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Results from the Faroese Exploratory Fishery with Longline for Cod
on Flemish Cap in 1990

by

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Introduction

Analytical assessments of the cod stock on Flemish Cap (NAFO Division 3M) have not been conducted since 1984 because of perceived inadequacies in the commercial fishery database (NAFO Sci. Coun. Rep., 1990 p.53). Since then the only available biomass and abundance estimates come from research vessel trawl surveys conducted by USSR and EEC. A moratorium on the Flemish Cap fishery was agreed by the Fisheries Commission for 1988 and 1989 and again for 1990. Despite this there were considerable fishing activities for cod in Division 3M both in 1988 and in 1989 with unofficially reported catches in the level of around 40,000 tons each year.

The need for some other measure of stock abundance and biomass is evident, i.e. commercial catch rate series and analytical assessment. With a moratorium which never has been effective and only unofficial catches, it is impossible to get reliable catch and effort data as well as data for analytical assessment. In addition, the general scientific meaning is, that the stock still is in a depressed stage. This conflict clearly was expressed last year, when the Scientific Council advised to prolonge the moratorium to 1991, while the Fisheries Commission decided to abandon this with a restricted total TAC for 1991.

Before this, the Fisheries Laboratory of the Faroes decided to conduct an exploratory cod fishery with long line on Flemish Cap in 1990 with the main purpose to establish the continuity in Faroese long line catch series data and to make available to the Scientific Council detailed long line catch rate data before the moratorium on cod (up to 1987) and in the present situation (1990). The long line catch rate series before the moratorium was presented to the Scientific Council last year (Reinert 1990), and a more detailed analysis including the data for 1990 will be presented in this document.

The exploratory fishery was performed with a commercial longliner, *m/s Hans Erik* (138 feet length, 426 GRT, 1000 HP) which has participated in the fishery on Flemish Cap since its building year (1969), and gear and seasonal pattern were the same as in the years before the moratorium to make comparisons possible, with the exception that the vessel in 1987 installed automatic baiting system, which increased the maximal setting of line per day from 24,000 hooks up to 36,000 hooks. Hoydal (1979) and Reinert (1990) give more information about the traditional long line fishery and processing on board.

Scientific observers from the Fisheries Laboratory monitored the fishery. Length samples were taken from every set, and regularly samples for weight, age, maturity, food etc. were taken. In addition, samples were taken to determine conversion factors between length and weight of saltfish fillets and ungutted fish.

Some of the results will be presented in this document.

Species composition of catches

The Faroese long line fishery is a directed cod fishery. This was verified by examination of the catch from 19,400 hooks in March and from 30,720 hooks in April. The results are shown in Fig. 1. Both months have similar species composition in the catches with cod amounting to about 80% and as by-catch Atlantic Wolffish (about 15%), thorny skate (about 5%) and very few other species.

Catch and effort data

Data on catch and effort per month and year are presented in Table 1 for *m/s Hans Erik* for the period 1973-90. With the exception of 1984 *m/s Hans Erik* has been fishing on Flemish Cap every year in the period. However, the fishing activity has varied from year to year, with only 2-3 weeks fishing in some years up to being at the grounds in 9-10 months. One reason for this is, that the vessels had opportunities to fish on the 2J-3KL cod stock as well as in 3NO, so there has been some movements between these fishing areas depending on the availability of fish. Adverse economy made worse by poor catches on Flemish Cap is another reason.

In Fig.2 the CPUE (kg/1000 hooks) for the *m/s Hans Erik* is shown together with the mean CPUE for 3 long liners (*m/s Hans Erik* included) (see Reinert 1990) for the period 1973-1990. There is good agreement between the two series with exception of the beginning of the eighties, which partially can be explained by the restricted fishing activity of *m/s Hans Erik* in these years. The series seem to reflect the status of the stock showing a reduction in stock abundance since the late seventies with a sharp decline after 1985. The CPUE value in 1990 is at the same level as in the period 1982-85 and could indicate, that the stock has recovered to some degree. This finding is in agreement with the results from the USSR and EEC trawl surveys (Kuzmin 1990, Vasquez 1990). It should be mentioned that a direct comparison between long line and trawl is difficult bearing in mind the different fishing behaviour of the two gears and differences between commercial and survey fisheries. However, the long line could be advantageous in cases, where the bottom is too rough for trawling or when a part of the fish is not close to the bottom.

The seasonal pattern of this fishery can be seen in Table 1 and in Figs. 3 and 4. Usually the vessels perform 2 trips a year, the first from January/February lasting 4-5 months and the next from July/august with the same duration. The catches have been very varying between years. An attempt to elucidate reasons for this is tried in Figs. 3 and 4, where total catch and CPUE, respectively, per month are depicted for 1990, two years with the same level of CPUE as in 1990 but with smaller total catches (1973, 1983), one year with good catches as well as high CPUE level, and one year just before the moratorium with small catch and CPUE.

There is good agreement between the trends in CPUE and total catches per month. In 1977 the catch rates were very good, and this is reflected in the little number of fishing days. In 1990 the high total catch is explained by the high number of fishing days whereas the CPUE is rather small. The small catch in 1983 could be explained by the sharp decline in CPUE in autumn indicating, that this trip started to late. The depressed situation in the stock in 1986 is clearly expressed by the small total catch, low CPUE values throughout year and the relative high number of fishing days.

Length distribution in the catches

The length distribution of cod in the catches by month and total for the year is shown in Table 2. In the same table are shown mean lengths per month, sample weight and total catch in weight per month and year. The coverage of the catches is quite good, the total sample weight being nearly 10% of the total catch. The mean length is increasing from about 55 cm in February up to about 62 cm in June, and is then fairly constant for the rest of the year. Although this reflect some growth through the year, the most truly explanation of this change in mean length is, that the vessel has changed fishing areas and depth in a consistent way as in former years, when they fish in deeper waters on the slope to the south in winter and early spring moving into shallower waters in the period from late in the spring to early winter. The total length distribution for 1990 is shown in Fig. 5 (1 cm groups) and in Fig. 6 (5 cm groups), and is a unimodal distribution with a mean about 60 cm.

Mean weight at length in the catches

The mean weight (kg) at length (cm) in the catches for the year is shown in Table 3. Fig. 7 shows the length-weight relationship together with the regression; the fit is very good, with $r = 0.978$.

Age composition in the catches

Age-length keys per quarter are shown in Tables 4-7, and for the total year in Table 8. In the same tables the mean lengths at age are given. The age composition in the catches per month, quarter and year are given in Table 9, and Fig. 8 shows the total age composition for 1990. The catches were mainly of age 4-6, i.e. year-classes 1984-86, by far dominated by the 1985-yearclass. In the USSR and EEC trawl surveys the 1986 year-class has been dominating (NAFO Sci. Coun. Rep. 1990, p. 14). This difference in age-composition could be explained by the

different selectivity of the two gears, the 1986 year-class has not yet fully recruited to the longline fishery. However, the EEC-survey also showed the 1985 year-class to be of some strength (NAFO Sci. Coun. Rep. 1990, p.53).

The calculated mean length at age and mean weight at age are given in Table 10. The values for length at age are at the same level as those given by f.ex. Wells (1979), Kuzmin (1990) and Vansques (1990) with exception of the youngest and oldest age groups, which could be explained by the few number of specimen at these ages. Also the mean weight at age correspond reasonable well to those given by Wells (1979) but there is a difference in the weights presented here and those given by Kuzmin (1979); at ages older than 6 years, the latter being more heavy at the same age.

Maturity and spawning

The fish were examined on board the vessel for maturity stages, using the usual scale from 1 to 7 with 1 as immature, 2 as recovering/maturing, 3-5 maturing, 6 spawning and 7 spent. Due to difficulties in distinguish between stages 1 and 2, no data are presented here, but judging from the observations and personal communication with the observers, the main part of the fish caught were sexually mature. Also, the observations confirmed the spawning period in March given by Lilly (1987), with a peak in the second part of this month.

Conversion of length/weight of saltfish fillets into total length and ungutted weight

Due to shortage of manpower and money it is not possible for the Fisheries Laboratory of the Faroes to have scientific observers on board every vessel every year. The usual way to overcome this is to sample the catches when landed. In such a case, where the fish is landed as wet salted cod fillets, the sampling is not straight forward.

This year, a number of cod specimen (i.e. 370) were measured for length and weight on board the m/s *Hans Erik* (ungutted, gutted, without head and as fresh fillets) and tagged individually before salting. The same saltfish fillets were then measured again at landing at the Faroes. The results will be used in the future to convert length/weight of saltfish fillets into total length and ungutted weight, when sampling the saltfish catches at landing.

Concluding remarks

The increase in catch rates for the Faroese longliners in 1988 and 1990 and the USSR and EEC trawl surveys in 1988-89 could indicate, that the cod stock on Flemish Cap has recovered to some degree. This must be due to the growth of the relatively abundant 1985 and 1986 year-classes. The Faroese exploratory long line fishery in 1990 is by far dominated by the 1985 yearclass, and the catches were practically composed of only three ages (4-6 years). Taking into account that the recruitment to this stock has been very variable except for the period from mid seventies to mid eighties with stable but very low values (see f.ex. Serchuk 1990), the scientific advice with respect to a possible TAC must be a very careful one. Any regulation must aim at reducing the fishing mortalities on the younger ages to benefit of the growth potential of the younger fish as well as to secure a contribution to the spawning stock.

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Table 1. M/s Hans Erik KG 516 on Flemish Cap
Catch of cod and effort data 1973-90
Catches = tons unguilt weight
Effort = 1000 hooks
CPUE = kg/1000 hooks

Year		Months												Year Total
		1	2	3	4	5	6	7	8	9	10	11	12	
1973	Catches		38	91	117	210	170	22	98	113	51	65		975
	Fish. days		7	16	18	30	28	4	14	26	13	15		171
	Effort		159.6	432	432	792	756	108	403.2	748.8	374.4	432		4638
	CPUE		238	211	271	265	225	204	243	151	136	150		210
1974	Catches								93				44	137
	Fish. days								15				7	22
	Effort								450				210	660
	CPUE								207				210	208
1975	Catches		151	156	17		134		89	150				697
	Fish. days		23	30	5		17		21	27				123
	Effort		568.8	579.6	75		397.8		628.5	796.5				3046.2
	CPUE		265	269	227		337		142	188				229
1976	Catches		79	23					213	319	212	91		937
	Fish. days		15	3					17	30	28	11		104
	Effort		285	75					428	786	679	292		2545
	CPUE		277	307					498	406	312	312		368
1977	Catches	48	210	224	203	105		152	352	266	63			1623
	Fish. days	6	24	30	27	12		13	31	25	6			174
	Effort	145.4	684.9	753.1	679	318.6		260	620	500	120			4081
	CPUE	330	307	297	299	330		585	568	532	525			398
1978	Catches	172	200	207	107			123	133	173				1115
	Fish. days	17	24	31	18			21	27	27				165
	Effort	345	464	620	360			676	384	500				3349
	CPUE	499	431	334	297			182	346	346				333
1979	Catches	63	181	178	132									554
	Fish. days	9	28	27	24									88
	Effort	214.2	643.9	550.9	593									2002
	CPUE	294	281	323	223									277
1980	Catches	131	129	129	9				11	142		76		627
	Fish. days	18	28	31	3				2	27		14		123
	Effort	360	540	620	50				50	610		280		2510
	CPUE	364	239	208	180				220	233		271		250
1981	Catches								109		21	163		293
	Fish. days								14		3	23		40
	Effort								280		78	604		962
	CPUE								389		269	270		305
1982	Catches							57	51					108
	Fish. days							10	6					16
	Effort							200	120					320
	CPUE							285	425					338
1983	Catches		23	148	36	43			168	157	19			594
	Fish. days		9	29	4	13			15	25	7			102
	Effort		180	580	80	260			300	500	175			2075
	CPUE		128	255	450	165			560	314	109			286
1984	Catches	No fishery												
	Fish. days	No fishery												
	Effort	No fishery												
	CPUE	No fishery												
1985	Catches									34	211	72	55	372
	Fish. days									5	30	14	12	61
	Effort									132.2	833.8	392	308	1666
	CPUE									257	253	184	179	223
1986	Catches		139	111	92	31		8	124	86	28	26		645
	Fish. days		26	31	26	11		2	31	30	7	12		176
	Effort		675.2	708.8	682	281		54	837	810	196	309		4553
	CPUE		206	157	135	110		148	148	106	143	84		142
1987	Catches							74	81					155
	Fish. days							25	31					56
	Effort							920	1150					2070
	CPUE							80	70					75
1990	Catches		36	169	201	197	284		114	222	174	96	40	1533
	Fish. days		7	30	29	27	29		13	25	31	23	8	222
	Effort		164	965.6	1022.7	869.6	1010.4		441.6	828.8	961.6	755.2	286.4	7305.9
	CPUE		220	175	197	227	281		258	268	181	127	140	210

Table 2. Faroese exploratory long line fishery in SM 1990
Length distribution of cod in catches by month and year

Length cm	Months											1990
	2	3	4	5	6	7	8	9	10	11	12	Total
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	10	0	0	0	0	0	0	0	0	0	10
28	0	0	15	0	0	0	0	0	0	0	0	15
29	0	0	8	0	0	0	0	0	0	0	0	8
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	38	8	0	0	0	13	0	0	0	0	59
32	0	29	0	9	0	0	13	0	0	0	0	51
33	0	67	15	0	0	0	0	0	0	0	0	82
34	0	67	45	19	0	0	0	14	0	0	28	173
35	0	143	91	47	0	0	0	0	11	0	4	292
36	0	200	129	103	0	0	13	0	0	0	0	445
37	28	295	167	113	64	0	0	0	0	0	0	667
38	28	209	220	113	53	0	0	0	0	0	0	623
39	42	352	250	281	75	0	13	14	0	0	0	1027
40	112	504	394	516	64	0	40	71	0	0	14	1715
41	126	694	545	731	129	0	54	142	75	13	14	2522
42	239	960	606	741	171	0	67	156	21	81	0	3042
43	449	998	811	1369	256	0	108	156	32	148	28	4355
44	463	1398	1121	1481	235	0	61	368	107	242	0	5496
45	561	1759	1409	1688	310	0	202	467	192	94	14	6696
46	702	1959	1930	2250	598	0	377	623	331	148	56	8983
47	1235	2529	2174	2850	747	0	283	921	363	592	14	11708
48	912	2957	2636	3338	876	0	673	1020	738	511	182	13843
49	1277	3584	3091	3788	1207	0	687	1586	1037	592	106	17045
50	1347	4031	3704	4735	1911	0	795	1799	1956	793	323	21394
51	1235	4754	4060	5204	2360	0	1253	2323	1946	1183	211	24529
52	1333	5030	4742	6179	3075	0	1306	2309	2812	1398	168	28362
53	1558	5562	4984	6498	3588	0	1603	2762	3817	1560	421	32353
54	1572	5714	5598	7238	4154	0	1859	3881	3517	1734	295	35562
55	1263	6085	5742	6845	5051	0	2344	4632	5228	2299	449	39938
56	1333	5942	5568	7613	5553	0	2317	4802	4736	1761	323	39948
57	1572	6056	5924	6779	6332	0	2963	5241	5655	2044	604	43170
58	1572	5857	5802	6610	6428	0	2909	5269	5324	2353	912	43036
59	1418	6313	5401	6104	7122	0	3057	5467	5388	2393	547	43210
60	1291	5847	5727	5991	8201	0	3367	6742	6842	2501	702	47211
61	912	5258	4704	5241	8222	0	2990	5411	4982	2366	772	40858
62	1039	4535	4431	4154	8852	0	3421	5255	5131	2326	702	39846
63	744	3955	3621	3694	8329	0	3098	5892	4864	2124	604	36925
64	632	3718	3416	3375	8254	0	2519	4915	4137	2044	561	33571
65	435	2795	3053	2560	7240	0	2640	6190	4233	2272	968	32386
66	323	2282	1985	1988	6193	0	2236	4703	3549	1519	660	25438
67	140	1578	1560	1481	5555	0	1872	4745	2769	1896	786	22412
68	126	1141	1068	1275	4410	0	1697	3881	2566	1842	365	18371
69	56	846	917	928	3470	0	1562	3201	1967	1466	407	14820
70	42	437	561	778	2637	0	1199	2989	1903	1116	477	12139
71	14	304	462	488	1847	0	741	1799	1197	780	407	8039
72	14	190	265	263	1313	0	687	1501	823	982	435	6473
73	0	200	318	234	865	0	444	1119	866	928	421	5395
74	14	181	348	206	705	0	377	737	417	524	154	3663
75	0	95	288	272	634	0	256	666	524	511	164	3300
76	14	219	394	291	502	0	218	156	289	215	56	2352
77	0	152	417	244	523	0	229	297	235	350	84	2531
78	14	228	409	225	502	0	162	255	182	175	84	2236
79	0	121	508	178	555	0	121	170	86	134	56	1989
80	0	162	379	291	545	0	189	142	64	81	0	1853
81	14	95	424	178	534	0	162	127	128	81	42	1785
82	0	114	470	309	662	0	242	198	43	54	14	2108
83	0	86	417	234	448	0	121	127	75	40	56	1604
84	14	86	379	225	481	0	108	170	64	27	14	1568
85	0	124	447	113	374	0	256	156	11	81	0	1562
86	0	67	371	159	374	0	81	241	11	81	42	1427
87	0	38	341	188	374	0	189	184	21	54	14	1403
88	0	95	212	122	299	0	175	184	53	13	14	1167
89	0	57	326	141	320	0	27	85	43	54	0	1053
90	0	57	303	131	171	0	135	113	76	67	0	1052
91	0	10	250	108	214	0	148	212	21	94	14	1086
92	0	0	333	113	278	0	81	85	107	54	0	1051
93	0	10	250	169	139	0	67	99	96	27	0	857
94	0	29	235	122	128	0	40	57	32	67	0	710
95	0	0	242	131	128	0	40	86	11	13	0	650

Table 2 (continued)

96	0	10	197	103	149	54	85	11	13	0	622
97	0	29	265	103	203	94	170	43	40	0	947
98	0	0	159	84	128	27	113	11	13	0	535
99	0	0	167	56	85	13	71	53	0	0	445
100	0	19	136	84	96	87	99	107	27	0	635
101	0	10	197	113	96	81	42	32	13	0	584
102	0	10	68	75	107	27	57	11	27	0	382
103	0	10	91	38	64	13	57	32	54	0	359
104	0	0	91	75	32	40	57	0	13	0	308
105	0	19	68	84	21	13	42	11	13	0	271
106	0	0	68	28	32	13	142	0	13	0	296
107	0	0	61	38	32	13	57	21	40	0	262
108	0	0	30	19	43	13	85	21	13	0	224
109	0	0	38	0	11	27	57	21	13	0	167
110	0	10	15	9	0	0	14	0	0	0	48
111	0	10	23	0	11	0	57	0	13	0	114
112	0	0	8	9	11	0	0	0	0	14	42
113	0	0	15	9	21	0	28	0	0	0	73
114	0	0	8	0	21	0	71	0	0	0	100
115	0	0	0	0	0	0	0	0	0	0	0
116	0	0	8	0	11	0	14	0	0	14	47
117	0	0	0	0	0	0	0	0	0	0	0
118	0	19	0	0	0	0	0	11	0	0	30
119	0	0	0	0	0	0	0	0	0	0	0
120	0	0	8	0	0	0	0	0	0	0	8
121	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0
125	0	0	8	0	0	0	0	0	0	0	8
126	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0
128	0	0	8	0	0	0	0	0	0	0	8
129	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0
Total	26215	109414	108767	129764	135740	55470	108230	92088	47203	13892	817733
Mean len	54.9	56.8	59.3	57.6	62.8	62.3	62.3	61	62.2	63.2	59.9
Sample w	2565	17775	26535	21011	26597	8464	15673	16276	7140	2083	144129
Catch w	36000	169000	201000	197000	284000	114000	222000	174000	96000	40000	1533000

Table 3. Faroese long line fishery for cod in 3M 1990.
Mean weight (kg) at length (cm) in the catches

Length	Weight	Length	Weight	Length	Weight	Length	Weight
25		50	1.07	75	3.37	100	8.17
26		51	1.06	76	3.29	101	
27		52	1.18	77	4.13	102	8.5
28		53	1.2	78	4.06	103	7.48
29	0.25	54	1.3	79	3.83	104	9.46
30		55	1.36	80	3.89	105	13.95
31		56	1.41	81	4.44	106	8.7
32		57	1.47	82	4.42	107	
33	0.6	58	1.64	83	4.47	108	
34	0.34	59	1.66	84	4.66	109	11.35
35	0.38	60	1.79	85	4.88	110	12.3
36	0.38	61	1.88	86	4.65	111	7.8
37	0.41	62	2.01	87	5.72	112	15.2
38	0.42	63	2.07	88	5.63	113	11.9
39	0.43	64	2.15	89	5.03	114	
40	0.49	65	2.22	90	6.09	115	
41	0.56	66	2.32	91	6.57	116	
42	0.58	67	2.41	92	5.73	117	
43	0.62	68	2.55	93	6.53	118	
44	0.66	69	2.73	94	6.96	119	
45	0.72	70	2.86	95	6.84	120	
46	0.76	71	2.91	96	6.2	121	
47	0.82	72	3.07	97	6.73	122	
48	0.93	73	3.13	98	6.62	123	
49	0.95	74	3.19	99	7.38	124	
						125	
						126	16.3

Table 4 (continued)

110	0	0	0	0	0	0	0	0	1	0	1
111	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	80	186	75	11	8	3	2	0	366
Mean length		41.5	50.9	56.6	65	78.1	86.3	87.2	108		58.9

Table 5. Faroese exploratory long line fishery in 3M 1990
Age-length key for COD in April-June

Length cm	Age										Total
	2	3	4	5	6	7	8	9	10	11	
29	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0
34	0	0	2	0	0	0	0	0	0	0	2
35	0	0	2	0	0	0	0	0	0	0	2
36	0	1	0	0	0	0	0	0	0	0	1
37	0	0	2	0	0	0	0	0	0	0	2
38	0	0	4	0	0	0	0	0	0	0	4
39	0	0	0	1	0	0	0	0	0	0	1
40	0	0	2	1	0	0	0	0	0	0	3
41	0	0	1	0	0	0	0	0	0	0	1
42	0	0	1	0	0	0	0	0	0	0	1
43	0	0	6	0	0	0	0	0	0	0	6
44	0	0	4	1	0	0	0	0	0	0	5
45	0	0	5	2	0	0	0	0	0	0	7
46	0	0	5	2	0	0	0	0	0	0	7
47	0	0	5	3	0	0	0	0	0	0	8
48	0	0	3	3	0	0	0	0	0	0	6
49	0	0	8	3	0	0	0	0	0	0	11
50	0	0	5	4	0	0	0	0	0	0	9
51	0	0	2	9	0	0	0	0	0	0	11
52	0	0	3	6	0	0	0	0	0	0	9
53	0	0	4	11	1	0	0	0	0	0	16
54	0	0	1	15	2	0	0	0	0	0	18
55	0	0	1	11	2	0	0	0	0	0	14
56	0	0	2	13	3	0	0	0	0	0	18
57	0	0	3	21	2	1	0	0	0	0	27
58	0	0	1	12	4	0	0	0	0	0	17
59	0	0	1	21	5	0	0	0	0	0	27
60	0	0	1	12	8	0	0	0	0	0	21
61	0	0	1	10	7	0	0	0	0	0	18
62	0	0	0	15	6	0	0	0	0	0	21
63	0	0	0	10	7	0	0	0	0	0	17
64	0	0	0	10	6	0	0	0	0	0	16
65	0	0	0	11	12	0	0	0	0	0	23
66	0	0	0	14	6	1	0	0	0	0	21
67	0	0	0	8	5	0	0	0	0	0	13
68	0	0	0	6	2	2	0	0	0	0	10
69	0	0	0	1	7	1	0	0	0	0	9
70	0	0	0	1	5	1	0	0	0	0	7
71	0	0	0	2	5	2	0	0	0	0	9
72	0	0	0	0	4	2	0	0	0	0	6
73	0	0	0	1	6	3	1	1	0	0	12
74	0	0	0	2	7	2	0	0	0	0	11
75	0	0	0	0	3	3	0	0	0	0	6
76	0	0	0	0	3	1	1	0	0	0	5
77	0	0	0	0	1	2	0	0	0	0	3
78	0	0	0	0	3	0	0	0	0	0	3
79	0	0	0	0	6	6	0	0	0	0	12
80	0	0	0	0	4	2	1	0	0	0	7

Table 5 (continued)

81	0	0	0	0	1	1	1	1	0	0	4
82	0	0	0	0	2	1	0	0	0	0	3
83	0	0	0	0	3	5	5	0	1	0	14
84	0	0	0	0	1	4	0	1	0	0	6
85	0	0	0	0	0	3	1	3	0	0	7
86	0	0	0	0	0	0	2	1	0	0	3
87	0	0	0	0	0	4	2	1	0	0	7
88	0	0	0	0	0	1	1	2	0	0	4
89	0	0	0	0	0	0	2	1	0	0	3
90	0	0	0	0	0	0	2	6	0	0	8
91	0	0	0	0	0	0	2	1	0	0	3
92	0	0	0	0	0	1	0	5	0	0	6
93	0	0	0	0	0	0	2	2	0	0	4
94	0	0	0	0	0	0	0	6	1	0	7
95	0	0	0	0	0	0	0	7	0	0	7
96	0	0	0	0	0	0	0	1	0	0	1
97	0	0	0	0	0	0	0	4	1	0	5
98	0	0	0	0	0	0	1	1	0	0	2
99	0	0	0	0	0	0	0	3	0	0	3
100	0	0	0	0	0	0	0	3	0	0	3
101	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	3	0	0	3
103	0	0	0	0	0	0	0	1	0	0	1
104	0	0	0	0	0	0	0	1	0	0	1
105	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	1	0	0	1
107	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	1	1	0	2
110	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	1	1
112	0	0	0	0	0	0	0	0	1	0	1
113	0	0	0	0	0	0	0	0	0	1	1
114	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	1	1
127	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	75	242	139	49	24	57	5	3	595
Mean len		36.5	47.7	59.1	68.1	78.8	86.7	94.3	99.5	117.2	66.5

Table 6 (continued)

106	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	32	221	74	15	3	4	0	0	0	349
Mean len	29.5		53.4	61.4	65.4	72	77.2	95				62.6

Table 7. Faroese exploratory long line fishery in 3M 1990
Age-length key for COD in October-December

Length cm	Age										Total	
	2	3	4	5	6	7	8	9	10	11		
29	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	1	0	0	0	0	0	0	0	0	1
34	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	1	0	0	0	0	0	0	0	0	1
46	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	2	0	0	0	0	0	0	0	2
49	0	0	1	0	0	0	0	0	0	0	0	1
50	0	0	0	2	0	0	0	0	0	0	0	2
51	0	0	0	3	0	0	0	0	0	0	0	3
52	0	0	2	6	0	0	0	0	0	0	0	8
53	0	0	0	11	0	0	0	0	0	0	0	11
54	0	0	1	9	0	0	0	0	0	0	0	10
55	0	0	0	12	1	0	0	0	0	0	0	13
56	0	0	0	15	0	0	0	0	0	0	0	15
57	0	0	0	10	3	0	0	0	0	0	0	13
58	0	0	0	11	2	2	0	0	0	0	0	15
59	0	0	0	9	1	1	0	0	0	0	0	11
60	0	0	0	12	3	1	0	0	0	0	0	16
61	0	0	0	9	6	0	0	0	0	0	0	15
62	0	0	0	10	12	0	0	0	0	0	0	22
63	0	0	0	7	8	1	0	0	0	0	0	16
64	0	0	0	3	5	1	0	0	0	0	0	9
65	0	0	0	6	7	2	0	0	0	0	0	15
66	0	0	0	0	6	2	0	0	0	0	0	8
67	0	0	0	1	2	2	0	0	0	0	0	5
68	0	0	0	2	4	0	0	0	0	0	0	6
69	0	0	0	0	2	1	0	0	0	0	0	3
70	0	0	0	0	3	3	0	0	0	0	0	6
71	0	0	0	0	6	2	0	0	0	0	0	8
72	0	0	0	0	3	2	0	0	0	0	0	5
73	0	0	0	0	1	0	0	0	0	0	0	1
74	0	0	0	0	0	2	1	0	0	0	0	3
75	0	0	0	0	0	0	2	0	0	0	0	2

Table 7 (continued)

76	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	1	0	0	1
78	0	0	0	0	0	1	0	0	0	0	1
79	0	0	0	0	0	0	1	0	0	0	2
80	0	0	0	0	0	0	0	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	1	0	0	0	1
83	0	0	0	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	6	140	75	26	3	1	0		251
Mean len			48	58.2	65	68.9	78.8	77.5			61.4

Table 8. Faroese exploratory long line fishery in 3M 1990
Age-length key for COD in January-December

Length cm	Age										Total
	2	3	4	5	6	7	8	9	10	11	
29	1	0	0	0	0	0	0	0	0	0	1
30	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0
33	0	0	1	0	0	0	0	0	0	0	1
34	0	0	2	0	0	0	0	0	0	0	2
35	0	0	2	0	0	0	0	0	0	0	2
36	0	1	0	0	0	0	0	0	0	0	1
37	0	0	2	0	0	0	0	0	0	0	2
38	0	0	4	0	0	0	0	0	0	0	4
39	0	0	1	1	0	0	0	0	0	0	2
40	0	0	2	1	0	0	0	0	0	0	3
41	0	1	2	0	0	0	0	0	0	0	3
42	0	0	2	1	0	0	0	0	0	0	3
43	0	0	6	2	0	0	0	0	0	0	8
44	0	0	5	2	0	0	0	0	0	0	7
45	0	0	13	2	0	0	0	0	0	0	15
46	0	0	12	4	0	0	0	0	0	0	16
47	0	0	9	4	0	0	0	0	0	0	13
48	0	0	16	16	0	0	0	0	0	0	32
49	0	0	15	13	0	0	0	0	0	0	28
50	0	0	18	15	0	0	0	0	0	0	33

Table 8 (continued)

51	0	0	8	26	2	0	0	0	0	0	36
52	0	0	19	26	1	0	0	0	0	0	46
53	0	0	11	42	1	0	0	0	0	0	54
54	0	0	9	42	3	0	0	0	0	0	54
55	0	0	6	39	4	0	0	0	0	0	49
56	0	0	7	41	6	0	0	0	0	0	54
57	0	0	8	55	8	1	0	0	0	0	72
58	0	0	3	50	13	2	0	0	0	0	68
59	0	0	3	68	11	1	0	0	0	0	83
60	0	0	2	52	19	1	0	0	0	0	74
61	0	0	3	55	23	0	0	0	0	0	81
62	0	0	0	49	31	0	0	0	0	0	80
63	0	0	0	33	31	4	0	0	0	0	68
64	0	0	1	27	25	3	0	0	0	0	56
65	0	0	0	34	29	3	0	0	0	0	66
66	0	0	1	24	20	4	0	0	0	0	49
67	0	0	0	21	17	2	0	0	0	0	40
68	0	0	0	16	11	3	1	0	0	0	31
69	0	0	0	9	14	3	0	0	0	0	28
70	0	0	0	9	12	5	0	0	0	0	26
71	0	0	0	3	15	6	1	0	0	0	25
72	0	0	0	4	11	4	0	0	0	0	19
73	0	0	0	1	10	4	1	1	0	0	17
74	0	0	0	2	8	4	1	0	0	0	15
75	0	0	0	0	4	7	0	0	0	0	11
76	0	0	0	0	4	1	1	0	0	0	6
77	0	0	0	0	4	2	0	1	0	0	7
78	0	0	0	0	6	4	0	0	0	0	10
79	0	0	0	0	6	7	1	0	0	0	14
80	0	0	0	0	5	2	1	0	0	0	8
81	0	0	0	0	2	2	3	1	0	0	8
82	0	0	0	0	3	2	1	1	0	0	7
83	0	0	0	0	3	7	6	0	1	0	17
84	0	0	0	0	1	4	1	1	0	0	7
85	0	0	0	0	0	5	1	3	0	0	9
86	0	0	0	0	0	1	2	1	0	0	4
87	0	0	0	0	0	4	4	2	0	0	10
88	0	0	0	0	0	2	2	2	0	0	6
89	0	0	0	0	0	0	2	1	0	0	3
90	0	0	0	0	0	0	2	6	0	0	8
91	0	0	0	0	0	0	3	3	0	0	6
92	0	0	0	0	0	1	0	5	0	0	6
93	0	0	0	0	0	0	2	2	0	0	4
94	0	0	0	0	0	0	0	6	1	0	7
95	0	0	0	0	0	0	1	9	0	0	10
96	0	0	0	0	0	0	0	1	0	0	1
97	0	0	0	0	0	0	0	5	1	0	6
98	0	0	0	0	0	0	1	1	0	0	2
99	0	0	0	0	0	0	0	3	0	0	3
100	0	0	0	0	0	0	0	3	0	0	3
101	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	3	0	0	3
103	0	0	0	0	0	0	0	1	0	0	1
104	0	0	0	0	0	0	0	1	0	0	1
105	0	0	0	0	0	0	0	0	1	0	1
106	0	0	0	0	0	0	0	1	0	0	1
107	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	1	1	0	2
110	0	0	0	0	0	0	0	0	1	0	1
111	0	0	0	0	0	0	0	0	0	1	1
112	0	0	0	0	0	0	0	0	1	0	1
113	0	0	0	0	0	0	0	0	0	1	1
114	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	1	1
127	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0
Total	1	2	193	789	393	101	38	65	7	3	1558
Mean len	29.5	39	50	59	66.3	75.2	85.2	93.7	101.9	117.2	63.1

Table 9. The Faroese exploratory long line fishery for COD in 3M 1990
Age composition in numbers in the catches per month, quarter and year.
Unit: thousands

Age	Months												Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	1990
	1	2	3	4	5	6	7	8	9	10	11	12	1-3	4-6	7-9	10-12	1-12
3		0.1	0.3	0.1	0.1	0		0	0	0	0	0	0.4	0.2	0	0	0.6
4		7.6	25.4	19.7	24.6	10.1		5.3	10.2	2.3	1.2	0.3	33	54.4	15.5	3.8	106.7
5		14.5	58.1	60.3	70.4	75.9		34	66.8	53	23.7	6.3	72.6	206.6	100.8	83	463
6		3.8	21.6	20.4	20.9	39.5		10.5	21.3	25.7	13.9	4.8	25.4	80.8	31.8	44.4	182.4
7		0.1	1.3	3.1	2.2	5.8		1.8	3.8	8.2	5.2	1.9	1.4	11.1	5.6	15.3	33.4
8		†	0.3	1.5	0.8	1.6		0.3	0.7	0.2	0.3	0.1	0.3	3.9	1	0.6	5.8
9		0	0.1	3.1	1.5	2.4		0.2	0.4	0.2	0.4	0.1	0.1	7	0.6	0.7	8.4
10		0	+	0.1	0.1	0.1		0	0	0	0	0	0	0.3	0	0	0.3
11		0	0	+	+	+		0	0	0	0	0	0	0	0	0	0.1

Table 10. Faroese exploratory long line fishery in 3M 1990.
Mean length and mean weight at age.

Age	Mean length	Mean weight
Year	Cm	Kg
2	29.5	0.21
3	39	0.49
4	50	1.02
5	59	1.67
6	66.3	2.37
7	75.2	3.44
8	85.2	5
9	93.7	6.64
10	101.9	8.52
11	117.2	12.93

Faroese explor. longline fish. 3M 1990
Species composition in catches

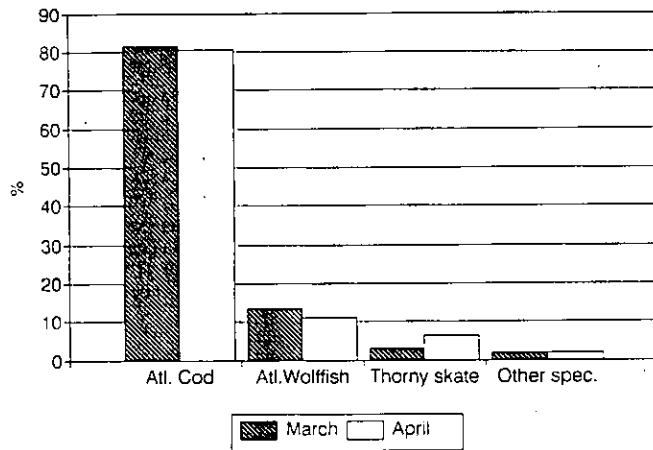


Fig. 1.

Faroese long line fishery for cod in 3M CPUE 1973-90 (kg/1000 hooks)

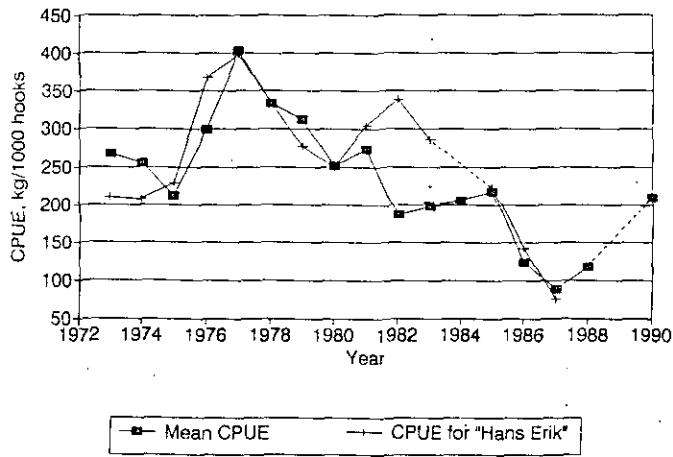


Fig. 2.

M/s Hans Erik on Flemish Cap Total catch of cod per month

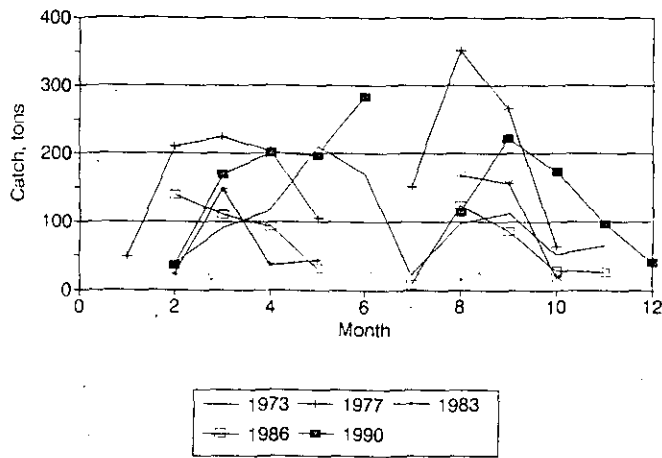


Fig. 3.

M/s Hans Erik on Flemish Cap CPUE (kg/1000 hooks) for cod per month

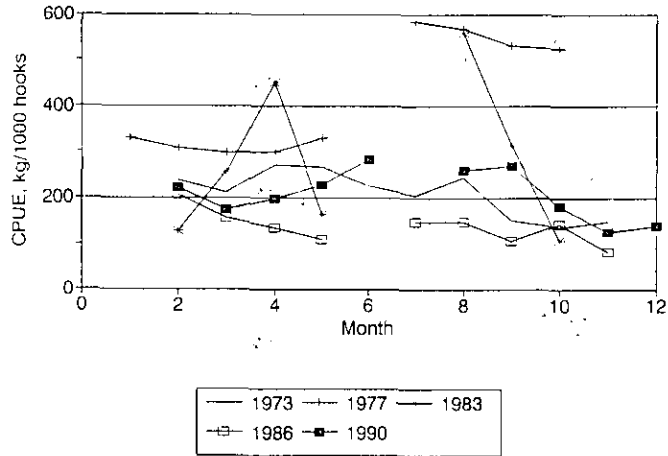


Fig. 4.

Faroese longline fish. for cod 3M 1990 Length distribution, 1 cm groups

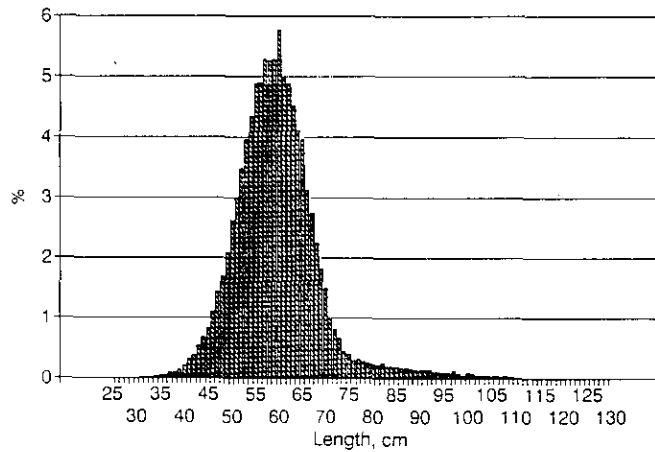


Fig. 5.

Faroese longline fish. for cod 3M 1990 Length distribution, 5 cm groups

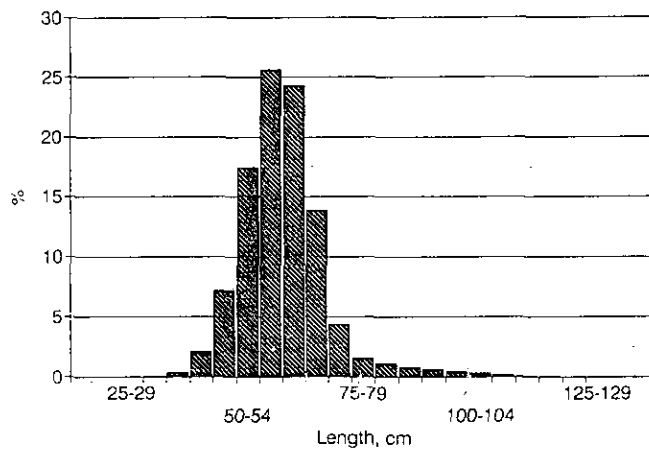


Fig. 6.

Faroese longline fish. for COD 3M 1990 Length-Weight relationship jan-dec

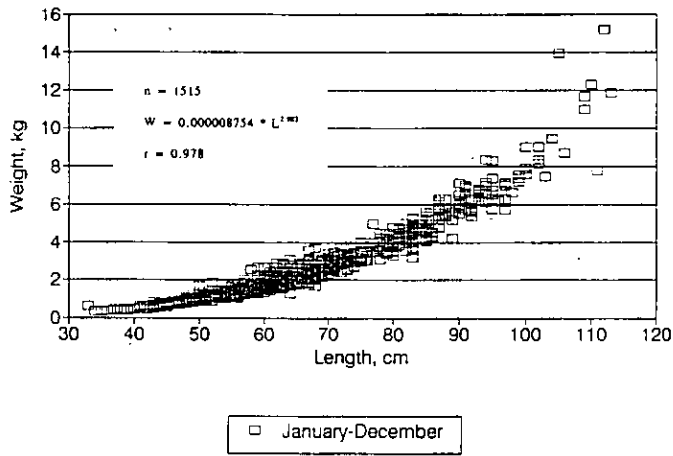


Fig. 7.

Faroese explor. longline fish. 3M 1990 Age composition of cod in catches

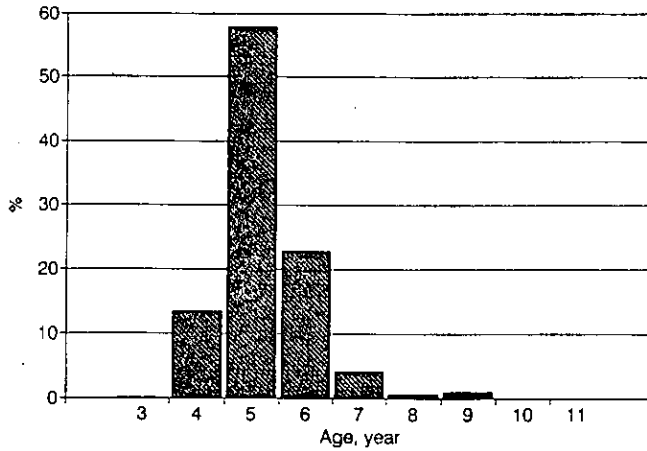


Fig. 8.