

Observations on Polar cod in the Barents Sea.

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In our endeavour of steadily improving the knowledge of the commercially exploited stocks of fish, we easily overlook or forget the fact that these stocks are themselves only part of an ecosystem, and whether they are to prosper or imperish is to some extent also determined by the state of the other members within the ecological community, and vice versa.

The smaller gadoids, or "the cods poor relations" as Mason (1958) calls them, are in many areas vital links in the ecosystem of their more "wealthy cousins". Thus, in the Barents Sea the Polar cod is a most important food organism for cod and other fish, whales and seals. In spite of this, and the fact that this abundant species itself undoubtedly present a potential interest for the fishing industry, as already pointed out by Klumov (1937) 25 years ago, very little factual information about the Polar cod was published until Ponomarenko's (1961) work last year.

From time to time during the Norwegian routine research vessel cruises to the Barents Sea incidental observations on Polar cod and other non-commercial fish have been made. These scattered observations, mainly based on echo recordings identified by bottom or pelagic trawl catches, fully support Ponomarenko's far more comprehensive material.

In September - October Polar cod have frequently been found on the Novaya Zemlya banks, in the Goose Bank area, the Central Gully, on the Central Bank and farther north, on the Great Bank. Occasional observations have also been made in March and April in the Central Gully and on the Central Bank. In many cases there have been recordings of dense concentrations over wide areas.

The Polar cod is obviously a schooling species which occur both near the bottom and in mid waters. The schools are usually not as sharply defined as those of herring and capelin and often give echo recordings of a cloudy type. Several observations indicate the ability of the schools to undertake rapid vertical movements.

We have no direct observations of adult Polar cod schooling at the surface, but the young fry (0 - and/or I-group (?)) are often distributed above the thermocline. During a cruise in September 1960 Polar cod fry was found in abundance in the surface waters on both sides of the Central Gully from 72° to 77°N. Farther west only few specimens were taken, and this is possibly a general feature as the log books from previous years give no indication of Polar cod fry west of the Central Gully.

The surface temperature in the area of fry distribution in September 1960 ranged from 4° to 7°C, but the larger fish were always found below the thermocline, in temperatures less than 3°C.

Table 1 below gives the records of some samples of Polar cod and Table 2 the mean lengths for various age groups in September 1960. Fry was measured in mm and larger fish to the nearest $\frac{1}{2}$ cm. Otoliths were used for age determinations and they were found fairly easy to read.

It appears that the schools of Polar cod are made up of fish of about the same size or age. This is generally experienced in other semi-pelagic gadoids, such as the coalfish.

The geographical distribution of the samples might perhaps indicate a trend of a more northerly distribution of the younger age groups. Such a trend would be expected, if there were a northward transport of larvae and fry and an active return migration as the fish become larger and more mobile.

The Polar cod is apparently not a fish of great longevity. The growth is probably 6 - 7 cm during the first year of life and in the range of 3 to 3.5 cm a year from age 2 and older.

References:

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1961. Gadoid Fish Committee. Document No. 78.

Table 1. Records of Polar cod samples.

Date	1/10-57	8/9-60	8/9-60	8/9-60	9/9-60	9/9-60	9/9-60	10/9-60	12/9-60	21/9-60
Pos.	76°56'N 35°00'E	72°00'N 50°10'E	72°00'N 50°10'E	72°30'N 50°00'E	73°52'N 50°36'E	73°50'N 50°30'E	73°50'N 50°30'E	76°03'N 55°30'E	74°09'N 43°10'E	75°38'N 24°25'E
Gear ¹⁾	B.tr.	B.tr.	IKMWT	IKMWT	B.tr.	Pel. tr.	Pel. tr.	IKMWT	Pel. tr.	IKMWT
Depth		125m	25-30m	25-30m	120m	25-30m	50-60m	15m	50-60m	20-25m
L _{min}	9.5cm	18.0cm	31mm	35mm	16.0cm	48mm	14.5cm	48mm	12.5cm	30mm
L	11.4cm	20.41cm	38mm	44mm	19.15cm	60mm	18.72cm	57mm	16.14cm	34mm
L _{max}	18.0cm	25.0cm	50mm	57mm	23.5cm	70mm	22.5cm	65mm	20.5cm	39mm
Percentage Age distribution			100	100		100		100		100
							1.8		9.0	
		4.4			20.9		31.2		71.0	
		92.7			79.1		66.1		20.0	
		2.9					0.9			

1) B.tr. - Bottom trawl

IKMWT - Isaac-Kidd midwater trawl

Pel. tr. - Pelagic trawl.

Table 2. Mean lengths of Polar cod
in September 1960.

Age group	Mean length in cm
0	4.7
I	-
II	13.8
III	16.6
IV	19.9
V	23.4