operation in the analysis and use of this type of data, between the two countries, could be the next step. A standardisation of the methods and the sampling methodologies applied would be of great importance for a more realistic comparison of results obtained from both programs.

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