

Preliminary results on Northern hake from the *õ*Spanish Discard Sampling Programme

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Abstract

*The *õ*Spanish Discard Sampling Programme was started in 1988, however it has not had a continuous implementation in time. Results on Northern hake discard were obtained sampling the Spanish trawl fishery operating in the Northern hake distribution area. Discarding strategy varies between fleets, depending mainly on the target species of the fleet. Differences along the time series were probably due to market changes more than to the abundance of the species. In the years with a higher sampling quality, 2003 and 2004, the total level of Northern hake discard was estimated to be around 5% in weight and between 11-15% in number, respectively. Discards were compounded by ages from 0 to 3, mainly ages 1 and 2.*

1. Introduction

The *õ*Spanish Discard Sampling Programme was started in 1988, however it do not cover the whole period until the present due to its implementation has depended on several European and national investigation projects which have not had an annual continuity:

Year	Project
1988-1989	National project
1994	EC Project: Pem/93/005
1997	EC Project: 95/ 094
1999-2000	EC Project: 98/095
2001	EC Project: 99/063
2002-2004	Community Sampling Fishery Programme (Spain)

Spanish data on Northern hake discards were provided to previous WGHMM, but it was not possible to incorporate them in the assessment in a consistent way due to their temporal discontinuity. At the same time, the discard information used traditionally in the Northern hake assessment, from the French artisanal and coastal trawl fisheries in the Bay of Biscay, was not more available since 2002, and it was decided to remove it from the full time series of catch-at-age data (ICES, 2004). For these reasons, the compilation of discard information takes on special significance at this moment.

The main objective of this paper is to present an update on the Spanish Northern hake discards to the WGHMM. Secondly, taking into account that a discontinuous time series is not suitable for being used in an assessment, some analysis of these discard data were made in order to help in the assessment in a qualitative way at least.

2. Material and methods

The sampling strategy and the estimation methodology used in the Spanish Discard Sampling Programme have been established following the *Workshop on Discard Sampling Methodology and Raising Procedures* guidelines (Anon., 2003). The observers-on-board programme is based on a stratified random sampling, considering the Fishery Unit as stratum and the trip as sampling unit. Landings are used in the raising procedure instead of effort due to the best quality of information.

Only the Spanish trawl fleet is considered in the sampling, because previous observations carried out on other fleets (long line and gillnet) showed insignificant discard levels (EC Project: Pem/93/005). The Spanish trawl fleet operating in the ICES Sub-area VII and Div. VIIIabd was segmented in the following Fishery Units taken into account fishing area, gear and target species (described in the Report of the EC Study Contract 98/095; Castro et al., 2003; and Santurtún *et al.*, 2003):

Basque Baka bottom trawlers fishing in the ICES Sub-area VI targeting blue ling and witch.

Galician Baca trawl operating in Sub-area VII targeting hake.

Galician Baca trawl operating in Sub-area VII targeting megrim.

Basque Baka otter trawlers fishing in the ICES Sub-area VII targeting anglerfish and megrim.

Basque Baka otter trawlers fishing in the ICES Div. VIIIabd targeting a great variety of species (mixed fisheries).

Basque Pair trawls operating with VHVO nets in ICES Div. VIIIabd targeting hake.

3. Results

The sampling level has varied along the time series of the Spanish Discard Sampling Programme, showing its highest level since 2003, when the Community Sampling Fishery Programme was completely implemented in Spain (Table 1). From 1988 to 2002, the sampling has had a partial coverage, focusing on different individual fleets: only Galician trawl fleet operating in the ICES Sub-area VII from 1988 to 2001, and only the Basque trawl fleet operating in Div. VIIIabd in 2002. The whole Spanish trawl fishery operating in both areas, Sub-area VII and Div. VIIIabd, was completely sampled since 2003. Due to that, the 2003-2004 information can be considered highly representative of the behaviour of the whole Spanish trawl fishery exploiting the Northern hake stock.

The Northern hake discard levels by Fishery Unit are shown in weight and number in Tables 2 and 3 respectively. The percentages of hake discard vary extremely between

fleets, the highest belongs to fleets not targeting hake as the Galician *õBacãõ* targeting megrim. The discard level of this fleet has oscillated along the time series, probably due to the market pressure and its own fishery specialization since no correlation between discard levels and the historic hake abundance (taken from the last assessment; ICES, 2004) was found. This fleet was gradually changing its fishery strategy towards targeting megrim, being more *õmixedõ* at the beginning than at the present.

The data presented by fleet were raised to their respective own landings. Due to the improvement in the sampling quality in 2003 and 2004 (all fishery units were sampled), it was possible to estimate the discard level of the whole Spanish trawl fishery catching Northern hake: 5.1% in weight and 14.6% in number during 2003, and 4.9% in weight and 11.3% in number during 2004.

Figure 1 shows the annual length composition of the Spanish discards of Northern hake. The highest discard levels were found in 2003 and 2004. The mean length of individuals discarded has slightly varied along the time series (Table 4), however any clear relationship with the implementation of fishery rules related to fish or mesh size was found.

Figure 2 shows the annual Northern hake discards composition by age in the Spanish trawl fishery. Due to the low quality of some annual ALK obtained specifically from discards sampling, a mean ALK was finally used for the whole time series. These results indicate that discards are compounded basically of ages from 0 to 3, being concentrated in ages 1 and 2. Discards age composition is similar to the observed in fleets from other countries operating in the same area (ICES, 2004). Comparing these results with the recruitment time series (taken from the last assessment; ICES, 2004), any clear relationship between high recruitments and high levels of 0-year individuals discarded could be founded. Nevertheless, the Northern hake recruitment time series does not include the years 2003 and 2004, when the highest percentages of age 0 were detected in discards. Recent information from surveys (Velasco; pers. com.), not considered in the last assessment, shows high recruitments in 2003 and 2004.

4. Conclusions

- (i) The intermittent implementation of the *õSpanish Discard Sampling Programmeõ* over time does it make not easily suitable for being directly used in the Northern hake assessment.
- (ii) Percentages of hake discards vary extremely between fleets, being the highest levels of discards related to fleets not targeting hake, specially the Galician *õBacãõ* targeting megrim.
- (iii) The whole discard rate of the Spanish trawl fishery operating in the Northern hake distribution area was around 5% in weight and between 11-15% in number during 2003 and 2004, years in which the *õSpanish Discard Sampling Programmeõ* was completely implemented.

- (iv) Length composition of the Spanish discards of Northern hake varies slightly along the time series, however no a clear relationship with the implementation of fishery rules related to fish or mesh size was found.
- (v) The Spanish Northern hake discards were basically compounded of ages from 0 to 3, mainly 1 and 2.
- (vi) Percentage of 0-year individuals discarded has increased in 2003 and 2004.
- (vii) Further analysis will be needed for completing the whole discard time series and it can be used in future assessments.

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Table 1. Annual discard sampling level and observation effort on board.

	Trips	Sampling Hauls	Fishing Hours
1988	14	371	1950
1989	8	236	1292
1990-1993		<i>NO DATA</i>	
1994	20	703	3665
1997-1998		<i>NO DATA</i>	
1999	6	230	976
2000	12	388	1649
2001	3	111	512
2002	7	130	1160
2003	26	640	2965
2004	28	741	3176

Table 2. Northern hake discards in weight (tonnes) of the Spanish trawl fishery operating in Sub-area VII and Div. VIIIabd.

		1988	1989	1994	1999	2000	2001	2002	2003	2004
BAK VI	t	-	-	-	-	-	-	-	0	0
	%	-	-	-	-	-	-	-	0	0
	CV	-	-	-	-	-	-	-	0	0
BACA 7 hake	t	-	-	4.0	47.6	21.6	17.9	-	16.8	37.5
	%	-	-	0.1	1.5	0.5	0.5	-	0.4	0.8
	CV	-	-	47.7	86.2	15.6		-	18.2	21.7
BACA 7 megrim	t	-	-	234.8	564.3	115.7	230.7	-	1240.9	1065.2
	%	-	-	11.2	25.5	7.4	17.7	-	45.5	40.1
	CV	-	-	64.3	17.1	19.5	167.9	-	26.8	6.8
BACA 7 hake + BACA 7 megrim	t	10.0	196.1	-	-	-	-	-	-	-
	%	0.1	2.6	-	-	-	-	-	-	-
	CV	90.3	72.4	-	-	-	-	-	-	-
BAK VII	t	-	-	-	-	-	-	-	1.1	1.4
	%	-	-	-	-	-	-	-	1.0	1.3
	CV	-	-	-	-	-	-	-	166.4	144.8
BAK VIIIabd	t	-	-	-	-	-	-	0	1.4	16.4
	%	-	-	-	-	-	-	0	0.6	7.4
	CV	-	-	-	-	-	-	0	481.9	273.5
GAV VIIIabd	t	-	-	-	-	-	-	91.0	48.0	15.8
	%	-	-	-	-	-	-	1.3	0.8	0.3
	CV	-	-	-	-	-	-	368.3	291.2	418.0

BAK VI: Basque ðBakaö bottom trawlers fishing in the ICES Sub-area VI targeting blue ling and witch.

BACA 7 hake: Galician ðBacaö trawl operating in Sub-area VII targeting hake.

BACA 7 megrim: Galician ðBacaö trawl operating in Sub-area VII targeting megrim.

BAK VII: Basque ðBaka otter trawlers fishing in the ICES Sub-area VII targeting anglerfish and megrimö.

BAK VIIIabd: Basque ðBaka otter trawlers fishing in the ICES Div. VIIIabd targeting mixed speciesö.

GAV VIIIabd: Basque ðPair trawls operating with VHVO nets in ICES Div. VIIIabd targeting hakeö.

BACA 7 hake + BACA 7 megrim*: These two fleets were sampled together in 1988 and 1989, before they had specialized targeting different species at the current level.

Table 3. Northern hake discards in number (thousands) of the Spanish trawl fishery operating in Sub-area VII and Div. VIIIabd.

		1988	1989	1994	1999	2000	2001	2002	2003	2004
BAK VI	No.	-	-	-	-	-	-	-	0	0
	%	-	-	-	-	-	-	-	0	0
BACA 7 hake	No.	-	-	26.7	270.9	88.6	64.6	-	40.4	96.0
	%	-	-	0.8	5.7	1.3	1.4	-	0.7	1.8
BACA 7 megrim	No.	-	-	3204.5	3852.7	1060.1	2303.7	-	16111.1	10577.6
	%	-	-	39.1	49.5	25.2	58.3	-	80.5	78.2
BACA 7 hake + BACA 7 megrim*	No.	79.6	1623.4	-	-	-	-	-	16151.6	10673.7
	%	0.6	15.7	-	-	-	-	-	62.3	56.6
BAK VII	No.	-	-	-	-	-	-	-	12.1	22.5
	%	-	-	-	-	-	-	-	4.2	12.1
BAK VIIIabd	No.	-	-	-	-	-	-	0	12.9	262.8
	%	-	-	-	-	-	-	0	0.53	15.9
GAV VIIIabd	No.	-	-	-	-	-	-	2708.6	1815.4	171.6
	%	-	-	-	-	-	-	11.5	10.42	2.0

BAK VI: Basque ðBakaö bottom trawlers fishing in the ICES Sub-area VI targeting blue ling and witch.

BACA 7 hake: Galician ðBacaö trawl operating in Sub-area VII targeting hake.

BACA 7 megrim: Galician ðBacaö trawl operating in Sub-area VII targeting megrim.

BAK VII: Basque ðBaka otter trawlers fishing in the ICES Sub-area VII targeting anglerfish and megrimö.

BAK VIIIabd: Basque ðBaka otter trawlers fishing in the ICES Div. VIIIabd targeting mixed speciesö.

GAV VIIIabd: Basque ðPair trawls operating with VHVO nets in ICES Div. VIIIabd targeting hakeö.

BACA 7 hake + BACA 7 megrim*: These two fleets were sampled together in 1988 and 1989, before they had specialized targeting different species at the current level.

Table 4. Annual mean length of Northern hake discards of the Spanish trawl fishery operating in Sub-area VII and Div. VIIIabd.

	1988	1989	1994	1999	2000	2001	2002	2003	2004
Mean length	25.2	22.9	20.1	26.7	23.4	23.9	23.4	21.5	22.4

Figure 1. Annual length composition of Spanish discards of hake in ICES Sub-areas VII and VIIIabd.

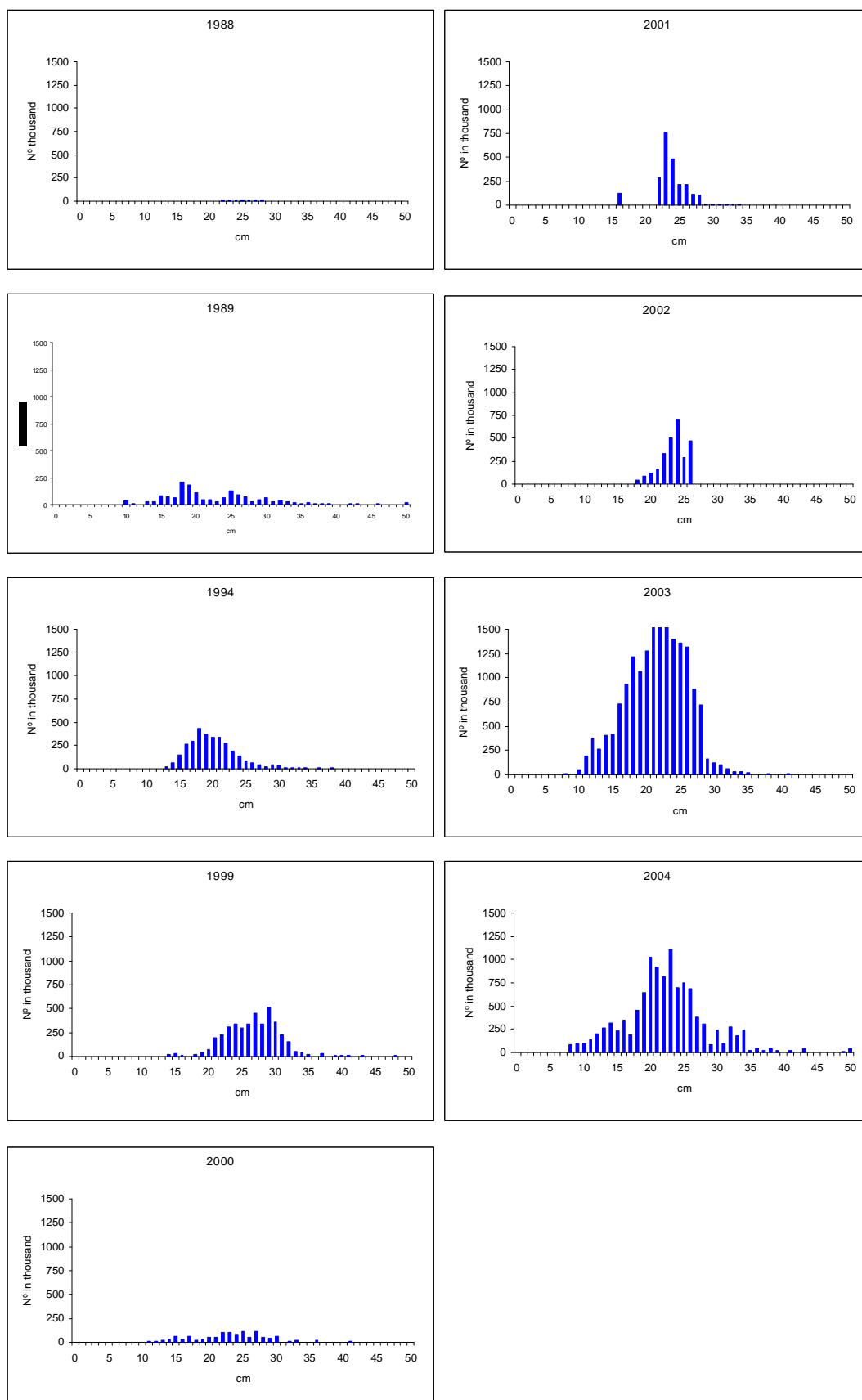


Figure 2. Discards composition of hake by age (percentage of each age in the discard by year) in the Spanish trawl operating in ICES Sub-areas VII and VIIIabd.

