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Results of USSR Investigations on Capelin in Divisions 2J and 3K,
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by

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Abstract

The paper gives the results of capelin abundance and biomass assessment which was made on the FRV "Suloy" in the South Labrador area (2J) from November 3 to 5, 1979.

The results of the survey show that in 1979 capelin biomass decreased by a factor of 4 in comparison with that in 1978 and almost by a factor of 100 compared with 1974 when the first assessment of stocks was made in Divisions 2J and 3K.

The total capelin abundance in Division 2J was estimated at 736.5 mill. specimens and their biomass was 14.49 thou. tons.

The main reason of capelin stocks depressive state in all fishing areas (3LNOK+2J) was the appearance of the poorest in size 1974 to 1976 year classes after 1973.

Introduction

A sharp decrease in total catch and production of capelin fishery was observed recently (Table 1). It could result from the depletion of capelin stocks which greatly depend on the strength of some year classes. Due to this an analysis of bio-statistical data for the period of capelin fishery is of great interest. Data on the age structure of the population given in Table 2 show that since 1972 specimens of the 1968 and 1969 year classes at an age of 3 and 4 years made up the bulk of catches.

In 1973 the abundant 1969 year class which accounted for 62.4% of the catches prevailed in the stock.

In 1974 the fishery of this year class aged 5 was also of great importance (22.9%).

In 1975 the 1973 year class which dominated in catches at an age of 2,3 and 4 years entered the fishery.

Because of commercial fishery and natural mortality the portion of this year class in catches decreased sharply and was only 17.7% in 1978.

To compare some year classes strength indices of relative abundance calculated in accordance with T.F.Demetyeva's methods (Demetyeva,1976) are given in Table 3. The catch of capelin per hour of trawling by the Soviet vessels (large refrigerator trawlers) is taken for the index of the stocks abundance.

The 1969 and 1973 year classes were the most abundant for the whole period of fishery. Just after the 1969 year class there follow three average in size year classes - 1970,1971 and 1972. Three less abundant year classes follow the strong 1973 year class.

Thus, the depressive state of capelin stock was caused by the increase of fishing and natural mortalities of the abundant 1973 year class and also by the recruitment of the poor 1974,1975 and 1976 year classes to the stock.

Materials and methods

An acoustic survey of capelin aggregations was conducted by the FRV "Suloy" in Division 2J (South Labrador) from the 3 to 5 of November 1979. Capelin aggregations were distributed on a limited area on the southern slope of the Hamilton Bank.

The preliminary survey conducted by the FRV "Suloy" as well as by the Soviet commercial vessels in September-November did not show capelin aggregations in the Notre-Dame Bay area (3K).

Control trawlings of capelin schools with a midwater trawl were conducted simultaneously with the acoustic survey.

Methods for determination of schools volume and aggregations area were similar to those which were used in the previous years in Divisions 2J + 3K and which were described by many authors (Bakanev, Seliverstov, Serebrov, 1976; Klochkov, Seliverstov, Serebrov, 1977; Bakanev, Seliverstov, 1978; Seliverstov, Serebrov, 1979).

Due to the fact that for the last two years we did not obtain any representative data on density of schools with the aid of an automatic camera "Triton" we used the long-term mean density obtained just in those Divisions in 1974-1977 for determination of specific abundance (Table 4).

Discussion

The results of capelin survey are given in Table 5.

The total area occupied by fish aggregations was 39.3 sq.mi. which was almost 20 times as less as in 1978.

Capelin abundance beyond the Canadian territorial waters was 736.5 mill.spec. and their biomass - 14.49 thou.t.

The analysis of the age composition of capelin shows that specimens of the poor 1975 year class made up the bulk of trawl catches in autumn 1979. Capelin of the 1977 year class which was also poor could not increase considerably the abundance of the population and prevent from the further decrease of their stocks.

Hence, the increase of capelin abundance and biomass in Divisions 2J and 3K is possible only with the appearance of abundant year classes in the nearest years.

References

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Table 1. Stock size, catch rates and total catch of capelin in Div. 2J and 3K in 1972-78

	Year of the fishery						
	:1972	:1973	:1974	:1975	:1976	:1977	:1978
Stock (000 t)			1334,0	981,8	748,9	505,7	59,0
Catch per hour of trawling by BMRT, t.	3,56,	3,65	3,79	4,42	3,78	3,55	1,66
Total catch, thou.t.	68,3	267,2	287,6	364,4	360,5	207,4	82,1

Table 2. Age structure of the capelin stock in 1972-78 (%)

Age	Year of the fishery							Mean
	:1972	:1973	:1974	:1975	:1976	:1977	:1978	
2	5,2	10,8	8,0	39,9	8,2	3,0	13,1	13,8
3	48,0	14,1	40,5	31,8	78,0	29,3	25,1	40,8
4	42,9	62,4	27,1	22,5	11,6	60,9	43,4	35,6
5	3,7	12,3	22,9	2,0	1,8	5,9	17,7	8,5
6	0,2	0,4	1,5	3,8	0,4	0,8	0,7	1,3
Mean age	3,5	3,8	3,7	2,9	3,1	3,7	3,7	3,4

Table 3. Relative abundance of the 1969-1976 year-classes

	Year class							
	:1969	:1970	:1971	:1972	:1973	:1974	:1975	:1976:
Mean catch/ tr.h.,spec.	81,8	27,1	40,6	33,2	90,1	28,7	17,2	9,2
Index	2,0	0,7	1,0	0,8	2,2	0,7	0,4	0,2

Table 4. Mean absolute density of capelin schools according to data of underwater photo surveys.

Year	Mean density, spec/m ³	
	Day	Night
1974	0,810	0,480
1975	1,188	0,873
1976	1,320	0,380
1977	2,210	0,820
	1,382	0,63

Table 5. Results of instrumental estimates of capelin abundance in Divisions 2J and 3K in 1974-79.

Indices	Year					
	: 1974	: 1975	: 1976	: 1977	: 1978	: 1979
Area, sq. mi.	2990,4	2866,7	4840,6	1266,6	771,2	39,3
Abundance; thou. spec.	43659,8	45669,7	34999,2	20126,3	2537,2	736,5
Biomass, thou. tons	1334,03	981,81	748,97	505,76	59,0	14,49

Table 6. Age composition of capelin in Division 2J in 1979 (%).

Sex	Age						
	: 2+	: 3+	: 4+	: 5+	: 6+	: 7+	: II
Males	3,0	28,3	54,0	13,7	1,0		198
Females	4,0	31,2	32,7	19,7	11,9	0,5	202
Total:	3,5	29,7	43,3	16,7	6,5	0,3	400

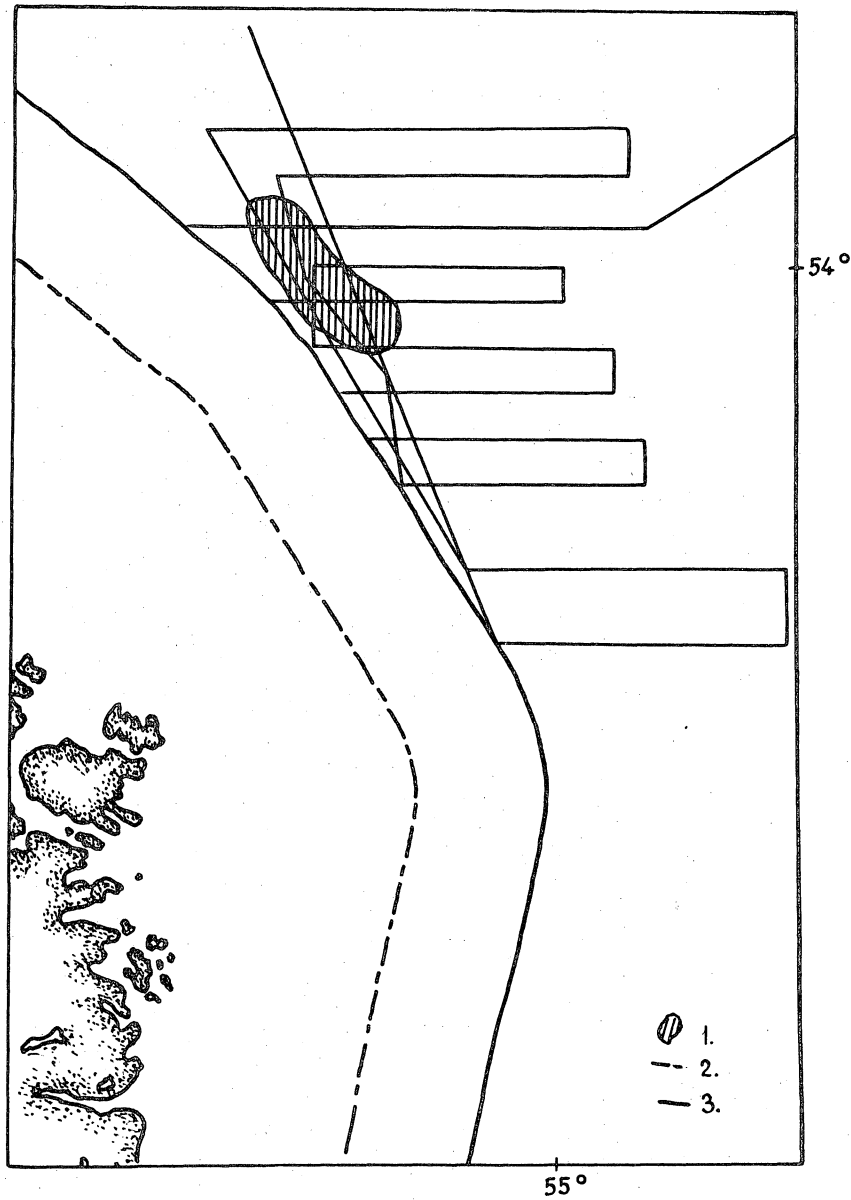


Fig.1 The route of the FRV "Suloy" and capelin distribution in November 1979

1. Capelin aggregations
2. Territorial waters border
3. Buffer zone border