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Results from Acoustic Capelin Surveys in NAFO Divisions 2J3K in 1992

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ABSTRACT

The results of the acoustic survey on capelin conducted in the first half of November 1992 in Divs.2J3K are presented. It is noted that like in the relevant survey of 1991, only small concentrations of capelin were revealed in the south-eastern part of the Div. 3K. Capelin biomass, estimated at 9.6 thou.t, was found to be the lowest for the recent 10 years. 1990 year class of capelin at the age of 2 constituted the basis (80%) of these concentrations.

MATERIAL AND METHODS

The acoustic survey of capelin was conducted by R/V "Kapitan Shaitanov". During the survey, the echo integrator complex was used, including echo-sounder EK-400, digital echo integrator SICRS and "Iskra-226" computer. Before the survey, the calibration of instruments was done, by the results of which the instrument constant of the echo integrating complex was calculated and equal to:

$$C_1 = 39.92 \text{ m}^2/\text{mile}^2$$

Operation mode was the following:

frequency	- 38 kHz
transmission band width	- 3.3 kHz
TVG	- 20 lgR - 0dB
pulse duration	- 1 ms
directivity diagram	-19.6 dB
target strength (TS)	- 19.1 lgL - 74.4 (dB), where L - capelin length

Capelin biomass and abundance were calculated by the method of isolines, which was used previously in this area on board of vessels of the Polar Institute (Manylov and Bakanev, 1984). The main difference of this method from the CAFSAC method used in recent years (O'Boyle and Atkinson, 1989), is in the impossibility to calculate the standard deviation (σ), since the main requirement - the parallel location of the survey tracks - was not maintained. It was connected with the deficiency of time in the period of the detailed survey in the area of concentrations, since the acoustic survey for capelin was combined with the total survey for bottom fish.

RESULTS

In 1992, it was the first time when the summer acoustic survey and autumn trawl survey of the capelin 0-group in Divs. 3LNO were not conducted by the PINRO vessels.

Capelin survey in Divs. 2J3K was conducted from October, 30 to November, 15, 1992. The survey route is presented in Fig.1. Like in the 1991 survey,

capelin concentrations of poor density were noted only in the eastern part of Div. 3K. The concentrations were registered by the hydroacoustic devices like schools or poor "path" at the depth of 250-400 m (Fig. 2). The temperature of the pre-bottom water layer constituted 2°- 3°C in the sites of fish concentration.

The total capelin stock in this area was estimated at 9.6 thou.t (Table 1). The basis of catches from the control trawlings was capelin 12-16 cm long (mean length is 14.1 cm) from 1990 year class mainly (79.6%). Some more than 20% constituted 1989 and 1988 year classes.

Thus, the capelin stock is still at the lowest level for the recent 10 years after the sharp unexpected reduction registered in autumn 1990 (Table 2).

REFERENCES

- O'Boyle R.N. and D.B. Atkinson. 1989. Hydroacoustic survey. Methodologies for pelagic fish as recommended by CAFSAC. CAFSAC Res.Doc. No. 89/72, 12 p.
 Mamylov V.S. and V.S. Bakanev. 1984. An acoustic assessment of capelin stocks in NAFO Div. 3LNO and 2J+3K in 1983. NAFO SCR.Doc. No. 84/39, Ser.No.824, 8p.

Table 1. Age composition (%), abundance and biomass of capelin in Div. 3K in November, 1992

Sex, indices	Age			Total
	2	3	4	
Males	80,4	19,1	0,5	100,0
Females	78,2	19,8	2,0	100,0
Males + remales	79,6	19,4	1,0	100,0
Abundance, mln. sp.	473,0	115,0	6,0	594,0
Biomass, thou.t	7,0	2,4	0,2	9,6
Mean weight, g	14,8	21,2	26,9	16,2
Mean length, cm	13,7	15,2	16,0	14,1

Table 2. Abundance by age and biomass of capelin due to Russian surveys' data in Divs. 2J3K for 1983-1992

Years	Abundance, bill. spec.					Total	Biomass, thou.t
	Age						
	2	3	4	5			
1983	20,5	16,2	2,5	-		39,2	852
1984	19,3	3,8	1,4	0,2		24,7	195,5
1985	83,8	18,1	2,6	0,2		104,7	1540
1986	19,0	44,6	3,6	0,2		67,4	1491
1987	44,6	6,9	7,0	0,2		58,7	1164
1990	14,9	13,1	2,7	0,1		30,8	631
1991	4,3	0,5	0,2	+		5,0	30
1992	0,5	0,1	+	-		0,6	10

Note: In 1988-1989, the surveys were not conducted

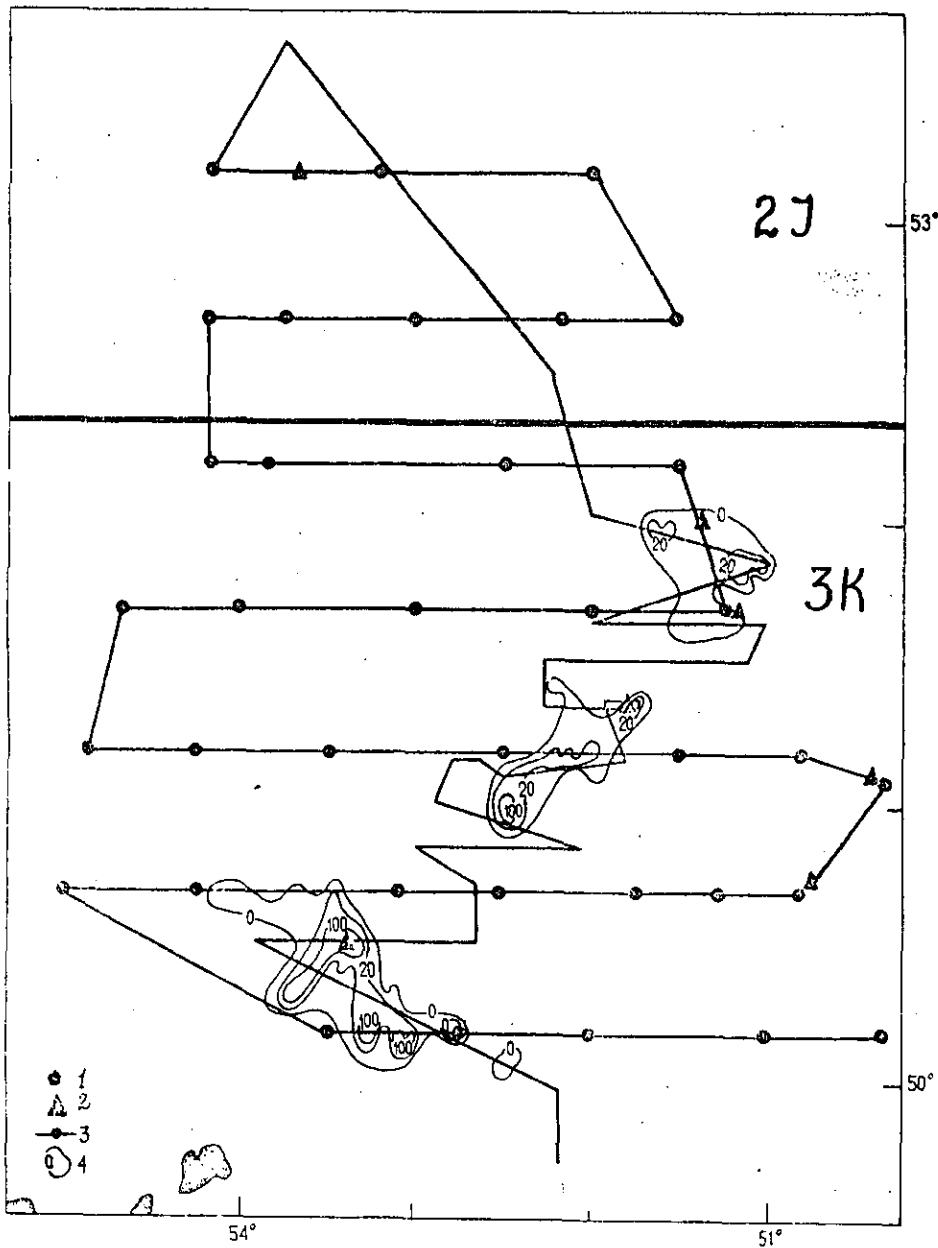


Fig.1. The rout of acoustic survey on capelin
1- hydrological stations
2- check trawls
3- the survey route
4- isolines of density of capelin concentrations in
the units of echo sounder ($m^2/mile^2$)

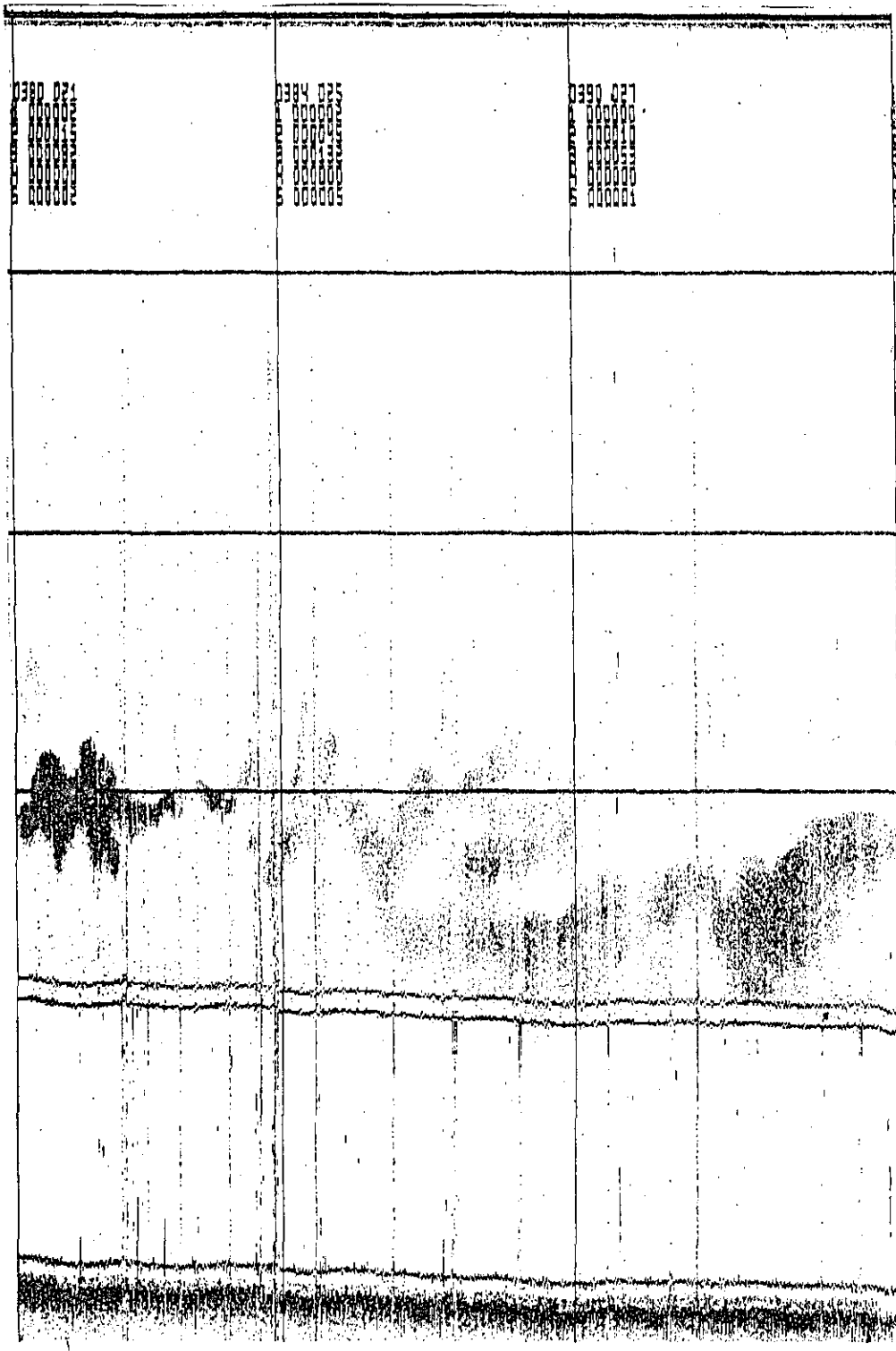


Fig. 2. Typical echo recordings of capelin concentrations