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Recent development of the fisheries for Greenland halibut
(Reinhardtius hippoglossoides, Walbaum) in northeast Atlantic waters.

by

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INTRODUCTION

Available resources of Greenland halibut have been rather heavily exploited for the last decade in the northeast Atlantic waters. The fishing fleet engaged in the fisheries consists to a large extent of big, modern vessels well equipped for catching the species preferably by bottom trawl or bottom long lines.

This paper aims at describing the development of the fisheries in general, and the present conditions apparently prevailing in the Norwegian Sea and the Spitsbergen-Bear Island area in particular.

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INTERNATIONAL FISHERIES

In the northeast Atlantic waters (ICES area) resources of Greenland halibut are being commercially exploited mainly in the Barents Sea, in the Norwegian Sea, in the Spitsbergen-Bear Island area and in Icelandic waters. Minor quantities are also caught around the Faroes and off the east coast of Greenland (table 1).

Vessels from several countries participate in the fisheries (table 2). Down to 1968 USSR, Norway and Germany were represented only, but in 1969 Poland, Iceland and the Faroes also started exploitation.

International data on separate landings of Greenland halibut by countries are not easily obtained in the ICES area, and the method chosen to cope with the problem in this paper has been to refer to the figures given in Bull. Stat. 1962-1970 under the category "Various Pleuronectiforms", as recorded in table 1, 2 and 3. These figures include, but truly overestimate, the actual landings of Greenland halibut, though probably a very large share will consist of this species alone.

The total annual yield has increased from approx. 14 500 tons in 1962 to approx. 94 000 tons in 1970 (table 1 and 2). Table 1 further shows that on the whole this is mainly due to increased landings from the Spitsbergen-Bear Island area, from Icelandic waters and to some extent also from the Norwegian Sea and the Barents Sea. It is observed, however, that maximum yield was obtained in 1967 in the Norwegian Sea and in Icelandic waters respectively .

Table 2 reveals that during the period 1962-1970 Norway and USSR on an average landed the bulk of the catches. The Norwegian annual quantities varied comparatively little during the period while those of USSR increased remarkably in 1967 and were kept at high levels later on. In 1970 the yield of Poland showed a sharp rise compared to the previous year.

The sudden increase of the annual landings of USSR in 1967 corresponds mainly to very high catches in Icelandic waters and substantial catches also in 1968 (Chumakov 1969) and during the subsequent years. In 1969 to some extent vessels from Iceland and the Faroes also started to exploit the same area.

From the Spitsbergen - Bear Island area both Norway and USSR landed rather moderate quantities up to 1967 and 1968, but in 1969 the yield of USSR increased exceedingly. This year Polish vessels also commended fishing in the same area. Of the substantial quantity caught in 1970 (table 1) USSR fished approx. 34 000 tons, Poland approx. 13 000 tons and Norway the remaining 7 800 tons.

International fishing for Greenland halibut in the ICES area is carried out by different vessels and gears. USSR, Poland and Germany mainly employ big trawlers, while from Norway, Iceland and the Faroes vessels mainly use bottom long lines.

NORWEGIAN FISHERIES

Greenland halibut originally occurred mainly as by-catch from the deeper coastal waters off northern Norway. After the last World War a particular fishery with bottom long lines gradually developed. The annual landings were rather low until abundant resources were discovered at great depths along the continental shelf from Norway towards Bear Island about 1960. During the following decade the total annual yield increased considerably, and fishing was also extended to the Spitsbergen area.

In the period 1962-1970 the Norwegian annual landings varied from 11 600 to 22 500 tons (table 2 and 3). Table 3 further indicates that the main areas of exploitation were the Norwegian Sea and the Spitsbergen - Bear Island area. Since 1965 the landings from the former area have gradually decreased, but increased landings from the latter have to some extent compensated for this, thus leaving the annual figures on reasonable levels during the remaining part of the period. The bulk of the catches were landed by bottom long lines and minor quantities by trawlers only. Greenland halibut from the Barents Sea were mainly taken as by-catches in either trawl or on long lines. The small quantities landed from Icelandic waters were caught by a few bottom long liners initiating fishing in this area.

According to Norwegian commercial fishery statistics the total annual landings of Greenland halibut decreased considerably in 1971, amounting to 9 300 tons only as against 12 800 tons in 1970. The prospects for 1972 are not bright either, as the total landings probably will go down even more this year. The decline corresponds mainly to less quantities landed from the Norwegian Sea and the Spitsbergen - Bear Island area.

INVESTIGATIONS ON THE FISHERY IN ICES SUB-AREA II A AND B

Records on commercial statistics of catch and effort have been collected regularly for several years at Tromsø, the port in northern Norway where the majority of catches is landed. It has been found that fishing for Greenland halibut is carried out with vessels ranging from 65/70 to more than 100 feet in length. The vessels set their bottom long lines at 350-700 m depth corresponding to the prevalent occurrence of the species during the fishing season. Fishing usually starts in April/May and ends in August/September. Each fishing trip usually lasts for 10 to 14 days, and a vessel may make several trips during the season.

This general picture persisted up to and including 1970, but changed radically the next year. On an average 21 to 22 vessels participated in the fishery making a total of 66 trips annually during the period 1960-1964, and 19 vessels and 95-96 trips from 1965 to 1970. In 1971 and 1972 the number of vessels dropped down to 9 and 6 respectively.

The catch per unit of effort expressed as kgs. of Greenland halibut (head off and gutted) caught per box of bait (50 kgs) consumed during fishing varied between approx. 600 and 650 kgs in the period 1965-1969. CPUE dropped to about 550 kgs in 1970 and to approx. 500 kgs in 1971. Data available for 1972, though few, indicate a similar value as that found in 1971.

Biological investigations have been made by sampling Greenland halibut on board commercial bottom long liners operating on the fishing grounds in the ICES sub-area IIa and b. Observations on length and age collected in May-June in the years 1970 to 1972 are presented in fig.1. The figure shows length frequency distribution and age composition of samples from deepwaters along the slope from off northern Norway towards and past Bear Island (Area A), and from the depths SSE of Bear Island (Area B). The

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latter area is not regularly exploited by bottom long liners fishing for Greenland halibut, but has been chosen in order to make useful comparisons between the two areas. The depth in area B ranged from approx. 450 to 470 m. It is seen that females were much more abundant in the samples than males, especially in the former area. Females were also on an average older than males.

In area A the average size of the fish decreased from 1970 to 1971. This is also reflected in the decline of the oldest age groups. The difference in length frequency distribution and age composition between 1971 and 1972 may probably be due to the fact that sampling in 1972 mainly was done in the southern part of the area as Greenland halibut only occurred in very small numbers on the slope W of Bear Island when investigations were carried out. The larger and older specimens seem to be most abundant in the southern part of the area. Almost all the fish in area A were mature except a small fraction of immature females.

In area B both sexes on an average were smaller and somewhat younger than in area A. It is further observed that the average size decreased from 1971 to 1972. Immature individuals of both sexes occurred much more frequently than in area A.

DISCUSSION

The recent decline observed in the Norwegian fisheries for Greenland halibut is mainly due to reduced landings from the Norwegian Sea and the Spitsbergen-Bear Island area. In 1971 and 1972 very small catches were landed from these areas during the first part of the sea season and only a few vessels continued fishing with bottom long lines throughout the season. This fact to some extent explains the comparatively low quantities landed.

According to the decreased CPUE-values calculated, however, it seems obvious that the resources of Greenland halibut have decreased. The reduced size and age of the fish sampled, points in the same direction. It is difficult to judge to which extent the expanding international exploitation or biological factors are involved in the reduction of the population, but this reduction seems to be rather close connected with the increased fishing effort.

The biology of Greenland halibut is not very well known yet, but as mentioned by Milinskii (1968) and Sorokin (1967) the adult, mature, individuals are most abundant in the western part of the Barents Sea and along the continental slope from Norway to Spitsbergen. Thus, this stock is depending on recruitment of younger immature fish mainly from the fjords and shallow coastal waters at Spitsbergen (Hognestad, 1969) and from the Barents Sea. At present the exploitation seems to exceed the rate of recruitment. It appears that the stock of Greenland halibut in ICES sub-area IIa and b is rather vulnerable regarding too high input of fishing effort, and the same may hold through in other areas as well.

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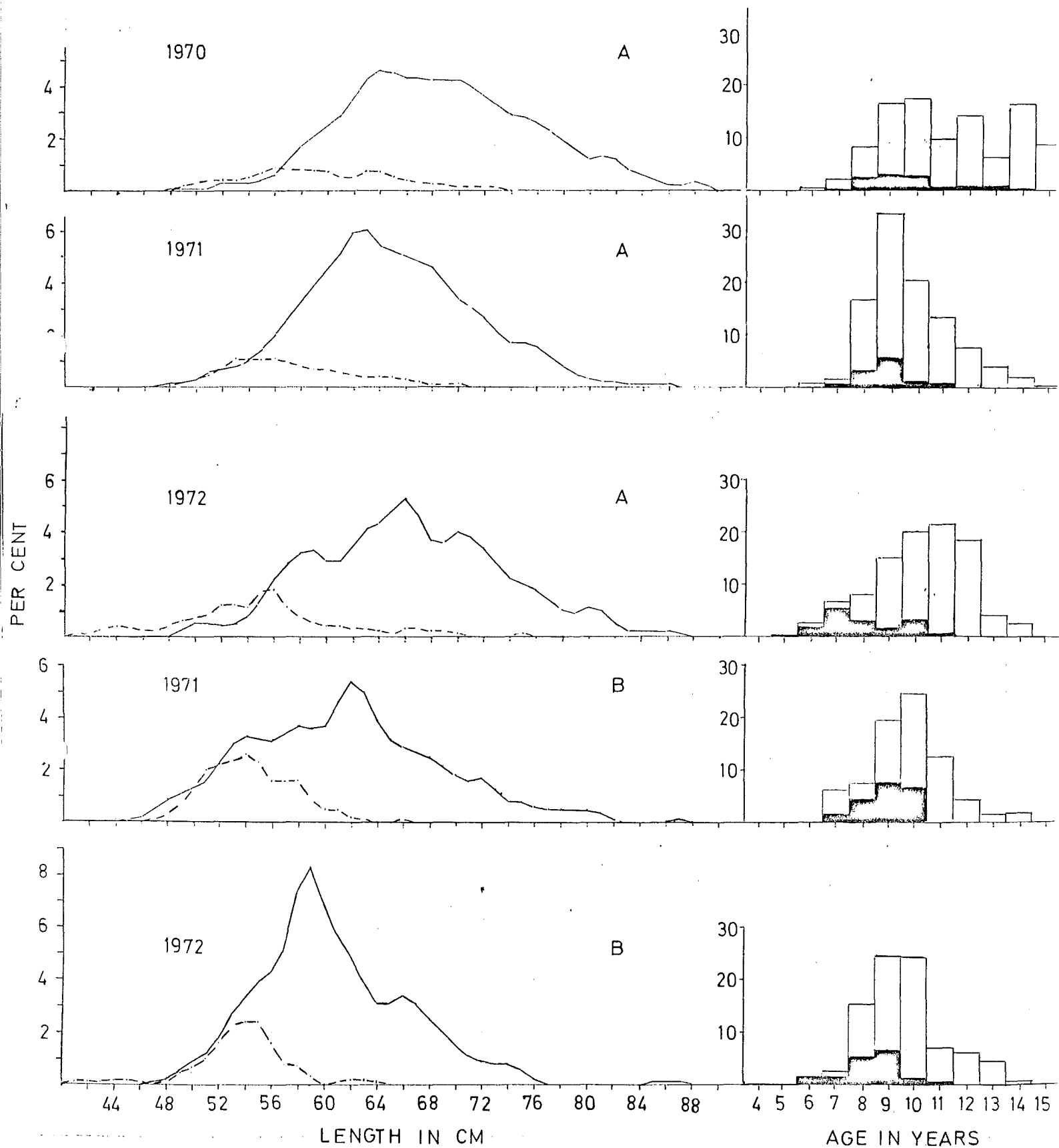


Fig. 1. Length frequency distribution and age composition of Greenland halibut caught by bottom long lines in May-June 1970-1972. A) Norwegian Sea, B) Locality SSE of Bear Island.

Table 1. Estimated annual landings of Greenland halibut from northeast Atlantic waters by ICES sub-areas. Round weight in 1000 metric tons.

ICES sub-area	Year									Mean
	1962	1963	1964	1965	1966	1967	1968	1969	1970	
Ia Barents Sea	1.3	0.6	6.1	3.7	7.0	7.2	5.7	11.9	9.6	5.9
IIa Norwegian Sea	10.1	7.6	13.5	18.0	17.6	18.2	16.4	9.9	12.8	13.8
Iib Spitsbergen-Bear Island	0.3	3.1	0.4	0.8	0.7	4.3	9.5	23.7	54.8	10.8
Va Iceland	2.4	3.2	3.5	4.8	5.6	25.0	14.8	17.3	15.9	10.3
Vb The Faroes	0.3	0.4	0.3	0.7	0.5	0.2	0.6	0.1	+	0.3
XIV East Greenland	0.1	0.1	0.1	0.4	+	0.2	0.2	0.2	0.9	0.2
Sum	14.5	15.0	23.9	28.4	31.4	55.1	47.2	63.0	94.0	

Table 2. Estimated annual landings of Greenland halibut from northeast Atlantic waters by countries. Round weight in 1000 metric tons.

Country	Year									Mean
	1962	1963	1964	1965	1966	1967	1968	1969	1970	
The Faroes		+			0.1			1.9	4.2	0.7
Germany	2.9	3.7	3.9	5.9	6.0	4.4	2.0	1.8	0.9	3.5
Iceland			+					5.9	7.3	1.5
Norway	11.6	11.3	14.2	18.0	16.6	17.6	22.6	15.0	16.2	15.9
Poland				+	+	+	+	5.3	21.1	2.9
U.S.S.R.			5.8	4.3	8.7	33.1	22.5	33.3	44.3	16.9
Others	+	+	+	+	+	+	+	+	+	+
Sum	14.5	15.0	23.9	28.4	31.4	55.1	47.2	63.0	94.0	

Table 3. Norwegian annual landings of Greenland halibut by ICES sub-areas. Round weight in metric tons.

ICES sub-area	Year									Mean
	1962	1963	1964	1965	1966	1967	1968	1969	1970	
I Barents Sea	1.2	0.6	0.6	0.4	0.2	1.3	1.5	0.7	1.7	0.9
IIa Norwegian Sea	10.1	7.6	13.5	17.5	16.4	14.5	14.8	9.9	6.4	12.3
Iib Spitsbergen-Bear Island	0.3	3.1	0.1	0.1	+	1.8	6.3	4.3	7.8	2.6
Va Iceland	-	-						0.1	0.3	+
Sum	11.6	11.3	14.2	18.0	16.6	17.6	22.6	15.0	16.2	

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