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Length-age Composition and State of Cod Stocks on the Flemish Cap in 1976-1982

by

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Abstract

The results of observations of length-age composition of cod on the Flemish Cap in 1976-1982 are presented in the paper. As is generally known, considerable fluctuations of the annual catch of cod are observed on the Flemish Cap (ICNAF, Statistical Bull. vol.11-21 for the years 1961-1971; NAFO, SCS Doc. 83/VI/5, Ser.No N653).

One of the reasons of the fluctuations of cod total catch on the Flemish Cap is a different strength of individual year-classes, recruiting an exploited part of the Flemish Cap cod stock.

Material and methods

The materials collected during the trawl surveys of demersal fishes on the Flemish Cap in 1976-1982 are the basis of the report. A collection of data on cod length-age composition was carried out on the basis of catches of fish-counting bottom trawl 1625, in the bag of which a small-meshed kapron net with 8 mm mesh size (14 mm inner mesh size) was inserted. Fish age was determined by means of calculation of annual rings with a

help of binocular MBC-Ion cross-broken otolith. The results of age determination of the Flemish Cap cod were reported earlier in the previous papers (Chekhova V.A., Chumakov A.K., Postolaky A.I., 1980; Chekhova V.A., Postolaky A.I., 1981; Postolaky A.I., 1982).

The assessment of the Flemish Cap cod stocks status was given in the reports and the methods of carrying out of the demersal fish survey were reported. In April 1982 the demersal fish trawl survey on the Flemish Cap was carried out according to strata at accidental stations according to Manual on Groundfish Surveys in the Northwest Atlantic, when 70 trawlings (1 hour duration) were carried out in contrast to the previous years.

Results of investigations

Since 1961 to 1981 total average annual catch of cod on the Flemish Cap constituted 28.1 thou. tons. The maximum catches were in 1965 and 1972 (53.8 and 57.7 thou. tons respectively). During the period 1972-1981, average catch of cod constituted 26.4 thou. tons. The maximum catch was in 1978 (33.1 thou. tons) and something lower was observed in 1977 and 1979 (27.0 and 29.7 thou. tons respectively). In 1980 and 1981 the catch reduced sharply and constituted 10.5 and 13.9 thou. tons respectively.

One of the reasons of total catch increase and decrease is a recruitment of exploited part of the Flemish Cap cod stock by different year-classes.

Since 1956 a number of cod strong year-classes was observed on the Flemish Cap. The 1949, 1950, 1953, 1954, 1957, 1958, 1962, 1968, 1972, 1973, 1976, 1977 and 1979 year-classes are considered rich. In 1965 individuals of two strong year-classes of cod (1957 and 1958) constituted the base of trawl catches, and in 1972 when the maximum catch reached 57.7 thou. tons, 4 year old fish of 1968 rich year-class constituted the base of catches.

Since 1973 to 1975 total annual catch of cod was approximately at a similar level (22 - 25 thou. tons), and in 1978 it increased considerably. Apparently, the increase of the total catch was due to the recruitment of exploited part of stock by high abundant year-classes (1972 -1973). These year-classes were particular important in 1977 and 1979 cod catches.

It should be noted that in the years of high catches strong year-classes of cod appeared as well.

As seen from the above, a certain periodicity is observed on the Flemish Cap Bank and in every three years two high abundant year-classes in succession appear. Sometimes instead of two year-classes only one strong year-class appears (1962, 1968 and 1979 cod year-classes).

The data on cod age and length composition on the Flemish Cap Bank in the years 1976- 1982 are presented in Tables 1 and 2.

The results from Table 1 show that in December 1981 and in April 1982 cod of the 1981, 1979, 1977 and 1976 year-classes predominated in the catches during the trawl survey. The cod of 1981 year-class also predominated in abundance in the catches during demersal fish trawl survey at the R/V "Suloy" in May 1983. The predominant fish length of this year - class was 24-26 cm.

In 1982/1983 fish abundance above 6 years in catches was comparatively low. It should be noted that in April 1982 the males (87.8%) predominated considerably among mature fish, spawning and post-spawning females were few (12.2%). Immature males and females were approximately in equal parts (47.8 and 52.2% respectively).

Taking into account that in 1982 mature females were few, 1982 cod year-class is expected not to be numerous.

Relative and absolute indices of cod abundance and biomass on the Flemish Cap Bank in 1980-1982 are presented in Tables 3 and 4.

According to the data presented in Table 4 the abundance and biomass of Flemish Cap cod decreased considerably in April 1982 compared to 1980-1981 and remained at the level of December 1981.

The data on mean length of different cod year-classes in 1981-1982 are presented in Table 5.

As the total commercial cod stock on the Flemish Cap Bank decreased considerably compared to the previous years and mature fish abundance was not high, it is not recommended to conduct directed fishing for cod in this area in 1984-1985.

R E F E R E N C E S

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Table 1 Age composition of cod in the Flemish Cap according to control trawl surveys in 1976 - 1982, 0/00

Year, month of trawl survey	A G E, Y E A R S												Number of investigated spec.
	0	1	2	3	4	5	6	7	8	9	10	10	
1976, March	-	-	5	132	623	210	20	8	2	-	-	-	400 ¹⁾
1977, April	-	4	94	224	270	334	48	10	4	6	4	2	500 ¹⁾
1978, July	-	-	7	147	364	406	63	10	-	-	3	-	300 ¹⁾
1979, March	-	6	113	206	82	134	263	151	37	4	2	2	2188 ²⁾
1980, May	-	5	58	251	441	61	31	69	49	19	10	6	956 ²⁾
1981, June	-	29	6	145	461	220	70	46	17	6	-	-	1532 ²⁾
1981, December	150	23	242	55	301	160	39	-	29	4	6	-	1140 ²⁾
1982, April	-	121	80	239	50	167	180	30	43	31	43	16	2045 ²⁾

1) Data on age sample;

2) Enumerated length composition on length-age key.

Table 2 Length composition of cod in the Flemish Cap according to control trawl surveys in 1976 - 1982, 0/00

Length, cm	Y E A R			M O N T H				
	1976 :March	1977 :April	1978 :July	1979 :March	1980 :April- :May	1981 :June	1981 :December	1982 :April
6- 8	-	-	-	-	I	-	I3	-
9-II	2	+	-	-	3	-	II6	II
I2-I4	2	+	-	3	I	-	27	62
I5-I7	6	I	3	3	I	6	-	72
I8-20	20	I6	5I	I	9	26	I	IO
2I-23	23	22	I9	I3	43	8	IO	2
24-26	20	4I	IO	97	94	-	42	I7
27-29	67	52	IO	IO5	68	I	I30	35
30-32	I6I	25	65	I7	32	4	89	IO2
33-35	280	24	I29	I2	III	4	I3	I89
36-38	236	59	I47	22	I75	I6	7	98
39-4I	I20	I38	IO2	39	I8I	65	4	II
42-44	39	I93	68	97	65	79	I4	I
45-47	I4	I56	90	IO0	23	99	8I	8
48-50	3	IO4	94	II2	6	I35	I2I	I7
5I-53	2	49	77	IO2	I8	I68	89	48
54-56	2	37	47	86	2I	II4	54	76
57-59	I	3I	I8	58	2I	6I	52	65
60-62	+	I9	I8	44	32	39	48	42
63-65	+	II	5	28	23	37	24	28
66-68	+	6	4	IO	I7	23	IO	20
69-7I	I	4	4	I5	I3	23	8	I6
72-74		2	2	8	9	I8	8	8
75-77		2	3	6	8	II	5	9
78-80		2	2	4	9	I3	4	6
8I-83		I	-	3	4	5	8	6
84-86		2	-	2	5	6	3	4
87-89		+	-	2	3	I2	2	2
90-92		+	I	I	-	6	6	2
93-95		I	+	2	2	IO	4	3
Above 95		2	4	8	2	I3	6	30
Mean length, cm	36,9	43,I	40,0	46,2	40,3	53,0	40,8	45,2
Number of fish investigated	6603	II239	2I79	2393	954	I532	II62	I000

Table 3 Mean catch of cod (spec. and kg. per trawling hour)
on the Flemish Cap Bank according to the trawl survey
data in 1980-1982

Y E A R	S P E C .	K G
1980 (MAY)	34	42
1981 (JUNE)	53	91
1981 (DECEMBER)	35	53
1982 (APRIL)	29	35

Table 4 Abundance and biomass of cod on the Flemish Cap
Bank in 1980-1982

INDICES	Y E A R			
	1980 MAY	1981 JUNE	1981 DECEMBER	1982 APRIL
Abundance spec. X 10 ⁶	32,2	36,3	21,4	25,2
Biomass, thou.t.	48,4	58,3	32,2	33,1
Mean mass I spec. of cod, kg	1,503	1,61	1,505	1,227

Table 5 Mean length of cod on the Flemish Cap Bank
in 1981-1982

YEAR, MONTH	A G E	Y E A R S										
		0	1	2	3	4	5	6	7	8	9	10
1981 JUNE	-	-	18,4	32,5	41,0	50,7	56,4	65,4	66,2	68,0	76,0	
1981 DECEMBER	10,5	24,3	29,1	34,4	48,9	55,6	63,4	-	75,0	94,0	91,0	
1982 APRIL	-	14,5	29,0	34,0	38,0	54,6	59,8	68,8	73,1	79,8	95,5	

