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Results of Acoustic survey for Capelin (*Mallotus villosus*)
in NAFO Divisions 3LNO in 1994

by

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Abstract

The paper presents results of an acoustic survey carried out from June, 14, to July, 18, 1994. Capelin stock is again registered as the depressing one. Total capelin biomass constituted 83 thou. t. The main number of mature pre-spawning capelin was revealed in Div. 3O.

Material and Methods

The acoustic survey was carried out by R/V "Vilnius" (MG-1362) on June, 14-24, 1994 in Divs. 3NO. Because of the lack of time during the trawl-acoustic survey for demersal fish in Div. 3L, a concomitant survey for capelin was conducted from June, 25, to July, 18, with the use of an acoustic survey and samples for length-age composition of catches and meshing of a bottom trawl were collected.

An acoustic complex of EK-400 echo sounder and SIORS echo integrator was used in the survey. Operating mode was as follows:

frequency	- 38 kHz
transmission band width	- 3.3 kHz
TVG	- 20 lgR - 10 dB
pulse duration	- 1 ms
aerial directivity diagram	- 19.6 dB
target strength (TS)	- 19.1 lgL - 74.4 (dB), where L - capelin length.

Results

Tracks and check hauls are presented in Figure. Main number of mature pre-spawning capelin was revealed in Div. 3O. Fish were distributed like separate schools, and many humpback whales were presented in each of them. Judge by whales' behaviour, they apparently consumed capelin actively. Capelin were very movable and quickly shifted westwards, that was revealed during the repeated observation of single concentrations in a time period.

Table 1 presents the results of capelin stock assessment in Div. 3O, which was slightly higher than 83 thou. t. The basis of check hauls was capelin at the age of 3 (43.3 %) and 2 (36 %). About 20 % of specimens were fourth- and fifth-year fish (Table 2). Females predominated in catches (76 %).

On the spawning grounds of the South-Eastern Shallow (3N) capelin concentrations were not revealed. Possibly, it is connected with the previous (at the moment of the survey) spawning and dispersion of post-spawning fish, since higher water temperature was typical for this area of the Grand Bank of Newfoundland. But more probable is the low stock of this population, since in the similar survey of 1993 mature fish were not revealed.

Single concentrations of immature capelin (at the age of 2, mainly) occurred in this area in canyons and in the eastern slopes of the Grand Bank of Newfoundland.

In addition, searching devices registered poor schools in the pre-bottom layer in the period of the trawl-acoustic survey of demersal fish in Div. 3L. Both mature young fish occurred in catches. Since capelin concentrations in Divs. 3N and 3L were scanty, it was impossible to estimate the stock acoustically.

Thus, the estimated capelin stock in June 1994 was the lowest one for last 15 years and constituted just 4.3 % of the long-term mean biomass for this period due to data of Russian acoustic surveys (Table 3).

Table 1. Results of capelin acoustic survey in Div. 3NO in June 1994.

Track No.	Track length in miles	Mean density t/sq.mile	Biomass by track t	No. of traw- lings	Mass meas- uring t	Spec. at age
1	84	7.73	649	-	-	-
2	84	37.71	3168	2	200	44
3	84	11.35	953	1	200	49
4	84	15.25	1279	1	200	40
No. of pos- sible tracks	Square of stratum, sq.miles	Mean biom. by track	Biomass in stratum, thou. t			
55	4620	1512	83.2+/-32.1			

Table 2. Age composition (A, %), mean weight (W, r) and mean length (L, cm) of capelin in Div. 3NO in June, 1994.

Parameter:	Age, years					Total
	2	3	4	5		
M A L E S						
A	7.1	8.0	6.9	-	22.0	
W	16.3	22.8	27.4	-	21.1	
L	13.3	15.0	16.0	-	14.8	
F E M A L E S						
A	28.9	35.3	11.2	2.6	78.0	
W	12.9	19.2	22.0	21.9	17.4	
L	12.5	14.4	14.9	15.5	13.8	
M A L E S + F E M A L E S						
A	36.0	43.3	18.1	2.6	100.0	
W	13.6	19.9	24.1	21.9	18.4	
L	12.7	14.5	15.3	15.5	14.8	

Table 3. Abundance (10-9 spec.) and biomass (10-3 t) of capelin due to data of Russian acoustic surveys in Divs. 3LNO for 1984-1994.

Years	Abundance	Biomass	Years	Abundance	Biomass
1984	191.7	2880	1989	187.6	2455
1985	289.3	2200	1990	299.9	3762
1986	95.2	1491	1991	8.2	118
1987	107.2	2161	1993	25.0	315
1988	310.9	3900	1994	4.5	83

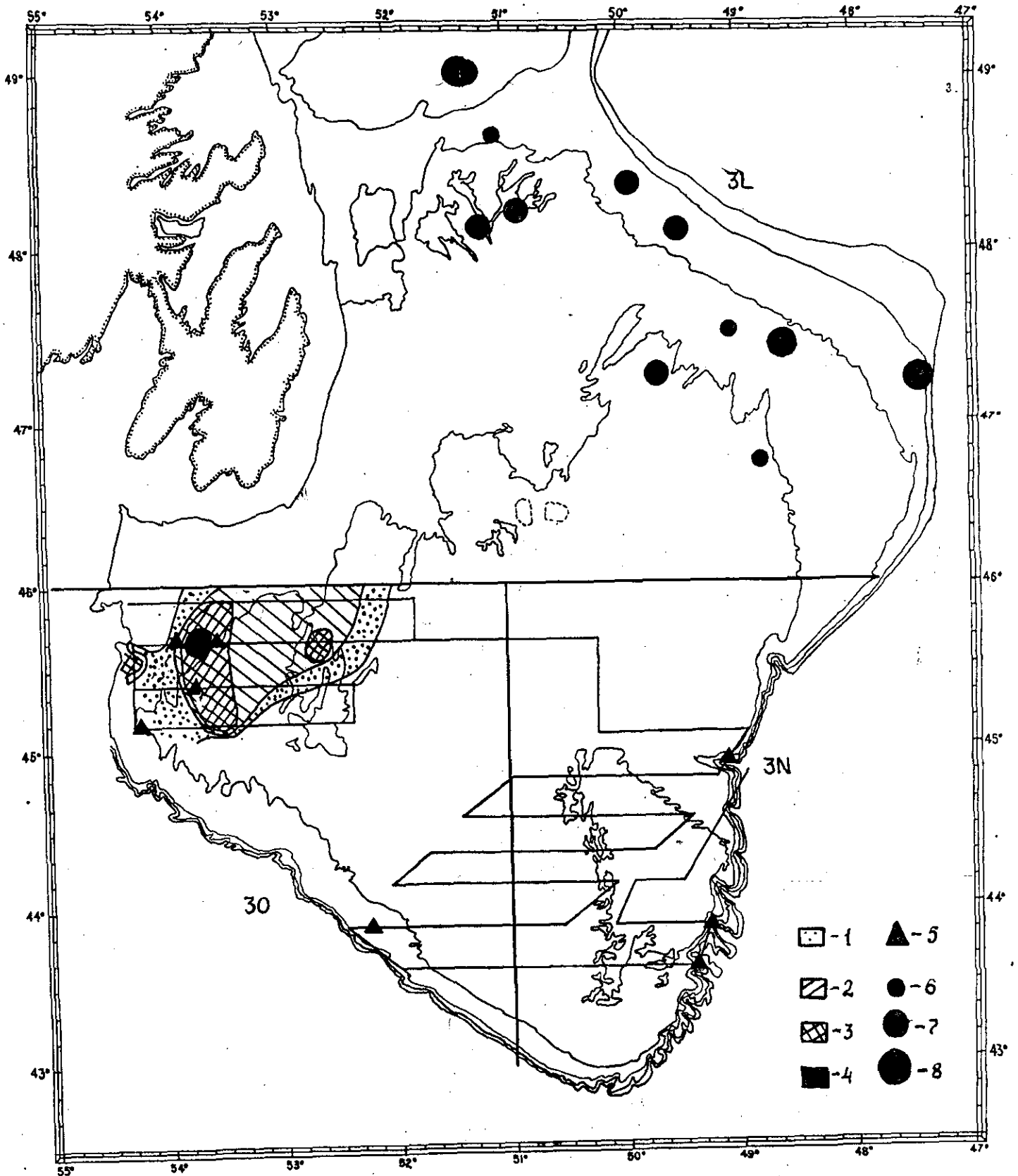


Figure 1. A route of the acoustic survey.
Schools density in echo integrator units:
1 - 1-10; 2 - 11-100; 3 - 101-1000; 4 1001

Check hauls:
5 - mid-water trawl; 6-8 - bottom trawl during
the TAS (capelin catches - tens, hundreds,
thousands).