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Soviet investigations on capelin in the Grand Newfoundland Bank area in 1972

by

S. M. Kovalyov and B. D. Kudrin
Polar Research Institute of Marine
Fisheries and Oceanography (PINRO)
Murmansk, USSR

Abstract

The paper deals with characteristics of the distribution of capelin by areas of the Grand Bank and South Labrador in different months. The length-age composition of capelin in March - June 1972 is given. Intensity of feeding of capelin by months is examined.

Studies on the biology of capelin on the Grand Bank was continued in 1972. Observations were aimed at studying the area and migration routes of the bank capelin. Detection of capelin concentrations was carried out in the Grand Bank area in spring and summer (February - June) and also in South Labrador in autumn and winter (September - December).

The paper deals with materials collected by the *RV Perseus III* and scouting vessels. Biological data were collected from bottom and pelagic catches; trawls used had 10-mm mesh size netting inserted into the codend. Capelin were measured from the tip of the snout to the end of middle rays of the tail fin. Ripening of gonads was determined according to the 6-mark scale suggested by V. P. Sorokin (1957). Fish were aged by otoliths (treated with glycerine) in the falling light. Charts of the capelin distribution were constructed on the basis of results of hydroacoustic detection and trawlings.

Observations on the distribution of capelin in the Grand Bank area were started in the second half of February. Some small schools of capelin were found on the north-eastern slope of the Grand Bank and they were distributed along the 150-250 m isobaths (Fig. 1).

In March capelin were observed on the north western part of the Bank and concentrations were found within 46°00' to 48°00'N and between 50°00' and 53°00'W. Considerable capelin concentrations migrated into the area of the Virgin Rocks by the middle of the month. Dense capelin concentrations remained in the Avelon Peninsula area during this period. By the end of the month, capelin were distributed over a large area from the southern part of the Avalon Peninsula to the south western slope of the Grand Bank (Fig. 1).

In April fish-detecting instruments recorded capelin schools on the northeastern slope of the Grand Bank, in the area of the Virgin Rocks, on the south western slope of the Grand Bank and also on the St. Pierre and Green Bank (Fig. 2).

In May capelin intensively migrated to the southern and south eastern areas of the Grand Bank. The densest concentrations were found on the south western slope of the Bank. The first capelin schools migrated to the south eastern slope of the Grand Bank at the end of May and the mature part of the stock of the bank capelin was concentrated on the south eastern slope of the Bank in June. Immature capelin were distributed in this period above the depths of 100-150 m over a great area of the north eastern slope of the Grand Bank (Fig. 2).

Spawning started during 7-10 June. Intensive spawning took place in shallow parts of the south eastern slope of the Grand Bank in the second half of June (Fig. 2).

According to observations by Hinds (1972) fishing concentrations of capelin appeared in the spawning area (the south eastern slope of the Grand Bank) on the 7 June.

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No Soviet observations on the distribution of capelin were conducted in July and August.

In September investigations were continued in South Labrador. Dense capelin concentrations were found on Hamilton Bank. No great horizontal migrations of capelin were observed in this period. In the Hamilton Bank area capelin were also registered in October (Fig. 3).

As further observations indicated, in November capelin were distributed more to the south east than in October. Schools were found in the area from 53°40' to 53°50'N and between 54°00' and 55°00'W. By the end of the month some schools of capelin were distributed in the area from 51°50' to 52°30'N and between 53°30' and 54°30'W. In the first half of December hydroacoustic devices recorded capelin in the North Newfoundland Bank area and schools were distributed within 50°00' and 51°00'N and between 52°30' and 54°00'W (Fig. 3).

Capelin were intensively feeding in spring and summer. Feeding intensity was decreasing from March to June (Table 1). The food organisms given in Table 2 were predominant in capelin feeding.

Diurnal vertical migrations of capelin were observed in pre-spawning and spawning periods. In the daytime capelin schools were found in the near-bottom layer. At night capelin moved to surface layers. In the pre-spawning period of 1972 capelin schools were observed migrating to spawning grounds. These migrating concentrations were recorded with hydroacoustic instruments in the sahpe of single schools distributing both in water columns and in surface and near-bottom layers independently of the time of day and night.

In March - June 1972, pre-spawning and spawning concentrations consisted of capelin of 10-19 cm in length and at the age of 2-5 years (Fig. 4). The main part of the spawning stock consisted of fish of ages 3 and 4 years.

Table 1. Feeding intensity (stomach fullness according to the 5-mark scale).

Month[1]		Index of stomach fullness 0	1	2	3	4	Total
March	spec.	93	3	6	42	56	200
	%	46.5	1.5	3.0	21.0	28.0	
April	spec.	191	21	47	70	96	425
	%	44.8	4.9	11.1	16.6	22.6	
May	spec.	74	17	31	20	3	145
	%	51.3	11.7	21.3	13.7	2.0	
June	spec.	157	52	63	16	12	300
	%	52.4	17.3	21.0	5.3	4.0	
September	spec.	26	8	15	28	23	100
	%	26.0	8.0	15.0	28.0	23.0	

[1] No observations were carried out in July and August. Data on the length composition and feeding in October - December are not available.

Table 2. Frequency of occurrence of food organisms in capelin during March - June 1972.

Food organisms	No. of stomachs: No. of spec.	No. of stomachs: % from No. of stomachs with food	Food organisms	No. of stomachs: No. of spec.	No. of stomachs: % from No. of stomachs with food
Calanus	347	55.4	Ctenophora	5	0.8
Euphausiidae	276	44.1	Fish larvae	24	3.8
Amphipoda	198	31.5	Sagitta	77	12.3
Food digested	35	5.6	Capelin eggs	15	2.4

Conclusions

In spring and summer the densest capelin concentrations were distributed in the Avalon Peninsula area and on the south western and south eastern slopes of the Grand Bank.

As in 1971, spawning of capelin took place at depths of 45-55 m on the south eastern slope of the Grand Bank.

While performing spawning migrations, capelin were distributed in water columns at different depths regardless of the time of day and night.

The stock of the bank capelin consisted mainly of specimens of ages 2-5 complete years.

In spring and summer great capelin concentrations, which can serve as basis for fishery, were found in the Grand Bank area.

References

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Hinds, L. 1972. Capelin stocks could support new fishery. Fishery News International, Vol. 11, No. 11, p. 20.

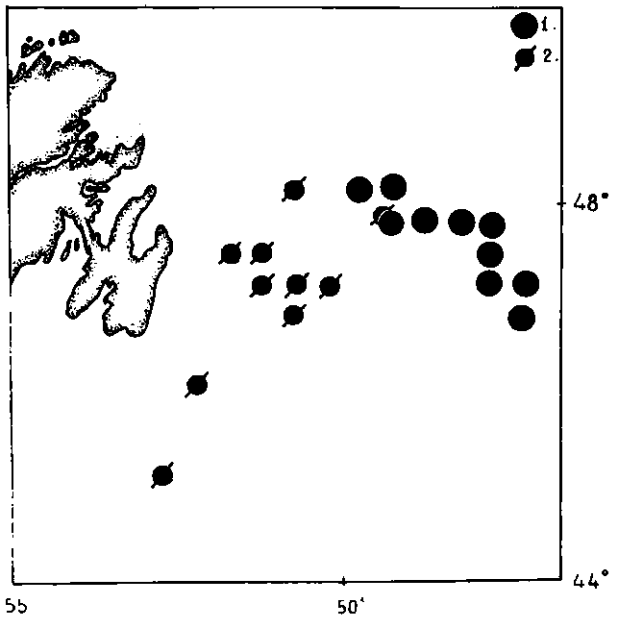

Fig. 1. Distribution of capelin on the Grand Bank.
1. February 2. March

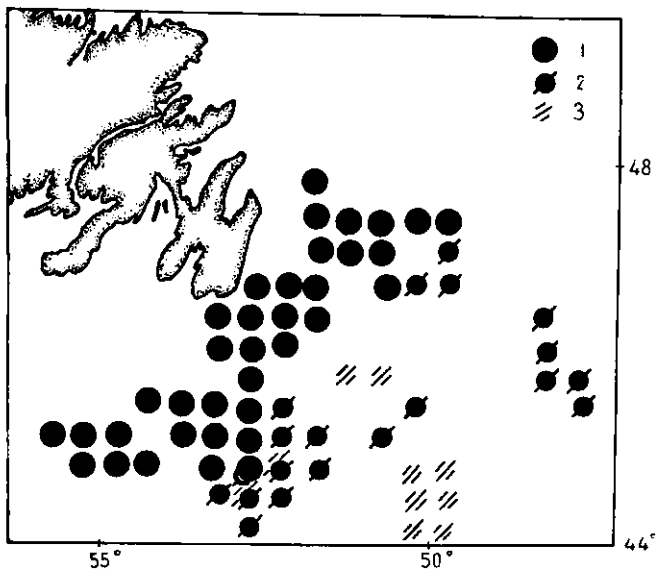

Fig. 2. Distribution of capelin on the Grand Bank.
1. April 2. May 3. June

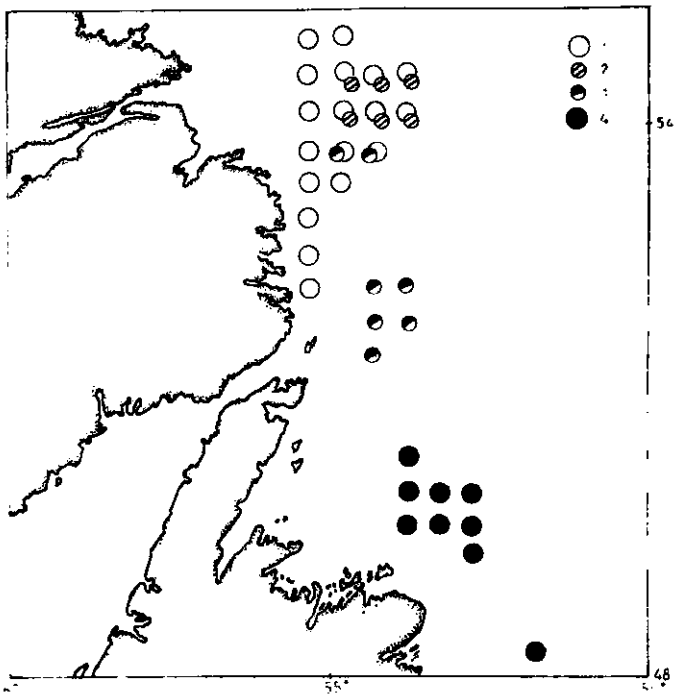

Fig. 3. Distribution of capelin on the Grand Bank.
1. September
2. October
3. November
4. December

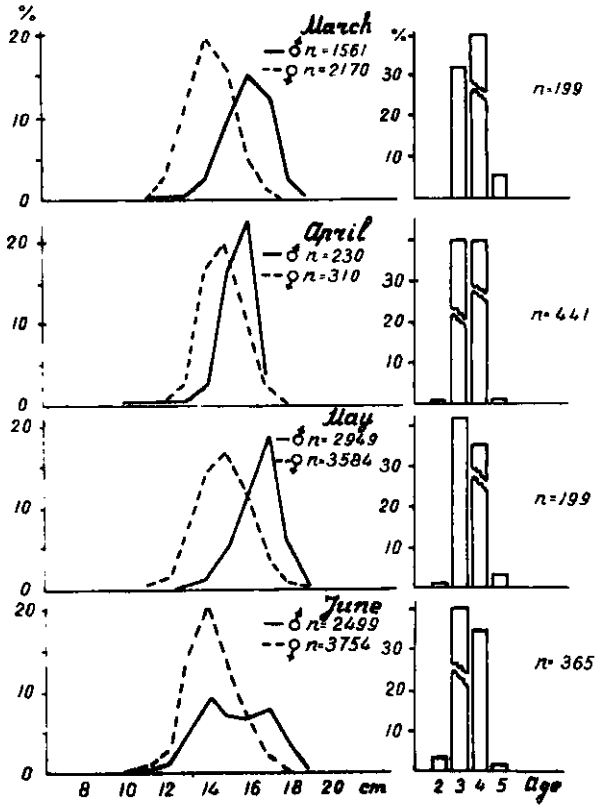

Fig. 4. The length-age composition of capelin in the Grand Bank area in March - June 1972.