



Serial No. 2843
(D.c.2)

ICNAF Res.Doc. 72/102

ANNUAL MEETING - JUNE 1972

Soviet Investigations on Capelin on the Grand Bank
of Newfoundland in Spring-Summer 1971

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A B S T R A C T

A brief information on capelin distribution on the Grand
Bank of Newfoundland in May - July 1971 is given in the paper.

Size - age characterization of pre-spawning and spawning
capelin concentrations is studied.

The areas of distribution of the densest concentrations,
depths and spawning grounds are shown.

The present-day data from the scientific sources
/Rikhter, 1962; Pitt, 1958; Templeman, 1948/ are indica-
tive of the fact, that some local capelin stocks in-
habit in the Northwest Atlantic area, in particular,
on the slopes of the Newfoundland Bank. Pitt, 1958
and Templeman, 1948 settle out two forms of capelin:
the coastal and the Grand Bank ones. The Grand Bank
capelin is of the greatest interest as they inhabit
on the shallows and slopes of Grand Bank of Newfound-
land during the whole life cycle. In accordance with
the observations undertaken by Templeman in July-
August /Templeman, 1955/ the abundant capelin concen-
trations distribute on the southeast slope of the

Grand Bank of Newfoundland, where big catches can be taken with bottom and mid-water trawls.

In May-July 1971 the expeditions to the Northwest Atlantic area, aimed at the searching for the possibilities of the commercial exploitation of capelin from the Grand Bank, were undertaken aboard the FRV. "Persey III" and on board the R/V. "Academik Knipovich".

Data collected aboard the FRV. "Persey III" and R/V. "Academik Knipovich" since May 25 to July 19, 1971 were assumed as a basis of the present paper. Biological material was collected with bottom trawl supplied with small mesh size insertion. Capelin specimens analysed were measured from the tip of the snout to the end of the middle rays of the caudal fin. Age was read by otoliths treated in glycerine when the light was incident. Data on the occurrence of capelin in cod stomachs and bycatch with bottom trawl with allowance for the density of echo recordings are plotted in the chart, which demonstrates the distribution of the Grand Bank capelin on the space of the whole period of investigations (Fig. 1).

Observations on the capelin distribution in the Grand Newfoundland Bank area were started in late May. The St. Pierre and Green Banks were investigated. Concentrations suitable for fishery were not registered during this period, only separate small capelin shoals distributed over the depths of 50-100 m.

In the first half of June considerable concentrations of pre-spawning capelin distributed on the southwest slope of the Grand Bank of Newfoundland. The densest concentrations occurred over the depths of 100-200 m in the area at $44^{\circ}30' - 45^{\circ}00'N$ and $52^{\circ}30' - 54^{\circ}00'W$.

Investigations on the southeast slope of Grand Bank were carried out in the second half of June. Data on trawlings in this area showed that spawning concentrations of capelin formed at the end of June. Their density permitted to obtain the catches from 3 to 10 tons per half an hour trawling with bottom trawl. Capelin concentrations distributed in the area between $43^{\circ}31' - 45^{\circ}10'N$ and $49^{\circ}10' - 51^{\circ}00'W$. The densest concentrations of capelin were observed on the shallows and small banks of depths of 45-55 m, where the spawning of capelin took place. In the north of the area 97% of fish in catches constituted females, among them the post-spawning specimens dominated. The capelin fed on their own fingerlings 20-42 mm long. Capelin eggs, Calanus, Euphausiids and Amphipoda were found in food clot (Tables 1,2).

Data on observations show that the Grand Bank capelin, evidently, have no great migrations and inhabit on the shelf of the Grand Bank. After spawning the survived specimens migrate to the northeast of the bank, where the fattening takes place.

Investigations carried out on the northeast slope of the Grand Bank in July somewhat confirm these assumptions. Trawlings in this area did not result in great catches however, separate captures of the post-spawning and intensively feeding females by bottom trawl evidence the fact that they probably have been migrated here from the spawning area.

In this period the hydroacoustic devices recorded the separate small shoals of capelin in water stratum and in the near-bottom layers.

During the pre- and post-spawning periods well-defined diurnal vertical migrations of capelin were observed. In the day time capelin distributed in the near-bottom layer and they were registered as

dense schools on the paper of the echo-sounders, their vertical extent was of 30-70 m. When the darkness comes capelin shoals fastly raised into the surface layers and dispersed. In that period the echo-sounders fixed their dispersed concentrations of thickness of 10-15 m at depth of 20-35 m. When the day time came capelin formed shoals again, migrated to the near-bottom layers and descended onto the ground. The echo recordings during the spawning and non-spawning periods are very similar. However, post-spawning capelin formed less dense shoals in the day time and kept above the ground higher than spawning fish and therefore the catches taken with bottom trawl were small.

It may be noticed that in the period of investigations capelin distributed at the temperatures from $-0.2-0.4^{\circ}\text{C}$ to $+3-5^{\circ}\text{C}$.

Concentrations of the Grand Bank capelin, distributed on the slopes of the Grand Bank of Newfoundland consisted of fishes 10-20 cm long at age of 2-5 complete years of the 1965-1969 year classes.

Specimens at the age of three (61-65%) and four (29-37%) complete years of the 1968-1967 year classes made up the basis of the spawning stock of the Grand Bank capelin (Fig.2).

CONCLUSIONS

Due to the type of echo recordings and captures of capelin by the trawl it can be said that the densest concentrations of capelin distributed on the southwest and southeast slopes of the Grand Bank of Newfoundland above the depths of 150-200 m.

Capelin spawning took place on the southeast slope of Grand Newfoundland Bank on the grounds of depths of 45-55 m.

Temperature registered in the spawning areas was 2.8-3.5°C.

The stock of the capelin from the Grand Bank is mainly represented by fishes at the age of 3-4 complete years of the 1967-1968 year classes.

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Table 1

Intensity of capelin feeding in June 1971

Stomach content index	0	I	2	3	4
Number	163	17	18	23	29
%	65,2	6,8	7,2	9,2	11,6

Table 2

Frequency of occurrence of feeding organisms

Feeding organisms	Number of stomachs		Feeding organisms	Number of stomachs	
	Number	% of number of stomachs with food		Number	% of number of stomachs with food
Capelin eggs	22	25,3	Calanus	22	25,3
Capelin fingerlings	38	47,7	Amphipoda	1	1,2
Euphausiids	2	2,3	Digested material	14	16,1

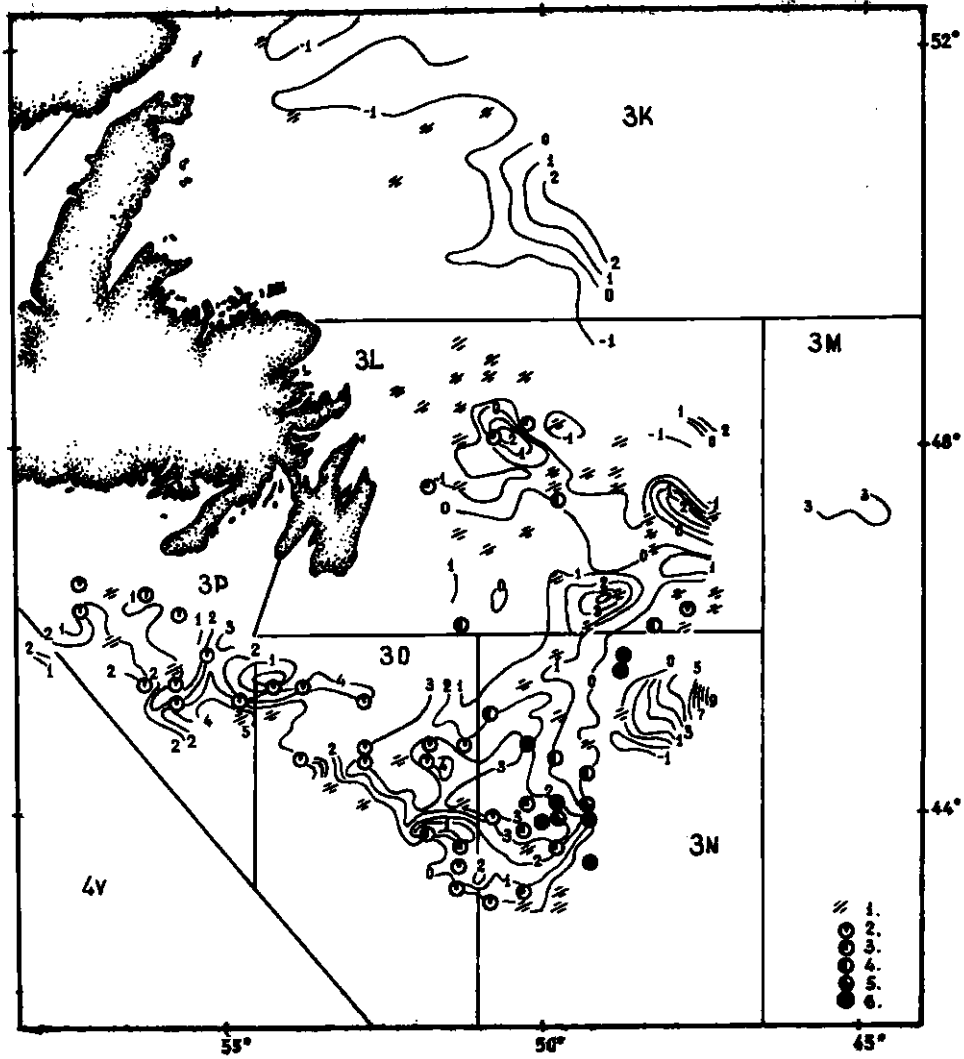


Figure 1. Distribution of capelin in May-June 1971.
1. Occurrence of capelin in cod stomachs.
2. Capture with trawl of 1-100 specimens.
3. Capture with trawl of 101-1,000 specimens.
4. Capture with trawl of 0.5-3 tons.
5. Capture with trawl of 3-5 tons.
6. Capture with trawl of 5-10 tons.

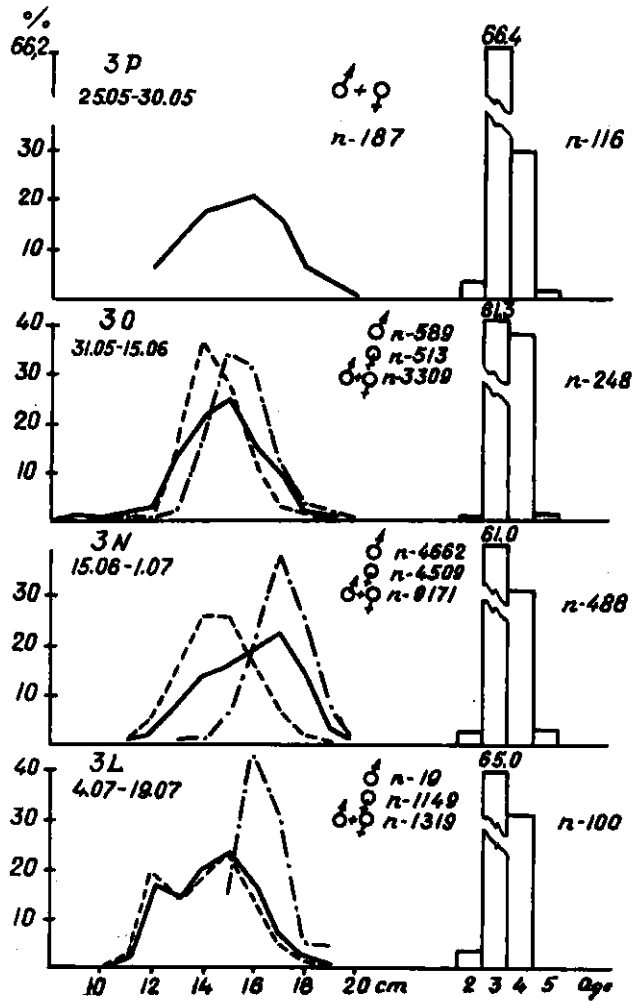


Figure 2. Size-age composition of capelin by Divisions.