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Preliminary Report
of joint Soviet-Norwegian O-group fish survey in
the Barents Sea and adjacent waters in August-
September 1970.

INTRODUCTION

The present investigation was the sixth in the series of surveys in the Barents Sea and the Svalbard region to study the distribution and abundance of O-group fishes.

The vessels and the scientists taking part were:

USSR:	R/V "Akademik Knipovich"	V.V.Penin, M.L.Zaferman.
	R/V "Fritjof Nansen"	A.S.Seliverstov, R.N.Sarynina, S.M.Kovalyov.
Norway:	R/V "Johan Hjort"	A.Hylen, O.Smestad, R.Sætre, B.Myrseth, G.Nilsen.
	R/V "G.O.Sars"	L.Midttun, O.Dragesund, P.T.Hognestad, J.Blindheim, O.Nakken, N.Radhakrishnan, T.Benjaminson.

Preliminary plan for the survey was made at a meeting in Bergen in May 1970, and the final arrangements for the coordination was made in Murmansk 26-27 August before the survey commenced. The survey was carried out between 27 August and 11 September and was followed by a meeting in Tromsø 11-13 September where exchange of data and analysis of the material took place.

MATERIAL AND METHODS

The distribution and density of the pelagic scattering layers were estimated from the echo sounder paper records, and the organisms forming the scattering layers were identified from samples taken with small meshed pelagic trawls (Dragesund, Midttun and Olsen 1970).

R/V "G.O.Sars" had a Simrad Net Sonde and the other three research vessels had depth recorders attached to the trawls. On board the R/V "G.O.Sars" and "Johan Hjort" Simrad Echo Integrators (QM) worked in conjunction respectively with 38 and 50 kHz Simrad Scientific Sounder in order to estimate more quantitatively the total echo abundance. The results of these investigations will be presented later.

The area surveyed is shown in Fig. 1, where also the ships' tracks, trawl and hydrographic stations are indicated.

RESULTS

Hydrography.

A preliminary analysis of data on water temperature in the Barents Sea observed during the survey (Figs. 2-7) made it possible to compare some hydrographical features to those of the previous years (Dickson, Midttun and Mukhin 1970).

The mean temperature of the 0-200 m layer observed in the Spitsbergen Current west of Bear Island (Fig. 6) was the highest since our surveys started in 1965.

The mean temperature of the 0-200 m layer in the North Cape Current observed in the section North Cape to Bear Island (Fig. 7) was also the highest since before 1965 (Table 1).

Table 1.

Mean temperature in the 0-200 m layer in the North Cape Current.

Year	1965	1966	1967	1968	1969	1970
t°	5,0	5,5	5,6	5,4	6,0	6,5

The mean temperature of the 0-200 m layer in the Murmansk Current (along the 33°30' E meridian) was also characterized by high values, (4,70) (Table 2).

Table 2.

Year	1965	1966	1967	1968	1969	1970
t°	4,4	3,6	4,9	4,4	4,0	4,7

The mean temperature recorded from surface to bottom in the section to the north of Cape Kanin (along 43°15'E) reached the long-term mean value (4,0°). Only the upper layers of water in the Kanin-Kolguev and Novaya Zemlya Currents were found to be warmer than the normal. For instance, the temperature of the surface layer in the Novaya Zemlya Current was 8,8°, whereas during the previous years it ranged from 5,7° to 6,8°.

Thus, it is obvious that during August-September 1970 the western part of the Barents Sea was relatively warmer than the eastern part, and that intensive heat advection had taken place in the Spitsbergen Current and in the northern branch of the North Cape Current.

The distribution and abundance of O-group fish.

The variation in total density of the scattering layers is shown in Fig. 8. As in previous years the recordings include the contribution from fish of older age groups occurring in the layer down to 100 metres. The density figures probably also to some extent include traces from organisms other than fishes, e.g. certain invertebrates species of Medusae, Euphauciacea and Amphipoda which contribute to the uppermost scattering layers. Although, attempts were made to distinguish such recordings from those of O-group fishes by in situ target strength measurements their contribution to the total echo abundance is difficult to estimate since target strength of these scatterers are yet to be determined.

As in previous years the variation in echo abundance has been expressed on a subjective scale from 0-4 (Dragesund, Midttun and Olsen 1970). The results showed that the concentration of scatterers was mainly confined to the central and western part of the Barents Sea between the meridians 18° and 28°E. Concentrations were also recorded near the Novaya Zemlya and off the Spitsbergen coast.

In addition to the O-group fish species discussed below, a few other species were occasionally recorded such as Agonus, Cottidae, Leptagonus, Liparis, Lumpenus etc.

Herring.

O-group herring were not recorded during the entire survey and this is the sixth successive year of very low abundance of O-group herring.

Cod.

The O-group cod were distributed over a wide area in the central Barents Sea, extending from the Norwegian coast north to 77°N and from Bear Island along the western coast of Spitsbergen as far north as 79°N (Fig. 9). The area of distribution was more extensive and the concentrations were considerably denser than in any of the previous years since 1963. Therefore the indication is that the 1970 year-class of cod is very abundant.

Haddock.

Similar to cod, the O-group haddock were also distributed over a wide area in the central Barents Sea, with extensions northwards along the coast of Spitsbergen as far as the northern limit of the survey (Fig. 10). However, the abundance of O-group haddock was probably lower than that of 1969 but second in strength for the years covered by the joint surveys (1965-1970).

Redfish.

The O-group redfish this year were distributed within a smaller area than in 1969. The redfish concentrations were observed in the western part of the Barents Sea with extension northwards along the Spitsbergen coast and may even be distributed beyond the limit of the investigated area, i.e. approximately 80°N. The density was found to be rather high (Fig. 11). The total echo abundance may indicate a fairly strong year-class, though probably less abundant than that of 1969.

Capelin.

In contrast to the four previous years the distribution of O-group capelin was found to be limited to smaller areas along the Finnmark and Murman coast and in the eastern part of the Barents Sea (Fig. 12). The concentrations were rather low indicating a weak 1970 year-class.

Long rough dab.

The O-group long rough dab were mainly distributed within an area from Bear Island northwards along the coast of Spitsbergen. Similar to 1969 this species again showed low values in abundance (Fig. 13).

Polar cod.

The concentrations of this species were found in two separated areas, namely in the eastern part of the Barents Sea and in an area extending from Hope Island to the water west of Spitsbergen as far as the northern limit of the investigation (Fig. 14). The distribution was more or less similar to that of 1969 and the year-class seemed to be abundant.

Other species.

O-group fishes of several other species were observed during the survey. The Greenland halibut (Fig. 15), Anarhichas and Ammodytes were frequently netted. Only a few saithe were taken during the survey (Fig. 15).

CONCLUDING REMARKS

Again a numerous year-class of redfish has been produced, being the fourth successive rich year-class since 1965. In contrast to the four previous years the abundance of capelin was low, indicating that a decrease in the adult capelin stock will occur during 1972-1973.

Concerning cod and haddock the 1970 year-class seems to be abundant. The O-group cod may be of the same magnitude as that of 1963 and considerably more abundant than the 1969 year-class (Hysten and Dragesund 1970). The O-group haddock seems to be somewhat less abundant than the 1969 year-class. On the other hand the abundance of herring and long rough dab was very weak. The rich year-class of Polar cod found

this year together with the rich year-classes of 1966 and 1969 (Anon. 1969, Benko et al.1970) indicate that the stock is on a relatively high level. Length frequencies of the different species are shown in Fig.16.

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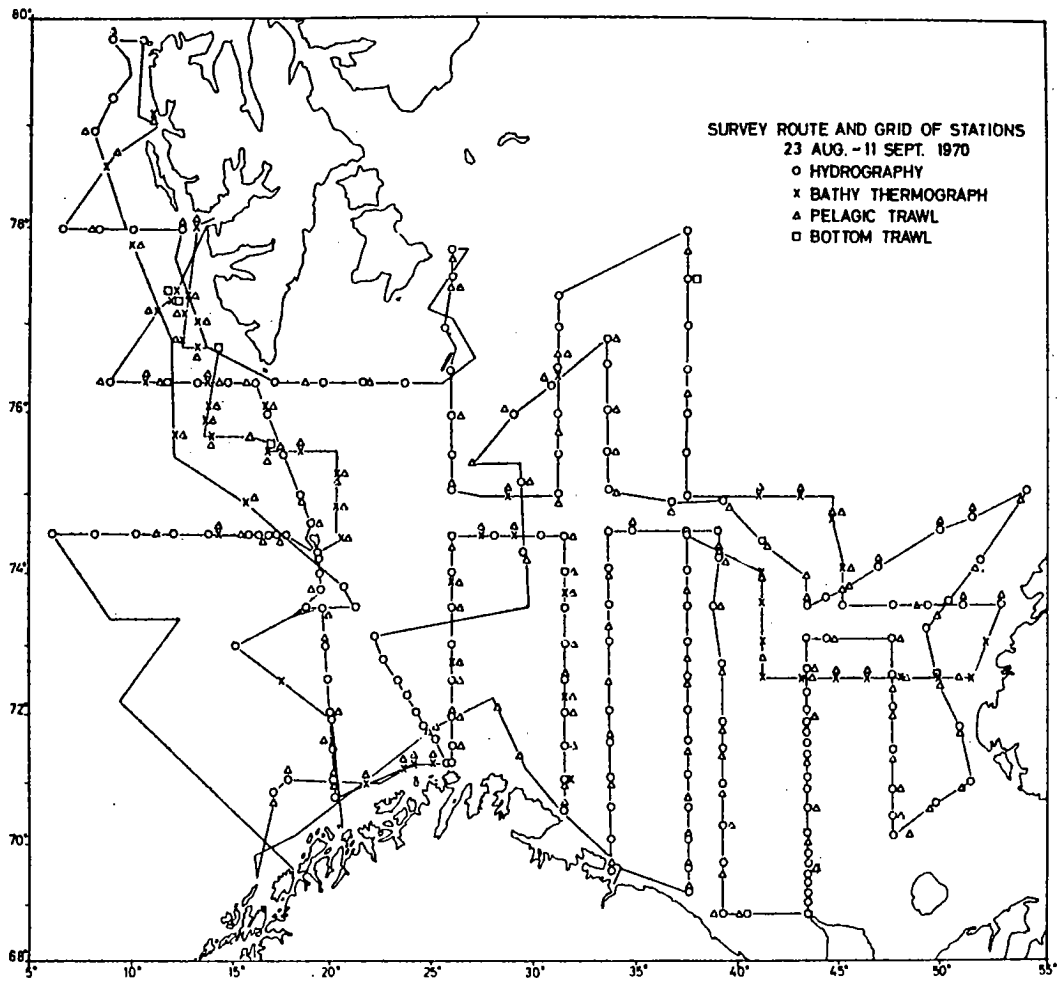


Fig. 1. Survey routes and grid of stations.

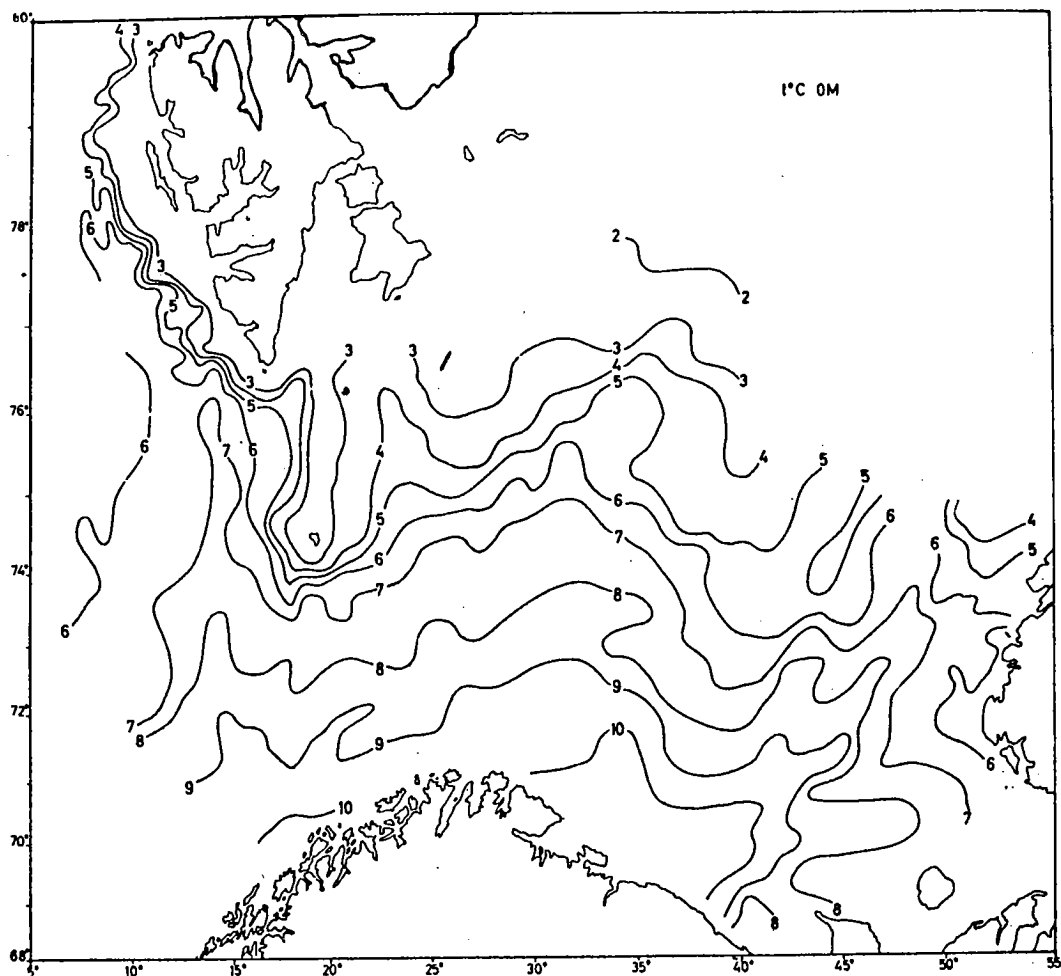


Fig. 2. Isotherms at 0 m.

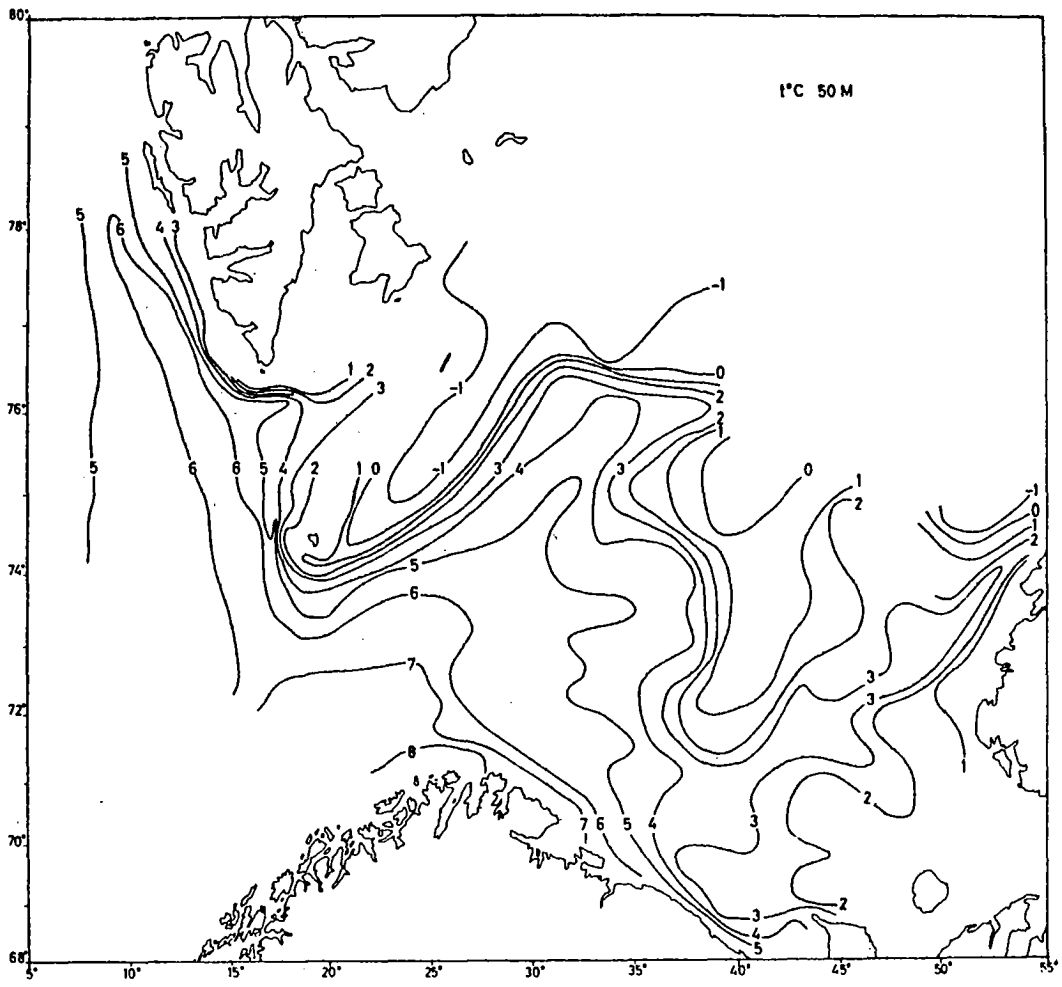


Fig. 3. Isotherms at 50 m.

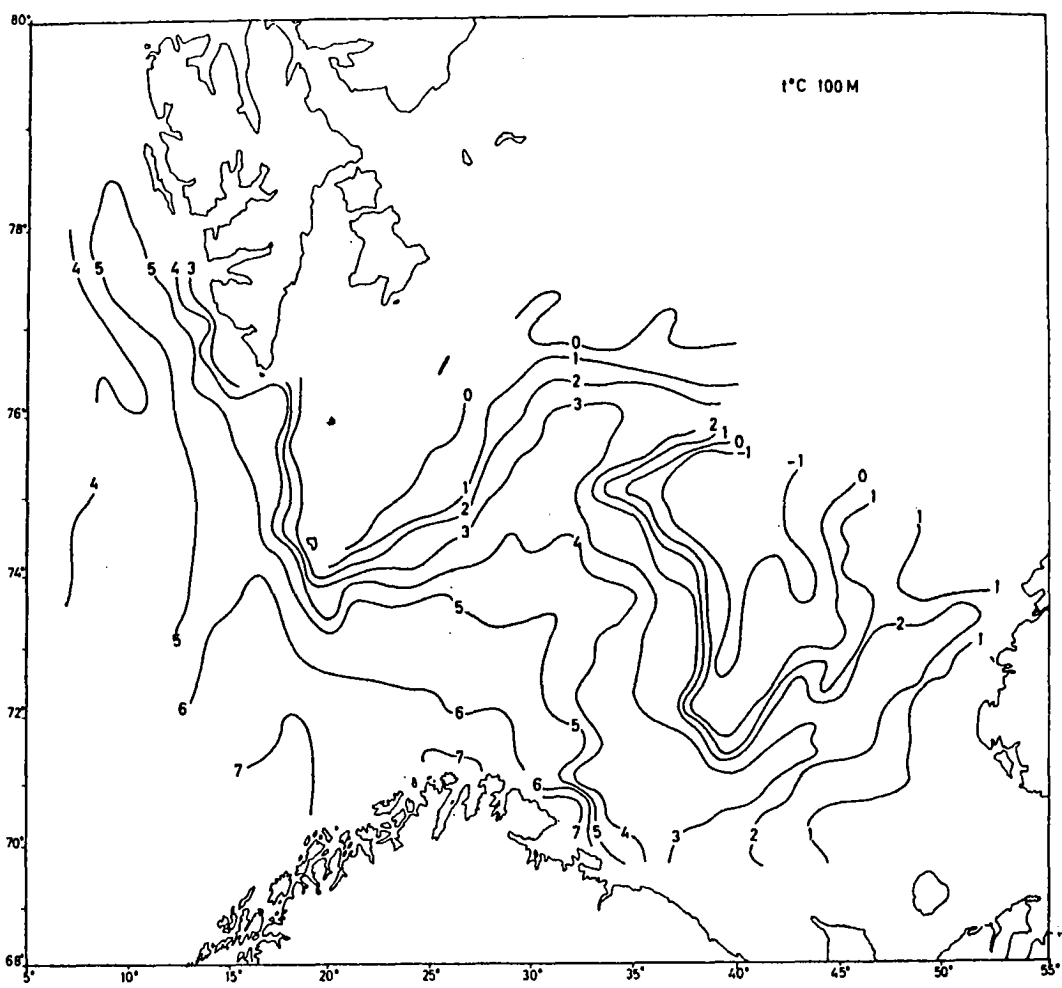


Fig. 4. Isotherms at 100 m.

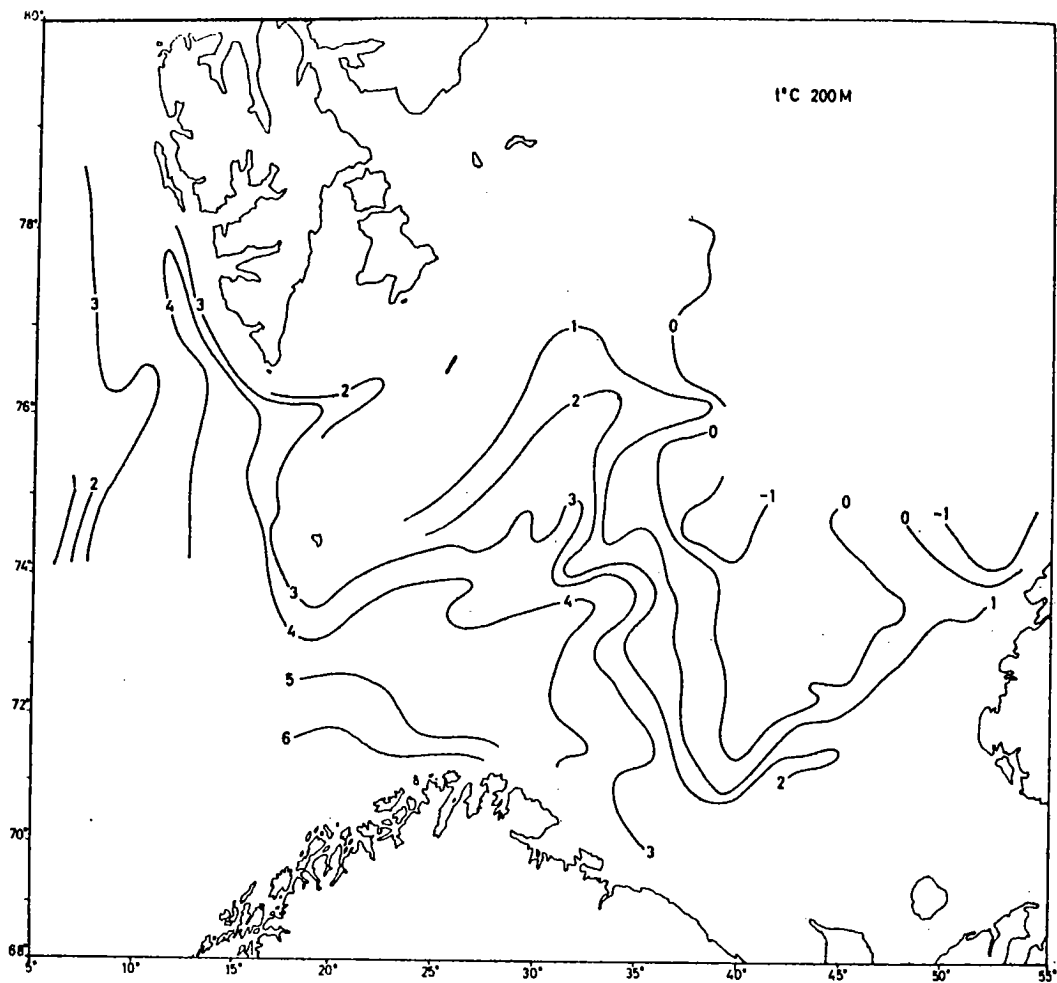


Fig. 5. Isotherms at 200 m.

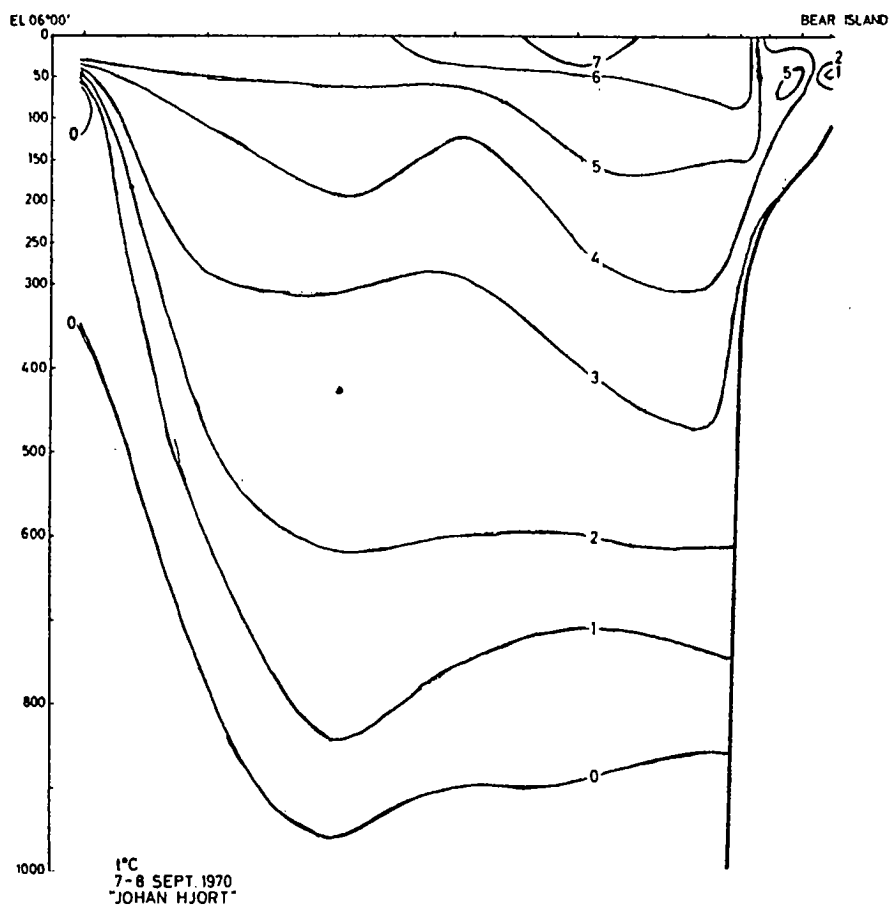


Fig. 6. Temperature section Bear Island - west.

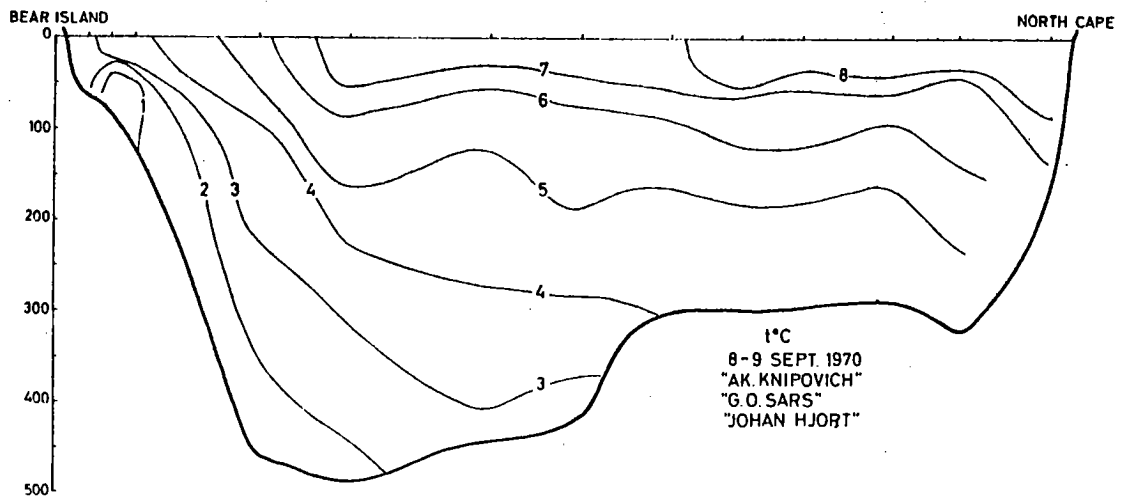


Fig. 7. Temperature section Bear Island - North Cape.

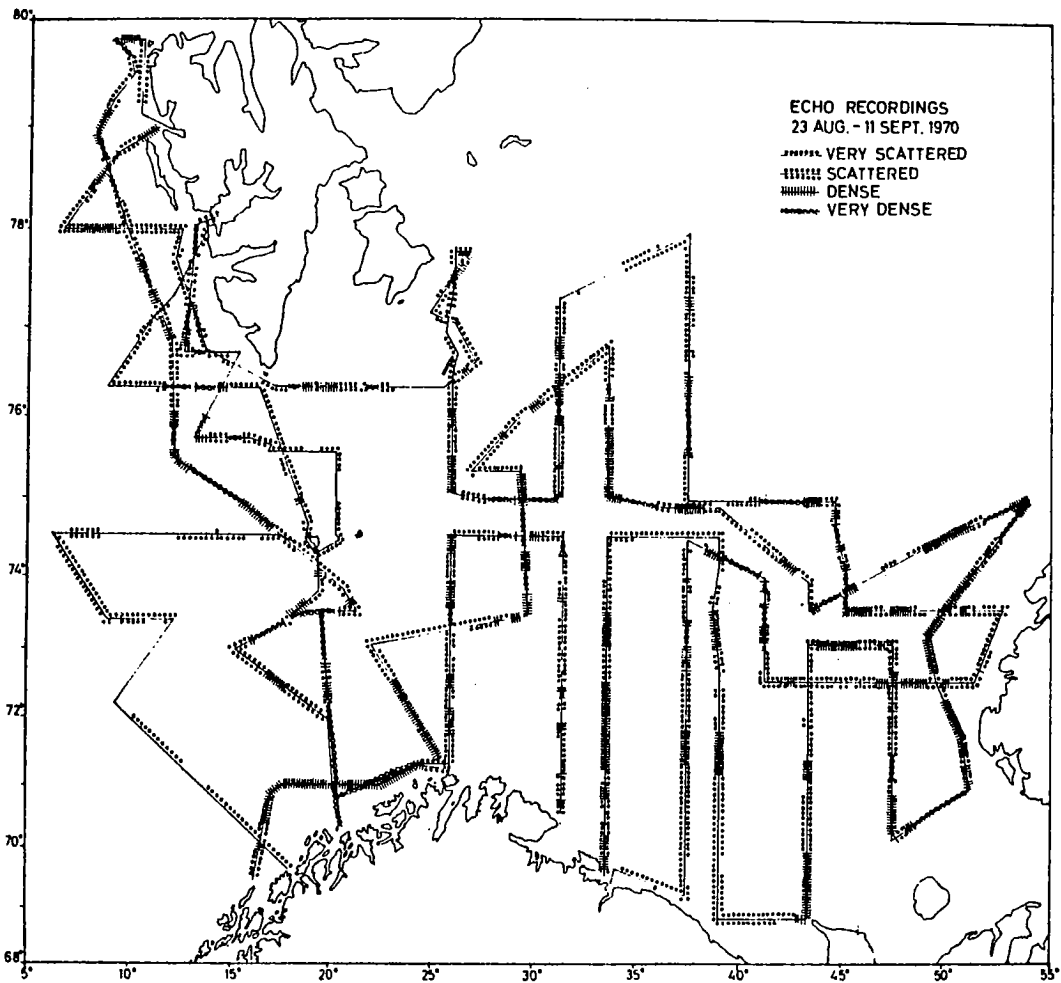


Fig. 8. Courses and echo recordings.

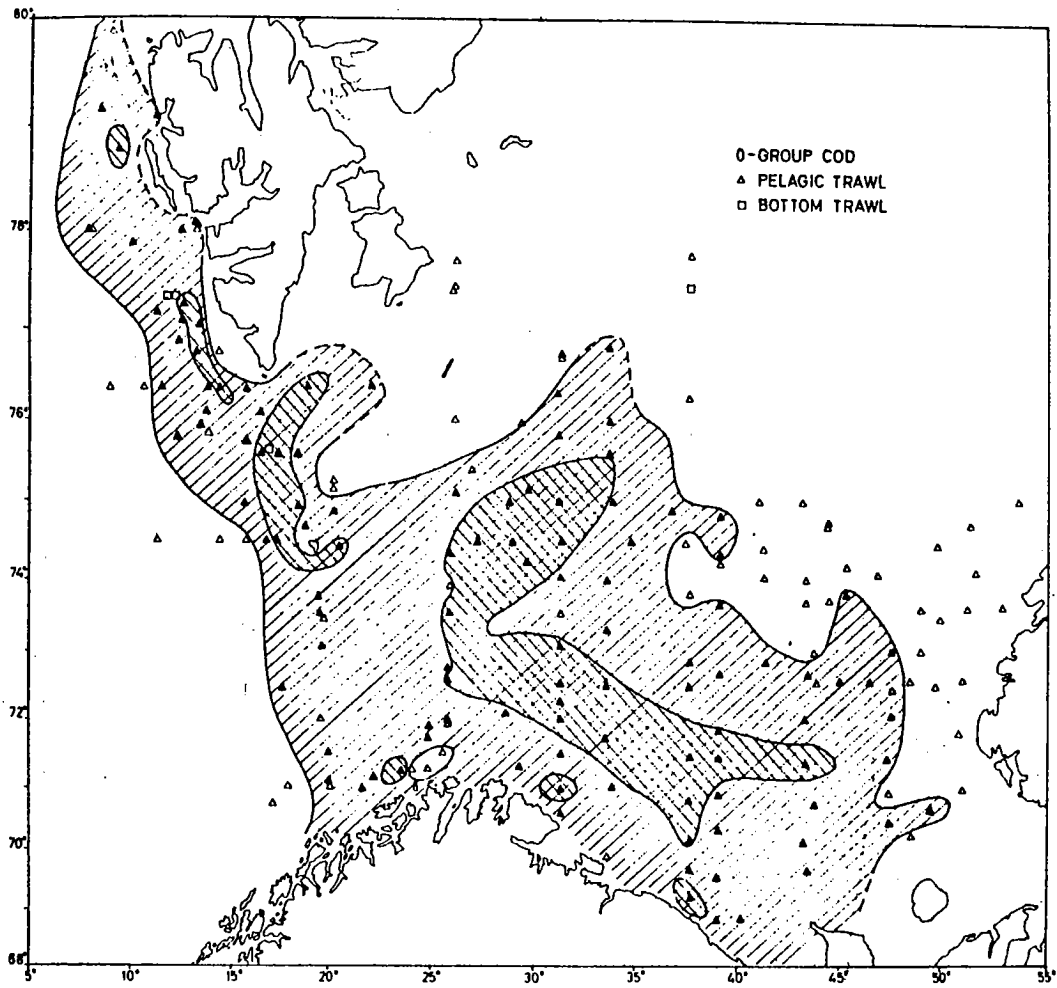


Fig. 9. Distribution of 0-group cod.

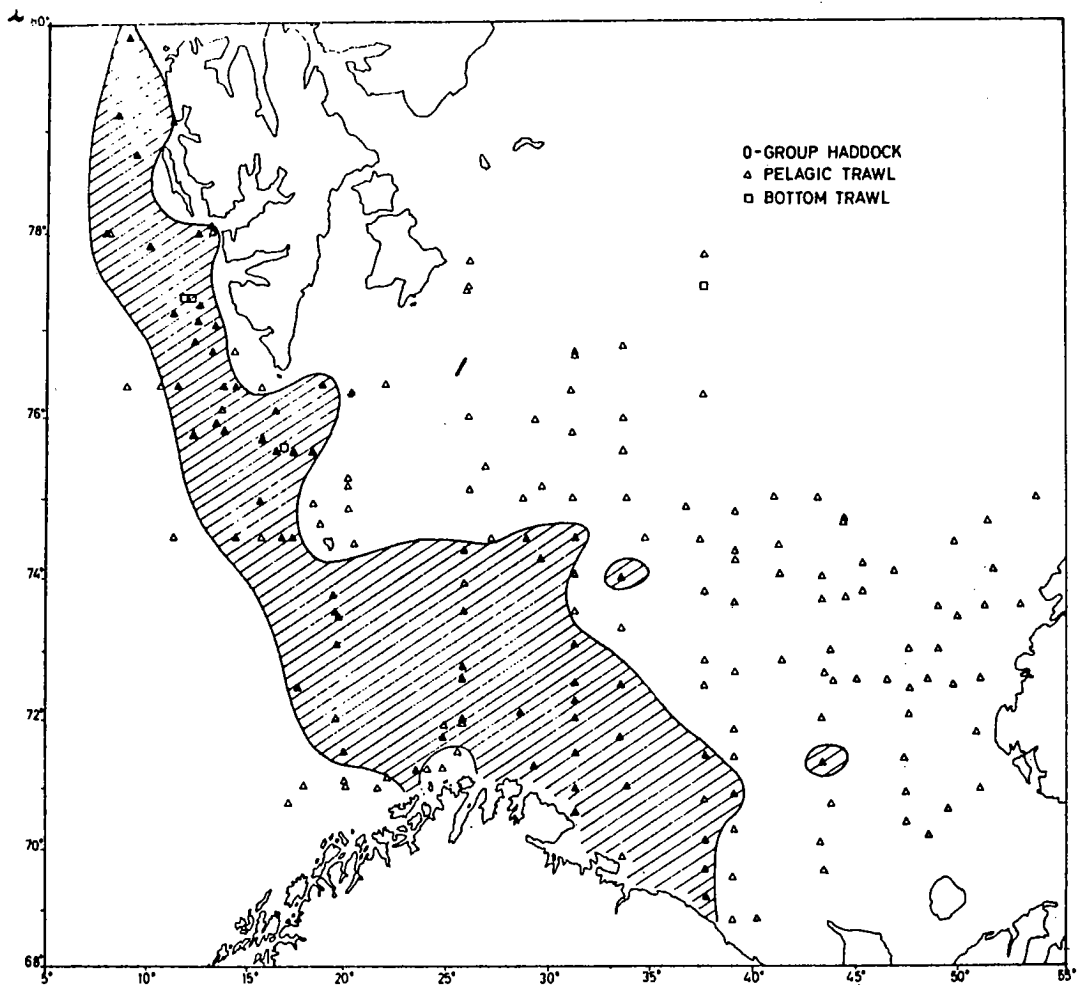


Fig. 10. Distribution of 0-group haddock.

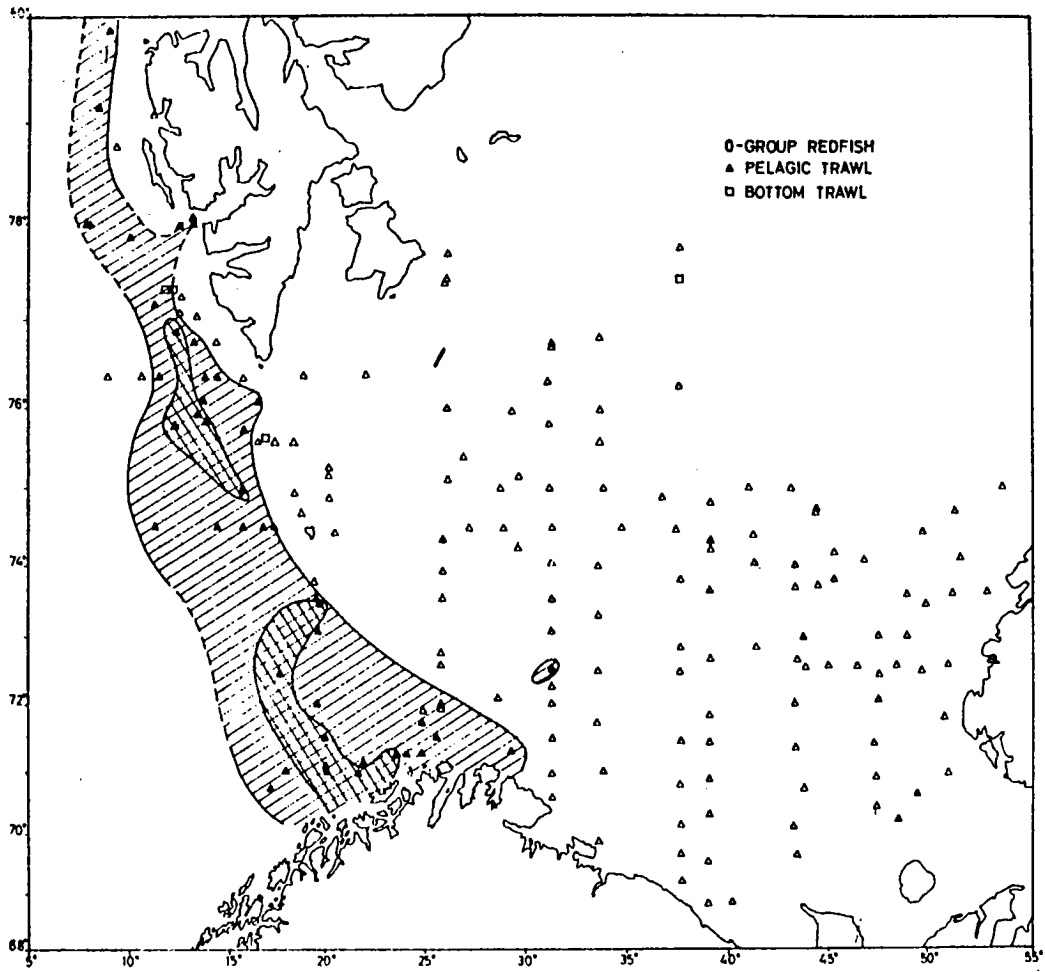


Fig. 11. Distribution of 0-group redfish.

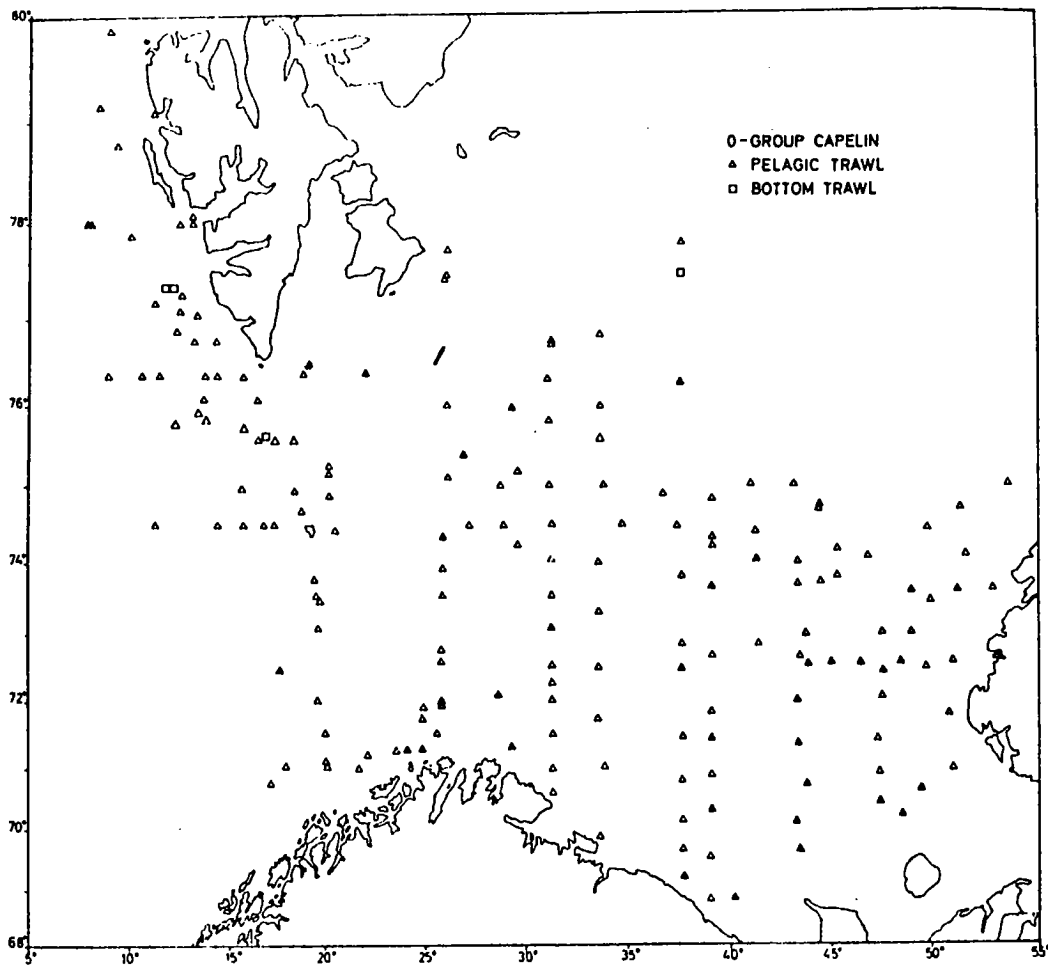


Fig. 12. Distribution of 0-group capelin.

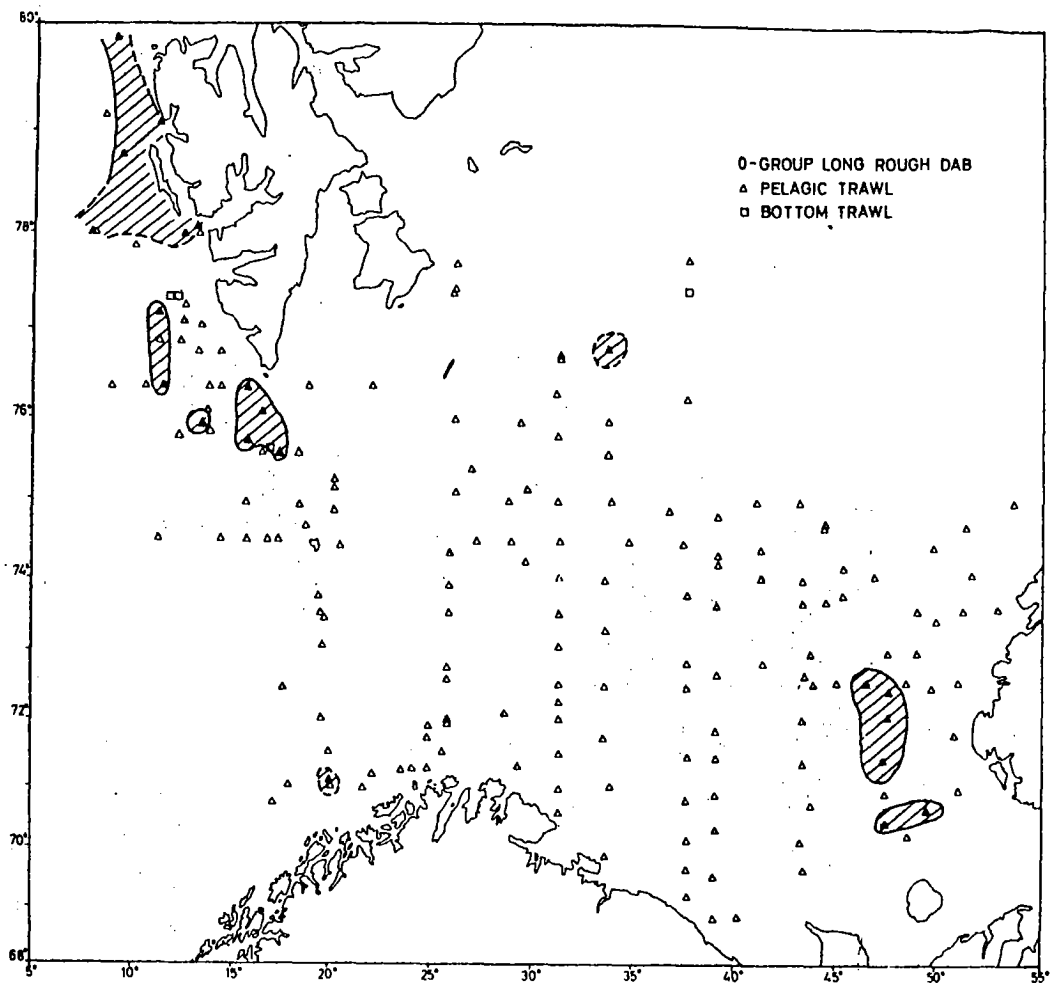


Fig. 13. Distribution of 0-group long rough dab.

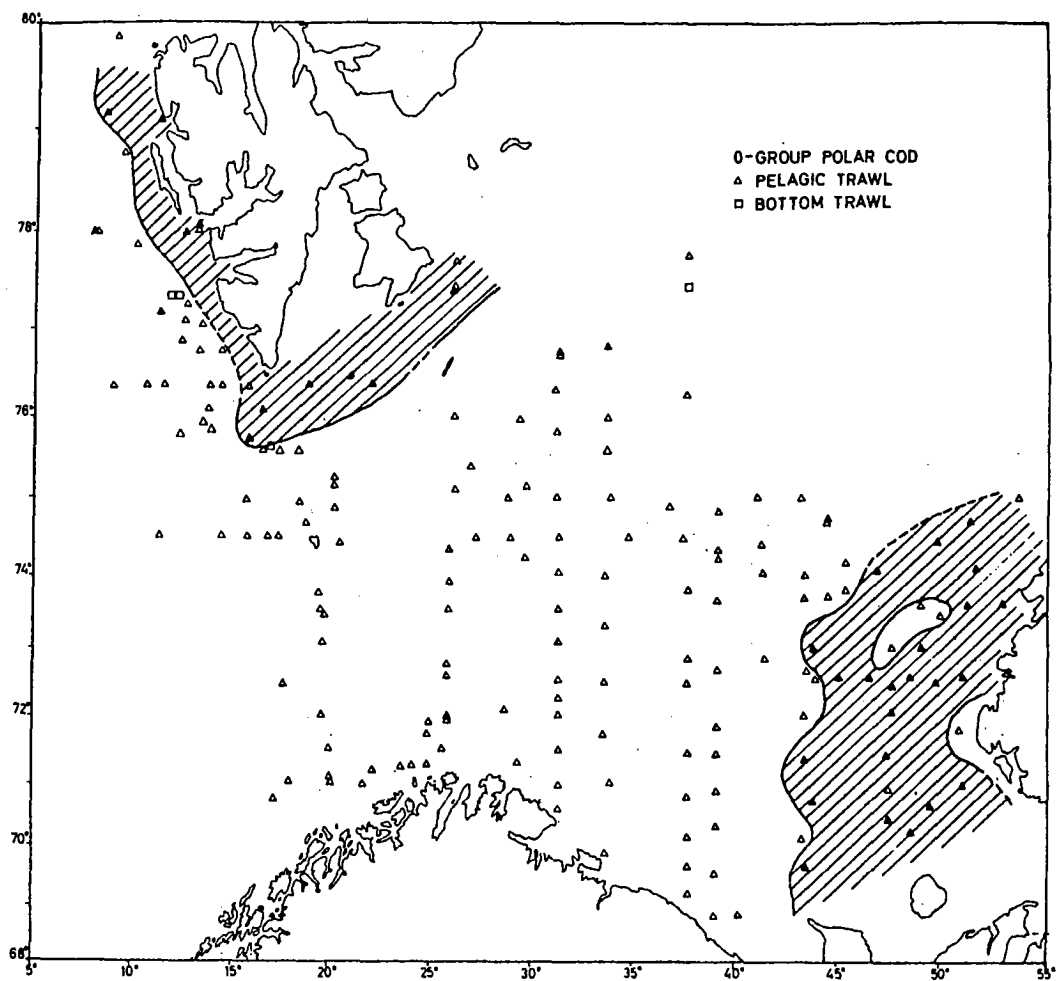


Fig. 14. Distribution of 0-group polar cod.

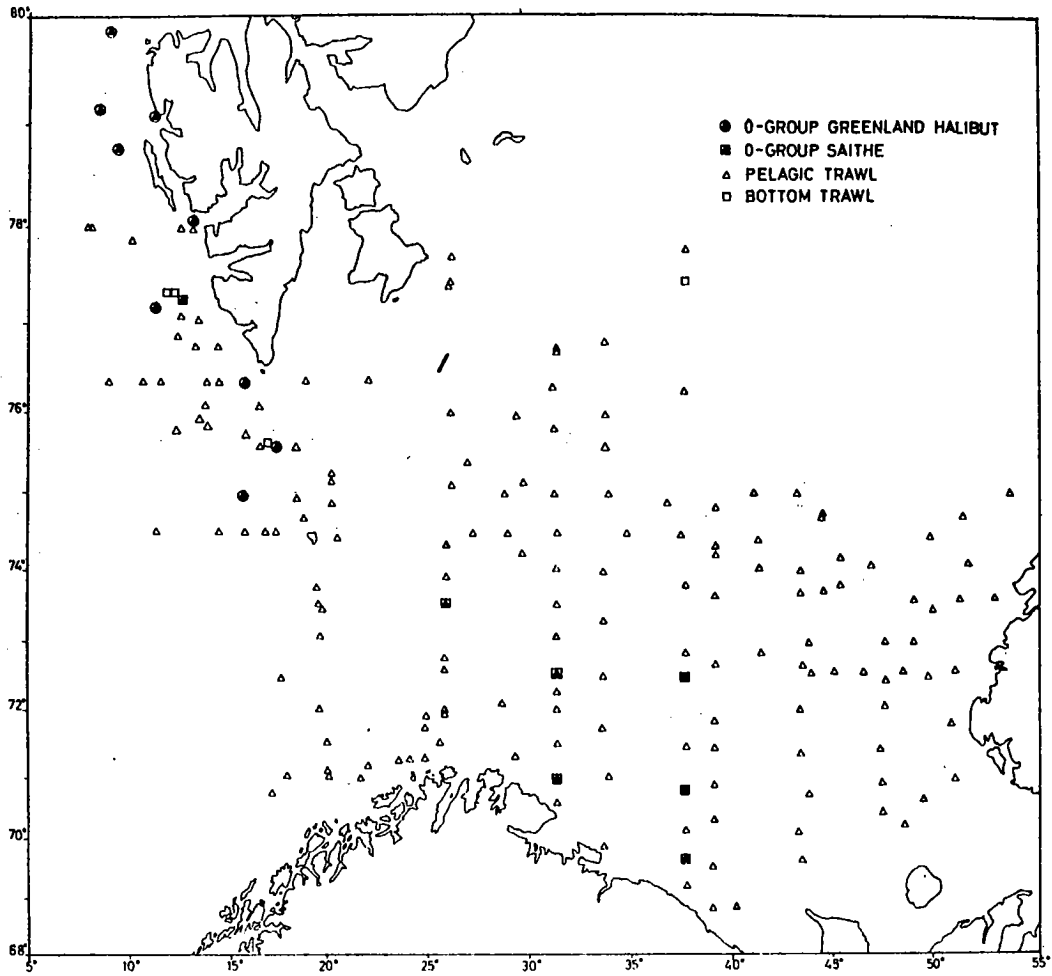


Fig. 15. Distribution of O-group Greenland halibut and saithe.

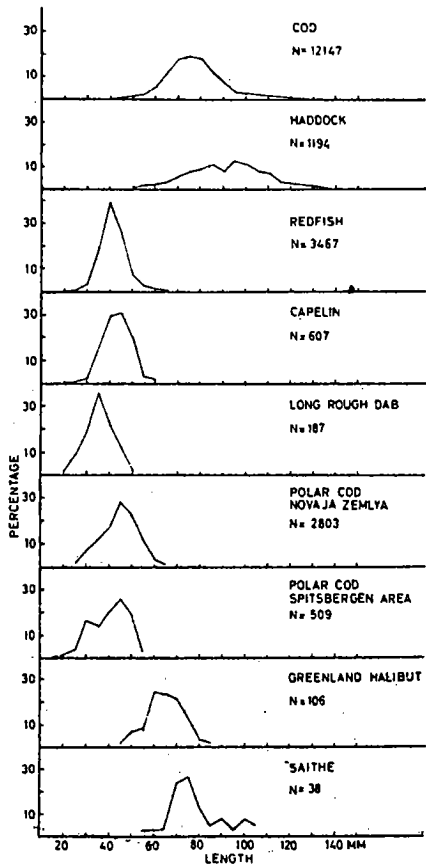


Fig. 16. Length frequencies.