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by

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PART I. AtlantNIRO Research in NAFO Subarea 4 in 1996

by V. A. Rikhter, and I. K. Sigaev

A. STATE OF FISHERY

In 1995 again no Russian fishery of silver hake was carried out in the Scotian shelf area. Therefore no length and age sampling was made from commercial catches. Concerning the prospects for 1997, considerable increase of abundance and biomass of the species under consideration may be expected in 1977 taking into account the results of the latest hake O-group trawling survey, retrospective estimates of its abundance and sharp decrease of fishing pressure, starting from 1994.

B. SPECIAL RESEARCHES

Environmental researches

In 1995 no marine hydrological observation were carried out in Scotian shelf area. Analysis of SST data and hydrological fronts boundaries fluctuations indices in the area between 70° and 55° W were continued in 1995. Preliminary results evidence that in offshore shelf area positive SST anomalies prevailed in 1995 while in the coastal area negative anomalies predominated. The highest positive SST anomalies occurred in June, August and October. Indices of water boundaries fluctuations at the surface evidence that in 1995 the boundary between warm and cold water masses was shifted northwards.

Biological researches

In October-November 1995 the trawling survey of silver hake O-group was carried out by the Canadian vessel with two specialists from AtlantNRO participated. According to a preliminary estimate the year-class of 1995 is one of the most strong during the period following 200-mile zone introduction.

Other researches

Comparative analysis of biological characteristics and abundance dynamics of silver hake (*Merluccius bilinearis*) from Scotian area and cape hake (*Merluccius capensis*) from Namibian area was carried out. The results obtained allow to classify both species as belonging to the same type of abundance dynamics with high reproduction ability and significant abundance variability. During the period discussed (1968-1990) similarity of recruitment abundance variation trends and total biomass of the northern and southern species was revealed. Instantaneous natural mortality of Scotian silver hake which seems to be close to the virgin population level was estimated on the basis of assumption that fishery renders no significant impact on long-term average recruitment rate the latter is approximately equal to the natural mortality in conditions of non-fished or lightly fished stock. The trends of abundance variations were analysed during the period after 200-mile zone implementation for the silver hake in Scotian area and 12 other gadoids in NAFO Subareas 2-5. Sufficient correlation of the total abundance dynamics of hake and cod 2J+3KL, 3NO and 4T, pollack 4+5 and haddock 3Ps was found.

The above-mentioned stock units recruitment dynamics also was considered, and the above trends coincidence was explained on the basis of the latter.

Detailed description of the results mentioned in this section of the report are presented in appropriate scientific documents.

PART II. PINRO Research in the NAFO Area in 1995

by A. A. Vaskov, P. I. Savvatimsky and
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I. SUBAREAS 0 AND I

A. Status of the Fisheries

In 1995 fishery for Greenland halibut was sporadically conducted with long-lines by SRTM-type vessels on the Baffin Bank in July-September and with bottom trawl by a BMRT-type vessel off West Greenland in September-November. In either area Greenland halibut dwelt scatteredly and did not aggregate into commercial concentrations. A national quota of 650 t in SA 1 was not fished. According to preliminary statistics a catch of 269.8 t was fished. In Div. OB a total of 274.1 t was taken. Best successive were long-line fishing in Div.OB in July (mean daily catch of 5.6

t) and trawl fishing in SA 1 in October-November (about 6 t per day fishing). In the latter area the catch from 1100-1500 m was by 23-36% composed of roundnose and roughhead grenadiers and this by-catch increased rapidly with depth.

B. Special Research Studies

No special environmental studies, including hydrographic, and biological studies were carried out.

II. SUBAREAS 2 AND 3

A. Status of Fisheries

Greenland halibut. Long-line fishing for Greenland halibut by SRTM-type vessels took place in Flemish Pass (Divs. 3L and 3M) in May-June and covered the depth from 1000 to 1400 m. The halibut did not aggregate in dense concentrations. Mean daily catch by long-line was 0.8 t. By-catch of roughhead grenadier in May averaged 74.2% and it was 59.6% on the average in June. A national quota of 3 200 t was not fished. A total of 91 t of Greenland halibut was taken in the two months. According to evidence provided by the research vessel MI-0708 "Olenitsa" a commercial bottom trawl catch from 850-1100 m in May did not contain more than 1 t per 3-4-hour haul.

Redfish. In late March the redfish fishery was conducted by BMRT-0361 on the southern slope of Flemish Cap (Div. 3M) in the depth range from 800 to 1000 m. The catch amounted to 7-20 t. In early April the catch by this vessel was as much as 15 t, however, the fishing was impeded by stormy weather. The situation in the fishery was unsatisfactory in mid-April. No commercial concentrations of redfish were found during exploratory fishing on the western and north-western slope of Flemish Cap. In late April 5 BMRT-type vessels fished for redfish on the southern slope of the bank at depth 850-1000 m. Catch per haul amounted to 5-10 t, mean daily catch 25 t.

In May 3-4 STM- and BMRT-type vessels fished for redfish at depth 600-950 m on the southern slope of Flemish Cap. The catch declined to 3-8 t per 2-4-hour haul. On 21 May the vessels left the area.

In late July 2 BMRTs fished for redfish in the southern part of Flemish Cap. Catch varied from 15 to 30 t per day.

There was no good fishery in the southern part of the Grand bank in June, mean daily catch by one BMRT was 9.3 t. In July one BMRT had a daily catch of 22 t. In the second half of August the catch here amounted to 15-30 t per day.

Both on the Flemish Cap and Grand Bank beyond the 200-mile limit a good fishery continued until late September, the catch was high. The redfish fishery terminated in either area in late September.

Cod. As in previous years there was no directed fishery for cod by Russian vessels in the Northwest Atlantic in 1995. The cod quota to be fished on Flemish Cap (1078 t) remained unfished.

Other species. No directed fishery for other species was conducted. Flounders, wolffish, sharks occurred only as minor by-catch in Greenland halibut and redfish fisheries.

B. Special Research Studies

1. No environmental and oceanographic studies were carried out.

2. Biological studies.

From 1 to 19 May 1995 a research vessel MI-0708 "Olenitsa" performed a series of hauls with commercial bottom trawl in the depth range between 600 and 1100 m in Flemish Pass (Divs. 3L and 3M). This was done with the aim to outline the distribution and to study biological characteristics of Greenland halibut from commercial catch.

From 20 to 29 May an assessment groundfish trawl survey, Greenland halibut including, was carried out on Flemish Cap (Div. 3M) (Table 1).

Greenland halibut. The catch from exploratory bottom trawl tows in Flemish Pass and in the trawl survey on Flemish Cap was dominated by immature individuals of 35-45 cm in length and 4-5 years of age. Mean length in both males and females increased with depth. Feeding intensity was weak. Major prey items were squids, prawn, roughhead grenadier and Themisto. Tables 2 and 3 show length frequency distribution for Greenland halibut in commercial bottom trawl catch in Divs. 3L and 3M (Flemish Pass). The distribution and biology of Greenland halibut are detailed in a paper by P.I. Savvatimsky and A.A. Vaskov (NAFO SCR Doc. 96/).

Estimates of numbers (2.5 mill. fish) and biomass (1.1 thou.t) provided by the assessment survey undertaken on Flemish Cap can not be regarded complete since the tows were performed down to less than 730 m depth only, where Greenland halibut constituted as much as only 4.4%.

Redfish. In the assessment trawl survey on Flemish Cap the catch was composed of redfish with the length from 8 to 45 cm, age 2 to 22 years. Very rich 1990-1989 year classes with the length of fish of 18-22 cm and age of 5-6 years prevailed. The stock size was estimated at 137.9 mill.fish or 20.7 thou.t. Table 4 shows length frequency distribution for redfish from commercial trawl catch. More detailed information is given in a paper by A.A. Vaskov, A.L. Karsakov (NAFO SCR Doc. 96/).

Cod. No good concentrations of cod were found by the trawl survey on Flemish Cap, the fish were distributed basically in the central part of the bank.

The stock of the Flemish Cap cod continues to be at a low level (numbers - 17.9 mill.fish, biomass - 8.3 thou.t). The 1993-1991 year classes prevailed in catch. The 1991 year class was dominant. A paper by V.M. Kiseleva presents more details (NAFO SCR Doc. 96/).

Capelin. Minor numbers of capelin were caught in the netting of a bottom trawl in a shallow part of Flemish Cap.

Males were from 129 to 175 mm, with the mean length being 153.6 mm. In females the length varied from 133 to 147 mm, mean length 137.9 mm. 5 capelin with gonads at juvenile stage had the length from 102 to 112 mm.

Almost all examined mature capelin had gonads at stage III and IV. The occurrence of capelin pre-recruits on the bank may, probably, be indicative of it spawning in this area.

The feeding was weak, almost all stomachs had 0 fullness. The diet was composed of Calanus, Themisto and euphausiids.

III. DIVISIONS 6G AND 6H

A. Status of Fisheries

In 1995 the fishery on the Corner Rising commenced in late January with participation of one STM-type trawler. From 2 to 5 Russian trawlers of the STM- and RTMA-type took part in the fishery in this area in June-August. The catch of alfonsoino

varied within a wide range: from some kilos to 25 t. Fishing on the Corner Rising terminated in September. A total catch by the Russian fishery in 1995 was about 3.5 thou.t (alfonsino - 95-98%).

B. Special Research Studies

1. Environmental Studies

In 1995 hydrometeorological studies were carried out by a commercial trawler MI-0716 "Petr Petrov" from 25 May to 19 June. They included: measurements of wind intensity and direction, air pressure, air temperature and surface water temperature, light conditions (clouds, Moon phase).

Based on these studies a relationship between the direction and intensity of air transport and the efficiency of the alfonsino fishery was established. Light conditions were confirmed to have impact on the behaviour and distribution of the species.

2. Biological Studies by Species

In 1995 biological studies were carried out by vessels MI-0716 "Petr Petrov" and MI-0708 "Olenitsa" from 25 May to 3 July (Table 1).

Alfonsino. During the study period alfonsino were distributed in depth from 400 to 950 m.

The length of fish in catch varied from 29 to 51 cm (Table 5). Individuals of 35-40 cm in length prevailed in catch. Females were somewhat bigger than males. Sex ratio was close to 1:1. All fish were mature. Major prey items were mesopelagic fish (viperfish, lanternfish, hatchetfish and others). Besides, stomachs contained also prawn, squid and ctenophore.

Table 1. Inventory of biological surveys, 1995

SA	: Div.	: Month ¹	: Survey type ²	: Objectives	: No. of tows
3	3LM	5	0	Greenland halibut	13
	3M	5	S	Groundfish	58
6	6GH	5-7	0	Alfonsino	33

¹ Use number from 1 to 12 for months

² Insert S for stratified-random and 0 for other surveys

Table 2. Length frequency of Grenland halibut on the data of commercial fishery in Div. 3L, 1995.

Length, cm	Males	Females	Total
30-31	2	3	5
32	12	10	22
34	22	39	61
36	48	75	123
38	57	81	138
40	62	87	149
42	63	87	150
44	47	65	112
46	34	36	70
48	15	38	53
50	22	17	39
52	13	25	38
54	12	17	29
56	6	13	19
58	8	9	17
60	3	2	5
62	3	6	9
64	-	1	1
66	2	2	4
68	-	-	-
70	-	1	1
72	-	1	1
74	-	-	-
76	-	1	1
78	-	1	1
80	-	1	1
No.fish mess.	431	618	1049
Mean length,cm	42.43	42.67	42.57

Table 3 . Length frequency of Grenland halibut on the data of commercial fishery in Div. 3M, 1995.

Length, cm	Males	Females	Total
28-29	1	1	2
30	1	1	2
32	7	2	9
34	16	21	37
36	21	33	54
38	26	44	70
40	51	57	108
42	32	43	75
44	34	37	71
46	39	40	79
48	41	58	99
50	40	53	93
52	35	42	77
54	26	33	59
56	11	13	24
58	7	17	24
60	5	8	13
62	1	3	4
64	-	1	1
66	1	1	2
68	-	1	1
70	-	-	-
72	-	1	1
74	-	1	1
76	-	-	-
78	-	2	2
110	-	1	1
No.fish mess.	395	514	909
Mean length,cm	45.28	45.99	45.68

Table 4 . Length frequency of Redfish on the date
of commercial fishery in Div. 3M, 1995.

Length, cm	:	Males	:	Females	:	Total
14		-		1		1
15		-		-		-
16		2		1		3
17		3		6		9
18		35		43		78
19		103		136		239
20		316		339		655
21		276		322		598
22		86		83		169
23		39		33		72
24		7		13		20
25		8		2		10
26		11		6		17
27		12		7		19
28		23		8		31
29		30		12		42
30		51		19		70
31		44		20		64
32		31		24		55
33		24		11		35
34		29		17		46
35		24		22		46
36		9		11		20
37		6		1		19
38		3		14		17
39		1		6		7
40		2		5		7
41		1		1		2
42		-		2		2
43		-		1		1
44		-		1		1
45		-		-		-
46		-		-		-
47		-		1		1
No.fish mess.		1176		1180		2356
Mean length,cm		23.29		22.60		22.94

Table 5 . Length frequency of alfonsino on the data of
commercial fishery in Divs. 6GH, 1995.

Length, cm	:	Males	:	Females	:	Total
29		2		-		2
30		2		2		4
31		13		1		14
32		29		5		34
33		44		4		48
34		66		17		83
35		130		46		176
36		174		88		262
37		199		151		350
38		159		139		298
39		94		136		230
40		75		109		184
41		28		66		94
42		17		38		55
43		8		27		35
44		7		17		24
45		3		11		14
46		-		6		6
47		-		1		1
48		1		6		7
49		-		2		2
50		-		-		-
51		-		1		1
No.fish mess.		1051		873		1924
Mean length,cm		36.85		38.65		37.66