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Results from Acoustic Capelin Surveys in NAFO Div. 3KLNO in Spring 1988

by

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ABSTRACT

The paper deals with the results of acoustic survey for capelin conducted in NAFO Divs. 3LNO in May-June 1988. Data from capelin survey made concurrently with the acoustic-trawl survey for bottom fish in Divs. 3KLNO in March-April are presented too.

A greater part of capelin stock biomass was composed of mature fish from the 1985 year-class, but a strong 1986 year-class prevailed in numbers.

Total capelin abundance in Divs. 3LNO in the survey area of 33 178 square miles was estimated at $332,4 \times 10^9$ fish, and biomass at 3,95 mill.t.

Annual acoustic surveys by Canadian and Soviet research vessels in the fishing zone of Canada provide information on the stock status, which is used as a basis for estimation of TAC and for selection of a proper exploitation pattern of commercial capelin stock.

MATERIAL AND METHODS

In the spring-summer period capelin stocks on the Grand Newfoundland Bank were surveyed twice by research vessel "Persey-III".

The first survey was carried out during the period from 17 March to 30 April concurrently with acoustic-trawl survey for bottom-fish in Divs. 3KLNO. The second capelin-directed survey was conducted from 13 May to 3 June in Divs. 3LNO.

Echo-sounder EK-S-38, integrators SIORS and computer "Iskra-226" were used aboard RV "Persey-III". During the acoustic-trawl survey biological samples were collected in bottom trawl with 4m vertical opening. Conventional pelagic trawl with a small-meshed liner was used to carry out check tows during the survey. 27 pelagic tows were carried out in Divs. 3LNO.

Methods of capelin abundance and biomass estimation were identical to those used in the previous survey (Bakanev, Mamylov, 1988). Specialized acoustic survey and stock assessment were made according to the methods as in Mamylov, Bakanev (1984), Bakanev et al.(1986). Dependance of target strength (TS) on capelin length (L) in echo sounders with the frequency of 38 KHZ is the basis of echo integration and biomass calculations techniques. Fish from each biological sample were measured and male/female ratio was determined. Abundance and biomass estimates by age were calculated on PINRO computers.

RESULTS

Observations of distribution and assessment of capelin abundance and biomass in Divs. 3KLNO made concurrently with trawl-acoustic survey for bottom fish provided tentative information on the stock status, and facilitated selection of most effective track of the May acoustic capelin survey.

According to the results of echo-integration and bottom trawl catch data, about 80% (by weight) and 70% (in number) of the total stock were concentrated in the north of Div. 3L in April. Capelin with the mean length of 14-16 cm prevailed in largest concentrations in Div. 3K, a proportion of mature fish in catches by bottom trawl fluctuated from 47% to 90%. Fish having the length of 9-13 cm predominated in numbers in Divs. 3NO. Inflow of warm Atlantic waters, penetrating as far as 47°N, influenced the capelin distribution pattern, especially in the central part of the Grand Newfoundland Bank. Increased shelf water heat content was observed during the specialized capelin survey in May too.

Capelin distribution in Divs. 3LNO in May-June is shown in Fig.1. Prespawning capelin were concentrated, on the whole, in the northern part of Div. 3O. Fig.2 shows fish length frequen-

cy distribution. Mixed aggregations, with 8-13 cm fish prevailing in number, were distributed in the rest of the survey area.

The total capelin abundance and biomass in Divs. 3LNO in May-June were estimated at 3,95 mill.t and 332,4 x 10^9 fish, respectively.

Capelin of the 1986 year-class were most abundant in the spawning stock in Div. 3NO. Capelin from the 1986 year-class had maximum abundance in Div. 3L and capelin from the 1985 year-class predominated by weight. These results are in a fairly good conformity with the data of Canadian researchers (Miller, Carscadden, 1988), who participated in acoustic capelin survey in Div. 3L in May 1988.

Thus, the results from spring acoustic survey in Divs. 3LNO show that the Newfoundland capelin stock in 1989 will be supported by the strong 1986 year-class.

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Table Results from acoustic capelin survey in May-June of 1988 (by Subarea)

Subarea	Area, sq. mile	Abundance x 10^9 spec	Biomass, mill.t	Mean length, cm	Mean weight, g
I	11617.4	31.9	853.5	15.9	26.7
II	12872.7	118.3	1812.8	13.3	15.4
III	5975.8	138.6	1037.3	11.0	7.5
IY	2712.5	43.6	247.1	10.1	5.7
Total	33178.4	332.4	3950.8	12.?	11.9

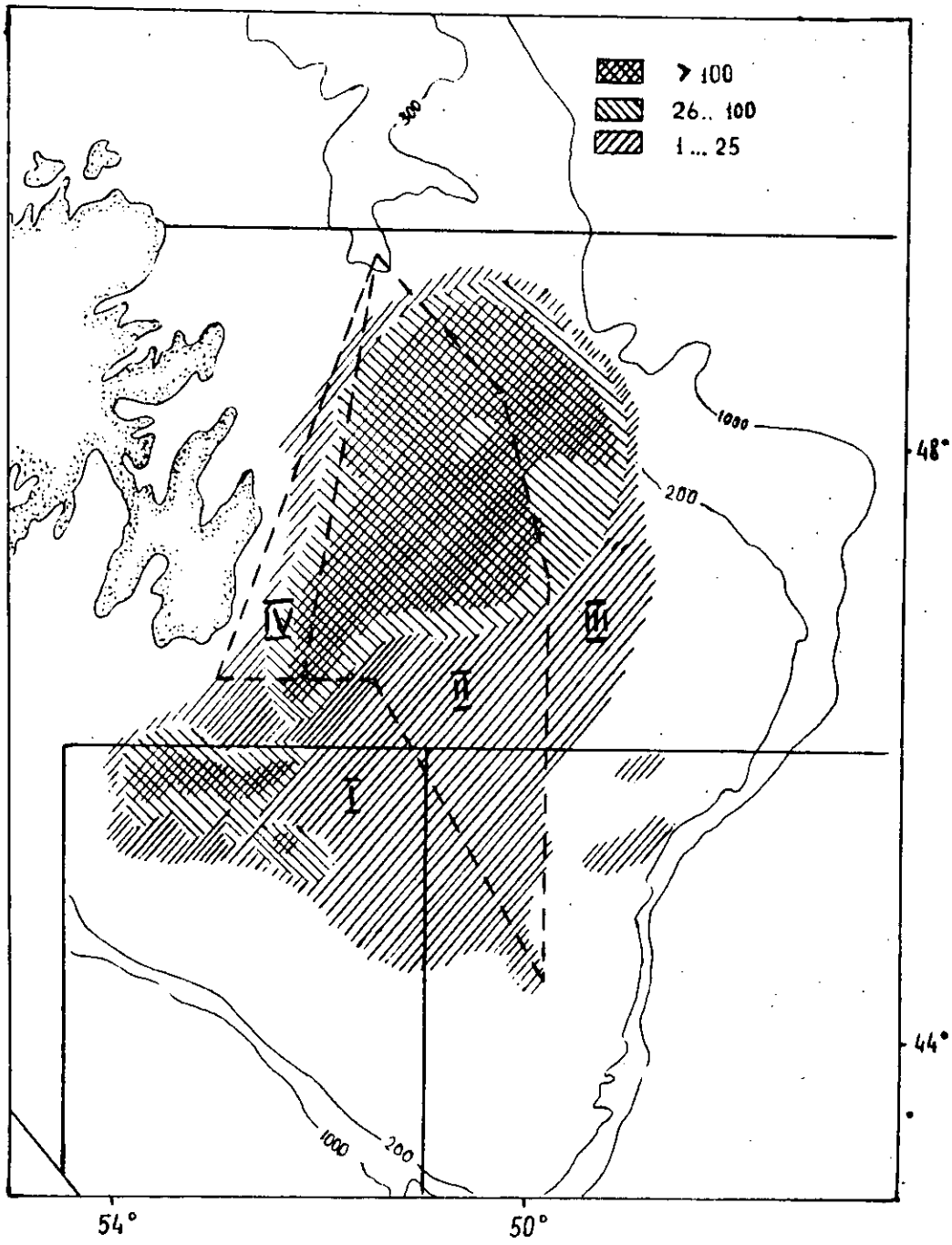

Fig.1. Distribution of capelin concentrations in Divs. 3LNO during the acoustic survey (13 May-3 June)
(Density in the echo-intensity units)

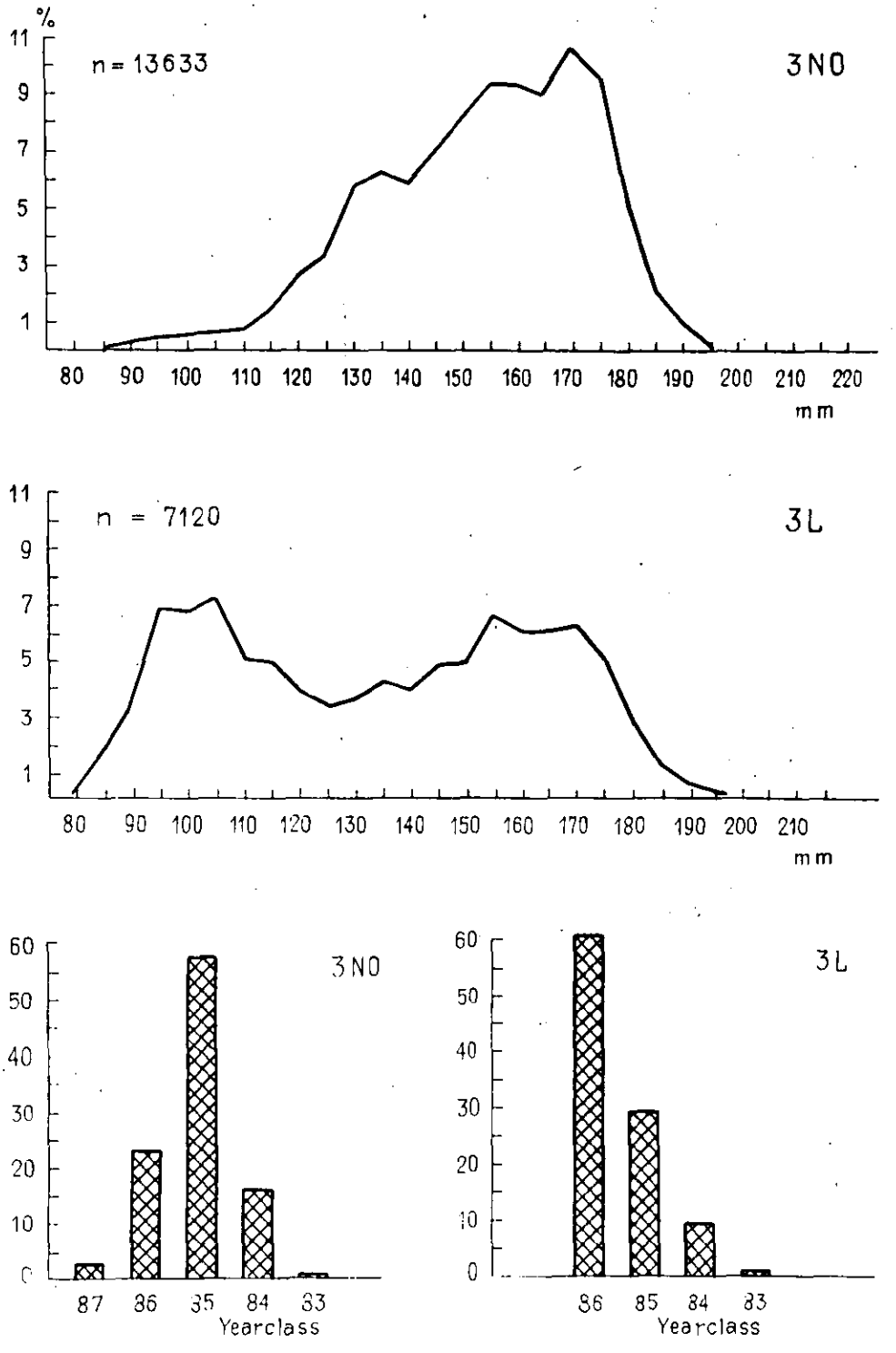

Fig.2 Age-length composition of capelin from NAFO Divs. 3NO and 3L in spring of 1988.

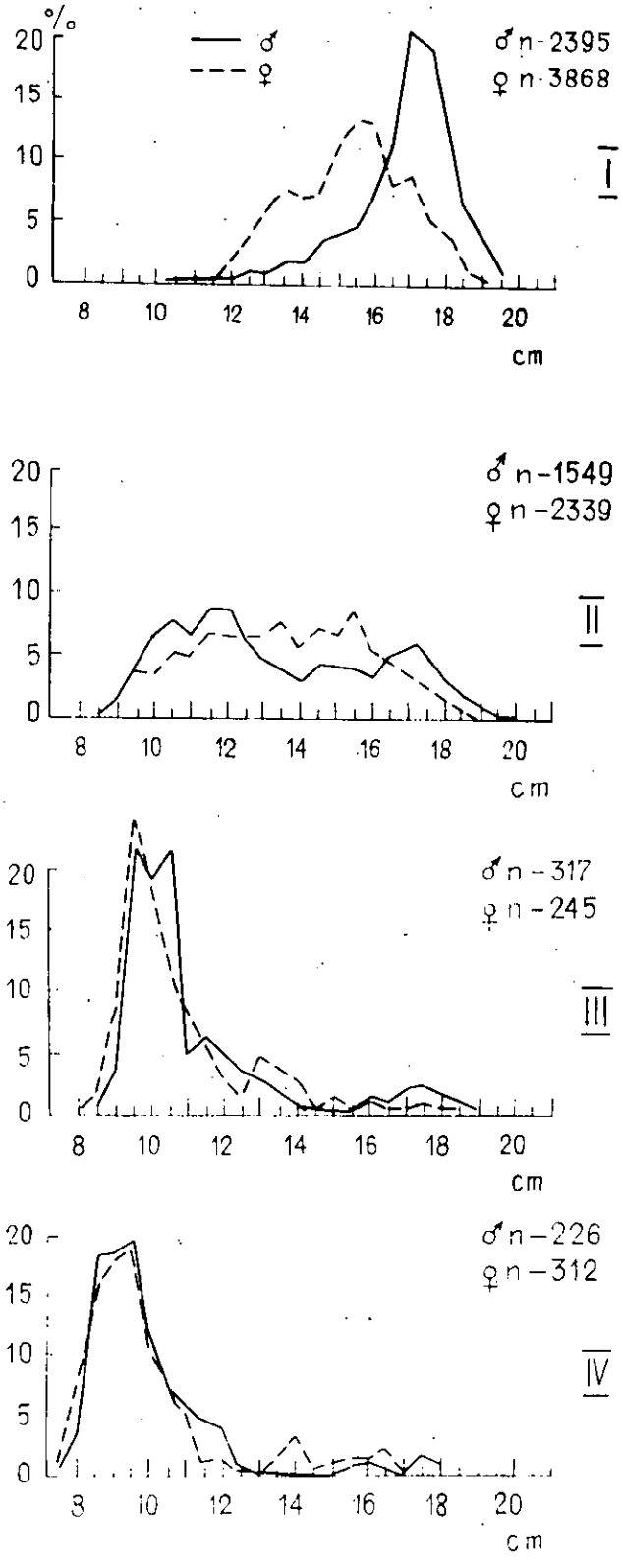

Fig.3. Length frequencies of capelin in Divs. 3LNO by survey Subareas.