



Serial No. 531
(D. Res. a./58)

Document No. 6

ANNUAL MEETING - JUNE 1958

Danish Research Report, 1957

A. Biology

By Paul M. Hansen

I. Cod in Coastal Waters and on the Offshore Banks of West Greenland.

1. Occurrence of cod eggs and fry.

Table 1 shows the number of cod eggs and larvae caught in the area of the Godthåb Fjord. Figure 1 shows the position of the stations. Fishery was carried out with a 1 m stramin net and from the 1st of May also with a 1 m nylon net of the same mesh size. The catches with nylon net are shown in brackets in Table 1. The nets

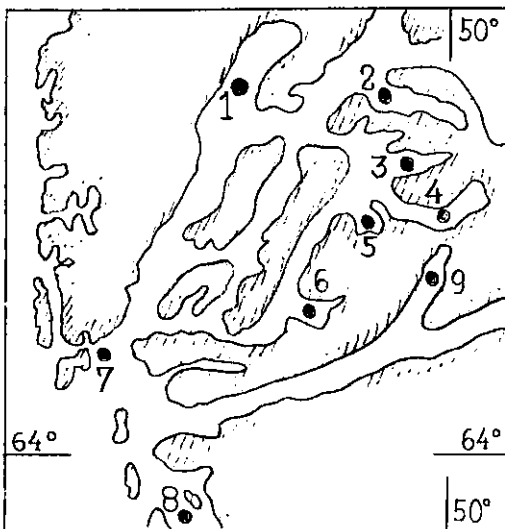


Figure 1. Position of cod eggs and larvae stations in Godthåb Fjord.

were hauled with a 100-50 m wire for 30 minutes. It appears that the nylon net in most cases yielded larger catches than the stramin net. The table only shows those hauls taken in the months February to July. On the 9th, 22nd, and 24th of January the stramin net was used on Stations 4, 6, and 7 respectively. Cod eggs were not caught in any of these hauls.

At the largest spawning place for cod in the Godthåb Fjord, Station 4, twenty cod eggs were caught on 21 February in a haul with stramin net with 100-50 m wire. At the same station and on the same date 88 cod eggs were caught in a haul with a 400 m wire (this haul is not shown in the table). In March there were considerably more eggs in the hauls on Station 4 than on the neighbouring stations. In April less eggs were caught on Station 4 than in March.

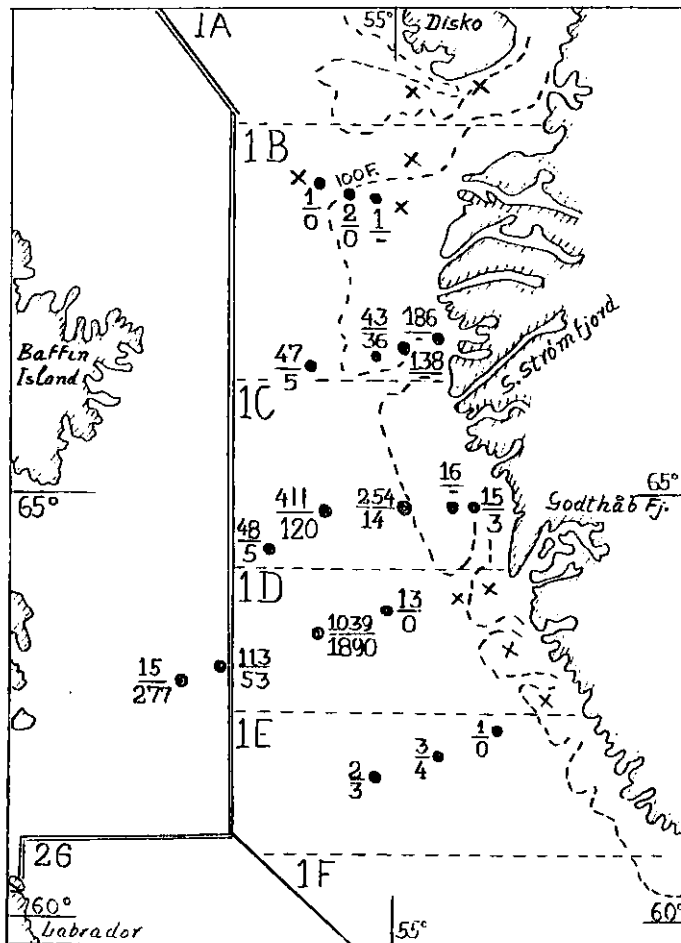
It is apparent that on an average the cod eggs have been scarcer in the Godthåb Fjord in 1957 than in the preceding year.

The first cod larvae were caught in the beginning of May at Station 7 in the mouth of the fjord, and at the same station the largest number of larvae were caught in the last half of June.

Figure 2 shows the catches with 2 m stramin net taken on the "Dana" stations in the Davis Strait in July. The numbers of cod larvae in the hauls were on a whole by far greater than in earlier years. The distribution of the larvae in the south part of the Strait was much more westerly than is usually the case. Thus no cod larvae at all were caught over Fyllas, Fiskenaes, and Dana Banks, whereas large numbers were caught on the stations farther west outside the banks. On Lille Hellefiske Bank a few cod larvae were found, but west of this bank the quantities caught were far greater. On the contrary more cod

...../2.

larvae were caught on the southern part of Store Hellefiske Bank than on the stations west of the bank. At the northern stations of this bank only few cod larvae were present in the hauls.



It is difficult to estimate from the distribution and frequency of the cod fry in 1957 whether this year-class will be rich or poor.

The western distribution of larvae indicates that the current has carried large quantities out over greater depths where they may either perish when reaching the stage when they seek the bottom, or be carried right to Labrador. In both cases they will be lost to the Greenland stock. However, the fairly good occurrence of cod larvae along the coast and over Store Hellefiske Bank will indicate that a sufficiently great number of larvae will be developed and form a good 1957 year-class which in 1962 for the first time will be of importance to the fishery.

Figure 2. Catches of cod larvae per 30 minutes haul by "Dana". 1957.

2. Occurrence of small cod of Age-Groups I, II and III.

Small cod were very scarce in the coastal and the fjord areas and only in one case a larger number were caught in seine. This seine catch was taken in the Sukkertoppen district 64°48'N, 52°12'W. 1,139 cod of length between 7 and 15 cm were caught; the modal length was 11 cm. These small cod belonged to the I-Group.

3. Commercial fish. The age composition.

a. Offshore banks.

Age determinations were made on 1546 otoliths. 941 were from "Dana" catches with handlines in July and August (nr. 1, 2, 4, 6 and 7), and 605 from longline catches by "Adolf Jensen" (nr. 3, 5, 8 and 9).

Figure 3 (left) shows the age distribution of nine catches from the Banks (the material will appear in tabular form in the 1957 "Sampling Yearbook"). Age analyses from Store Hellefiske Bank (nr. 1 and 2) show a surprising dominance of the 1953 year-class with about

...../3.

Table 1. Number of cod eggs and larvae caught in the Godthåb Fjord area.

STATION	February		March		April		May		June		July	
	1-15	15-28	1-15	15-31	1-15	15-30	1-15	15-31	1-15	15-30	1-15	15-31
1 Eggs			4									
Fry			0									
2 Eggs					4							
Fry					0							
3 Eggs				134			7500					
Fry				0			(9240) 0 (0)					
4 Eggs		20		9950		834				0		
Fry		0		0		0				(0) 0 (1)		
5 Eggs				18			1239					
Fry				0			(2804) 0 (0)					
6 Eggs			4	4			77	290		0		
Fry			0	0			(353) 0 (0)	(519) 0 (0)		(0) 5 (1)		
7 Eggs	0						30			0		
Fry	0						(18) 6 (2)			(0) 128 (139)		
8 Eggs	0		0			0		24		0	0	
Fry	0		0			0		(7) 23 (9)		(0) 20 (55)	(0) 0 (0)	
9 Eggs								328				
Fry								(1000) 0 (0)				

50% of the catch. Even if the 1953 year-class, based on the investigations from 1956, was estimated to be a rich year-class it was not expected to appear already at an age of four years in such large quantities on the banks. On the banks south of Store Hellefiske Bank it only made up a rather small percentage of the catches. It was without importance for the fishery in 1957 owing to the small size of the individuals, about 46 cm (0.9 kg.).

The rich 1947 year-class predominated in most of the samples from the other banks. However, it appears to be somewhat reduced since 1956. It is probable that the 1947 year-class is about to migrate southwards and then via E. Greenland to Iceland, as was the case in earlier years with the 1945 year-class.

The 1950 year-class is present in all the samples and has obviously played a great role in the yield of the bank fishery. Year-classes older than 1947 were very scarce in the samples.

The length distribution (Figure 3 - right) shows good conformity with the age distribution. In the two samples from Store Hellefiske Bank (nr. 1 and 2) and in the longline catch in April from Fyllas Bank (nr. 9) mainly small cod occur in correlation with the fact that these samples only contain young cod. In the other samples

...../4.

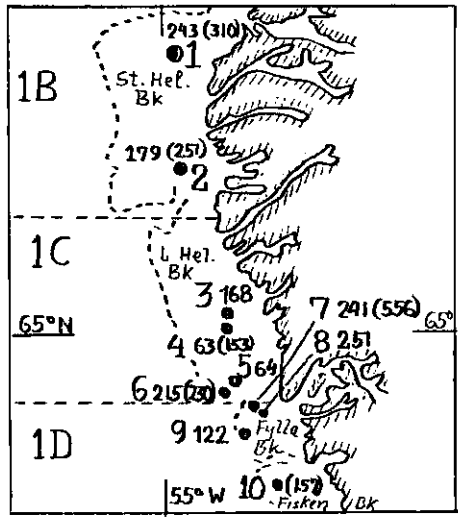
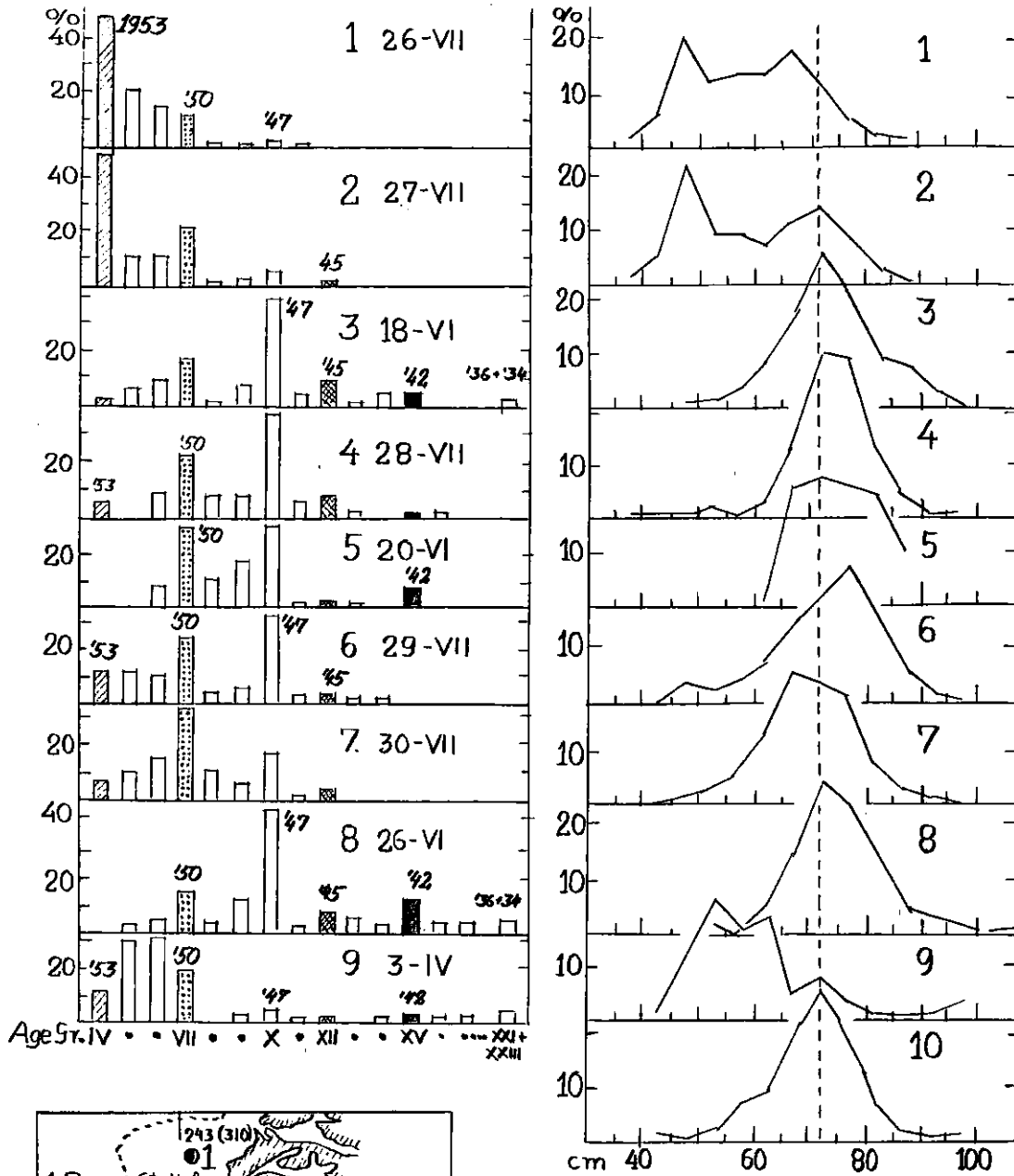


Figure 3. Percentage age distribution (left) and length distribution by 5 cm groups (right) of cod caught on the Greenland Banks in 1957. Left below - map showing positions of samples with numbers of cod examined and of cod tagged (in brackets).

...../5.

most cod measure between 70 and 80 cm which agrees well with the fact that the samples mainly consist of the rich 1950 and 1947 year-classes, with mean lengths of 70 and 77 cm, respectively.

b. Inshore waters and fjords.

Age determinations were carried out for 5,172 cod sampled from coastal and fjord areas (see Fig. 4). Most of the cod were caught on longline with cod hooks. Nr. 15 is from pound net, nr. 21a, 21b and 21d are from prawn trawls and nr. 21g and 27 from handline. Nr. 25 is a sample composed by equal numbers from handline, longline and pound net. (The data from these samples will appear in tabular form in the "Sampling Yearbook, 1957").

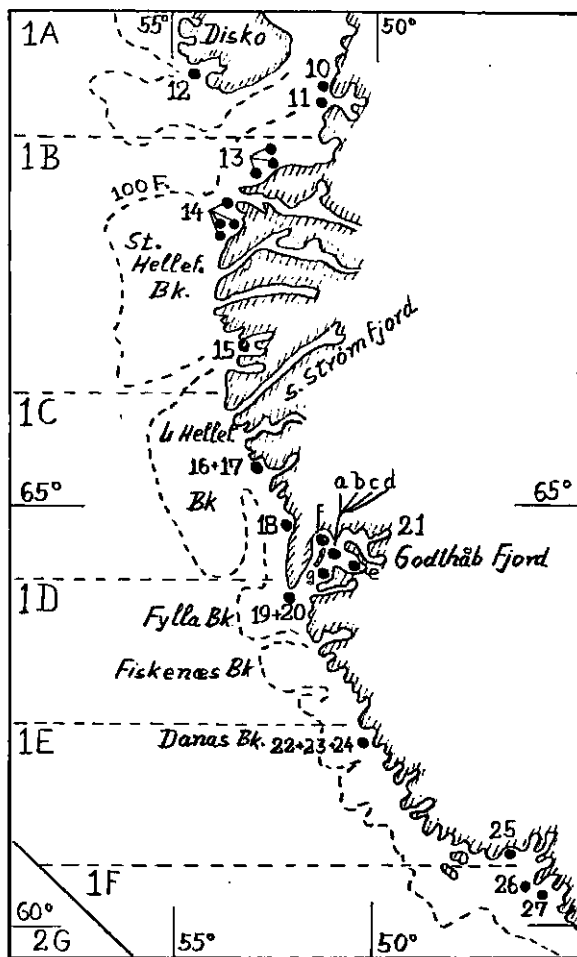


Figure 4. Position of samples of cod from inshore waters and fjords.

In nr. 10, 11 and 12 from Subdivision 1A the 1942 year-class is strongly represented. In 10 and 12 it predominates with 41 and 29%, while in 11 it is the next largest year-class with 26%. The 1947 year-class is the largest (34%) in nr. 11, while it amounts to between 15 and 20% in the two other samples.

In Subdivision 1B a completely different age distribution is found. The 1942 year-class is here quite unimportant. In the northern part of the area, nr. 13, the 1947 year-class predominates (40%), while the 1950 year-class is the next largest one with between 25 and 30%. In the sample nr. 14 the 1950 year-class is the strongest with over 30%. The 1951 year-class comes second and the 1947 year-class third.

In sample nr. 15 from pound net in Amerdloq Fjord the younger year-classes are more strongly represented than in the northern samples. 1950 is dominating, 1951 is the next largest. The 1953 year-class which was very dominant in the handline catches of "Dana" on the Store Hellefiske Bank was completely without importance in the samples from the coastal regions. Only in the sample from Amerdloq Fjord it constitutes between 10 and 15%.

The year-classes 1950, 1953 and 1947 dominated in samples nr. 16, 17 and 18, respectively. In nr. 17 the 1953 year-class constituted not less than 32%.

In Subdivision 1D two samples were taken at the mouth of the Godthåb Fjord (nr. 19 and 20). Both samples contain nearly exclusively young year-classes, 1950-1953. In nr. 20 from the autumn, the 1953 year-class constitutes more than 50%.

...../6.

In the Godthåb Fjord seven samples were collected from January to May. These are shown on the map, Figure 4, as nrs. 21a-g. The four samples a, b, c, d are from the same locality, but from various gears. Nrs. a, b and d are from prawn trawl and caught at a depth of about 240 m; c and f from longlines; and e and g from handlines. Nr. e is taken right in the bottom of the fjord where the greatest spawning ground is found. A rather even distribution of rich year-classes was as usual found in several of the samples from the Godthåb Fjord.

Amongst the young year-classes there is a strikingly good representation of the 1952 year-class which dominates in four of the samples.

Many old mature cod are found in the samples from January and February (a, b and c), both in catches with prawn trawl (a and b) and with longline (c). In March, however, a catch from prawn trawl (d) from the same locality as a and b contained almost exclusively the age-groups IV and V (1952 and 1953 year-classes). The older, mature cod have by now migrated to the innermost part of the fjord for spawning. The sample e was taken in April on this spawning place and showed an age distribution very much the same as that found in February a little farther out in the fjord. In this sample, however, we do not find many cod younger than the VII-Group.

The two samples f and g correspond fairly well to e and d and show the same fact - namely that far into the fjord (f) are found mainly old, mature cod, whereas farther out in the fjord mainly young not yet mature fish.

The three samples from Subdivision 1E, nr. 22, 23 and 24, were taken in the same region, in May, August-September and October respectively. Common for these three samples is that the 1950 and 1949 year-classes play a rather considerable role. In nr. 24, however, the 1947 year-class dominated with more than 30%. In the two other samples it is without importance.

In Subdivision 1F the three samples nr. 25, 26 and 27 were collected. The 1950 year-class dominated in all three samples; in nr. 26 with 57.5%, in the other samples with a little more than 30%. The 1947 year-class constituted only between 5 and 10% in these samples. The 1949 and 1950 year-classes together made up not less than 88% of sample nr. 26. Sample nr. 25 consisted of three catches taken with various gears, longline, handline and pound net. In the table below is shown the percentage age distribution for the age-groups III-VI, VII-X and XI-XVI in the catches with each of these three gears. From the table it is apparent that the longlines take more old cod than the handlines and the pound nets. Pound nets yield more young cod than the two other gears.

Age Group	III-VI	VII-X	XI-XVI	No.	Mean Length cm.
Year-class	1954-51	1950-47	1946-41		
Longline	40.4	<u>47.1</u>	12.4	121	60.3
Handline	44.3	<u>53.9</u>	1.8	113	58.0
Pound net	<u>61.5</u>	38.5	-	192	54.5

...../7.

II. East Greenland.

From 9 August to 24 September researches were carried out in SE Greenland waters from "Adolf Jensen". The work was concentrated mainly between 63°NL and 66°NL.

Off Angmagssalik (65°35'N, 37°35'W) large concentrations of cod were found. At Kungmiut in the Angmagssalik Fjord (65°51'N, 37°03'W) the concentrations were somewhat smaller. In all 681 cod were aged, of these 589 were collected by "Adolf Jensen" and 92 by the leader of the fisheries at Skjoldungen. The material includes five samples (nr. 1-5, Figure 5), and will be presented in tabular form in the "Sampling Yearbook, 1957".

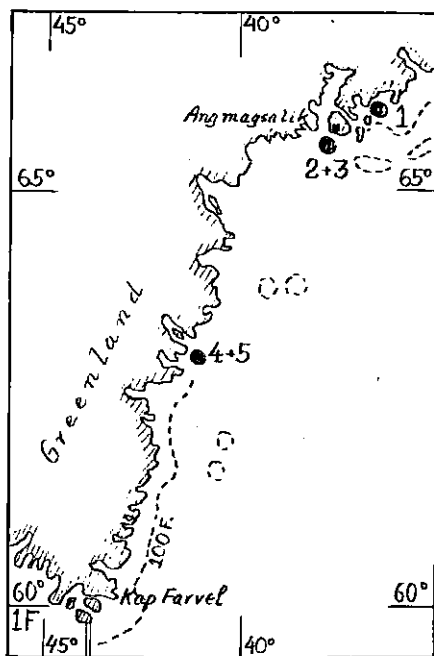


Figure 5. Position of samples of cod from East Greenland waters.

These two samples are completely different from the samples nr. 1 and 2 as they include mainly cod older than the X-Group (1947). In nr. 3 and 4 these old cod constitute 75 and 66%. The 1942 year-class makes up about 20% in both samples. The old 1936 and 1934 year-classes are, however, represented in the samples by few specimens only.

Sample nr. 5 is from Greenlanders' catches with handline in the end of September. Also this sample contains mainly old cod. 81% were made up of the 1947 and older year-classes. The 1942 year-class was the largest with 32.6%. Only in the end of September cod appeared in the Skjoldunge Sound in larger quantities. During the investigations in August most of the cod were found on the offshore banks.

Two ripening cod with ovaries containing rather large eggs were caught on the 16th of September off Angmagssalik. Possibly these cod would have spawned in October or November.

...../8.

III. Age at First Maturity - West and East Greenland.

Table 2 gives a survey of the age at first maturity as estimated from otoliths of the 1942, 45 and 47 year-classes from various regions of West and East Greenland. The 1942 year-class was the year-class with the largest number of cod reaching maturity already at age seven. Of the two other year-classes the majority only reached maturity at age eight.

Table 2. Age at first maturity for the three year-classes 1942, 1945 and 1947 from otolith observations made in 1957, Greenland.

Banks (Subdivisions 1A-1D)														
1942 year-class					1945 year-class					1947 year-class				
age	no.	%	no.	%	age	no.	%	no.	%	age	no.	%	no.	%
6	5	20.8	2	15.4	6	1	5.3	1	3.8	6	2	1.1	2	1.2
7	11	45.8	6	46.2	7	7	36.8	8	30.8	7	90	51.7	53	32.1
8	8	33.3	3	23.1	8	8	42.1	13	50.0	8	57	32.8	82	49.7
9	-	-	2	15.4	9	1	5.3	4	15.4	9	16	9.2	26	15.8
10	-	-	-	-	10	1	5.3	-	-	10	-	-	1	0.6
11	-	-	-	-	11	1	5.3	-	-	-	-	-	-	-
Total	24		13			19		26			174		165	
mean age		7.1		7.4			7.8		7.8			7.4		7.7

North (Subdivisions 1A-1D)														
age	no.	%	no.	%	age	no.	%	no.	%	age	no.	%	no.	%
6	16	25.0	9	13.2	6	2	4.0	-	-	6	3	1.2	22	6.0
7	31	48.4	29	42.6	7	4	8.0	3	5.4	7	8	3.3	1	0.3
8	9	14.1	17	25.0	8	12	24.0	18	32.1	8	74	30.1	82	22.2
9	7	10.9	12	17.6	9	25	50.0	27	48.2	9	110	44.7	162	43.9
10	1	1.6	1	1.5	10	7	14.0	8	14.3	10	49	19.9	93	25.2
11	-	-	-	-	11	-	-	-	-	11	2	0.8	9	2.4
Total	64		68			50		56			246		369	
mean age		7.2		7.5			7.4		7.7			7.8		7.6

South (Subdivisions 1E and 1F)														
age	no.	%	no.	%	age	no.	%	no.	%	age	no.	%	no.	%
6	-	-	-	-	6	-	-	1	6.7	6	-	-	3	5.8
7	6	100.0	1	50.0	7	2	10.0	1	6.7	7	5	8.6	2	3.8
8	-	-	1	50.0	8	7	35.0	4	26.7	8	27	46.6	18	34.6
9	-	-	-	-	9	8	40.0	4	26.7	9	24	41.4	24	46.2
10	-	-	-	-	10	2	10.0	2	13.3	10	2	3.4	5	9.6
11	-	-	-	-	11	-	-	3	20.0	11	-	-	-	-
Total	6		2			20		15			58		52	
mean age		7.0		7.5			7.7		7.6			7.4		7.7

Table continued/9.

Table 2 (continued)

<u>Godthåb Fjord</u>														
<u>1942 year-class</u>				<u>1945 year-class</u>				<u>1947 year-class</u>						
age	no.	%	no.	%	age	no.	%	no.	%	age	no.	%	no.	%
	♂♂		♂♂			♂♂		♀♀			♂♂		♀♀	
6	7	22.6	3	13.6	6	18	24.3	14	30.4	6	5	20.0	4	15.4
7	18	58.1	8	36.4	7	36	48.6	18	39.1	7	10	40.0	6	23.1
8	5	16.1	7	31.8	8	17	23.0	12	26.1	8	7	28.0	12	46.2
9	-	-	3	13.6	9	3	4.1	2	4.3	9	3	12.0	3	11.5
10	1	3.2	1	4.5	10	-	-	-	-	10	-	-	1	3.8
Total	31		22			74		46			25		26	
mean age		7.0		7.6			7.1		7.0			7.3		7.7

<u>East Coast</u>														
age	no.	%	no.	%	age	no.	%	no.	%	age	no.	%	no.	%
	♂♂		♀♀			♂♂		♀♀			♂♂		♀♀	
6	-	-	4	8.2	6	-	-	2	8.3	6	-	-	-	-
7	14	60.9	23	46.9	7	4	40.0	4	16.7	7	7	29.2	4	9.3
8	8	34.8	19	38.8	8	6	60.0	9	37.5	8	11	45.8	22	51.2
9	1	4.3	2	4.1	9	-	-	6	25.0	9	3	12.5	11	25.6
10	-	-	1	2.0	10	-	-	2	8.3	10	-	-	1	2.3
11	-	-	-	-	11	-	-	1	4.1	11	-	-	-	-
Total	23		49			10		24			24		43	
mean age		7.4		7.4			7.6		8.2			7.8		8.2