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Catch and Size Distribution of Greenland Halibut, Reinhardtius hippoglossoides  
(Walb.) at Jakobshavn, West Greenland

by

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Abstract.

The fishery for Greenland halibut and the size distribution of the catch are described for the presently most important fishing area for this species in West Greenland, the Jakobshavn area, on the basis of research data and commercial landings from 1985-1987.

The annual landings at Jakobshavn increased from approximately 500 tonnes in the 1970's to 2911 tonnes in 1986, representing about one third the total landings of Greenland halibut in West Greenland. Of the landings in 1986 about 2500 tonnes are estimated to be from the gill-net fishery and about 400 tonnes are estimated to be from the long-line fishery.

Samples from long-line and gill-net fishery in the Jakobshavn Icefjord area indicate that the two types of gear catch different length groups of Greenland halibut. The gill-net catches are predominated by fish in the length interval 55 - 69 cm, while the long-line fishery covers a broader length interval, viz. 55 cm - 100 cm, with no distinct peaks. The catches of the larger fish are restricted to the localities in the icefjord.

On the basis of the proportions of catch by weight of the gill-net and the long-line fishery the size distribution for the total landings at Jakobshavn in 1986 is estimated.

1. Introduction.

The fishery on Greenland halibut (Reinhardtius hippoglossoides Walb.) in West Greenland is in a stage of rapid increase, especially in the Disko Bay area, Umanak and Upernavik districts, expanding from a small long-line fishery to include a big gill-net fishery. Thus, Greenland halibut constitutes an increasing part of the total catch of fish at Greenland. In 1986 total landings of Greenland halibut at West Greenland amounted to 8705<sup>1</sup> tonnes (metric) of which 2911<sup>2</sup> tonnes were taken at Jakobshavn.

- 1) Provisional data of catch.
- 2) Provisional data of landings (KTU).

In the present paper, it is the proposal to give a description of the fishery pattern at Jakobshavn, the size distribution of the catches from the different types of gear and to estimate a total size distribution of the catch at Jakobshavn in 1986.

## 2. Data material.

For the description of annual landings and trends in composition of size categories of landings, statistics from the Greenland Home Rule (KTU) have been used. Description of the size distribution of the catch is based on research data (Greenland Fisheries and Environment Research Institute) from 1985, 1986 and 1987.

Research data include length measurements at the fishery plant in Jakobshavn and length measurements directly at the fishing grounds.

## 3. Description of the fishery.

The fishery at Jakobshavn consists of a gill-net fishery off Jakobshavn Icefjord and of a long-line fishery in the icefjord (Fig.1) plus a new combined fishery in a more northern icefjord, Torsukataq.

The gill-net fishery is carried out from smaller vessels (less than 20 GRT) and besides the northern icefjord, Torsukataq restricted to an area off Jakobshavn Icefjord. It fluctuates much, taking place in periods with no ice cover, i.e. normally during the whole summer and, more rarely in mild winters. Gill-nets, having mesh sizes in the range 90 - 100 mm (bar length), more rarely 110 mm, are used at depth of about 200 m.

The long-line fishery is carried out from dog sledges, mainly taking place from the ice in Jakobshavn Icefjord and to a less degree in the northern icefjord, Torsukataq. It is normally carried out from December to April depending on the stability of the ice cover. Long-lines with approximately 100-200 hooks are used at depths in the range 200 - 800 m in the icefjord depending on the locality. If the conditions admit, the long-line fishery takes place in the main branch of the icefjord at depths of 600 - 800 m, otherwise it takes place in the side branch at depths of 200 - 300 m.

A minor long-line fishery from small boats takes place during the summer outside Jakobshavn Icefjord in the same area as where the gill-net fishery takes place.

## 4. Results.

### 4.1 Commercial catches.

Fig.2 states the annual landings of Greenland halibut in Jakobshavn since 1964. From an annual landing round 500 tonnes in the period 1964-72, the level increased to 3000 tonnes in 1985 and 1986. Obviously there is a general trend in the landings showing an increase since the 1970ies, although it is of a rather fluctuating character.

When catches of Greenland halibut are landed they are sorted in two size categories, 1.5-3.5 kg and >3.5 kg. Fig.2 shows the percentage of small fish (1.5-3.5kg) in the landings in the period from 1980 to 1986. While the small fish constitute 46.6% in 1981, this percentage increases steadily to 70.6% in 1985, indicating that small fish have become more abundant in the landings.

#### 4.2 Size distribution of catches.

##### Gill-net catches

Of the size distributions presented on Fig.3, the research sample was measured on a commercial fishing vessel on the fishing ground and the commercial sample was measured at the fishery plant in Jakobshavn. The size distribution of the gill-net catches (Fig. 3 a-c) has a rather narrow length interval from about 55 cm to 69 cm, with a peak on 60-64 cm. In the period covered by the samples, 1985-1987, no changes seem to have occurred in the size distribution of the catches.

From observations on the commercial fishery it was noted that very few fish below the minimum weight for landing, 1.5 kg which equals 54 cm, appear in the catches. Comparing the commercial samples (Fig.3a,b), and the research sample (Fig.3c) it can be seen that they are very similar, in accordance with the observations on discarding on the fishing grounds.

##### Long-line catches

Fig.4 represents length frequencies of Greenland halibut from the long-line fishery in Jakobshavn Icefjord. Fig.4 a-c shows commercial samples (measured at the fishery plant), while Fig.4d-e shows research samples (measured at the fishing ground).

The length frequencies of the commercial samples (Fig.4 a,b,c) show a broad distribution ranging from 50 - 114 cm with no distinct common peaks.

The research samples on Fig.4 d,e show length frequencies in a broad interval too, ranging from 40 cm to 109 cm. From the samples of the catch from the side branch (Fig.4d) and the main branch (Fig.4e), it appears that fish more than 74 cm are more common in the catches from the main branch. The size distribution of the catch from the side branch has a peak on 55 - 59 cm compared to a peak on 70 - 74 cm in the main branch sample.

It is obvious that fish below 54 cm are more abundant in the research sample from the main branch of the fjord compared to the commercial samples indicating a degree of discard in the commercial fishery.

A minor long-line fishery takes place outside the fjord. Fig.5a represents research samples while Fig.5b represents commercial samples from this fishery. Contrary to long-line catches from the icefjord the catches outside the fjord are distributed in a narrow length interval, with distinct peaks, very similar to the gill-net fishery in the same area. (It must be noted that in the period of research fishery, the commercial fishery nearly stopped, due to poor catches).

#### 4.3 Estimated size composition of the total fishery in the area.

The proportions of small and big size categories in catches of the gill-net and the long-line fisheries were investigated in February 1986 and a "landing-size category key" was made. Using this key and the total landing of each category in 1986 from KTU statistics, it is estimated that 84% (by weight) of the 1986 catches derive from the gill-net fishery and 16% from the long-line fishery.

Using the weight proportions of the two fisheries, a size distribution for the total fishery has been estimated (Fig.6). The distribution is very similar to these for samples from the gill-net fishery outside the fjord with a peak at 60-64 cm, but it has a tail from 75 cm to 109 cm constituting less than 6% of total catch by number.

#### 5. Discussion.

The fishery for Greenland halibut at Jakobshavn consists of a complex fishery pattern of a long-line and a gill-net fishery. The two forms of fishery take place at different localities. The ratio of landings from the two fisheries fluctuates both within the year and from year to year. This leads to a very dispersed effort and makes it a very resource consuming procedure to acquire information on length distributions of catches.

The marked increase from 1982 to 1985 is due partly to the exploitation in the northern Icefjord, Torssukataq, and partly to an increased effort in the traditional gill-net fishery on the ground outside Jakobshavn Icefjord.

Decreases in landings from 1977 until 1984 may have been caused by cold winters, in particular the extreme ice-winters 1982/83 and 1983/84 (Buch, 1986). This prevented a gill-net fishery from boats in the winter and early spring. The winters 1984/85 and 1985/86 was on the other hand warmer than the mean, and therefore have allowed an intensive gill-net fishery in this period, leading to an increase in the annual landings.

Regarding the length frequencies of the gill-net catches, which consist mainly of the small landing-size category (80%), an increased effort with this type of gear may result in an increased ratio of the small landing-size category. This is in accordance with Fig.2 where it seems as the percentage of small fish and the annual landings are positively correlated.

The increase in small landing size-category during the last years, does therefore not necessary mean that smaller fish have become more abundant in the catches in the area due to over-fishing.

Observations on the fishing ground have shown that some part of the actual catch is discarded. In the gill-net fishery the discard is negligible. In the long-line fishery the "discard" is used either as bait or as food for the dogs. The amount used depends therefore on the travelling distance to the fishing grounds and on the choice of bait. Furthermore, in cases of big

catches the fishermen might select the fish of the larger landing-size category (gives higher price) due to loading capacity problems on the sledge.

From the length frequencies of the two fisheries (Fig.3,4,5) it is obvious that difference in the distributions are under influence of the gear selection. Although, comparing the length frequencies of long-line catches in the fjord with catches off the fjord, it is obvious that the bigger fish are more sparsely represented off the fjord. This is in accordance with earlier investigations (Smidt, 1969).

The estimated size distribution of the total fishery in 1986 based on annual weight proportions between gill-net and long-line landings is dominated totally by the gill-net catches, i.e. the length groups 55 - 69 cm constitute 85% of total catch by numbers. As mentioned before, the winter 1985/86 was warmer than the mean with an intensive gill-net fishery and the estimated size distribution might therefore be atypical for the area.

#### 6. References.

Buch, E. 1986. A review of the Hydrographic Conditions off West Greenland in 1980-1985. NAFO SCR Doc. 86/48.

Smidt, E.L.B. 1969. The Greenland Halibut, Reinhardtius hippoglossoides (Walb), Biology and Exploitation in Greenland Waters. Medd. Dan. Fisk.-Havundersøgelser N.S., 6:79-148.

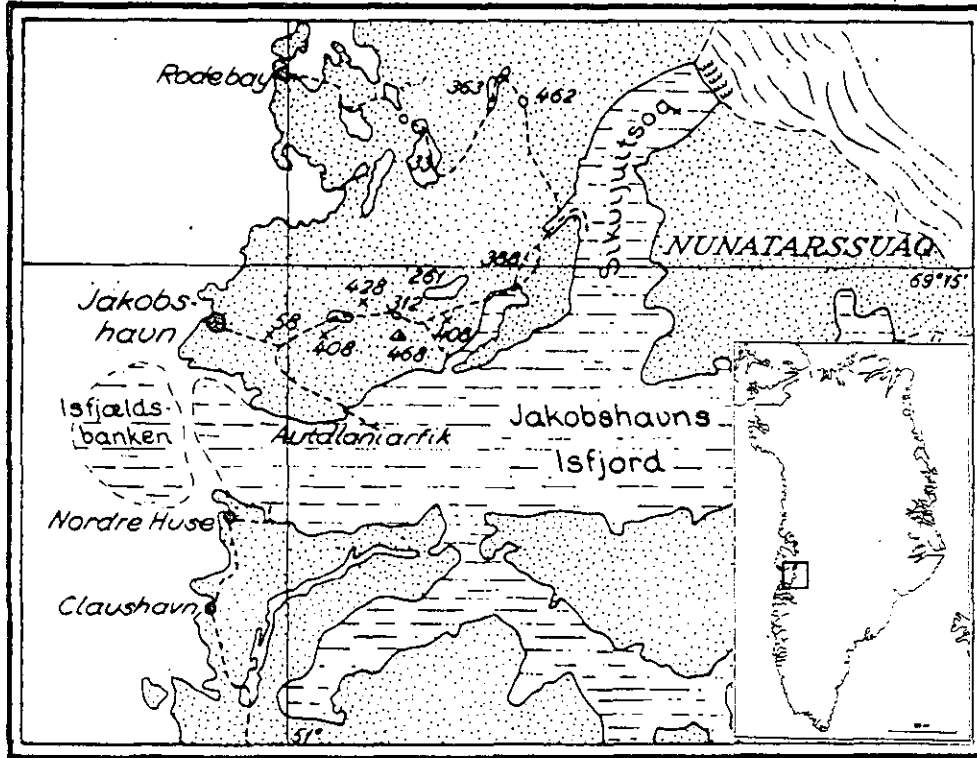


Fig.1. Map of Jakobshavn Icefjord area. Dog sledge routes are indicated.

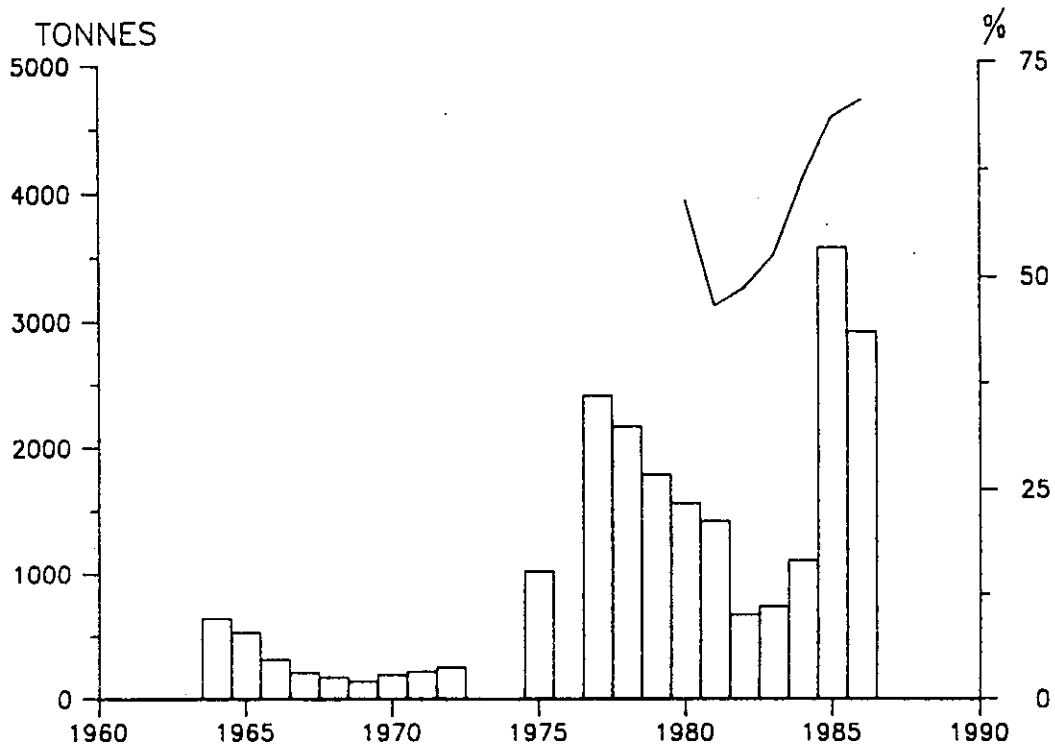


Fig.2. Annual landings of Greenland halibut 1964 - 1986 in Jakobshavn. No data exist for the years 1973-74 and 1976. Proportions of small landing-size category (1.5-3.5 kg) as percentage of landings in 1980-86 are added.

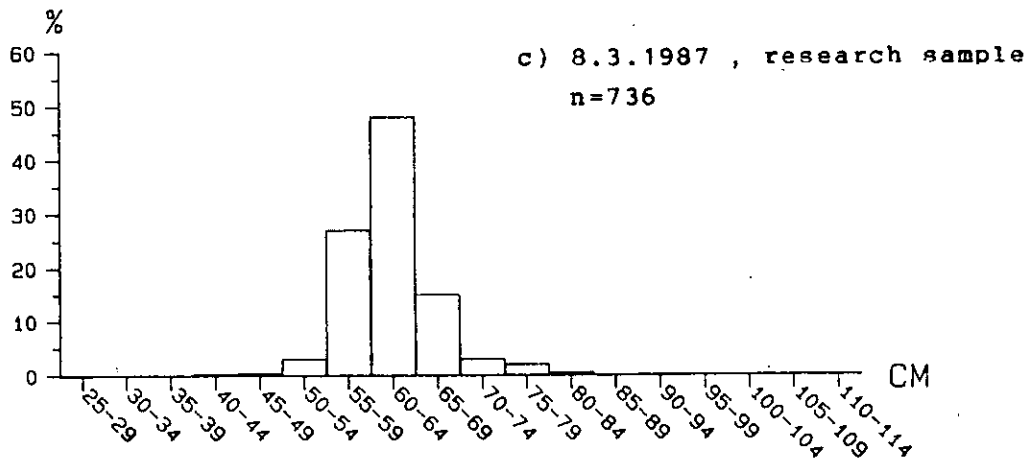
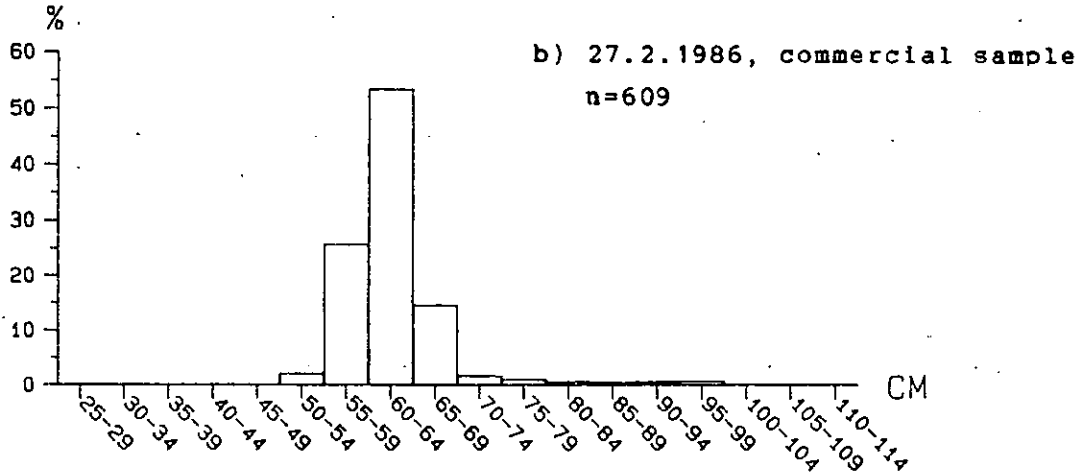
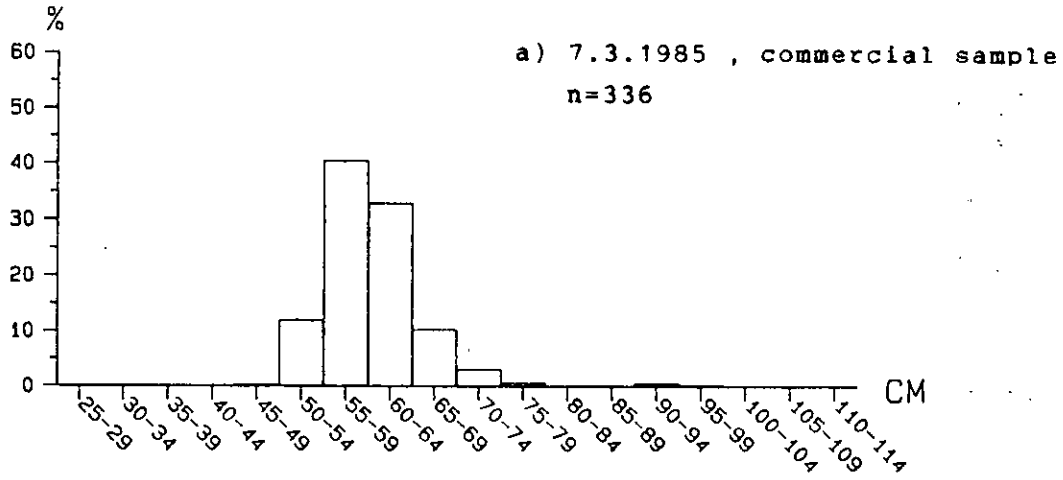


Fig. 3. Length frequencies of gill-net catches outside Jakobshavn Icefjord.



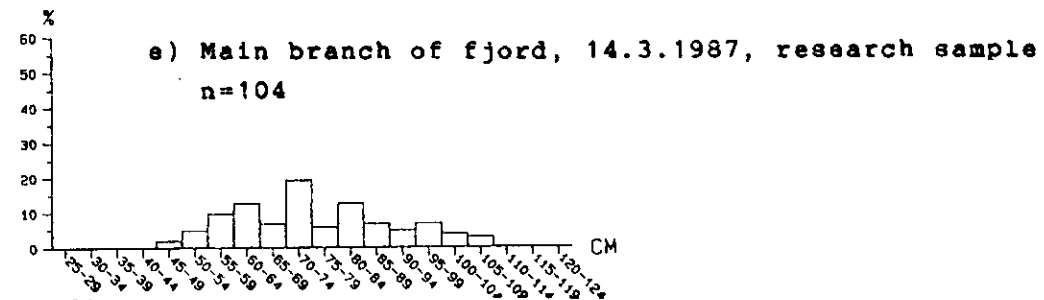
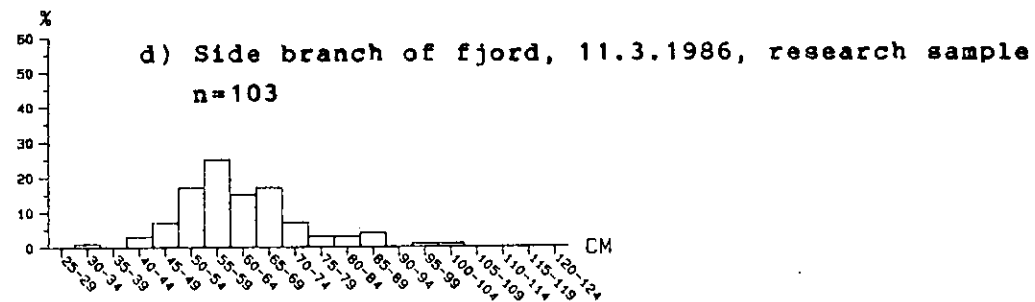
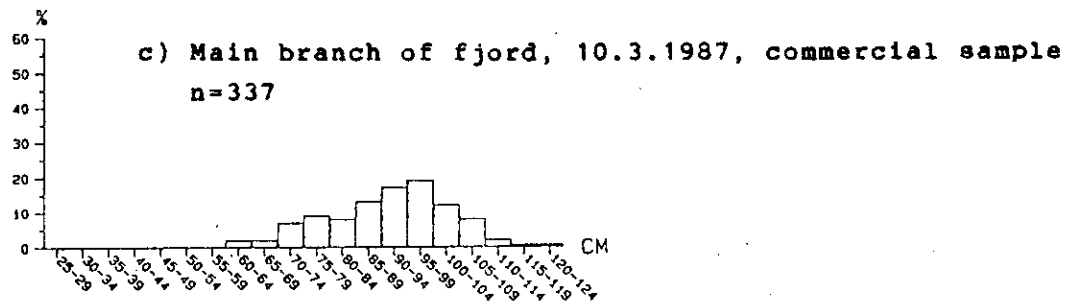
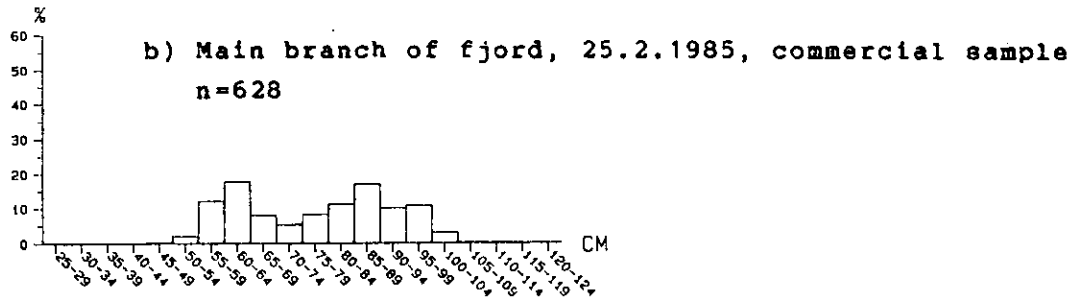
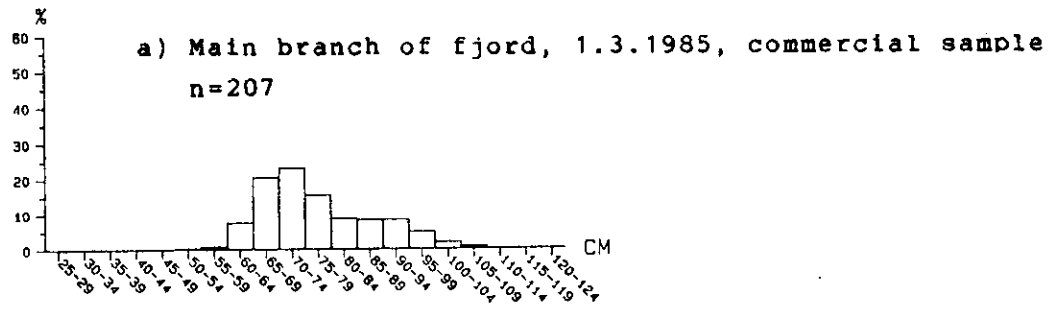


Fig.4. Length frequencies of long-line catches in Jakobshavn Icefjord.

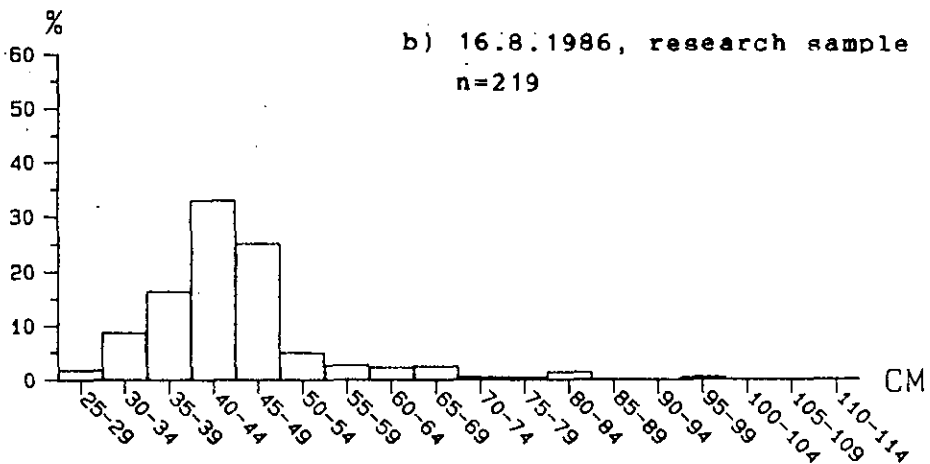
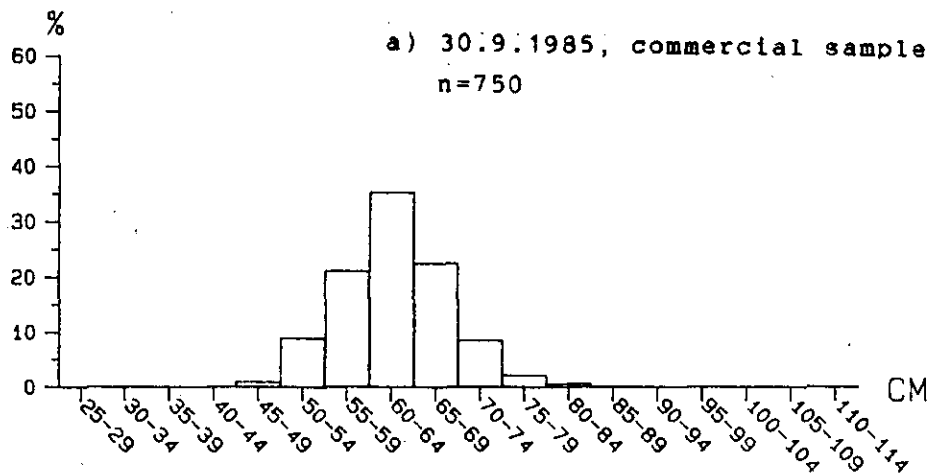


Fig. 5. Length frequencies of long-line catches outside Jakobshavn Icefjord.

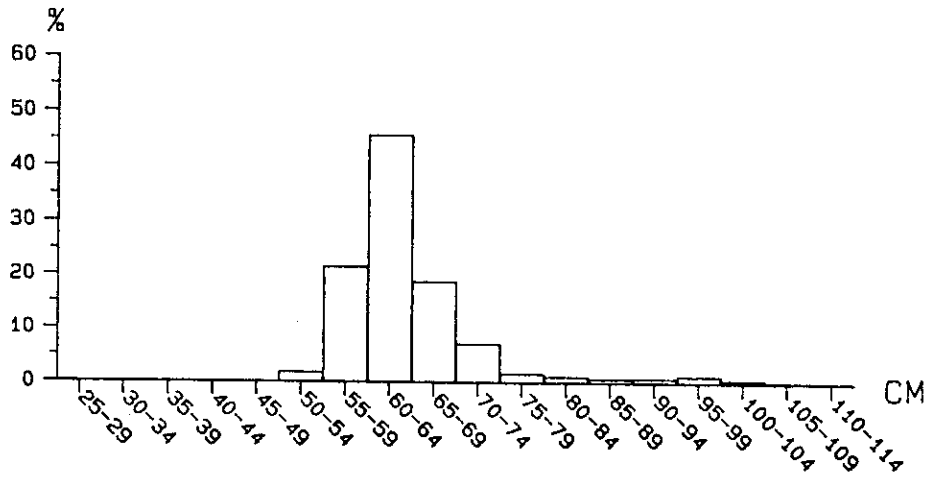


Fig. 6. Estimated length frequencies of total catch in Jakobshavn in the year 1986.