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Cod Catch Sampling of Pair-trawlers Fishing in Flemish Cap, 1988-1990

by

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During 1988-1990 period, a fishing cod moratorium in Flemish Cap was agreed by NAFO due to the observed low biomass level of the stock. But fishing activity remains in these years in some extent. Fishing of NAFO non-member countries seems have been not affected by moratorium agreement. A pair-trawler cod fishery took place at that time in Flemish Cap and catches were sampled on board for length distribution and age composition. Sampling of these vessels was made as part of an observer's on board program.

Table 1 presents the catch rates observed for pair-trawlers during 1988-1990 period compared with the similar information from Spanish pair-trawlers in 1987. Mean annual yield per hour was calculated as mean monthly yields weighted by observed fishing hours.

Pair-trawlers can be considered a standard category independently of their flag because all of them that are fishing in the North Atlantic were Spanish originally or they were made in Spain in a quite characteristic way. The statistical distinction between tonnage 4 and 5 is of less importance for pair-trawlers because most of vessels in a pair-trawl unit has around 500 GRT, with a narrow range of 400-600 tons. So, yield for 1988-1990 period for pair-trawlers from no specified flag and Spanish pair-trawlers in 1987 can be accepted in the same series of abundance indices.

In Table 1, the yield corresponding to 1987, arriving from Spanish pair-trawlers is 333 Kg/h. The catch rate index presented in Spanish Research Report for 1990 (Vazquez et al., 1991) is 0.413. This last value was calculated as mean commercial data powered by month and Division factors from a multiplicative model (Vazquez and Larraneta, 1980). Both values must be considered to be the same index of commercial catch rate but in different scale.

Length distribution, age composition, mean length at age and mean weight at age for year 1988, 1989 and 1990 cod catches in Flemish Cap sampled on board pair-trawlers are shown in Table 2.

References

Vazquez, A. and M.C. Larraneta - 1980. Assessment of cod stock in Divisions BNO. NAFO SCR Doc. 80/II/10.

Vazquez, A., G.P. Gandaras, J. Paz, J. Zamorro and E. Cardenas - 1991. Spanish research report for 1990. NAFO SCR Doc. 91/16.

Table 1 - Cod catches and catch per hour registered by observed on board pair trawlers fishing for cod in Flemish Cap.

1987

month	1	2	3	8	9	10
hours fishing	67	369	343	351	243	182
catch (t)	13	113	220	51	90	29
discards (t)	.	.	.	13	4	1
yield (Kg/h)	194	307	643	146	370	161

1988

month	1	2	10	11	12
hours fishing	21	297	342	52	169
catch (t)	10	49	240	19	110
discards (t)	.	0	20	1	31
yield (Kg/h)	465	164	703	358	649

1989

month	2	3	10	11	12
hours fishing	10	4	214	205	148
catch (t)	1	1	181	109	63
discards (t)	.	.	2	.	.
yield (Kg/h)	51	294	846	534	421

1990

month	3	4	5	7	8	9	10	11
hours fishing	313	321	221	205	79	133	26	82
catch (t)	185	248	270	70	27	56	7	56
discards (t)	.	.	.	0	0	1	.	1
yield (Kg/h)	590	774	1224	342	343	419	274	679

year	hours fishing	catch (t)	yield (Kg/h)	main months
1987	1555	517	333	2, 3, 8, 9, 10
1988	881	427	485	2, 10, 12
1989	581	354	609	10, 11, 12
1990	1380	919	666	3, 4, 5, 7, 9

Table 2 - Length distribution, age composition, mean length at age and mean weight at age for cod sampled on board pair-trawlers fishing in Flemish Cap.

year 1988: 3M  
Length composition of pair trawler cod catches.

	catch				discarded	
	FEB	OCT	NOV	DEC	OCT	DEC
21-23:	.	5	.	.	.	.
24-26:	.	248	.	37	.	50
27-29:	22	823	.	279	62	580
30-32:	36	5170	101	1694	625	3308
33-35:	134	15980	360	4974	1550	9887
36-38:	224	25255	673	10819	1587	10696
39-41:	92	28844	833	12835	450	4878
42-44:	19	27706	645	12727	37	861
45-47:	42	20296	739	9780	.	282
48-50:	128	11599	521	6064	.	35
51-53:	317	3372	223	2345	.	.
54-56:	534	1445	98	626	.	.
57-59:	493	1555	152	341	.	.
60-62:	412	2126	232	730	.	.
63-65:	507	1867	304	977	.	.
66-68:	420	790	152	735	.	.
69-71:	260	536	56	415	.	.
72-74:	209	250	40	271	.	.
75-77:	148	99	9	150	.	.
78-80:	128	57	16	153	.	.
81-83:	70	133	.	60	.	.
84-86:	104	140	.	23	.	.
87-89:	62	10	16	77	.	.
90-92:	81	20	32	12	.	.
93-95:	45	44	16	32	.	.
96-98:	36	26	24	36	.	.
99-01:	7	.	24	8	.	.
102-04:	30	.	17	40	.	.
105-07:	6	.	8	.	.	.
108-10:	.	.	.	.	.	.
111-13:	.	.	8	25	.	.
114-16:	.	.	.	.	.	.
117-19:	7	.	.	.	.	.
<b>Total</b>	<b>4571148395</b>	<b>5299</b>	<b>66262</b>	<b>4312</b>	<b>30577</b>	
sampling						
catch(t)	12	116	6.9	57	1.8	14
samples	4	13	2	6	1	2
fish meas.	1088	4032	639	5001	345	717
sampling						
weight(Kg)	2864	3295	842	4696	144	323
mean weight	2.631	0.779	1.297	0.866	0.417	0.442

Table 2. (continued)

year 1988: 3M  
Age composition of pair trawler cod catches.

age	catch				discarded	
	FEB	OCT	NOV	DEC	OCT	DEC
1	.	.	.	.	.	.
2	11	396	59	125	396	2461
3	460	8336	2191	3465	3764	26152
4	441	5410	2068	2613	152	1965
5	1611	585	728	310	.	.
6	1066	68	87	66	.	.
7	558	39	87	36	.	.
8	286	4	49	6	.	.
9	81	.	21	3	.	.
10	50	.	7	2	.	.
11	.	.	.	.	.	.
12	.	.	2	1	.	.
13	.	.	.	.	.	.
14	.	.	.	.	.	.
15	.	.	.	.	.	.
16	.	.	.	.	.	.
total	4564	14838	5299	6627	4312	30578
x		10		10		
otoliths	225	868	868	868	868	868
sampling						
catch(t)	12	116	7	57	1.8	14
SOP	11944	115661	6881	57373	1797	13555
%	99	100	100	100	100	100

year 1988: 3M  
Mean length-at-age of pair trawler cod catches.

age	catch				discarded	
	FEB	OCT	NOV	DEC	OCT	DEC
1	.	.	.	.	.	.
2	34	31	32	31	31	31
3	36	38	39	39	36	36
4	50	46	48	46	40	41
5	58	61	63	62	.	.
6	66	73	71	73	.	.
7	75	82	88	81	.	.
8	86	90	98	96	.	.
9	94	95	103	102	.	.
10	102	.	110	111	.	.
11	.	.	.	.	.	.
12	.	.	112	112	.	.
13	.	.	.	.	.	.
14	.	.	.	.	.	.
15	.	.	.	.	.	.
16	.	.	.	.	.	.

year 1988: 3M  
Mean weight-at-age (gr) of pair trawler cod catches.

age	catch				discarded	
	FEB	OCT	NOV	DEC	OCT	DEC
1	.	.	.	.	.	.
2	365	268	299	271	280	272
3	435	547	560	564	425	443
4	1190	943	1077	946	582	659
5	1850	2222	2374	2322	.	.
6	2820	3737	3539	3776	.	.
7	4038	5373	6764	5342	.	.
8	6295	7185	9055	8700	.	.
9	8131	8450	10728	10312	.	.
10	10259	.	13179	13281	.	.
11	.	.	.	.	.	.
12	.	.	13724	13724	.	.
13	.	.	.	.	.	.
14	.	.	.	.	.	.
15	.	.	.	.	.	.
16	.	.	.	.	.	.

Table 2. (continued)

year 1989; 3M  
 Length composition of pair trawler cod catches.

length	OCT	NOV	DIC
21-23:	.	5	.
24-26:	128	34	.
27-29:	184	126	29
30-32:	1238	589	91
33-35:	3718	738	775
36-38:	9384	1474	1953
39-41:	16153	2145	3085
42-44:	21262	3019	3480
45-47:	18104	3883	3780
48-50:	12768	3089	3976
51-53:	9536	3262	2911
54-56:	6094	2320	2158
57-59:	2827	1892	1582
60-62:	1072	1433	944
63-65:	69	657	520
66-68:	163	210	202
69-71:	50	104	174
72-74:	11	263	23
75-77:	38	117	154
78-80:	31	104	68
81-83:	11	160	78
84-86:	31	19	40
87-89:	18	32	66
90-92:	94	35	77
93-95:	11	59	12
96-98:	.	17	12
99-01:	.	18	37
102-04:	11	.	8
105-07:	.	41	37
108-10:	.	19	37
<b>Total</b>	<b>103005</b>	<b>25863</b>	<b>26309</b>
<b>sampling</b>			
catch(t)	95	34	33
samples	10	7	4
fish meas.	3077	2064	1413
<b>sampling</b>			
weight(Kg)	3056	2795	2018
mean weight	0.918	1.305	1.235

Table 2. (continued)

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year 1989: 3M  
Age composition of pair trawler cod catches.

age	OCT	NOV	DIC
1	.	.	.
2	24	107	16
3	4896	7944	9108
4	4289	10281	10966
5	1022	5940	4911
6	46	933	716
7	9	373	271
8	13	198	209
9	1	79	92
10	1	9	18
11	.	.	2
12	.	.	.
13	.	.	.
14	.	.	.
15	.	.	.
16	.	.	.
total	10301	25864	26309
x	10		
otoliths	715	715	715
sampling			
catch(t)	95	34	33
SOP	94702	33788	32493
%	100	100	100

year 1989: 3M  
Mean length-at-age of pair trawler cod catches.

age	OCT	NOV	DIC
1	.	.	.
2	28	28	29
3	40	40	40
4	48	49	49
5	56	57	57
6	64	67	66
7	80	78	79
8	90	89	89
9	96	102	103
10	103	106	107
11	103	.	103
12	.	.	.
13	.	.	.
14	.	.	.
15	.	.	.
16	.	.	.

year 1989: 3M  
Mean weight-at-age (gr) of pair trawler cod catches.

age	OCT	NOV	DIC
1	.	.	.
2	198	210	225
3	622	604	620
4	1044	1109	1096
5	1639	1822	1793
6	2580	2913	2854
7	5051	4646	4751
8	6980	6975	7013
9	8699	10366	10783
10	10636	11688	11833
11	10636	.	10636
12	.	.	.
13	.	.	.
14	.	.	.
15	.	.	.
16	.	.	.

Table 2. (continued)

year 1990: 3M  
 Length composition of pair trawler cod catches.

length	MAR	APR	MAY	JUL	AUG	SEP	OCT	NOV
21-23:	20	.	.	3	.	.	.	.
24-26:	20	.	.	20	.	.	.	.
27-29:	121	.	.	34	34	5	.	64
30-32:	672	155	.	54	85	103	.	265
33-35:	1161	1310	418	170	51	167	.	787
36-38:	3100	2199	1521	493	389	317	.	1118
39-41:	4506	4991	3053	1039	547	988	30	1849
42-44:	5525	7515	6228	2006	526	2147	30	1936
45-47:	6172	8747	9681	2886	430	3142	59	1650
48-50:	7340	9912	11027	3673	490	3568	74	1452
51-53:	6914	8137	10315	4092	724	2679	59	1331
54-56:	4852	6528	8562	3846	941	2444	119	1186
57-59:	3520	4796	5437	2697	1001	1537	45	932
60-62:	1938	2477	3221	1644	1341	1040	45	597
63-65:	1354	1577	2305	798	1146	820	74	432
66-68:	407	625	1130	366	1072	452	30	297
69-71:	146	246	290	98	547	306	.	212
72-74:	41	.	32	24	93	117	.	100
75-77:	161	.	.	45	78	13	.	54
78-80:	72	33	6	11	29	4	.	.
81-83:	64	28	46	52	6	9	.	.
84-86:	78	.	.	11	8	17	.	11
87-89:	10	.	.	5	2	22	.	.
90-92:	10	.	.	13	10	9	15	10
93-95:	10	.	30	.	6	4	.	.
96-98:	7	.	.	21	18	4	.	15
99-01:	.	.	.	.	10	.	.	9
102-04:	.	.	.	1	16	4	.	21
105-07:	.	.	.	.	14	14	.	4
108-10:	.	.	.	.	2	.	.	4
111-13:	.	.	.	.	6	.	.	.
114-16:	.	.	.	.	4	4	.	.
117-19:	.	.	.	.	.	.	.	.
120-22:	.	.	.	.	2	.	.	.
123-25:	.	.	.	.	2	.	.	.
126-28:	.	.	.	.	2	.	.	.
<b>Total</b>	<b>48223</b>	<b>59278</b>	<b>63301</b>	<b>24100</b>	<b>9631</b>	<b>19936</b>	<b>579</b>	<b>14337</b>
<b>sampling</b>								
catch(t)	58	71	83	34	19	27	1	17
samples	8	8	8	10	3	8	1	4
fish meas.	2544	2833	2902	3046	544	2913	39	1810
<b>sampling</b>								
weight(Kg)	2906	3223	3986	4205	1429	4375	67	2197
mean weight	1.192	1.202	1.315	1.391	1.949	1.369	1.728	1.196

