Northwest Atlantic Fisheries Organization

Serial No. N2145 NAFO SCR Doc. 92/84

SCIENTIFIC COUNCIL MEETING - SEPTEMBER 1992

Evaluation of Index for O-group Capelin Abundance in NAFO Div. 3LNO in November

by

V. S. Bakanev

Polar Research Institute of Marine Fisheries and Oceanography (PINRO)
6 Knipovich Street, Murmansk 183763, Russia

ABSTRACT

Trawl survey for evaluating the index of O-group capelin abundance, conducted in Divs.3LNO in November 1991, indicated an apperance of a yearclass to be close to mean abundant that year, since the index proved to be low than that for 1983and 1988-1990 yearclasses, however, higher than 1984-1986 poor ones.

Length composition of O-group and distribution of its main aggregations were close to the long-term mean , though mass spawning of capelin took place about a month later than usually and its abundance was very low in the spawning grounds of the Grand Newfoundland Bank southeastern shallows by the data from Soviet acoustic survey.

INTRODUCTION

Evaluating of the index for O-group capelin abundance by trawl survey method in Divs.3LNO is included into a set of investigations carried out in accordance with the Soviet/Canadian agreement on monitoring the dynamics of stock abundance to regulate fishery and to set total allowable catch (TAC). Such research cruises have been conducted since 1983 by PINRO research vessels in autumn-winter period.

MATERIAL AND METHODS

The survey was carried out by RV "Vilnuis" from 15 to 30 November 1991. Special fry pelagic trawl (20x20m) was used for O-group capelin fishing. Small-meshed knotless "netting" (3.6mm) was inserted into a codend of bag. 40-60, 20-40 and 0-20 m depths were alternatively fished. 1 haul total duration was 30 m.at vessel's speed 3 knots, i.e. 10 minutes at each depth. In total 52 trawl stations have been occupied (Table 1).

Only 200 spec.of larvae were measured from large catches, the rest were counted. Larvae were measured by length to tip of tail accurate to 1mm.

Methods, symbols and formulae used when calculating a logarithmic index for abundance were similar to those from calculations of capelin index abundance for 1990 yearclass (Bakanev, 1991).

Along with the logarithmic index their antilogarithmic indices are given first, which, in our opinion, allow to compare strength of yearclasses for a number of years.

To calculate the index by stratified method the whole area surveyed was divided into 8 separate strata combined by three Divisions- 3L,3N and 3O (Fig.1).

RESULTS AND DISCUSSION

Position of trawl stations and density of O-group capelin distribution by catches are presented in Fig.2. The highest amount of O-group capelin , as in preceding years (Fig.3),was noted in Divs. 3N and 3O, while no mass spawning was registered during acoustic survey in July 1991(RV "Vilnuis") in the areas of spawning grounds of the Grand Newfoundland southeastern shallows (3N) (Bakanev, 1992). There are two reasons for this: the first - capelin spawning in that area , as at the Newfoundland Island coast (J.Carscadden, personal communication), took place later compared to the acoustic survey terms (in August), and the second - the larvae transported from spawning grounds on the Newfoundland Island coast into those areas during O-group trawl survey. Length composition of larvae in both cases does not indicate their late hatching since it occurred to be close to the long-term mean except Div.3L, where their mean length was minimal for the years of observations (Table 2).

Table 3 includes total logarithmic and antilogarithmic indices for O-group capelin abundance and their confidence limits. The index for abundance estimated for the whole area surveyed proved to be close to the indices for 1987-1989 higher abundant yearclasses, however, much lower than the rich 1983 yearclass. However, index estimated, excluding the northern strata (1-2), which contain about 6% of larvae caught (Bakanev, 1990), occurred to be lower than 1983-and 1987-1990 high abundant yearclasses, however, much higher than 1984 and 1986 poor ones. In connection with this the 1991 yearclass at O-group stage should be regarded as mean abundant. However, one should be careful when

using this index to forecast stock recruitment in future, since irregularity in relations between capelin abundance estimated at O-group stage with a subsequent recruitment of this year-class to the stock was observed due to unfavourable hydrographic conditions during recent two years (1990 and 1991). Thus, a sharp catastrophic reduction took place instead of expected increase in the stock of 1988 and 1989 capelin yearclasses, estimated at O-group stage as rich ones (the 1988 year-class was also abundant at age 2) (Bakanev, 1992). A reason for such disturbance in the relation especially for the 1988 year-class is not clearly known and demands supplementary studies.

REFERENCES

BAKANEV, V.S. 1990. Estimate of the Newfoundland capelin (Mallotus villosus) year-classes abundance by method of ichthyoplankton survey. Reports of the Soviet/Canadian Symposium (in press).

BAKANEV, V.S. 1991. Trawl survey for the 1990 year-class of capelin stock assessment in Divisions 3LNO. SCR Doc. No. 91/10, Ser. No. N1882, 8 p.

BAKANEV, V.S. 1992. Results from acoustic capelin surveys in Divs. 3LNO and 2J3KL in 1991. (in press).

Table 1. Trawl survey for O-group capelin carried out in Divs. 3LNO in 1983-1991

Period of survey	Vessel	No. of stations
05.II.83-22.II.83	МГ-I356 "Kokshaisk"	6I
II.I2.84-I3.0I.85	-"-	53
30.II.86-I2.I2.86	МГ-I330 "Klintsy"	33
I9.II.87-07.I2.87	МГ-I366 "Kapitan Shaitanov"	59
25.II.88-09.I2.88	-"-	48
I9.II.89-08.I2.89	-"-	43
22.II.90-II.I2.90	МГ-I356 "Kokshaisk"	54
I5.II.9I-30.II.9I	МГ-I362 "Vilnuis"	52

Table 2. Length composition of O-group capelin (mm) by divisions for 1983-1989

Years	Divisions		
	3 L	3 N	30
I983	46	48	47
I984	47	48	43
I986	45	47	46
I987	52	50	47
I988	46	53	49
I989	48	47	46
I990	45	45	49
I99I	44	47	45

Table 3. Indices and confidence limits for O-group capelin by the data from trawl surveys of 1983-1991

Year-class	3LNO		3LNO excluding strata 1-2		Confidence limits	
	Logarith. index	Antilog. index	Logarith. index	Antilog. index	3LNO	3LNO, no strata 1-2
I983	4,70	II0	5,85	347	3,76-5,7I	4,56-7,26
I984	2,42	II	2,98	20	I6,50-3,30	2,52-3,46
I986	2,26	I0	3,48	33	I,24-3,58	2,28-4,9I
I987	4,03	56	5,58	265	3,I5-5,0I	4,60-6,54
I988	3,98	54	6,88	973	3,35-4,65	4,04-8,28
I989	4,34	77	6,87	963	3,4I-5,37	5,27-8,68
I990	-	-	6,2I	498	-	5,05-7,37
I99I	4,II	6I	5,I6	I74	2,63-5,87	3,06-5,88

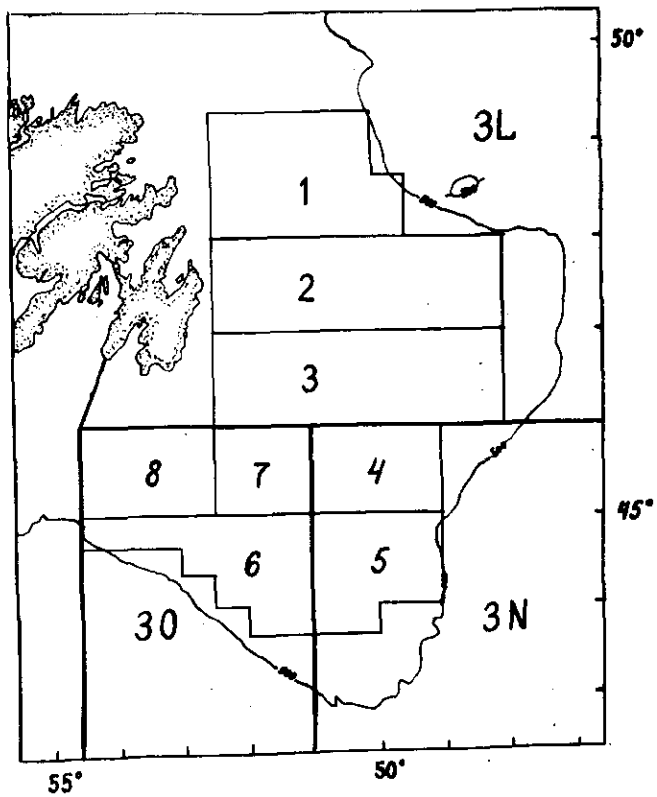

Fig.1. Strata used when estimating the index for O-group capelin strength from 1991 yearclass

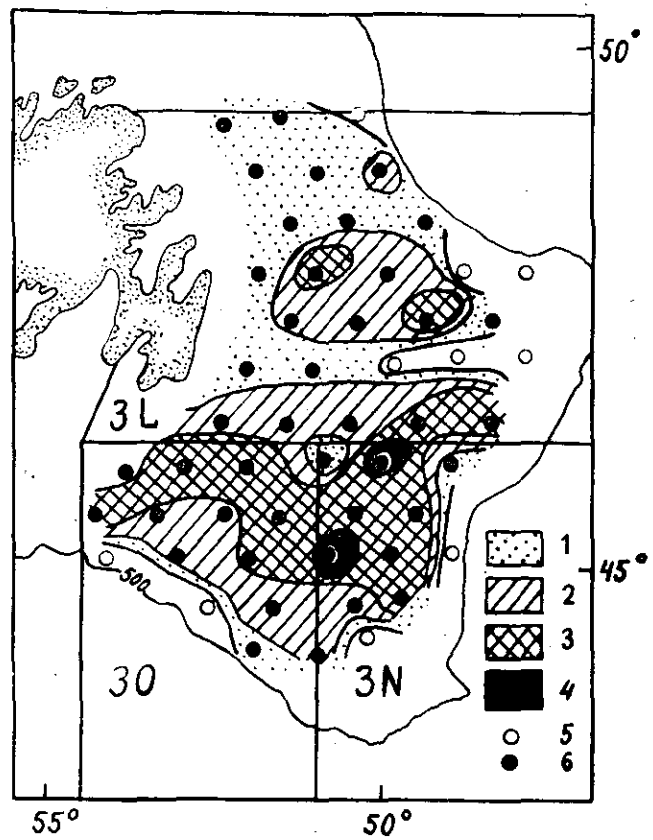

Fig.2. Distribution of O-group capelin by the data from trawl survey in November 1991.
Catch per 1 trawling mile, spec.
1 - 1-100; 2 - 101-1000; 3 - 1001-10000; 4 - > 10000;
5 - trawl stations without catches; 6 - trawl stations with catches.

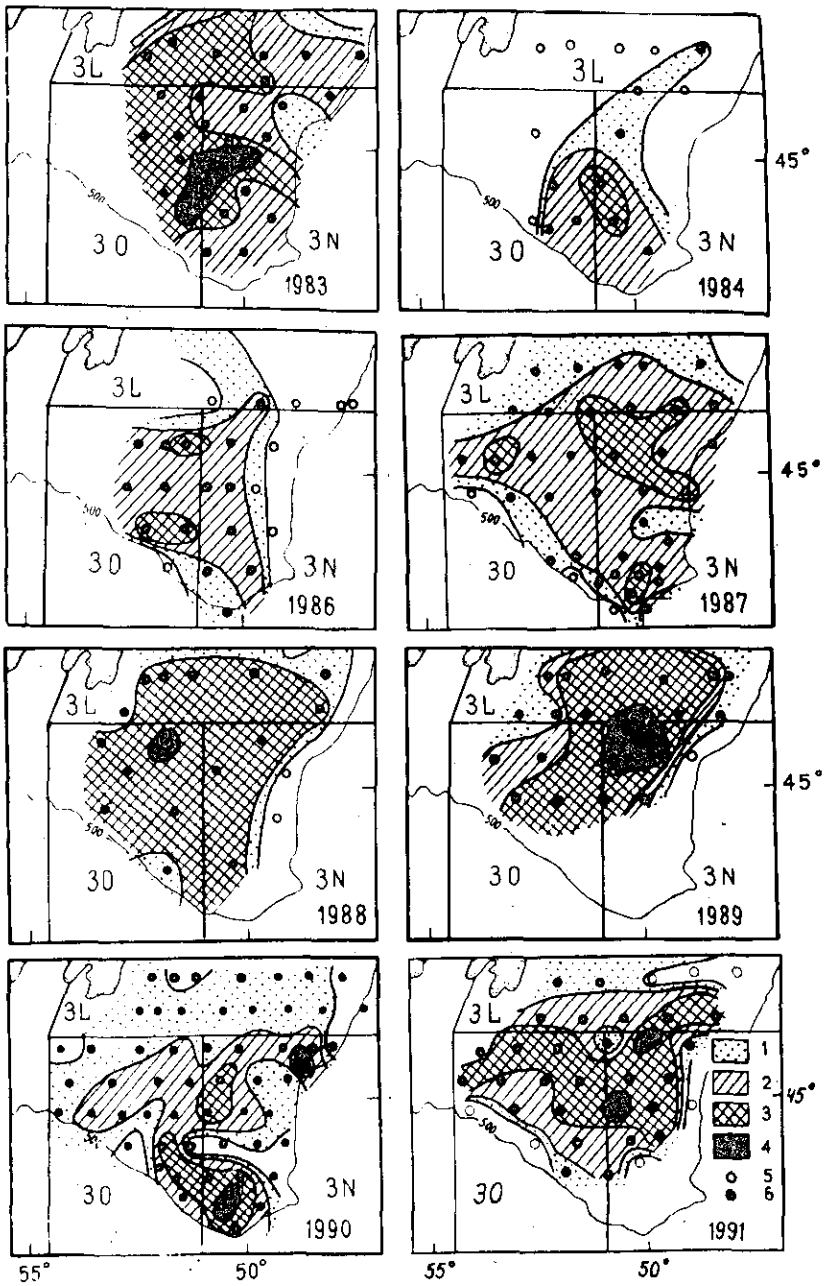

Fig.3. Distribution of 0-group capelin by the data from trawl surveys for 1983-1990.
For symbols see Fig.2.