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Report of USSR Investigations in Subareas off Newfoundland, Labrador and Baffin Island in 1981

by

K. G. Konstantinov
Polar Research Institute of Marine Fisheries & Oceanography (PINRO)
6 Knipovich Street, Murmansk, USSR

The total yield taken by the Soviet fleet in Subareas 0, 2 and 3 in 1981 was equal to 65088 tons (Table 1) or 10036 tons more than in 1980.

A. Fisheries status

Compared to the 1980 level, the mean catch per unit effort (cpue) taken by the Murmansk commercial trawlers increased almost in all the areas (Table 2).
In particular, cpue essentially increased in Subarea off Newfoundland, where, in accordance with the data on the total trawl survey, a tendency to further increase in the abundance and biomass of the main demersal fishes has retained (Tables 3 and 4). Undoubtedly, the limitation of yield scientifically grounded favourably affect their stocks status.

All fish-counting trawlings in the total trawl survey were conducted by bottom trawl with small-meshed insertion in the codend (NAFO SCR Doc. 81/VI/73). The fish for the analysis of the age-length composition of the catches was taken from the same trawls (see Tables 6–15 given below).

C o d

The results of the total trawl survey undertaken in June-July 1981 indicated that the abundance and biomass of cod in

Division 3K decreased compared to those of the preceding year's level (Tables 3 and 4). A reduction in the Labrador stock registered was caused by the low strength of the 1975, 1976, 1977 and 1978 year classes. The specimens of these year classes assessed in Division 3K at age of 3 were very few (Table 5). The latest abundant year class appeared in 1973; the next 1974 year class had the abundance below the long-term mean. The cod of the 1973, 1974 and 1975 year classes reached 55-65 cm long and predominated in the trawl catches, taken in Divisions 2J, 2H and 3K in summer 1981 (Tables 6 and 7). The specimens of the young ages less than 50 cm long were not very numerous.

On the southern slopes of the Grand Bank (Divisions 3NO) the abundance and biomass of cod somewhat reduced (Tables 3 and 4). Apparently, the cod of the abundant 1974 and 1975 year classes had already significant natural and fishery losses, but the strength of all subsequent year classes was below the long-term mean level (Table 5). In Division 3N (where both in 1980 and 1981 considerably greater number of cod specimens was measured than that of Division 3O) the mean length of one specimen in 1981 was 43.10 cm (Table 6), whereas in 1980 it was only 38.32 cm (NAFO SCS Doc. 81/VI/13). An increase in cod length (and their total abundance decrease) is caused by relatively poor recruitment to the stock with the young specimens. Among them the specimens of the 1978 year class prevailed, they reached 20-30 cm long in 1980 and 35-40 cm in 1981.

The abundance and biomass of cod on the Flemish Cap Bank (Div.3M) are at a fairly low level, however, slightly increased in comparison with those of the previous year (Tables 3 and 4). The specimens 40-55 cm long dominated in the trawl catches taken in summer 1981 (Table 6). Those specimens belonged to the 1975, 1976 and 1977 year classes (Table 7). Among the spawning cod, caught with conventional bottom trawl in March 1981 on the southwestern slope of the Flemish Cap Bank at depth over 400 m, the specimens of the 1973

year class (354‰ of all the specimens analysed) and of the 1974 year class (268‰) were the most abundant.

Project. The abundance and biomass of the Labrador cod will reduce and in 1983 they will be lower than those in 1981 1982. The stock will mainly consist of the large mature specimens at age of 7-10 at an extreme low abundance of small fishes. The natural fluctuations, i.e. the appearance of the poor year classes in the previous period were the reason of variations in stock status. In accordance with limits and quotas the Labrador cod yield essentially reduced in the last ten years. This measure had to favor the increase in the cod stocks. However, the influence of the natural factors (in this case - unfavourable influence) was stronger than the fishery regulation measures.

The abundance and biomass of cod on the southern slopes of the Grand Bank in 1983 will not change essentially in comparison with those of the present level. The specimens of the 1978 year class, 45-55 cm long will dominate in the commercial catches. The specimens of the 1974 and 1975 year classes will make up the significant portion of the spawning stock.

At present, on the Flemish Cap Bank a very small quantity of the young cod is observed so that it's impossible to project a significant recruitment to the commercial stock in 1983. The abundance and biomass of the stock will remain at the level below the long-term mean one.

H a d d o c k

During the total trawl survey in May 1980 the favourable conditions for haddock reproduction were registered on the southwestern slope of the Grand Bank. The author of this paper supposed, that the 1980 year class would be stronger, than many of the previous ones (NAFO SCS Doc. 81/VI/13). The total trawl survey undertaken in summer 1981 confirmed the

high abundance of the young haddock at age of one year. This year class prevailed considerably in the catches of haddock (Table 8).

Project. A high growth rate (probably, due to the lack of food competition with the specimens of the other year classes) was registered for the haddock of the 1980 year class. In 1983, the mean length of the haddock, appeared in 1980, will exceed 40 cm and they will be constantly taken with the bottom trawls as bycatch in the flounders, cod or redfish fisheries.

Probably, the appearance of the rich 1980 year class means the beginning of the regeneration of the haddock stock on the Grand Bank.

As it noted above (ICNAF Res. Doc. 72/107) the abundance of the year classes of cod and haddock in Divisions 3NO fluctuated in antiphase: in the years of the rich cod year classes appearance, usually the poor year classes of haddock formed and vice versa. Probably, the period favourable for haddock reproduction started in 1980.

It would be very interesting to assure that V.Templeman's (1965, 1972) hypothesis was true; the scientist assumed that after the appearance of the abundant year classes of the Newfoundland haddock, the rich year classes of herring, cod and haddock appeared in the Northeast Atlantic.

R e d f i s h

From the results of the total trawl survey conducted in summer 1981 it follows that almost all the stocks of the redfish Sebastes mentella increased their abundance and biomass. Such increase was particularly essential in Divisions 3K and 3L (Tables 3 and 4), and also in Divisions 3N and 3O; the data on the two latest divisions are to be summarized, because a common stock distributed there. An increased level of the redfish stocks in Divisions 3NO is confirmed, in particular, by high results of the Soviet commercial trawlers operation in the first quarter of 1982.

As usual, in the northern part of the Newfoundland continetal shelf the beaked redfish was larger, than that in the southern part (Table 9). A similar difference was typical for the age composition also (Table 10).

During the total trawl survey on the Flemish Cap Bank in 1981 a reduction of the abundance and biomass of the beaked redfish was registered (Tables 3 and 4). As it seen from the same tables the mean weight of one specimen in some recent years continuously increased. The analysis of the size composition shows that since 1977 on the Flemish Cap Bank larger specimens have become gradually dominating (Fig.1), mainly belonged to the abundant 1970, 1971 and 1972 year classes. The subsequent year classes were poor.

Project. In 1983, the abundance and biomass of the beaked redfish over the whole continental shelf of Newfoundland will approach the maximum level for the last 10-15 years. Undoubtedly, such a growth of stocks is caused by scientifically grounded limitation of the redfish yield. The limit for 1983 and subsequent years may be increased.

On the Flemish Cap Bank due to the weak recruitment to the commercial stock with the young specimens, the abundance of the beaked redfish in 1983 will slightly decrease. However, due to the individual specimens'growth by weight, the total stock biomass, apparently, will remain at a former level, higher than the long-term mean one. The specimens 30-33 cm long at age of 11-13, 300-500 g by weight will prevail in the stock.

F l o u n d e r s

The abundance and biomass of the American plaice increased in all divisions investigated during the total trawl survey in summer 1981 (Tables 3 and 4). As usual, the densest concentrations were registered in Division 3L, where the large spawning grounds of the American plaice were found. From 28 June to 11 July in Division 3L, thirty fish-counting trawlings by

bottom trawl with small-meshed insertion were carried out in the 70-250 m depths. While analysing, 775 specimens of the American plaice were dissected, including the ripe and spent fishes: 197 males (22-48 cm long, mean length - 35.8 cm) and 331 females (34-65 cm long, mean length - 45.1 cm). As in other calendar years the females in all divisions were more numerous than the males (Table 11).

The stock inhabited on the Flemish Cap Bank differs from the other stocks by larger sizes of specimens. Our attention is also concentrated upon the fact that the juveniles 16-17 cm long were also numerous. The abundance and biomass of the American plaice on the Flemish Cap Bank increased since 1971 to 1976. However, in the subsequent 2-3 years on the Flemish Cap Bank the intensity of cod fishery sharply increased, the American plaice continuously was taken as bycatch, as consequence of which their abundance and biomass gradually decreased (Tables 3 and 4). In 1979-1981 the American plaice stocks on the Flemish Cap Bank increased again and, at present, the stocks are under satisfactory condition with tendency to further growth.

One can say the same about the abundance and biomass of the yellowtail flounder (Tables 3 and 4). The yield limitation introduced in 1973 favors their stocks status.

It's difficult to judge the abundance and biomass of witch because in spring, during the spawning the mature fishes concentrate at great depths, not covered with the total trawl survey.

Project. In 1983 an increase in abundance and biomass of the American plaice and yellowtail flounder will continue along the whole extension of their areas. There are no grounds to expect for the reduction of the witch stocks.

Greenland halibut

The comparison between size compositions in the trawl

catches taken in different divisions (Table 12) shows that the smallest specimens are observed in the south of the area. Almost everywhere the females were more numerous than the males.

In Divisions 2J, 3K and 3L the specimens of the 1972-1975 year classes dominated in the catches, in Division 2H the specimens of the 1970-1974 year classes prevailed (Table 13).

The increased abundance and biomass of the Greenland halibut were registered during the trawl survey carried out in winter 1980-1981. The main results of this survey were represented in a special report (NAFO SCR Doc. 81/IX/95). The total biomass of the Greenland halibut in all the areas investigated can be assessed to be equal to about 1 mill. tons, including the biomass of the fishes of commercial sizes equal to 800 thou. tons.

Project. In 1983 the Greenland halibut stocks and their trawl fishery capacity will retain at a very high level.

C a p e l i n

From 28 May to 15 June 1981 the hydroacoustic capelin survey was carried out aboard the RV "Persey III" on all the slopes of the Grand Bank in the area between 45°50' and 48°20'N, 50°30' and 52°20'W. Besides the acoustic recordings, the control trawlings by midwater trawl with small-meshed insertion were conducted. The capelin was biologically analysed.

The immature capelin 9-13 cm long mainly belonged to the 1979 year class of high abundance prevailed in the catches by number. In the southern part of Division 3L the juveniles 6-10 cm long of the 1980 year class was observed over a wide area (Tables 14 and 15). Mature spawning capelin was registered on customary spawning grounds of Division 3N.

The total abundance of capelin on the Grand Bank in 1981 was assessed to be equal about 60 billions of specimens,

the biomass - to 700 thou. tons.

B. Special investigations

Oceanographic observations

In 1981 oceanographic observations were carried out on standard sections and trawl stations during the trips of the RV "Gemma", "Protsion", "Persey III" and "Nikolai Kononov". As in previous years, by 1 November the water temperature was measured on the standard section 8-A crossed the shelf and continental slope off the South Labrador (Table 16). It is seen from the table that in autumn 1981 the water temperature in the 0-50 m layer was above the long-term mean and it was close to the norm in the 50-200 and 200-500 m layers. On the whole, 1981 can be assessed as hydrologically moderate warm.

On the basis of a 4 year-periodicity of water temperature fluctuations it should be expected that in 1982 and 1983 the recurrent cooling of water masses up to the level of the moderate and moderate cold years will come.

Water temperature influence upon the cod year classes strength

The former investigations (NAFO SCR Doc. 81/VI/77) revealed the regular relationship between the water temperature on standard section 4-A and abundance of the cod year class on the Flemish Cap Bank. The analysed relation was refined with the use of data obtained in 1981 and expressed by the equation:

$$Y = \frac{136}{X + 0.5}, \qquad (I)$$

where

X - water temperature in the 0-50 m layer in the sector of the standard section 4-A between 45°46'N, 48°15'W and 45°20'N, 47°22'W, measured in May (or April);

Y - the index of cod year class strength on the Flemish Cap Bank (average of a number of yearlings and two-year olds taken per one fish-counting trawling hour).

From equation (I) and Fig.2 it follows that the higher is water temperature, the lesser is a strength of the year class. Such regularity is typical for the southern part of cod area. In recent years (1977-1981) the water temperature on the reference section was maintained above the long-term mean level and correspondingly to that fact, the poor cod year classes appeared on the Flemish Cap Bank (Table 5).

Ichthyoplankton sampling

Ichthyoplankton samples were simultaneously collected with two nets (Bongo net with a 0.333 mm mesh and IKS-80 net) aboard the RV "Gemma" on the Flemish Cap Bank from 21 to 30 March 1981. In total, 25 stations and 50 ichthyoplankton samples were carried out. The samples were fixed and brought to PINRO for further analysis.

Besides the sampling with these two nets, the samples were also collected with one IKS-80 net; 166 stations were carried out in total.

Trawl selectivity investigations

The investigations on the studying of selectivity of bottom trawls in the Greenland halibut fishery were conducted aboard the RV "Nikolai Kononov" from October 10, 1980 to February 17, 1981. The data obtained and also the results of the analogous investigations undertaken in 1979 and 1980 allow to conclude that with the variations in mesh size of the polyamide bag from 117 to 127 mm the losses constitute 23.1-30.2% by number of specimens and 7.7-10.1% by mass.

In March 1981 the selectivity of the bottom trawls was investigated aboard the RV "Menzelinsk" in the flounders

fishery in Divisions 3NO. It was revealed that the escape of the American plaice from polyamide bags with a 127 mm mesh size constituted 7.0-21.9%, and of the yellowtail flounder - 10% (by mass). The escape of the American plaice from polyamide bags with a 134 mm mesh size constituted 12.5-26.1%, and of the yellowtail flounder - 12%.

In January 1981 the investigations on the bottom trawls selectivity in the roundnose grenadier fishery were carried out aboard the RV "Nikolai Kononov". The data obtained and the materials for 1980 allow to state that with the transfer of the mesh size from 117 mm to 134 mm the catch losses constitute 4-5%.

In February-March 1981 the investigations on the selectivity of bottom and midwater trawls in the redfish fishery were carried out on board the RV "Menzelinsk" and "Suloy". It was revealed that the redfish escape from the midwater trawl with a 124 mm mesh size was equal to 71% by number of specimens and 58.3% by mass.

On the basis of the data represented above one can recommend the optimum mesh size of the polyamide bags for the redfish fishery equal to 95-100 mm; for the Greenland halibut and roundnose grenadier - to 120 mm; for the American plaice and yellowtail flounder - to 130 mm.

TABLE 1. The USSR catches taken in the Northwest Atlantic in 1981 (tons).

Object of fishery	Subareas				Total	Stat.Subareas		Total
	II	III	IV	V	II-V	6	0	(NWA)
TOTAL								
Including:	16441	48647	48279	-	113367	584	-	113951
Capelin	10149	46	-	-	10195	-	-	10195
Argentine	-	-	71	-	71	-	-	71
Atlantic halibut	-	22	-	-	22	-	-	22
Greenland halibut	2486	853	4	-	3339	-	-	3339
American plaice	14	1198	68	-	1280	-	-	1280
Witch	69	2063	-	-	2132	-	-	2132
Yellowtail flounder	-	-	-	-	-	-	-	-
Cod	1223	4153	630	-	6006	-	-	6006
Haddock	-	-	187	-	187	-	-	187
Pollack	-	-	358	-	358	-	-	358
White hake	-	28	-	-	28	-	-	28
Red hake	-	-	207	-	207	-	-	207
Silver hake	-	101	40235	-	40336	-	-	40336
Grenadier	2060	3600	-	-	5660	-	-	5660
Redfish	389	34677	421	-	35487	-	-	35487
Wolffishes	29	68	-	-	97	-	-	97
Angler	-	98	30	-	128	-	-	128
Sea robin	-	-	-	-	-	-	-	-
Beryx	-	-	-	-	-	584	-	584
Other bottom fish	-	-	-	-	-	-	-	-
Butterfish	-	-	-	-	-	-	-	-
Herring	-	-	-	-	-	-	-	-
Alewife	-	-	-	-	-	-	-	-
Mackerel	-	-	58	-	58	-	-	58
Other pelagic fish	-	-	-	-	-	-	-	-
Sharks	-	44	472	-	516	-	-	516
Skates	-	1497	302	-	1799	-	-	1799
Other fish	22	59	452	-	533	-	-	533
Illex squid	-	140	4788	-	4928	-	-	4928
Loligo squid	-	-	-	-	-	-	-	-

TABLE 2. Average catch of fish per unit effort taken with bottom trawls by the Murmansk gross tonnage commercial trawlers (tons).

Year	Baffin Island		Labrador		Newfoundland	
	per trawling h.	per day of trawling	per trawling h.	per day of trawling	per trawling hour	per day of trawling
1980	1,39	17,0	1,60	13,5	1,89	23,2
1981	1,20	16,2	1,60	19,1	3,03	33,0

TABLE 3. Average number of demersal fishes of all sizes per trawling hour taken with fish-counting trawl in the total trawl survey (spec.).

Year	3K	3_L	3M	3_N	30
		C o d			
I97I	97	I84	77	208	44
I972	I58	205	66	I39	56
I973	4I	29	I08	I34	53
I974	32	40	346	I85	30
I975	27	24	550	I86	28
I976	98	57	693	243	32
I977	42	I35	489	452	70
I978	I5	3I	95	I8I	43
I979	55	I3I	I22	I03	22
I980	69	63	34	I24	34
I98I	23	92	53	I03	II
		redfish Sebastes mentella			
I97I	337	82	66	9II	957
I972	6I2	37	449	366	498
I973	475	II3	484	645	884
I974	796	3I4	3I4	733	560
I975	692	73	5I6	I278	I864
I976	227	4	I03	I28	I085
I977	600	73	660	282	3033
I978	405	224	8I6	2556	508
I979	9I0	42	48I3	4247	668
I980	622	I78	2077	70I	3I39
I98I	I925	668	950	466I	2I44
		American plaice			
I97I	57	703	38	I94	I45
I972	74	5I6	4I	387	I67
I973	I42	569	55	277	278
I974	I77	67I	83	357	I58
I975	238	683	93	356	30I
I976	I75	394	I69	223	209
I977	227	I086	69	567	203
I978	69	573	46	I67	I2I
I979	62	487	I6	53I	I5I
I980	78	7I0	30	266	I55
I98I	79	66I	34	29I	I50

TABLE 3. (Continued).

Year	3K	3L	3M	3N	3O
		Yellowtail flounder			
1971	-	71	-	282	16
1972	-	126	-	326	128
1973	-	31	-	206	122
1974	-	84	-	395	98
1975	-	16	-	227	100
1976	-	23	-	439	121
1977	-	24	-	108	112
1978	-	8	-	105	124
1979	-	57	-	327	68
1980	-	20	-	230	76
1981	-	125	-	317	129

TABLE 4. Average catch of demersal fishes of all sizes per trawling hour taken with fish-counting trawl in the total trawl survey (kg).

Year	3K	3L	3M	3N	3O
		C o d			
1971	77	138	69	135	34
1972	134	163	75	72	67
1973	33	19	46	47	18
1974	36	33	51	72	10
1975	19	20	121	155	16
1976	123	48	296	121	25
1977	36	98	448	254	70
1978	17	36	79	122	23
1979	77	160	108	83	33
1980	97	104	35	100	58
1981	36	123	91	99	15
		redfish Sebastes mentella			
1971	144	33	13	221	80
1972	266	16	194	43	62
1973	160	38	117	161	114
1974	308	110	89	145	66
1975	282	29	163	241	166
1976	109	1	48	21	107
1977	205	23	327	56	509
1978	151	79	166	535	99
1979	553	15	710	971	106
1980	250	82	702	213	664
1981	540	295	339	966	403

TABLE 4. (Continued).

Year	3K	3L	3M	3N	3O
		American plaice			
1971	16	250	26	142	57
1972	9	132	22	117	42
1973	56	111	37	107	77
1974	43	166	74	186	53
1975	66	202	53	171	90
1976	39	112	127	84	86
1977	64	345	30	197	69
1978	16	208	29	75	54
1979	16	153	10	166	54
1980	22	264	21	106	78
1981	35	259	21	146	68
		Yellowtail flounder			
1971	-	32	-	110	8
1972	-	57	-	140	46
1973	-	12	-	76	50
1974	-	40	-	137	46
1975	-	7	-	88	41
1976	-	10	-	171	52
1977	-	11	-	44	100
1978	-	3	-	45	57
1979	-	28	-	148	32
1980	-	10	-	104	41
1981	-	64	-	135	60

TABLE 5. Number of young cod of the 1959-1980 year-classes in average catch per trawling hour in the Newfoundland area (spec.).

Year class	Age, I year					Age, 2 years					Age, 3 years				
	3K	3L	3N	3O	3M	3K	3L	3N	3O	3M	3K	3L	3N	3O	3M
I959	-	-	-	-	-	-	-	-	-	-	33	I8	I2	I	-
I960	-	-	-	-	-	9	3	5	0	-	I6	II	3	2	-
I96I	2	2	2	2	-	5	6	9	4	-	29	42	I7	2	6
I962	0	I	2	I0	-	2	8	23	3	7	22	56	26	3	29
I963	I	3	I	I	0	I	II	8	2	6	5I	44	42	2	I4
I964	0	2	57	37	0	4	22	I92	I8	I	II	68	I03	60	I4
I965	0	I	0	0	3	I	2	I9	I7	2	27	I7	32	27	9
I966	0	0	2	2I	0	4	I0	39	24	0	38	6I	53	47	I3
I967	0	0	0	2	0	II	I5	4	6	I3	48	36	44	20	20
I968	I	I	8	24	I0	I0	68	I53	40	I06	46	II8	I27	32	58
I969	I	4	4	6	0	0	3I	I5	8	2	I9	60	37	I7	2
I970	0	I	9	2	0	I	7	35	4	I	8	8	39	I4	I
I97I	0	0	6	2	22	2	I	5I	2I	87	4	I2	8I	I2	3
I972	0	0	6	3	3	0	3	I2	II	29	8	7	34	9	22
I973	0	I	I	3	303	7	9	43	I0	350	4I	24	92	9	568
I974	0	2	2	4	I33	3	4	89	7	50	I0	58	20I	2I	57
I975	0	0	I0	I	5	I	8	92	5	I7	2	6	62	5	I7
I976	0	0	0	0	0	0	0	4	3	2	2	3	24	2	I3
I977	0	0	0	I	8	0	0	8	0	5I	I	2	22	3	8
I978	0	0	2	5	3	0	2	39	5	2	3	22	47	3	2
I979	0	0	0	0	0	I	I	4	I	0	-	-	-	-	-
I980	0	0	4	2	2	-	-	-	-	-	-	-	-	-	-
Mean for 20 years	0	I	6	6	27	3	I0	42	9	40	20	34	54	I4	48

TABLE 6. Size composition of cod (%o) in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Length, cm	2H Jan	2J Jan	2J Jul	3K Jul	3L Jun	3L Jul	3M Jun	3N Jun	3O Jun
12-14	-	-	-	-	1	-	-	4	98
15-17	-	-	3	-	1	-	7	18	65
18-20	-	4	3	4	2	1	26	18	16
21-23	-	12	29	4	4	1	8	4	18
24-26	-	5	82	18	17	6	-	8	24
27-29	-	5	27	27	29	11	1	29	22
30-32	-	8	14	24	44	20	4	77	51
33-35	2	11	23	43	123	51	4	189	82
36-38	5	6	11	72	150	100	16	176	53
39-41	3	5	13	54	129	62	65	111	53
42-44	6	8	13	28	54	50	79	56	67
45-47	9	19	19	35	41	37	99	39	31
48-50	44	73	66	49	52	60	135	46	53
51-53	102	120	92	98	58	86	168	34	36
54-56	167	166	177	114	62	96	114	27	33
57-59	197	178	169	125	66	107	61	30	18
60-62	181	148	100	109	51	87	39	23	49
63-65	129	104	52	73	46	77	37	24	33
66-68	86	61	43	44	25	45	23	18	38
69-71	40	37	23	23	19	27	23	14	36
72-74	16	16	14	18	8	24	18	13	18
75-77	9	6	10	16	5	15	11	6	13
78-80	1	2	2	3	4	12	13	6	16
81-83	1	1	2	6	2	4	5	3	20
84-86	-	1	-	-	1	4	6	3	13
87-89	-	1	2	3	2	3	12	2	7
90-92	1	1	2	-	1	1	7	3	7
93-95	1	-	-	1	-	2	10	2	11
96-98	1	-	3	2	-	1	6	2	2
99-101	-	-	3	-	-	1	3	3	4
102-104	-	-	-	-	-	1	1	3	-
105-107	-	-	2	1	1	1	1	2	7
108-110	-	-	2	2	1	1	1	1	2
111-113	-	-	-	-	-	1	1	1	-
114-116	-	-	-	-	-	1	-	2	-
117-190	-	-	-	3	-	-	-	-	-
120-122	-	-	-	-	-	1	-	1	-
123-125	-	-	-	-	-	-	-	1	-
126-128	-	-	-	1	-	1	-	-	2
129-131	-	-	-	-	-	-	-	1	-
Relative number, %o	1000	1000	1000	1000	1000	1000	1000	1000	1000
Mean length, cm	59,24	56,78	51,92	52,64	45,83	53,09	53,04	43,10	45,01
No.of spec.measured	1092	8319	621	1020	2925	1885	1532	3603	449

TABLE 7. Age composition and mean length of cod in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Year class	Age, years	2J (Jan)		3M (Jun)	
		No.of spec.(%o)	Mean length (cm)	No.of spec.(%o)	Mean length (cm)
1980	I	3	19,0	23	18,3
1979	2	-	-	6	19,0
1978	3	3	34,0	32	37,5
1977	4	13	43,0	133	41,8
1976	5	50	51,6	457	50,7
1975	6	261	55,4	209	56,8
1974	7	325	60,1	93	65,4
1973	8	258	63,6	41	69,1
1972	9	77	67,8	6	77,5
1971	10	10	76,0	-	-
Mean age, years		7,01	-	5,23	-
Mean length, cm		-	59,65	-	51,73
No.of spec.analysed		299		345	

TABLE 8. Age composition and mean length of haddock in catches taken by fish-counting trawl with small-meshed net insertion in Division 3O in June 1981.

Year class	Age, years	No.of spec.(%o)	Mean length (cm)
1980	I	772	21,2
1979	2	-	-
1978	3	5	43,0
1977	4	51	47,5
1976	5	19	53,3
1975	6	116	63,4
1974	7	37	67,6
Total		1000	29,82
No.of spec.analysed		216	

TABLE 9. Size composition of the redfish Sebastes mentella (%o) in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Length,	2J (Jul)		3K (Jul)		3L (Jul)		3M (Jun)		3N (Jun)		30 (Jun)	
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
II	-	-	-	-	-	-	I	-	-	-	-	-
I2	-	-	-	-	-	-	2	I	-	-	-	-
I3	-	-	-	-	-	-	3	I	I	I	I	I
I4	-	-	-	-	I	-	2	I	3	-	3	3
I5	I	-	I	-	I	-	2	I	3	2	8	5
I6	I	I	I	I	3	2	I	I	5	3	7	4
I7	I	-	2	I	3	3	I	I	6	4	4	4
I8	3	3	8	8	4	4	I	I	5	3	II	4
I9	5	3	I3	I7	3	4	2	3	3	5	20	I6
20	I0	9	I7	2I	I0	I0	4	5	I5	I2	32	I8
2I	7	I0	I4	I7	I2	I4	5	4	36	38	47	30
22	I0	20	I2	I3	I9	20	4	6	53	5I	78	52
23	2I	24	I5	23	30	33	7	6	70	74	82	77
24	30	40	29	38	35	36	I6	I4	74	76	72	92
25	5I	60	4I	57	39	38	4I	37	65	66	52	79
26	30	4I	27	43	2I	22	4I	28	3I	33	I5	32
27	26	38	27	42	26	3I	78	58	29	4I	I4	38
28	33	36	33	39	2I	26	49	42	I8	27	9	22
29	34	35	36	4I	30	33	65	56	I2	29	8	I8
30	39	36	27	26	28	24	3I	28	6	2I	5	II
3I	3I	I9	I8	I3	26	I5	28	II	3	I0	I	6
32	26	I6	24	I2	29	I8	26	II	2	I2	I	4
33	23	II	20	I0	25	I7	32	I3	2	7	I	2
34	38	I4	2I	I2	2I	I8	33	I8	2	5	I	I
35	28	I7	20	I6	29	20	35	24	2	5	-	2
36	I4	I0	I3	I0	I3	I5	I9	I4	I	4	-	2
37	I2	II	I0	9	I3	I4	I8	I3	I	4	-	2
38	9	9	I0	I0	I0	I3	9	7	I	3	-	I
39	I0	I0	I4	I4	7	I8	8	I3	I	4	-	I
40	4	9	7	9	2	I6	2	5	I	3	-	I
4I	I	4	I	4	I	9	-	4	I	I	-	-
42	I	2	I	5	2	I2	I	2	I	I	-	-
43	-	-	-	3	I	I2	-	2	-	I	-	-
44	-	I	I	4	-	I2	-	I	-	-	-	-
45	-	-	-	5	-	I3	-	I	-	I	-	-
46	-	I	-	2	-	6	-	-	-	-	-	-
47	-	-	-	3	-	4	-	-	-	-	-	-
48	-	-	-	3	-	2	-	-	-	-	-	-
49	-	I	-	3	-	I	-	-	-	-	-	-
50	-	-	-	2	-	-	-	-	-	-	-	-
5I	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	I	-	-	-	-	-	-	-	-
Relative number, %o	509	49I	463	537	465	535	567	433	453	547	472	528
Mean length, cm	29,I	28,4	28,5	28,7	28,6	30,8	29,4	29,4	24,I	25,5	22,7	24,2
No.of spec. measured	2568	2473	5777	6673	2348	270I	4250	3246	306I	3696	24I9	2706

TABLE 10. Age composition of the redfish Sebastes mentella (%o) in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Year class	Age, years	2J (Jan) ♂♂	2J (Jan) ♀♀	2J (Jul) ♂♂	2J (Jul) ♀♀	3K (Jan) ♂♂	3K (Jan) ♀♀	3K (Jul) ♂♂	3K (Jul) ♀♀	3L (Feb) ♂♂	3L (Feb) ♀♀	3N (Jun) ♂♂	3N (Jun) ♀♀
I977	4	-	-	-	-	-	-	-	3	-	-	-	-
I976	5	-	-	-	-	-	-	35	24	-	-	7	3
I975	6	-	-	I4	I0	3	-	66	95	-	-	4I	54
I974	7	-	-	58	7I	48	7	I26	II2	7	-	I29	247
I973	8	-	-	9I	65	48	20	45	I02	4	3	I53	I46
I972	9	-	-	I08	96	78	82	63	2I	50	I4	44	78
I97I	I0	-	-	3I	59	34	75	28	28	83	58	7	64
I970	II	7	-	88	20	78	37	52	I5	I22	58	-	I7
I969	I2	I0	I0	8I	4I	69	82	24	28	58	97	-	7
I968	I3	4I	I0	4I	I7	I06	48	24	I8	90	58	3	-
I967	I4	64	34	27	27	58	6I	I8	I4	29	39	-	-
I966	I5	34	30	-	3	I7	20	7	7	II	29	-	-
I965	I6	75	44	I0	7	3	-	3	3	25	36	-	-
I964	I7	7I	27	3	7	I0	-	3	7	-	-	-	-
I963	I8	68	58	3	3	3	7	-	7	II	7	-	-
I962	I9	I25	37	3	3	3	3	-	3	II	II	-	-
I96I	20	85	II9	-	7	-	-	3	3	I8	25	-	-
I960	2I	I0	24	-	3	-	-	-	7	-	2I	-	-
I959	22	-	I4	-	-	-	-	-	3	-	I4	-	-
I958	23	-	3	-	-	-	-	-	-	-	7	-	-
I957	24	-	-	-	-	-	-	-	3	-	-	-	-
I956	25	-	-	-	-	-	-	-	-	-	-	-	-
I955	26	-	-	-	-	-	-	-	-	-	4	-	-
Relative number, %o		590	4I0	558	442	558	442	497	503	5I9	48I	384	6I6
Mean age, years		I7,04	I7,9I	I0,I9	I0,22	II,20	II,43	8,78	9,00	I2,I4	I2,92	7,94	7,87
No.of spec. analysed		I74	I2I	I65	I30	I64	I30	I43	I44	I44	I38	II3	I82

TABLE 11. Size composition of American plaice (%o) in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Length, cm	2J (Jul)		3K (Jul)		3L (Jul)		3M (Jun)		3N (Jun)		3O (Jun)	
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
14-15	-	-	1	-	1	1	8	10	3	2	5	3
16-17	-	-	1	2	2	1	42	55	5	3	8	8
18-19	-	-	3	5	12	6	8	23	12	6	18	14
20-21	5	6	20	14	28	17	6	5	28	15	26	16
22-23	18	17	27	26	33	25	3	5	22	15	21	18
24-25	33	54	55	71	47	43	8	11	32	27	35	33
26-27	40	62	44	61	43	35	8	15	31	27	32	30
28-29	56	95	47	90	62	48	1	7	42	32	50	50
30-31	46	101	26	77	54	40	5	4	47	44	45	49
32-33	18	99	14	44	47	45	9	6	43	38	46	58
34-35	11	116	14	55	41	48	41	16	51	47	45	72
36-37	2	75	10	41	28	42	67	25	37	44	29	50
38-39	4	33	9	42	24	43	99	40	37	34	21	50
40-41	-	31	6	32	14	34	79	36	27	40	15	30
42-43	1	14	3	30	14	29	39	42	14	30	9	14
44-45	1	18	2	41	6	29	31	65	13	33	12	16
46-47	-	9	-	30	3	19	5	66	8	24	6	8
48-49	-	12	-	17	2	13	1	53	5	18	4	10
50-51	-	9	-	19	1	8	-	27	2	16	1	13
52-53	-	6	-	7	-	6	-	14	1	10	1	8
54-55	-	7	-	9	-	4	-	13	-	11	-	6
56-57	-	1	-	3	-	1	-	-	-	6	-	3
58-59	-	-	-	2	-	1	-	2	-	6	-	5
60-61	-	-	-	-	-	-	-	-	-	6	-	4
62-63	-	-	-	-	-	-	-	-	-	1	-	1
64-65	-	-	-	-	-	-	-	-	-	3	-	1
66-67	-	-	-	-	-	-	-	-	-	1	-	-
68-69	-	-	-	-	-	-	-	-		1	-	1
Relative number, %o	235	765	282	718	462	538	460	540	460	540	429	571
Mean length, cm	28,2	33,1	27,9	34,0	30,0	34,8	35,2	38,0	31,8	37,1	30,4	34,2
No.of spec. measured	323	1055	864	2201	3994	4660	440	517	3439	4045	2148	2863

TABLE 12. Size composition of Greenland halibut (%o) in catches taken with fish-counting trawl with small-meshed net insertion, 1981.

Length, cm	0 (Dec)		2G (Dec)		2H (Dec)		2J (Jan)		3K (Jul)	
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
12-13	-	-	-	-	-	-	-	-	2	2
14-15	-	-	-	-	-	-	2	1	7	7
16-17	-	-	-	-	-	1	5	5	2	2
18-19	-	-	-	-	1	1	1	1	11	15
20-21	-	-	-	-	4	3	-	-	32	33
22-23	-	-	-	-	6	6	2	2	36	43
24-25	-	-	-	-	2	3	1	3	20	23
26-27	-	-	-	-	2	1	1	1	21	19
28-29	-	-	1	-	1	2	2	1	28	34
30-31	1	-	3	2	2	3	3	1	13	12
32-33	4	2	5	6	3	3	2	4	14	13
34-35	8	2	11	13	5	3	4	2	18	15
36-37	14	6	21	17	11	8	8	4	21	17
38-39	16	10	27	14	10	8	10	6	18	19
40-41	34	9	31	28	17	10	15	9	22	20
42-43	39	16	39	40	27	26	20	13	21	20
44-45	35	19	38	42	41	31	34	15	24	33
46-47	40	28	45	40	55	42	44	22	34	31
48-49	39	32	31	31	46	48	50	25	26	39
50-51	52	44	32	37	61	68	73	35	23	29
52-53	48	48	30	36	52	52	64	35	24	28
54-55	32	41	24	28	31	39	59	32	15	20
56-57	34	46	26	29	32	30	41	34	9	12
58-59	23	37	14	26	16	27	24	25	3	8
60-61	11	38	10	28	15	22	16	23	4	6
62-63	11	34	6	33	10	14	11	24	2	4
64-65	4	22	4	24	6	13	7	22	2	6
66-67	2	24	2	28	4	10	2	20	-	4
68-69	1	21	2	24	1	7	1	16	-	4
70-71	-	20	1	26	3	7	1	17	-	4
72-73	1	16	1	15	-	5	-	16	-	2
74-75	-	12	-	11	-	6	-	19	-	3
76-77	-	8	-	8	-	4	-	15	-	2
78-79	-	5	-	5	-	4	-	11	-	4
80-81	-	4	-	4	-	5	-	11	-	4
82-83	-	2	-	2	-	5	-	7	-	2
84-85	-	2	-	2	-	4	-	6	-	2
86-87	-	1	-	-	-	3	-	4	-	2
88-89	-	1	-	1	-	3	-	4	-	2
90-91	-	1	-	-	-	3	-	2	-	1
92-93	-	-	-	-	-	2	-	2	-	-
94-95	-	-	-	-	-	1	-	1	-	1
96-97	-	-	-	-	-	1	-	-	-	1
98-99	-	-	-	-	-	1	-	1	-	-
Relative number, %o	449	551	401	599	464	536	503	497	452	548
Mean length, cm	48,92	57,24	47,38	54,45	48,94	53,7	49,80	58,68	36,97	40,70
No.of spec.measured	1436	1760	1468	2191	2180	2519	3146	3103	1929	2340

TABLE 13. Age composition of Greenland halibut (%o) in catches taken by fish-counting trawl with small-meshed net insertion, 1981.

Year class	Age, years	2H (Jan)		2J (Jan)		2J (Jul)		3K (Jan)		3K (Jul)		3 L (Jun	
		♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
I977	4	-	-	I0	3	I0	-	-	-	II	33	-	5
I976	5	-	-	20	I7	I03	5I	-	I4	II	33	-	I0
I975	6	-	30	93	80	5I	5I	28	56	76	I52	35	60
I974	7	I42	20	II8	II9	I66	42	I55	I4I	I52	I4I	I00	I50
I973	8	9I	III	II3	93	II4	5I	I27	II3	I85	I20	95	I65
I972	9	III	6I	63	37	72	5I	85	99	43	43	90	I25
I97I	I0	5I	40	23	27	-	42	-	56	-	-	25	55
I970	II	30	8I	7	40	I0	3I	-	I4	-	-	20	35
I969	I2	20	20	I3	30	I0	3I	28	I4	-	-	5	I5
I968	I3	20	30	-	I7	-	3I	-	I4	-	-	-	5
I967	I4	-	5I	-	I0	-	3I	I4	I4	-	-	-	-
I966	I5	-	6I	-	23	-	2I	-	-	-	-	-	-
I965	I6	-	20	-	20	-	2I	-	I4	-	-	-	-
I964	I7	-	I0	-	I0	-	I0	-	-	-	-	-	5
I963	I8	-	-	-	7	-	-	-	-	-	-	-	-
I962	I9	-	-	-	7	-	-	-	I4	-	-	-	-
Relative number, %o		465	535	460	540	536	464	437	563	478	522	376	630
Mean age, years		8,74	I0,83	7,52	9,26	7,II	I2,07	8,I6	8,77	7,29	6,79	8,I3	8,24
No.of spec. analysed		46	53	I38	I62	52	45	3I	40	44	48	74	I26

TABLE 14. Age composition of capelin (%o) in catches taken by midwater trawl with small-meshed net insertion, June 1981.

Year class	Age, years	3L (400 spec.)		3N (200 spec.)	
		males	females	males	females
1980	I	5	8	-	-
1979	2	475	433	86	I0
1978	3	35	32	390	I77
1977	4	2	5	I36	I26
1975	5	-	5	25	45
1974	6	-	-	5	-
Relative number, %o		517	483	642	358

TABLE 15. Size composition of capelin (%o) in catches taken by midwater trawl with small-meshed net insertion, 1981.

Length, cm	3L (May)		3L (Jun)		3N (Jun)		3LM(Jun)
	males	females	males	females	males	females	juveniles
6,0	-	-	-	-	-	-	4
6,5	-	-	-	-	-	-	38
7,0	-	-	-	-	-	-	II8
7,5	I	I	-	-	-	-	I85
8,0	3	-	I	-	-	-	206
8,5	I4	I2	4	6	I	-	227
9,0	4I	57	6	I2	4	I	II3
9,5	49	76	I7	23	2	2	67
I0,0	90	I07	23	4I	4	I	25
I0,5	65	62	49	65	-	5	I7
II,0	60	79	84	I05	I	5	-
II,5	49	45	76	84	2	26	-
I2,0	46	45	66	65	3	44	-
I2,5	20	I7	47	42	3	I32	-
I3,0	I8	6	27	36	4	I44	-
I3,5	I0	4	I3	2I	4	I56	-
I4,0	2	2	I2	I4	II	73	-
I4,5	I	2	I0	9	24	49	-
I5,0	-	2	I0	6	63	I5	-
I5,5	I	-	5	2	53	I0	-
I6,0	3	2	5	2	86	I	-
I6,5	I	-	5	2	38	I	-
I7,0	4	I	3	2	27	-	-
I7,5	-	-	-	-	4	-	-
I8,0	2	-	-	-	I	-	-
Relative number, %o	480	520	463	537	335	655	I000
No. of spec. measured	662	7I6	2324	2700	I364	2734	I572

TABLE 16. Water temperature on hydrographic section 8-A (between 53°40'N, 55°44'N, 53°32'W) by 1 November (°C).

Year	Layer, m			
	0-50	50-200	0-200	200-500
1964	1,04	0,04	0,32	1,99
1965	1,49	1,76	1,66	2,59
1966	2,41	1,44	1,72	3,97
1967	2,00	0,89	1,19	1,54
1968	2,29	-0,18	0,50	1,42
1969	0,82	0,36	0,50	1,51
1970	1,29	0,32	0,60	2,32
1971	0,88	0,43	0,57	1,44
1972	0,35	-0,39	-0,17	1,26
1973	1,00	0,59	0,72	1,41
1974	0,96	-0,02	0,27	1,89
1975	1,14	0,51	0,70	1,45
1976	0,74	0,20	0,36	1,51
1977	1,76	2,52	2,32	3,62
1978	0,94	0,78	0,82	2,49
1979	1,42	0,79	0,99	2,34
1980	1,32	0,62	0,82	1,70
1981	2,76	0,70	1,28	2,22
Mean	1,37	0,63	0,84	2,04

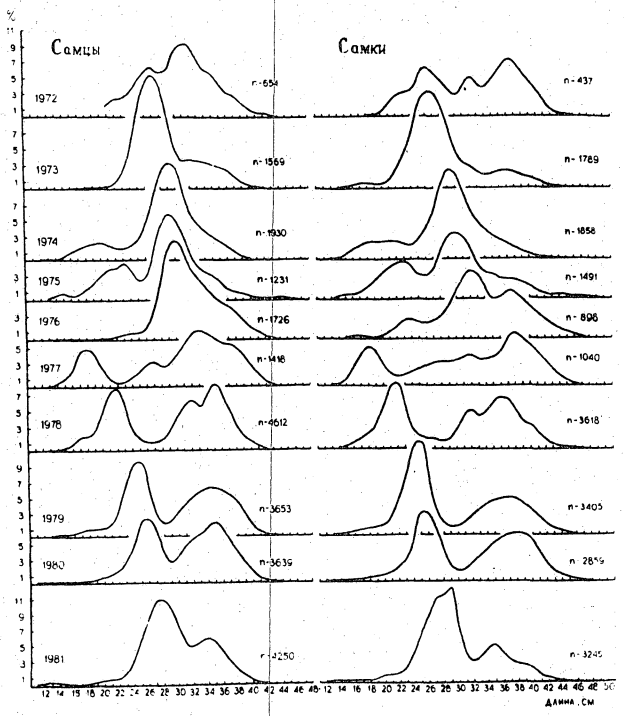

Fig. 1. Size composition of the beaked redfish from the catches taken by a fish-counting trawl with small-meshed insertion on the Flemish Cap Bank, the spring-summer months of 1972-1981.

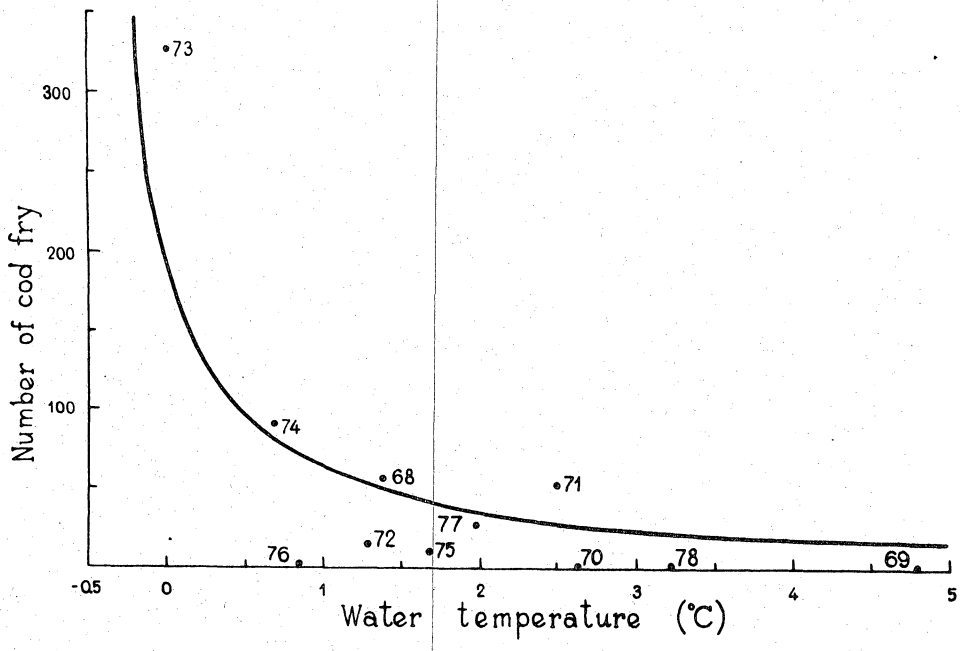

Fig. 2. Water temperature in the 0-50 m layer on the standard section 4-A in relation to the cod year-classes abundance on the Flemish Cap Bank in 1968-1979.