

International Commission for



the Northwest Atlantic Fisheries

Serial No. 5056
(D.c. 9)

ICNAF Res. Doc. 77/VI/31

ANNUAL MEETING - JUNE 1977

The Soviet Cod Investigations in the West Greenland Area

by

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INTRODUCTION

In the paper, submitted to the ICNAF 25 Annual Meeting, generalizing the results of the Soviet investigations for 1958-1974 on size-age structure of the West Greenland cod stock there is cited that inspite of a fairly limited fishing, the Soviet Union taking into account the perspective of the West Greenland area continuously, from year to year, undertakes the observations in this area on boards both the research and scouting vessels.

In the fifties-sixties the main attention had been paid to the studying of qualitative and quantitative compositions of the commercial concentrations of cod and redfish, conditions and features of their seasonal distribution, feeding, maturity and reproduction.

Since late sixties alongside with cod and redfish there started to study such fishing objects as long rough dab, Greenland halibut, grenadier and shrimp, the yield of which has been considerably increased for the subsequent years.

As it is known, since late sixties in the area off the West Greenland coast the cooling of the waters is registered

particularly, north of 64°N, that is confirmed by severe ice conditions in the area, and also by stock decrease of the boreal fishes: cod and redfish and abundance increase of the Arcto-boreal species: Atlantic wolffish, long rough dab, Greenland halibut and grenadier.

Similar phenomena are quite typical for the Davis Strait, the area with fairly changeable hydrometeorological factors, that was repeatedly mentioned in the papers by Danish researchers Hansen, Hermann, Jensen.

The history of the fishing and investigations carried out by the Soviet Union in this area is relatively short, nevertheless we were able to follow quite obvious change in the ichthyofauna composition in the Banan-Lille-Hellefiske Banks area (64°-65°30'N). This area is the most favourable for mass inhabitation of fish because of the optimum feeding conditions.

In late fifties-early sixties in this area together with cod, "golden redfish" not in small numbers and of rather large sizes inhabited. The concentrations of golden redfish were more stable than those of cod and this bank can be by right considered as the "Percidae" bank. On the space of the years the abundance of redfish in this area considerably decreased and in the second half of the sixties the next mass fishing object after cod became Atlantic wolffish. In the seventies the long rough dab, widely distributed in the depths from 50 to 550 m in the area between 64°30' and 65°30'N, became to be the most numerous and stable fishing object for the Soviet vessels. While scouting the fishing objects the Soviet vessels operating in the deepwater areas of the shelf between 63° and 66°N, located the concentrations of Greenland halibut and grenadier; in the last years a main attention was paid to the studying of these species.

THE RESULTS OF THE COD INVESTIGATIONS

A total cod stock in the area off the West Greenland coast as it is known depends upon the strength of the real West Greenland cod stock, extended predominantly north of 64°N, small coastal local stocks, and, mainly, upon the quantity of cod, migrating into this area for feeding from the Icelandic coast.

As our investigations showed, size-age sets of the commercial cod concentrations of the West Greenland stock were sufficiently shorter and monotonous, than those of cod of Icelandic origin and they matured much earlier than the Icelandic ones.

During the last years, when the total yield of cod was considerably reduced and their mass extension off the West Greenland coast was not observed, a set of size-age groups in the catches was very small (5-6 groups), and 4-6 year olds usually constituted their bulk (Table 1).

In the period of observations in 1975 the commercial concentrations of cod were registered by us in March-April on the south-western slopes of the Banan Bank in the depths from 150 to 300 m and deeper. Hour trawlings on these concentrations gave the catches of 6 - 10-12 tons of cod.

The cod kept by dense stable concentrations in the near bottom water layers on the warmed slopes of the Banan Bank in the areas of food aggregations: in March - on concentrations of lanternfishes, young redfish and shrimp; in April - on concentrations of krill, sand eel, shrimp and the young of redfish and long rough dab. The cod rather actively fed with these food objects, having the fatness at that time from 3.7 to 7 % (on the average 5.6 %). Cod sizes in the catches varied from 30 to 83 cm, and 80 % of these constituted the cod of 42-62 cm long (average length 52.78 cm). Mainly, the cod were immature, only 12-16 % of all the specimens analysed had mature gonads.

While using the size-age keys, we re-calculated all the measured material on age and obtained the following results:

Age	:	3	:	4	:	5	:	6	:	7	:	8	:	9	:	10	:	11	:
Quantity																			
(%)		0.7		32.0		52.0		5.5		6.4		0.7		1.1		0.7		0.9	
																			1078 spec.

As the data show, 84 % of these fairly great catches consisted of the 4-5 year olds of cod; and only 5-6.5 % - of 6-7 year olds; the rest age groups had 1 % or less.

In late 1975 while investigating the Banan Bank area the similar dense cod concentrations were not observed. Nevertheless, those small catches, which were caught in winter consisted of fish of the same age groups; only a percentage of the 6-7 year olds somewhat increased. The most part of fish, even among the 5 year olds were matured; they fed poorly.

As in spring, the cod concentrations were observed on the western slopes of the Banan and Fyllas Banks; there was no cod in the shallow part of banks.

SUMMARY

1. The studying of the West Greenland shelf, that in the last decade the abundance of cod and redfish sharply reduced in this area; the number of long rough dab, Atlantic wolffish and Greenland halibut increased both by density of concentrations and area of distribution.

2. Since 1965 alongside with a set of poor cod year classes the cooling of the waters and reduction of reeding areas off the West Greenland coast did not favour the fattening of the Icelandic cod, that effected the results of fishing.

3. During the last years the cod of the West Greenland stock predominantly distributed over the warmed western slopes of the Central and Southern banks, in the areas of concentrations of pelagic food - lanternfishes, juvenile and shrimp.

4. Great concentrations of cod observed in 1975 on the western slopes of the Banan Bank show that apparently the beginning of the seventies was favourable for occurrence of relatively abundant year classes of cod (1970-1971) of the West Greenland stock.

5. Growth rate of cod of these two year classes was average (in the first half of 1975 the average length of the 4 year olds was 47.7 cm; of the 5 year olds - 58.2 cm); the maturity was early (by the end of the year the main mass of the 5 year olds had developing gonads).

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Table 1

Age composition of the West Greenland cod (in %)
and their average length (in cm) in 1959-1975

Age	1959-1962	1963-1966	1967-1970	1972-1975
I	0,4	-	-	-
2	0,1	0,7	-	+
3	2,9	8,5	1,8	0,8
4	27,4	40,0	13,3	1,7
5	19,2	27,0	27,5	44,1
6	18,4	17,3	27,2	21,2
7	13,0	6,8	17,6	8,6
8	6,2	2,6	7,9	3,8
9	5,8	1,3	3,2	1,6
10	1,9	0,8	0,7	1,1
11	1,5	0,5	0,2	0,7
12	1,4	0,2	0,3	0,2
13	0,5	0,2	0,1	0,1
14	0,5	0,1	0,1	+
15	0,4	0,1	-	+
16	0,1	0,8	-	-
17	-	0,1	-	-
18	0,1	+	-	-
19	0,1	+	-	-
20	+	-	-	-
21	-	-	-	-
Average age	6,0	5,0	5,9	5,5
Average length, cm	63,1	58,7	61,4	61,6
Number of measurements, specimens	92873	303159	92489	39013
Number of age determinations, specimens	10193	15832	7816	3152