

International Commission for



the Northwest Atlantic Fisheries

Serial No. 3436
(D.c.5)

ICNAF Res.Doc. 75/8

ANNUAL MEETING - JUNE 1975

Some notes about the influence of the capelin fishery on the food supply of Arcto-Norwegian cod¹

by

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Capelin is now one of the most important food items for cod in the Barents Sea. We know, however, little about how close the stocks are interrelated. This paper is a short discussion on some of the facts that are known about the species. Looking at the distribution patterns we find that in late summer and autumn the capelin are distributed mainly north of 76°N, at least this is the case for the last years. Some I-group capelin is found between the skolpen Bank - Gose Bank and northwards, but the main stock is found in the north (Fig.1B). The cod, at least the young cod, is found south of 76°N (Fig.3).

During winter the whole stock of capelin migrates southwards. The mature part of the stock migrates to the very coast of Finnmark or/and Murman, where they spawn and after spawning most of them die. The immature part of the stock remains in the central parts of the Barents Sea (Fig.1).

At the same time the young cod are distributed in the same area and to some extent following the schools of capelin to the coastal waters (Fig.2), while the spawning stock of cod is on their way to Lofoten.

The data from stomach contents reflect to some extent the differences in distribution pattern. In summertime and autumn we find that the diet is very varied, namely krill, prawns, bottom crustaceans, capelin, small bottom dwelling fish, 0-group fish etc. In winter and spring, however, capelin is one of the main food items (Fig.5 and table 1).

In the last years capelin has been very numerous. However, several subsequent poor year classes may bring the capelin stock down to a low level. It is impossible to forecast what will happen then. In the 30's Zatsepin and Petrova (1939) found that herring was just as important if not more important

¹ Presented to the Sixth Special Commission Meeting, January 1975, Bergen, Norway as Res.Doc. 75/8.

as food item for cod as capelin (Fig.4). The herring vanished, but this did not seem to have had any effect on the cod stock. According to our data (table 1) the cod seems to have compensated the lack of herring by eating more capelin, small redfish and prawns. It lies very near to think that at least the capelin took advantage of some of the surplus food that the herring usually had eaten. However, if the capelin vanishes, we have no guarantee that the surplus food is utilized by organisms that can serve as food items for the cod stock.

The most important capelin fishery is on the spawning grounds in winter. Knowing that the capelin die after spawning, we may conclude that the winter fishery of capelin have little influence on the food supply of cod apart from the recruitment of the capelin stock. It is rather a question of in what extent the cod reduces the spawning stock of capelin. In summer, however, there is a fishery in the feeding area on immature capelin, and this fishery may reduce the amount of capelin as food for the cod. But, as already mentioned, capelin has been very numerous in the last years, and the fisheries do not seem to have had any influence on the food supply for cod til now.

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Table 1. Data on stomach contents of cod collected on some cruises with R/V "G.O. Sars" in the Barents Sea.

Time	Number investigated	% empty stomachs	Number with filled stomachs	Stomach contents in % of filled stomachs												
				Invertebrates					Fish							
				Indet.	Prawn	Euphausiids	Plankton	Benthos	Redfish	Cod	Haddock	Capelin larvae	Capelin	Cottus etc.	Fish indet.	Fish Total
January 1974	724	33,8	479	30	16	4	3	1	33	+	-	-	21	+	-	52
Feb-March 1974	Mainly capelin (pers.comm. with fishermen)															
April-May 1972	1849	62,3	698	9	27	10	3	11	2	+	+	5	24	2	10	39
May 1974	724	63,8	262	6	65	4	1	-	1	+	-	-	22	+	5	29
May-June 1971	822	33,5	547	19	25	15		2	2	+	1	-	35	5	13	53
November 1970	428	34,4	280	22	32	-		2	20	7	1	-	4	6	21	56

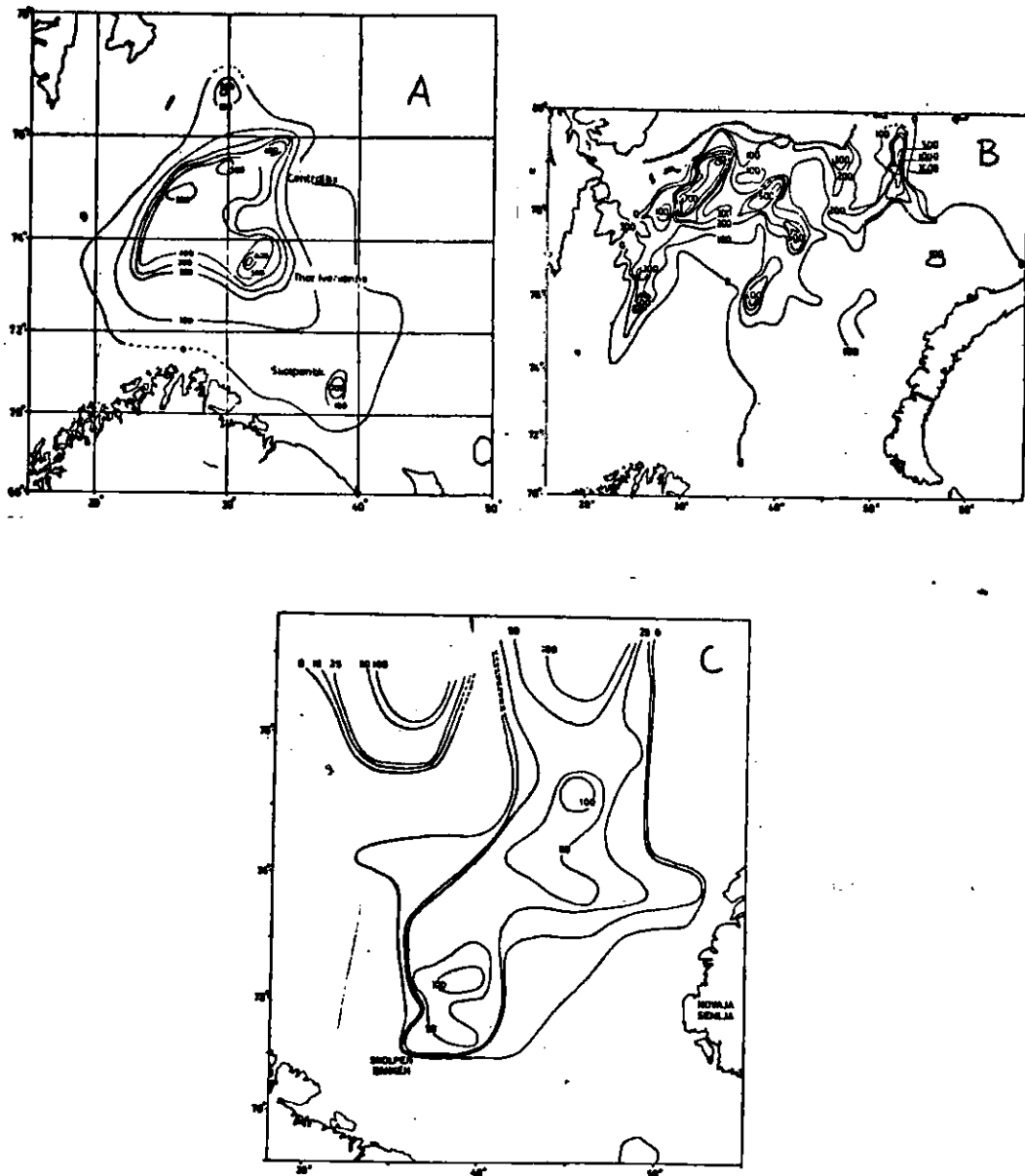


Fig.1. Density distributions of capelin.

A: Echo abundance 18 May - 13 June (Dalen og Dommasnes 1974)

B: Echo abundance 16 September - 8 October 1973 (Dommasnes et al. 1974a)

C: Hectolitre per (nautical mile)² 15 November - 10 December (Dommasnes et al. 1974b).

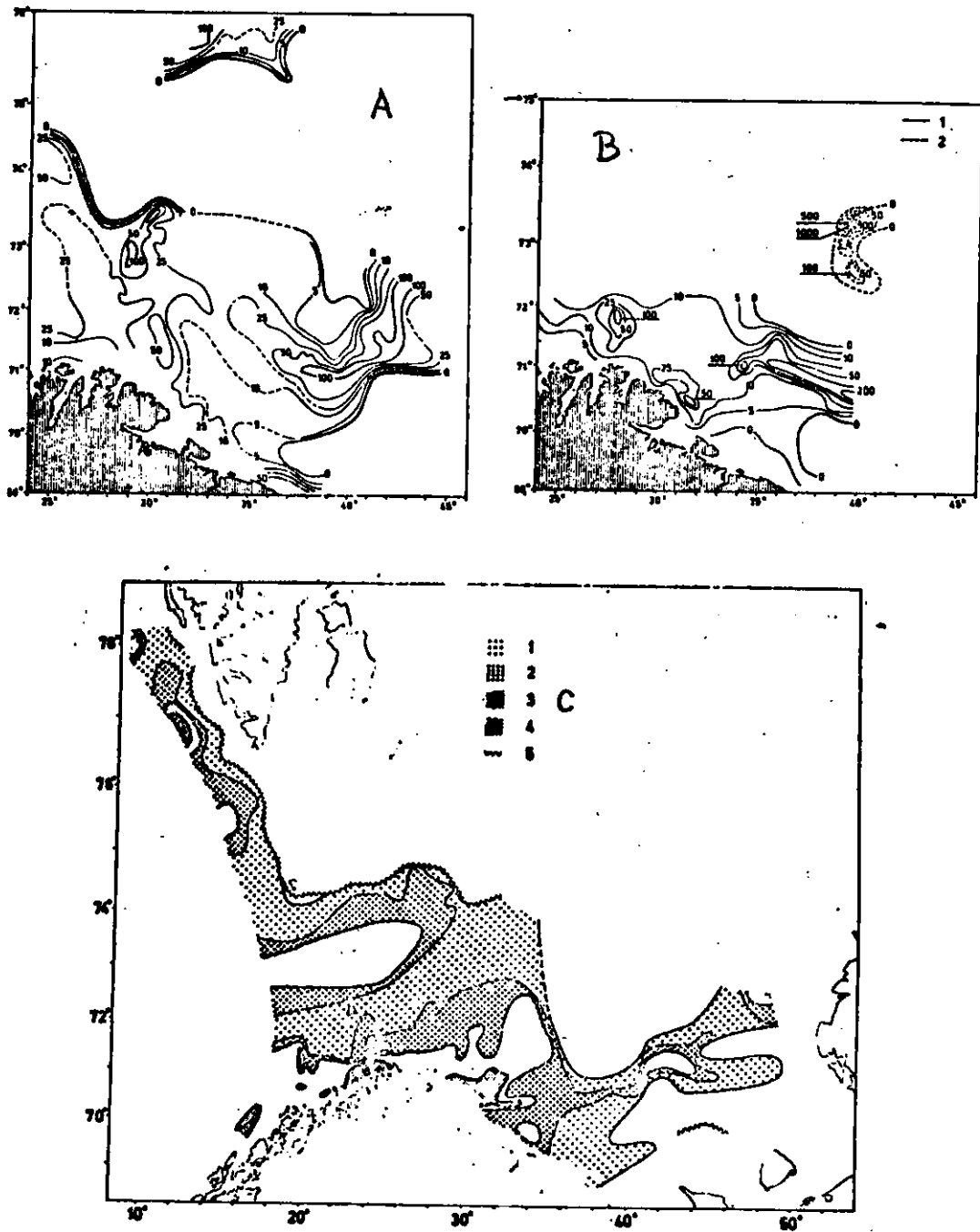


Fig.2. Echo abundance of demersal fish, mainly cod.
A: 10 January - 10 February 1974 (Anon 1974)
B: 20 February - 10 March 1974. 1: Demersal fish 2: polar cod.
(Anon 1974).
C: April - Mai 1972 (Hysten and Smedstad 1972).

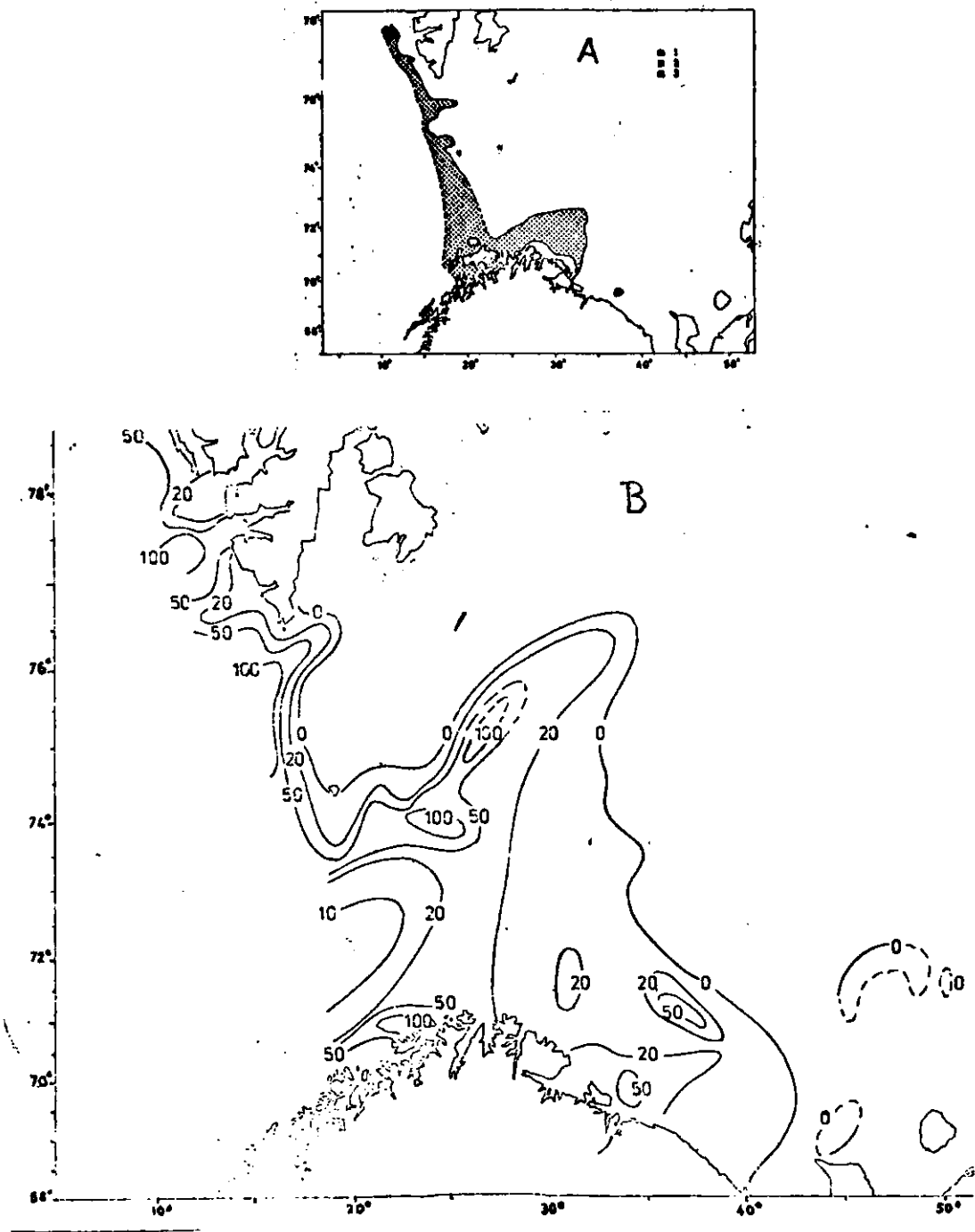


Fig.3. Echo abundance of demersal fish, mainly cod.
A: 1-27 June 1971 (Hyllen et al. 1972)
B: 6-24 August 1973 (Unpublished)

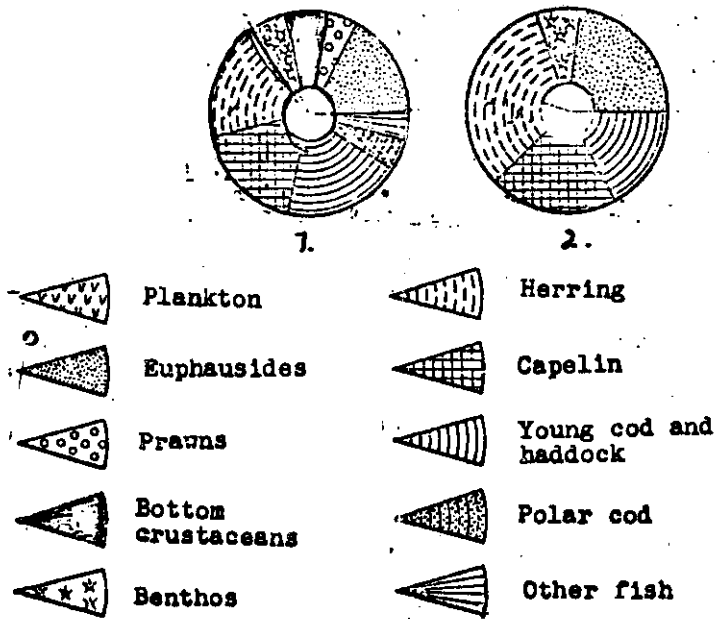


Fig.4. Food composition of cod in the southern Barents Sea. 1. Quantitative weight analysis. 2. Trawler data (Zatsepin and Petrova 1939).

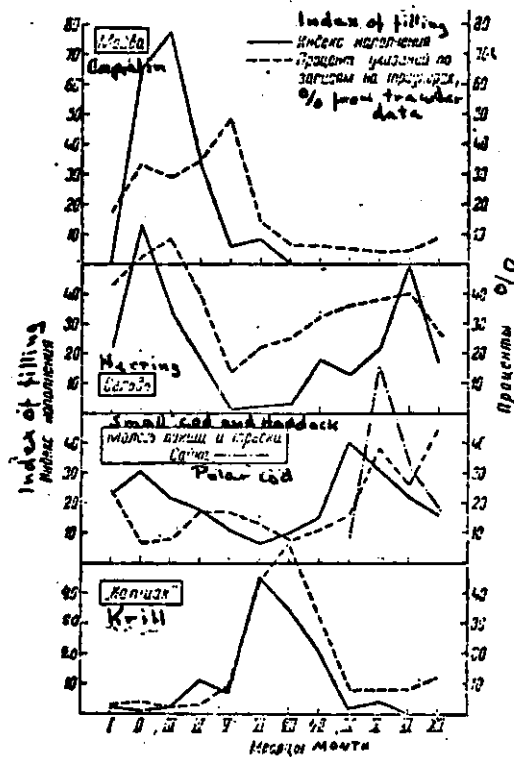


Fig.5. Yearly cycle of feeding with the main food organisms. (Zatsepin and Petrova 1939).