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Young Cod Distribution and Abundance in West Greenland Inshore Areas, 1988

by

Klaus H. Nygaard, Klaus M. Lehmann and Holger Hovgård

Greenland Fisheries Research Institute
Tagensvej 135, DK-2200, Copenhagen N, Denmark

1. Introduction

A survey using links of gill-nets with different mesh-sizes has been developed and used since 1985 (Hansen and Lehmann 1986, Hovgård 1987, Hovgård and Nygaard 1988). The objective of this programme is dual a) to gain knowledge on the geographical distribution of young cod and b) to asses the relative year-class size of 1- and 2-year old cod.

2. Materials and methods

The young-cod survey was carried out in June-July, 1988 in three inshore areas off West Greenland: Qaqortoq (NAFO Div. 1F), Nuuk (Div. 1D) and Sisimiut (Div. 1B) (Fig. 1).

The links of gillnets contained seperate sections with mesh-sizes of 16.5, 18, 24, 28 and 33mm (bar length) arranged in random order. The catching capacity of each mesh-size is bimodal as the cod is attached either behind the gill-cover or at the jaw (mandibulars). Catch efficiency at both catching sites are simply related to fish size, but the gill catching is 4 to 5 times as efficient as the jaw-catching (Hovgård 1988). With the mesh-sizes used fish from 15 cm are caught, but large fish is caught with lower efficiency.

A total of 189 net settings were made (Table 1). Nets were set floating or at the bottom at depths ranging from 2 to 35 m. Average fishing time was approximately 8 hours, and catch rate (number caught per hour) for each age group is used as an index of abundance.

3. Results

Distribution pattern of young cod

Length frequency distribution of the catch for each mesh-size is shown in figure 2, and age and length composition of the catch by Division in figure 3.

During the survey a total of 1979 cod were caught. In the northern part (Div. 1B and 1D) catches were dominated by 3- and 4-year olds, but a substantial amount of 2-year olds were caught as well. In the southern part (Div. 1F) the 3-year old cod dominated catches almost completely (Fig.3).

Only one 1-year old cod was caught, which indicates a poor recruitment of this year-class, as 1-year olds are caught efficiently by the smaller mesh-sizes when abundant (Hansen and Lehmann 1986).

Catch rates of 2-year olds, by area and depth, are shown in table 2. Highest catch rates were found in Div. 1B, whereas the catchrate was somewhat lower in Div. 1D, and very low in Div. 1F. Furthermore catchrates were very low in the floating nets, and at depths below 20m.

The 3-year old cod are too big to be caught efficiently by the net links, and a more formal analysis of their abundance is therefore not conducted. However as survey effort was relatively even distributed (430, 420 and 528 hours of fishing in divisions 1B, 1D and 1F respectively), it is deducted from figure 3, that the abundance of 3-year old cod is relatively even in Div. 1B and 1F in 1988, but somewhat lower in Div. 1D.

Year-class indices

Year-class indices are calculated as the mean of the CPUE given in table 2, excluding surface settings and settings below 20m, where effort has been scarce, and density is low.

In 1985 and 86 only three mesh-sizes (16.5, 24 and 33mm) were used, whereas in the 1987 and 88 surveys five mesh-sizes (18.5 and 28mm added) were used. For comparison indices using the catch from both three and five mesh-sizes have been computed for the years 1985-88 (table 3).

By comparing the abundance indices for 2-year old cod the 1986 year-class is estimated to number between 25% (three mesh-sizes) and 27% (five mesh-sizes) of the 1985 year-class.

4. Discussion

The 1985 year-class distribution pattern with high abundance in Div. 1B and 1F and low abundance in 1D was also found in the surveys of 1986 and 87. This pattern was not found in the offshore trawl surveys in the autumn of 1986 and 87, where the 1985 year-class was found mainly in the southern areas (Anon. 1987 and 1988). However this could be caused by a seasonal southward migration during the fall.

The abundance index of the 1986 year-class is only around 25% of the 1985 year-class and very low in comparison with the 1984 year-class. The 1986 year-class is thus believed to be poor and probably not account for more than 30 mill. fish at age three, using the index as face value and figures for the abundance of the 1985 year-class in 1988 (Anon., 1988b). However young cod (probably of the 1986 year-class) have been observed in areas north of the survey area (Div. 1A and northern 1B), and using face value from the survey area might thus result in an underestimate.

The size of the 1987 year-class also seems to be very low, as this year-class in effect was absent in the catches of the 1988 gill-net survey.

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Table 1 : Number of gill-net settings by area and depth (hours
fished in brackets), 1988.

Area Div.	Qaqortoq 1F	Nuuk 1D	Sisimiut 1B
Depth (m)			
Surface	6 (46)	5 (30)	8 (64)
0 - 5	15 (111)	12 (83)	13 (88)
5 - 10	13 (101)	10 (81)	10 (68)
10 - 15	13 (94)	14 (96)	12 (83)
15 - 20	14 (112)	10 (79)	11 (74)
20 - 30	6 (49)	6 (37)	7 (53)
30 - 40	2 (15)	2 (14)	0 (-)
total	69 (528)	59 (420)	61 (430)

Table 2 : CPUE (Nos. per hour) of two year old cod (1986 year-
class) by area and depth.

Area Div.	Qaqortoq 1F	Nuuk 1D	Sisimiut 1B
Depth (m)			
Surface	0.00	0.00	0.04
0 - 5	0.04	0.26	0.40
5 - 10	0.01	0.23	1.03
10 - 15	+	0.27	0.39
15 - 20	0.01	0.05	0.31
20 - 30	0.01	0.10	0.19
30 - 40	0.06	0.03	-

Table 3: Indices of year-class strength.

Meshsizes 16.5, 24 and 33mm.

Survey	Age 1	Age 2
1985	0.74	+
1986	0.09	1.61
1987	+	0.36
1988	+	0.09

Meshsizes 16.5, 18, 24, 28 and 33mm.

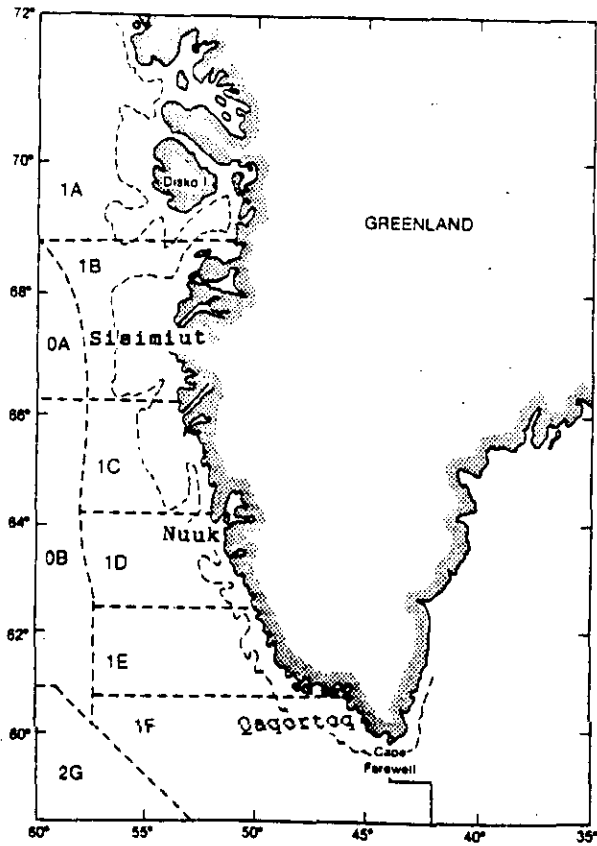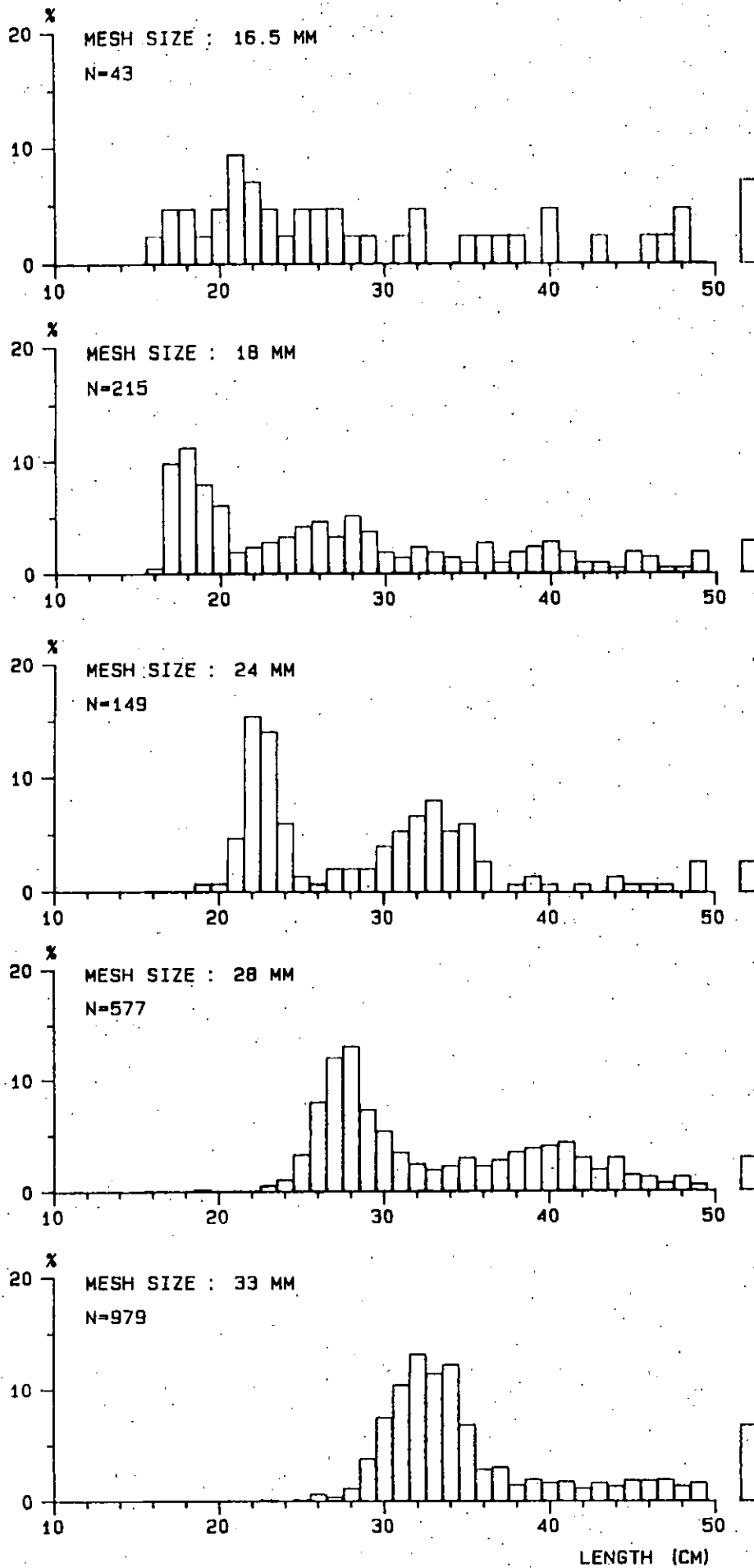| Survey	Age 1	Age 2
1987	+	0.93
1988	+	0.25

Fig. 1 Map of West Greenland.

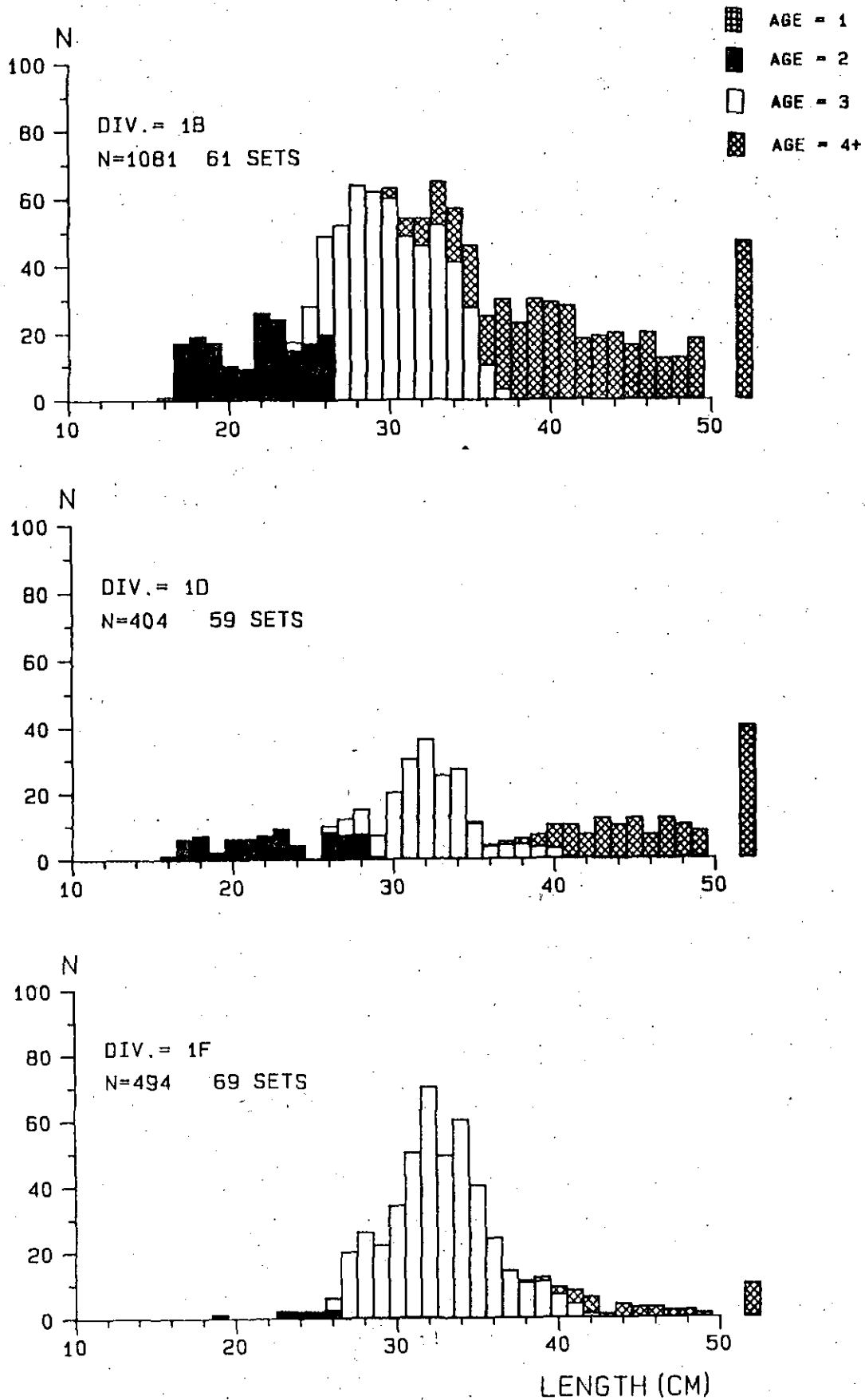Fig. 2 Length frequency distribution of the catch by mesh-size.

Fig. 3 Length and age distribution of the catch by Division.