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AGE ANALYSIS OF HOODED SEALS IN SOUTH GREENLAND

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ABSTRACT

Samples of 234 jaws for age analysis of hooded seals in South Greenland 1971 are presented and the results discussed.

The samples are considered representative for the catches in South Greenland 1971. The age analysis shows that young and younger animals occur in small numbers. Samples from four localities differ from each other in respect to age composition and sex ratio, but this fact is thought to reflect differences in time of arrival or migration patterns of the seals. Previous samples from South Greenland and samples from other parts of Greenland are mentioned, but are too small to give any definite evidence for other age compositions of catches in Greenland than found in the 1971 South Greenland sample.

The age composition of hooded seals caught in South Greenland are very like the composition of moulting animals in the Denmark Strait, but shows lower percentages of one year old animals of both sexes and two years old females.

Provisional estimates of mortality rates based on the South Greenland sample are lower than estimates made for hooded seals in the Denmark Strait before 1960, but more like mortality rates found for breeding stocks in the 60'ies.

New data on hunting periods, areas and methods are presented. They confirm and supplement previous statements in literature. Hunting statistics are thought to give a reliable picture of catches of hooded seals in South Greenland.

The need for further sampling and collecting of data is stressed.

I. Hunting of Hooded Seals in Greenland.

The most important species to the seal hunters of Greenland are ringed seal (*Pusa hispida*), harp seal (*Pagophilus groenlandicus*) and hooded seal (*Cystophora cristata*), of which more than 50,000, some 5,000-10,000 and between 2,000 and 3,000 respectively are caught annually.

Information on the size of the catches comes partly from the Royal Greenland Trade Department's lists of purchased products, partly from the Greenlanders' lists of game caught in Greenland. Although both are defective they give a reliable impression of the size, variation and distribution of the catches.

The major part of the Greenland catch of hooded seals (about 40%) takes place in South Greenland, i.e. the districts of Julianehåb, Narssaq and Nanortalik. Second most important area is Southeast Greenland (Angmagssalik district) accounting for about 30% of the total catch. The remaining 30% are caught in different parts of West Greenland with Umanak and Upernavik districts (NW Greenland) as the more important areas (Fig.1).

The hunting season in South Greenland is from late April to mid June. At this time of the year the animals are in good condition: "The fat, south-migrating hoods". Formerly "The lean, north-migrating hoods" were of similar importance to the hunters of South Greenland in July and August, but this hunting is now of little importance (see Fig. 2).

In Angmagssalik district the hunting for hooded seals is going on mainly in July and August immediately after the moult in the Denmark Strait, but a few animals are caught in the autumn and throughout the winter.

The Northwest Greenland hunt for hooded seals takes place as by-catch to other seal hunting, especially from August to October.

In 1953 jaws of harp seals and hooded seals were collected by Greenland Fisheries Investigations in order to get knowledge of the age composition of Greenland catches. These studies were resumed in 1970 and 1971 parallel to collection of other information on recent hunting practise and hunting statistics. Some preliminary results of these studies are presented in the following

II. Investigations on Hooded Seals in South Greenland 1971.

1. Materials and methods.

Collecting of material was arranged with the assistance of the local representatives of the Royal Greenland Trade Department at four settlements in South Greenland: The towns Julianehåb and Nanortalik, and the outposts Qagssimiut and Sydprøven.

The material consists of lower jaws of hooded seals and reproductive organs of mature females. The latter have not yet been studied and accordingly no results of reproductive studies can be presented in this paper. The size of the samples appears from Table I, in which also previous samples of hooded seals in Greenland are listed.

The jaws were preserved in salt. After arrival to the laboratory they were boiled for some time, the canines were extracted, cut transversely, and sections imbedded on slides for microscopy. The method is very similar to the one described by Fisher and Mackenzie (1954).

The interpretation of the sections may in some cases be difficult, but it is our opinion that animals below ten years can be aged accurately, while animals of 11-15 years are determined within a range of ± 1 year, older animals with an uncertainty of two years. Deviation from this rule may occur, young animals being difficult or old individuals very easy to read.

Each jaw was provided with a pasteboard label asking the hunter to give several data on the animal and the hunting conditions. As a rule the answers give valuable information, but some data, e.g. on length of the seal, are not reliable.

The data derived from the labels were supplemented by information collected by the author in South Greenland from mid April to early June. Qagssimiut (60°47'N. 47°10'W.) was visited 20-30 April, and Julianehåb

17-20 April and again 30 April - 11 May. During the stay in Sydpreven from 16-29 May a visit on the hunting place Angissoq near Sagalît (60°15'N, 45°30'W.) was established (21-25 May). Nanortalik was visited from 12-15 May and 31 May - 1 June with a short visit on the hunting place Nunarsuit in the northern part of the Kitsigut Islands (60°03'N, 45°16'W.).

The time of the visits was well-chosen, as the various localities were visited at the beginning of the hunting seasons, which offered good opportunity to give instructions and demonstrations of sampling practise before hunting activity was at its maximum.

Some data from the author's personal investigations in South Greenland and from the pasteboard labels will be mentioned below, before the result of the age analysis is discussed.

2. Data on hunting practise.

Hunting season of the various settlements or districts may be shown by using the lists of game, as demonstrated by Rosendahl (1961).

Fig. 3 shows the mean catch of hooded seals in South Greenland 1963-69, broken down by half-months and subdistricts. No definite change from the statements of Rosendahl in the early 50'ies seems to have occurred, although the maximum of the hunting activity may have fallen a little earlier in recent years.

The hunt in Qagssimiut, Narssaq and Julianehåb areas begins as a rule in late April, reaches its maximum in mid May and comes rather abruptly to an end in the first days of June. A few animals are caught early in April and some are taken after the main hunting season, especially in the Julianehåb area.

In Sydpreven and Nanortalik areas the catch in April is insignificant and the major part of hooded seals are taken from late May to mid June with a few catches in the following one and a half month.

This general picture of hunting activity may vary from year to year, mainly caused by ice situation and weather conditions. The catch in Qagssimiut was thus exceptional good in late April, but a period of storm and rain in mid May brought the hunt to cessation at a time, where it should normally be at its maximum. (Observations in 1971).

A study of the material collected in 1971 shows, that the samples seem to represent the hunting periods very well. The early days of hunt in the Nanortalik area are rather poorly represented, probably because the author's demonstration of sampling practise did not take place till the last day of May.

Hunting methods and hunting areas can also be illustrated by data from the investigations in 1971. All seals were shot and only a single animal was reported harpooned too. In the northern areas most animals were shot from cutters or small boats with outboard motor; in few cases rowboats or kayaks were used. In the southern areas, however, these small boats were most important or the seals were shot from land.

This difference is easily explained by the organisation of the hunt in the two areas. In Qagssimiut the hunters leave the outpost in the morning in motorboats and return in the evening. In Sydpreven and Nanortalik areas many hunters settle down with their family the whole season on traditional hunting places situated on tiny islands in the middle of the ice. They live in huts of turf and stone or in tents for a month or two. From these dwellings they can often shoot the seals from the shore or they may go away in kayaks or dinghies out in the ice, but as a rule not far from the dwelling places.

The hunting statistics for the last fifteen years were studied rather closely for each subdistrict separately and for South Greenland as a whole. The figures for Qagssimiut and Sydpreven are considered very reliable, and as the variation of catches for the remaining settlements are in good agreement with that of one of these or both, it is concluded that the lists of game give rather good evidence of the catch of hooded seals in South Greenland although the figures may be too low for some of the localities, e.g. Julianehåb town.

It has not been possible to show any immediate correlation between the catches in the breeding areas and the hunt in South Greenland. However, it is remarkable that the latter increased considerably a few years after the cessation of the hunting in Denmark Strait.

Increasing catches in South Greenland may also be related to changing ice conditions. It is a well known fact that the East Greenland drift ice in recent years have reached farther north along the coast of West Greenland, and the amount of drift ice in South Greenland may be a factor with influence on the occurrence of hooded seal in this area.

As changing rate of exploitation or climatic fluctuations may influence long-term variation in catches of hooded seals in South Greenland, the most likely cause for varying catches between years is the actual ice and weather conditions in any particular year.

3. Sex ratio and age analysis of samples in 1971.

Results of age determination are presented in Table II and illustrated by Figs. 4, 5 and 6.

For six females jaws were not collected and on another two the canines were spoilt by bullets, so that no more than 109 females could be determined to age. For one animal the sex was not reported.

Direct comparison with the catches in 1971 is possible only for Qagssimiut, where the sample amount to 53 per cent of the catch. To judge from catches in previous years the samples from Julianehåb, Sydpreven and Nanortalik correspond to 10-20, 50-60 and 25-40 per cent of the catch respectively. This result must be considered satisfactorily and sufficient to give a basis for some conclusions on the composition of catches in South Greenland.

The same is not the case with other samples from Greenland, but

some of these may represent a few localities rather well, and they may thus give valuable supplement to the 1971 samples from South Greenland.

The combined samples from South Greenland in 1971 indicate that males and females are approximately equal in numbers in the catches.

This is not the case, when samples from different hunting areas are looked upon separately. In the Qagssimiut, Julianehåb and Sydprøven areas the females amount to 34, 29 and 38 per cent respectively, but in the Nanortalik area they constitute as much as 77 per cent of the sample.

The records of the hunters must be regarded as reliable in respect to the sex of animals. It may be argued that the circumstance, that the payment for collecting reproductive organs of mature females was almost seven times as high as the payment for jaws alone, could have lead to dominance of females in the samples. However, it is difficult to explain, why this circumstance should influence the samples only in the Nanortalik area, not on the three more northern localities.

Furthermore, observations by the author during the visits to Qagssimiut and Sydprøven confirm, that catches in these areas actually were dominated by males.

Finally, a close analysis of the sample from Sydprøven shows a trend towards increasing percentage of females during the hunting season from about 25 per cent in late May to around 50 per cent in early June.

The conclusion is, that males seem to dominate in catches of the more northern areas at the beginning of the hunting season, whereas females are more numerous in the southern areas later on. Whether this difference is due to later arrival or more southern migration routes of most females, is an open question. Another question is, whether the picture shown by the samples is a general pattern or something special for the occurrence in 1971 of hooded seals in South Greenland.

Future samples and investigations may throw more light on this problem; previous samples are too small to give any evidence in this connection.

The age distribution is to some extent different for separate samples, too. In the Qagssimiut area age-groups 0-3 and 4-6 constitute 9 and 19 per cent of the samples respectively. Although small in figures the material account for more than 50 per cent of the catch in 1971, and the faint representation of youngs and younger animals can hardly be accidental. The Julianehåb sample shows tendency to a similar age distribution, but is too small to give any significant evidence.

The samples from Sydprøven and Nanortalik both lack the youngs of the year and show very faint representation of age-group one. Two years old animals are better represented (10-15%, prevaillingly males). The representation of age-group 3 plus 4 is good (25-30%), at Sydprøven prevaillingly males, at Nanortalik exclusively females. The following six age-groups (5 to 10) are also well represented (altogether 42-45%), dominated by males at Sydprøven and by females at Nanortalik. Older animals amount to around 14 per cent of the sample in both areas, at

Sydpreven equally represented by males and females, at Nanortalik exclusively by females.

To summarize it may be pointed out, that the age composition of the samples from the four localities differ from each other, but separately seem to represent the catches of respective areas very well, so that in sum they may give a rather reliable picture of the composition of catches in South Greenland for the year 1971.

This catch of hooded seals is characterized by a very low representation of young of the year and one year old animals. The same is the case with two years old females, whereas this age-group apparently is fully represented among males.

The previous year classes, at least age-group 3 to 15, occur in the material of females with the expected percentages. The same seems to some extent to be the case for the males, although the age-groups 3, 6 and 11 are rather faintly represented, whereas age-group 7 and probably also age-groups 2 and 4 are relatively strongly represented. For both sexes age-group 14 (year-class 1957) seems to be better represented than the nearest preceding and following year classes.

4. Comparison with other samples from Greenland.

As shown in Table I age samples from South Greenland have previously been taken in 1953 and 1970. These are presented in Table III.

The 1970 sample totals 42 jaws, 11 females and 31 males, and comes from Qagssimiut, Julianehåb and Nanortalik (18, 16 and 6 jaws respectively). Most animals were caught in late May, a few from the Julianehåb sample in mid June to late August ("lean hoods"). Females constitute no more than 25 per cent of the animals caught in May, which is in good agreement with the 1971 sample. As for the animals from July and August, no material is available for comparison.

Almost every age group between 0 and 20 is represented in the sample. The five younger age groups are faintly represented, and age-groups 5 to 10 seem to dominate. The age composition thus resembles the Qagssimiut sample for 1971.

There is no reason to postulate, that catches in 1970 differed considerably from the 1971 catches; the samples just cover only part of the hunting season in 1970 and are very small for the southern areas.

For the 1953 sample of 50 jaws sex was not reported. The material consists of samples from Qagssimiut, Sârdloq (Julianehåb), Sagdlit (Sydpreven) and Nanortalik (15, 4, 30 and 1 jaw respectively). In the two northern areas sampling was done in April and early May, in the southern areas in late May and early June.

There are no young of the year and just a few 1 and 2 years old animals in the sample. Age-groups 3 to 6 are very well represented, and few animals older than ten years were sampled. This age composition resembles the 1971 sample from the Sydpreven area, and this region

account for 60 per cent of the 1953 sample.

Neither of the previous samples are big or representative enough for separate analysis of the catches in 1953 and 1970, but there is no evidence for the opinion, that they should differ considerably from the catches in 1971. A common feature for the samples is a low representation of the younger age groups. Future investigations may show, whether this is a general characteristic for the catches of hooded seals in South Greenland.

From West Greenland only one sample of hooded seal is available. Of this sample 54 jaws were from Umanak and Upernavik districts (Table III).

Most of these animals were caught in August and early September, which as mentioned is the most important period for hunting hooded seals in Northwest Greenland. To judge from the hunting statistics (Fig. 1) the sample account for a rather great deal of the catch.

Although the sample is small in number, it may thus give some evidence of the composition of catches in this area. Youngs of the year are absent and immature young animals few, whereas the younger age groups of mature seals seem to dominate in catches, in which also old animals occur.

Three samples from the Angmagssalik area in East Greenland exist (Table III). The first one (1953) consists of nine animals only, of which six were youngs of the year.

Of the 1970 sample nine per cent were youngs, and age-groups 1 and 2 accounted for about 30 per cent. Most age groups between 3 and 20 were represented.

The fact that 67 per cent of the total sample were males may in part be due to misunderstanding in connection with sampling instruction. Furthermore, part of the material comes from occasional winter hunt and consists merely of males. However, most animals were caught in the main season from late July to early August, and among these some 50 per cent were males.

Similar sex ratio is found in the 1971 sample, however, with a different age composition. The 1971 sample is dominated by younger mature females and a bit older males, whereas age-groups 0-3 occur in small numbers.

It is to be hoped that future sampling will give better information on composition of catches in both West and East Greenland.

5. Estimation of mortality.

On the basis of the age samples from South Greenland 1971 some estimates of mortalities were made.

In Fig. 7 logarithms of the strength of each age group (numbers as per cents) is plotted against age. A straight line is fitted to the plots by regression. As the younger age-groups (0-2) as mentioned do

not seem to be fully represented in the sample, the values for these were not used in the calculations. Neither were the values for age-group 16 and older, as the representation of these year classes in this small sample may be accidental, and as the determinations for old animals are more uncertain.

The remaining plots (corresponding to age-groups 3 to 15) are scattered along the line the slope of which may be taken as an expression of total annual mortality (mortality coefficient Z). For the total sample a mortality of 12.9 per cent ($Z = 0.138$) was found. When only the plots for age-groups 5 to 10 were used a value of 13.9 per cent ($Z = 0.150$) was found.

Similar estimates made for females of age 3 to 15 and age 5 to 10 gave mortalities of 14.3 per cent ($Z = 0.155$) and 16.5 per cent ($Z = 0.181$) respectively. For males mortalities of 11.6 ($Z = 0.123$) and 10.6 per cent ($Z = 0.112$) were estimated for age-groups 2 to 16 and 5 to 10 respectively.

All values thus point to a total annual mortality for hooded seals around 13.5 per cent (11 to 17) for animals older than two years. There are indications of higher mortalities for females than for males.

Some of the preconditions for using the above method for estimating mortalities may not be fulfilled, e.g. equal production of young in any year and relative equal representation in catches, but since no attempt has previously been made to estimate mortalities on the basis of samples from Greenland, it is found worth while to present a provisional estimate in this paper.

III. Discussion.

Since 1954 age samples of hooded seals from the breeding areas and from the moulting patches in the Denmark Strait have been studied by Canadian, Norwegian and Russian scientists. Results from the Jan Mayen area and the Denmark Strait have been published by Rasmussen (1957, 1960 and 1962), Øritsland (1959 and 1964) and have been presented in several reports to commissions for seal fisheries. Data from the Newfoundland area are published by Sergeant (1967).

Sex ratio in the Jan Mayen samples seems to be close to 1:1, eventually with a faint surplus of males (cf. Øritsland, 1964). Age-groups 1-3 occur only in small numbers and so does 4 years old males, while females of this age groups are better represented. In most samples 5 years old females dominate (15-20%) with decreasing percentages for the following age groups. Males are not dominated by a single year class; each age-group between 5 and 15 accounts for about 5% of the sample, whereas older males occur in decreasing numbers with increasing age.

Age composition of the samples from the Denmark Strait are more like the one found in South Greenland.

In some samples the young of the year occur in greater numbers,

but as a rule they are few. The following age groups seem to occur in varying numbers in samples from various years. As stated by Rasmussen (1962) the immature, 1-4 years old animals seemed to account for an increasing percentage of the catches from 1956 to 1960.

Later age analyses confirm that age-groups 1-4 account for more than 50% of the samples. Mutual proportions between these four age groups vary from sample to sample, but the following age groups occur in gradually decreasing percentage, corresponding to natural falling off from the stock. No definite difference in age composition of males and females is found, apart from a relative heavier representation of 1-4 years old females.

The age composition of the sample of hooded seals from South Greenland is thus very similar to the one found for the moulting patches in the Denmark Strait, but one year old animals of both sexes and two years old females seem to be less good represented in South Greenland catches. It may be so that these young animals do not pass through the South Greenland hunting areas on their way from Newfoundland to Denmark Strait, but either follow a more direct migration route to the known moulting patches or accomplish their moulting in some other regions, the position of which is unknown.

Only one small sample from West Greenland is available and do not support the theory that the young occur in great numbers in Northwest Greenland. However, they may follow migration routes that keep them away from coastal waters, where hunting takes place.

The values for total annual mortality estimated from the South Greenland material are lower than the values mentioned by Rasmussen (1962).

One reason for this difference may be that the South Greenland sample is too small to give reliable estimate of mortalities, and that a weak representation of young animals in the sample may give too low estimates.

Furthermore it is possible that cessation of catches in the Denmark Strait from 1961 onwards now has resulted in lower mortality rates than in the 50'ies. Some of the more recent samples from the Denmark Strait may render this explanation probable.

Finally it is most likely that mortality rates of the Newfoundland stock of hooded seals are lower than mortality rates of the Jan Mayen stock, which in all probability is more heavily exploited. This opinion agrees very well with the conclusion of Sergeant (1967). However, the mortality rate found for female hooded seals in South Greenland is more like the value for the Jan Mayen area mentioned by Sergeant than the one for the Newfoundland stock, whereas the mortality rate estimated for males in South Greenland is lower than corresponding values for both breeding areas.

This inconsistency may simply be explained by uncertainty of the method used for estimating mortality rates in this paper. The need of

more samples from Greenland is obvious in this respect.

Altogether, future sampling and collecting of data are necessary to show, whether the provisional results presented in this paper are general feature of the catches of hooded seals in South Greenland.

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Table I. Material of hooded seals caught in Greenland.

Locality	Year	Jaws				Repr. organs.			Individuals.	
		♀♀	♂♂	?	total	♀♀	♂♂	total	No.	% ♀♀
Qagssimiut	1971	16	31	-	47	16	-	16	47	34.0
Julianehåb	-	5	12	-	17	5	-	5	17	29.4
Sydproeven	-	38	62	1	101	27	-	27	101	38.0
Nanortalik	-	52	17	-	69	40 6+)	-	46	75	77.3
SOUTH GRL.	1971	111	122	1	234	88 6+)	-	94	240	49.0 (48.8-49.2)
Qagssimiut	1970	5	15	-	10	5	10	15	16	27.0
Julianehåb	-	4	12	-	16	1	3 1+)	5	17	25.0
Nanortalik	-	2	6	-	8	1	4	5	8	25.0
SOUTH GRL.	1970	11	34	-	42	7	17 1+)	25	43	25.6
Qagssimiut	1953	-	-	15	15	-	-	-	15	-
Julianehåb	-	-	-	4	4	-	-	-	4	-
Sydproeven	-	-	-	30	30	-	-	-	30	-
Nanortalik	-	-	-	1	1	-	-	-	1	-
SOUTH GRL.	1953	-	-	50	50	-	-	-	50	-
WEST GRL.	1953	-	-	61	61	-	-	-	61	1
EAST GRL.	1971	22	24	-	46	-	-	-	46	47.8
EAST GRL.	1970	20	45	1	66	5 2+)	11 8++)	26	66	32.0 (32.4-33.8)
EAST GRL.	1953	-	-	9	9	-	-	-	9	-

+) reproductive organs without corresponding jaw.

++) eight jaws without number of corresponding reproductive organs.

Table 11. Age Samples of Hooded Seals, South Greenland 1971.

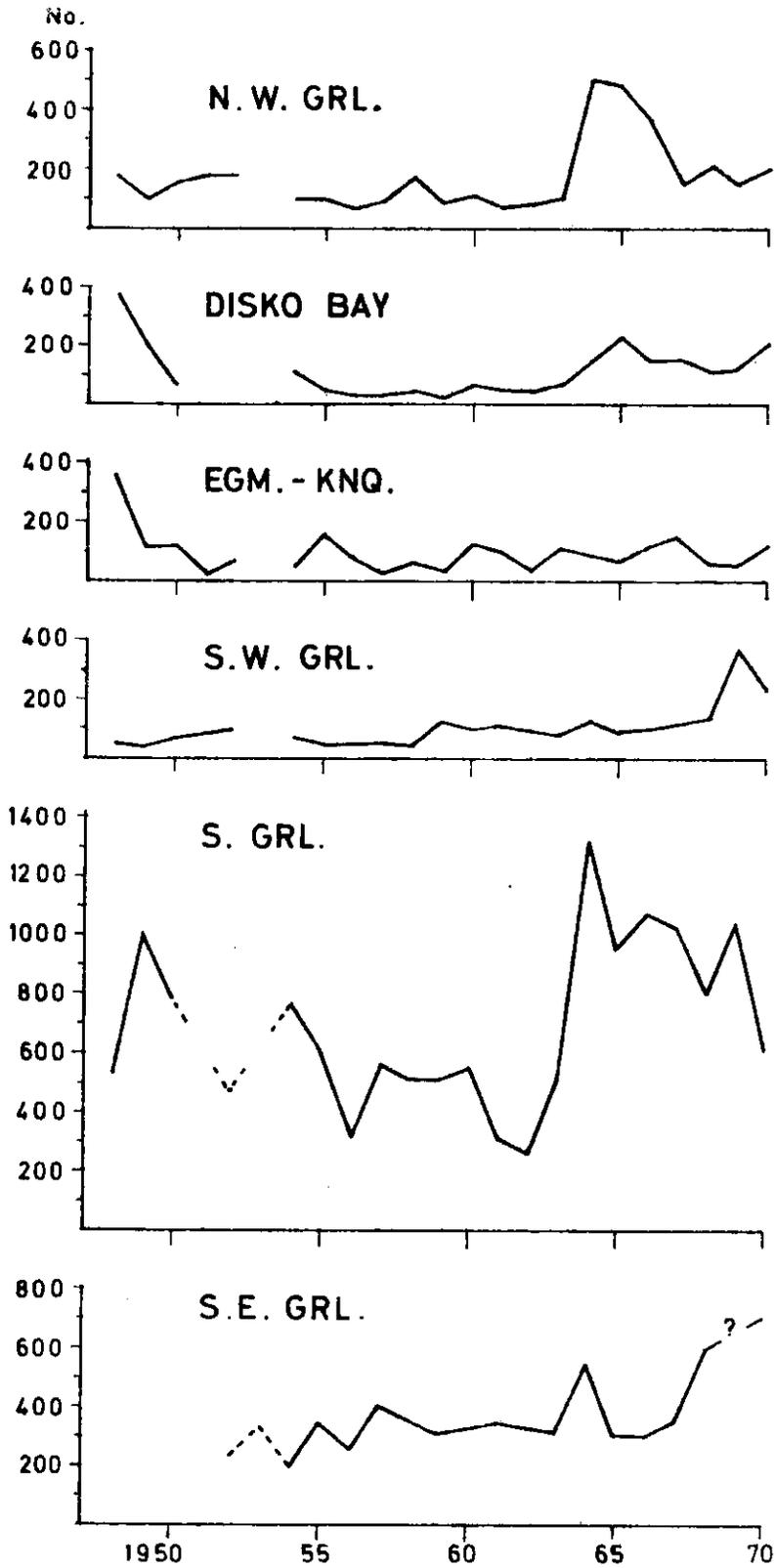
Age	Year	♀♀		♂♂		Sex ?	T o t a l				
		No.	%	No.	%		No.	No.	%	% ♀♀	% ♂♂
0.2	1971	0	0.0	2	1.6		2	0.9	0.0	0.9	
1.2	1970	1	0.9	3	2.5		4	1.7	0.4	1.3	
2.2	1969	6	5.5	19	15.6		25	10.8	2.6	8.2	
3.2	1968	19	17.4	8	6.6		27	11.6	8.2	3.5	
4.2	1967	12	11.0	15	12.3	1	28	12.1	5.2	6.5	0.4
5.2	1966	12	11.0	11	9.0		23	9.9	4.7	5.2	
6.2	1965	10	9.2	6	4.9		16	6.9	4.3	2.6	
7.2	1964	7	6.4	14	11.5		21	9.1	3.0	6.0	
8.2	1963	8	7.3	9	7.4		17	7.3	3.5	3.9	
9.2	1962	5	4.6	7	5.7		12	5.2	2.2	3.0	
10.2	1961	5	4.6	5	4.1		10	4.3	2.2	2.2	
11.2	1960	5	4.6	1	0.8		6	2.6	2.2	0.4	
12.2	1959	3	2.8	4	3.3		7	3.0	1.3	1.7	
13.2	1958	3	2.8	4	3.3		7	3.0	1.3	1.7	
14.2	1957	5	4.6	6	4.9		11	4.7	2.2	2.6	
15.2	1956	2	1.8	3	2.5		5	2.2	0.9	1.3	
16.2	1955	0	0.0	3	2.5		3	1.3	0.0	1.3	
17.2	1954	1	0.9	0	0.0		1	0.4	0.4	0.0	
18.2	1953	3	2.8	1	0.8		4	1.7	1.3	0.4	
19.2	1952	0	0.0	1	0.8		1	0.4	0.0	0.4	
20.2	1951	1	0.9	0	0.0		1	0.4	0.4	0.0	
21.2	1950	1	0.9	0	0.0		1	0.4	0.4	0.0	
Sum	-	109	100.0	122	100.1	1	232	99.9	47.0	52.6	0.4
?	?	8	-	0	-	0	8	-	-	-	-
total	-	117	-	122	-	1	240	100.0	48.8	50.8	0.4

Note: Age 0.2, 1.2, etc. indicates that most animals were caught 1-3 months after breeding period.

Table III. Age Samples of Hooded Seals, 1953, 1970 and 1971.

Age	South Greenland			N.W. Greenl.	East Greenland			Year Classes		
	1953 No.	1970 No.	1971 No.	1953 No.	1953 No.	1970 No.	1971 No.	1953	1970	1971
0+	-	1	2	-	6	6	-	53	70	71
1	5	1	4	1	1	9	-	52	69	70
2	3	-	25	4	-	10	2	51	68	69
3	10	2	27	4	-	4	-	50	67	68
4	5	1	28	6	-	6	6	49	66	67
5	11	4	23	2	-	4	4	48	65	66
6	4	3	16	8	-	4	5	47	64	65
7	-	5	21	6	1	2	6	46	63	64
8	5	6	17	5	-	3	1	45	62	63
9	-	3	12	5	-	-	4	44	61	62
10	1	3	10	-	-	4	3	43	60	61
11	1	1	6	1	-	3	2	42	59	60
12	2	1	7	2	-	2	5	41	58	59
13	-	2	7	1	1	2	3	40	57	58
14	-	1	11	1	-	1	1	39	56	57
15	1	2	5	-	-	3	-	38	55	56
16	-	2	3	-	-	1	2	37	54	55
17	-	1	1	-	-	-	-	36	53	54
18	1	1	4	1	-	1	-	35	52	53
19	-	-	1	-	-	-	-	34	51	52
20	1	2	1	-	-	-	-	33	50	51
21	-	-	1	-	-	-	-	32	49	50
22	-	-	-	1	-	1	1	31	48	49
23	-	-	-	2	-	-	1	30	47	48
24	-	-	-	4	-	-	-	29- 25	-	-
sum	50	42	232	54	9	66	46	-	-	-

Fig.1. Catch of Hooded Seal in Greenland.



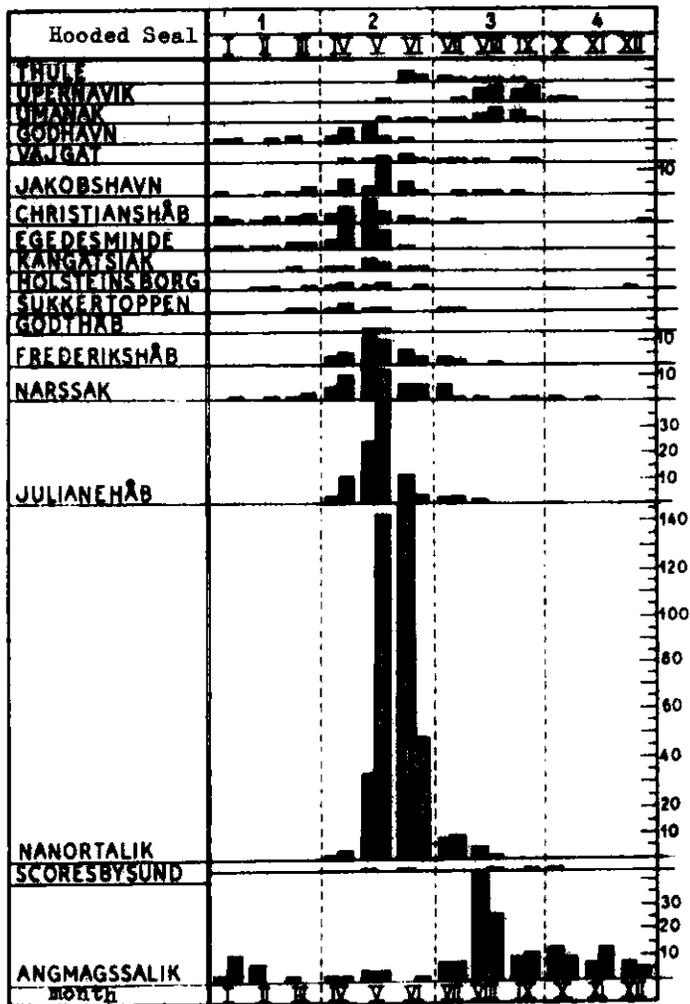


Fig. 2. Average catch per 100 hunters per half-month in the period 1948/49 - 1950/51. (Rosendahl, 1961.)

Fig.3. Catch of Hooded Seals in South Greenland per half - month. 1963 -69.

Samples in Greenland 1971 (per half - month)
 • Catch in 1971
 ♂
 ♀

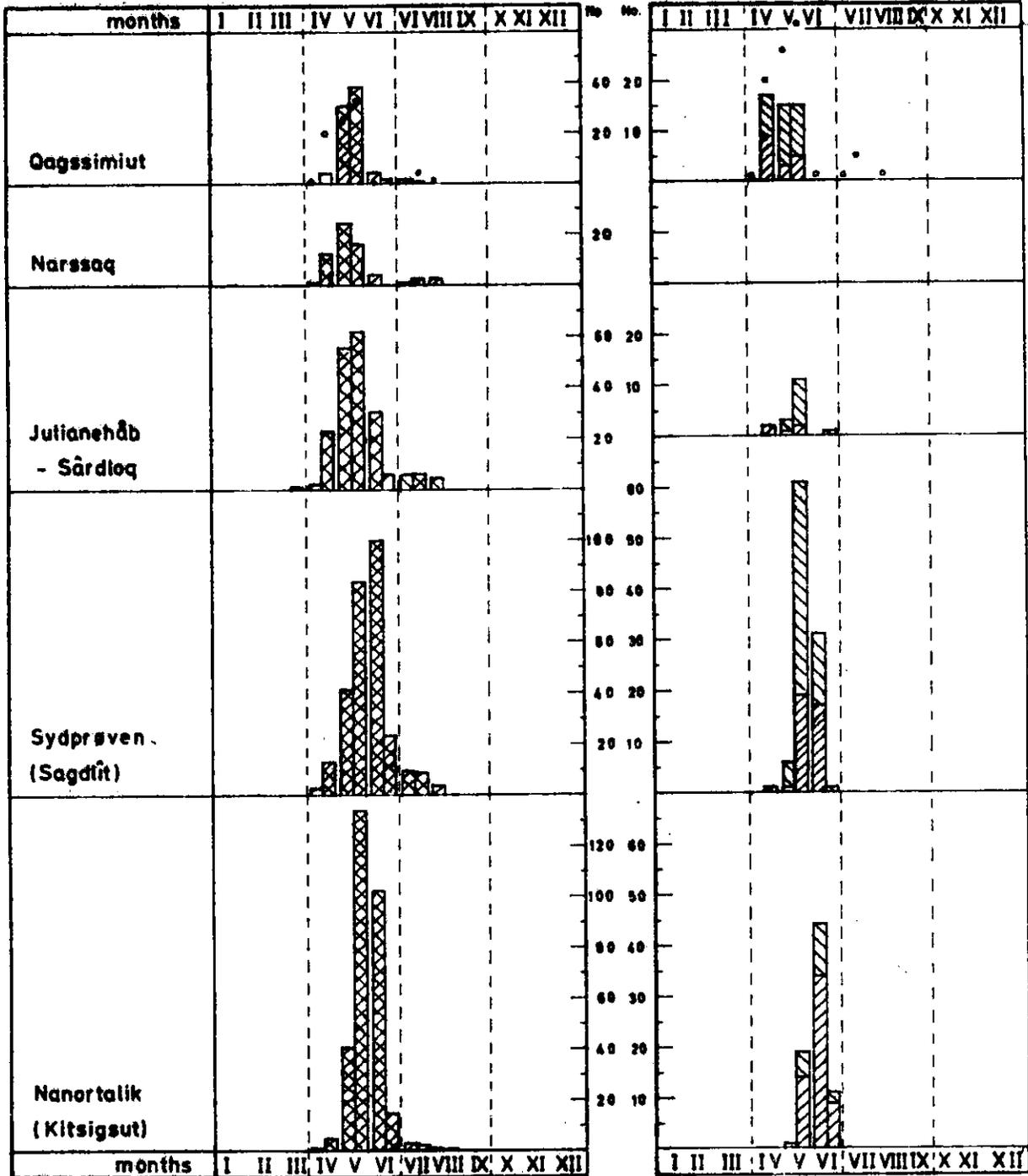


Fig. 4. Age Samples of Hooded Seals.

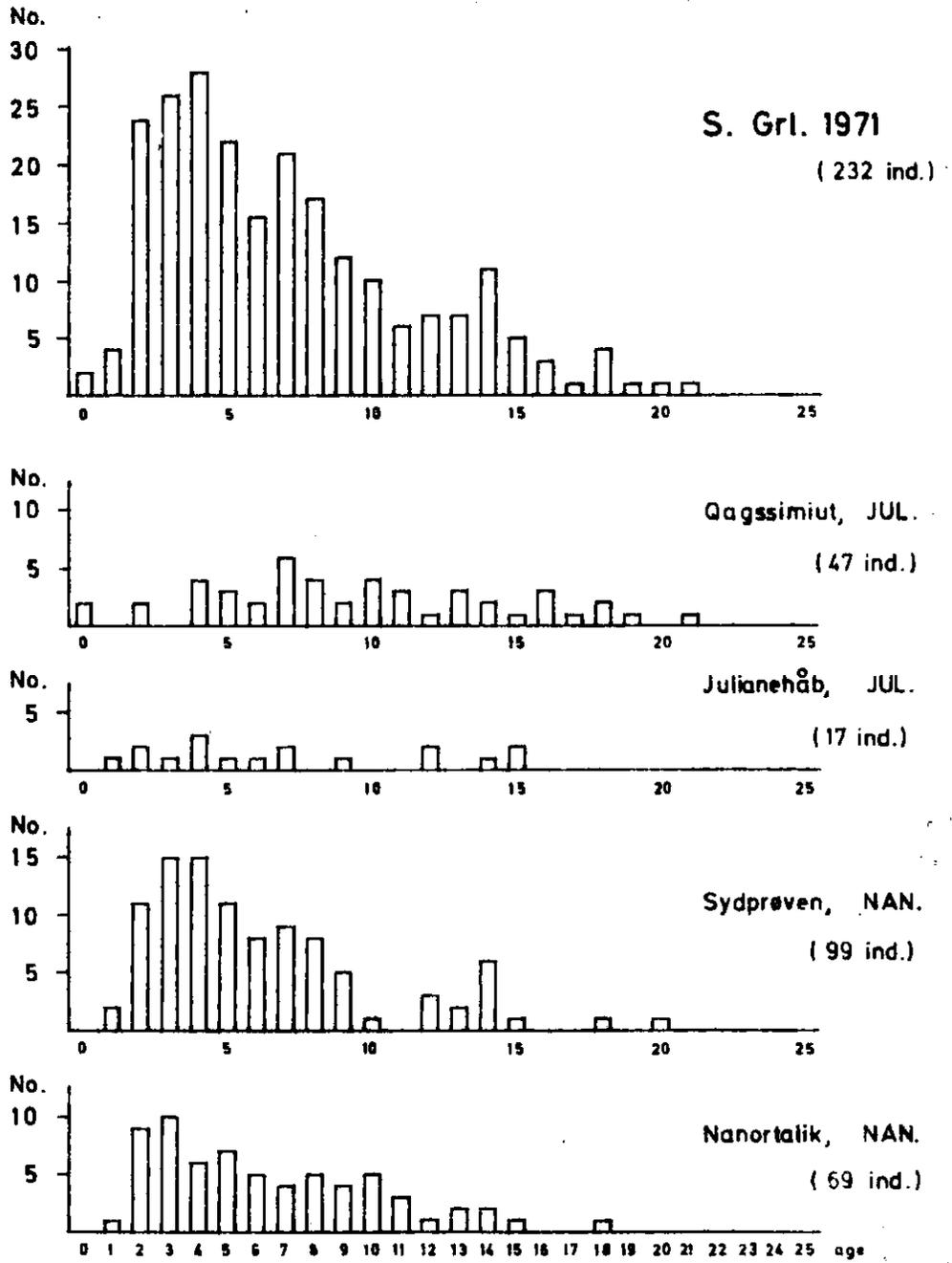


Fig. 5. Age Samples of Female Hooded Seals.

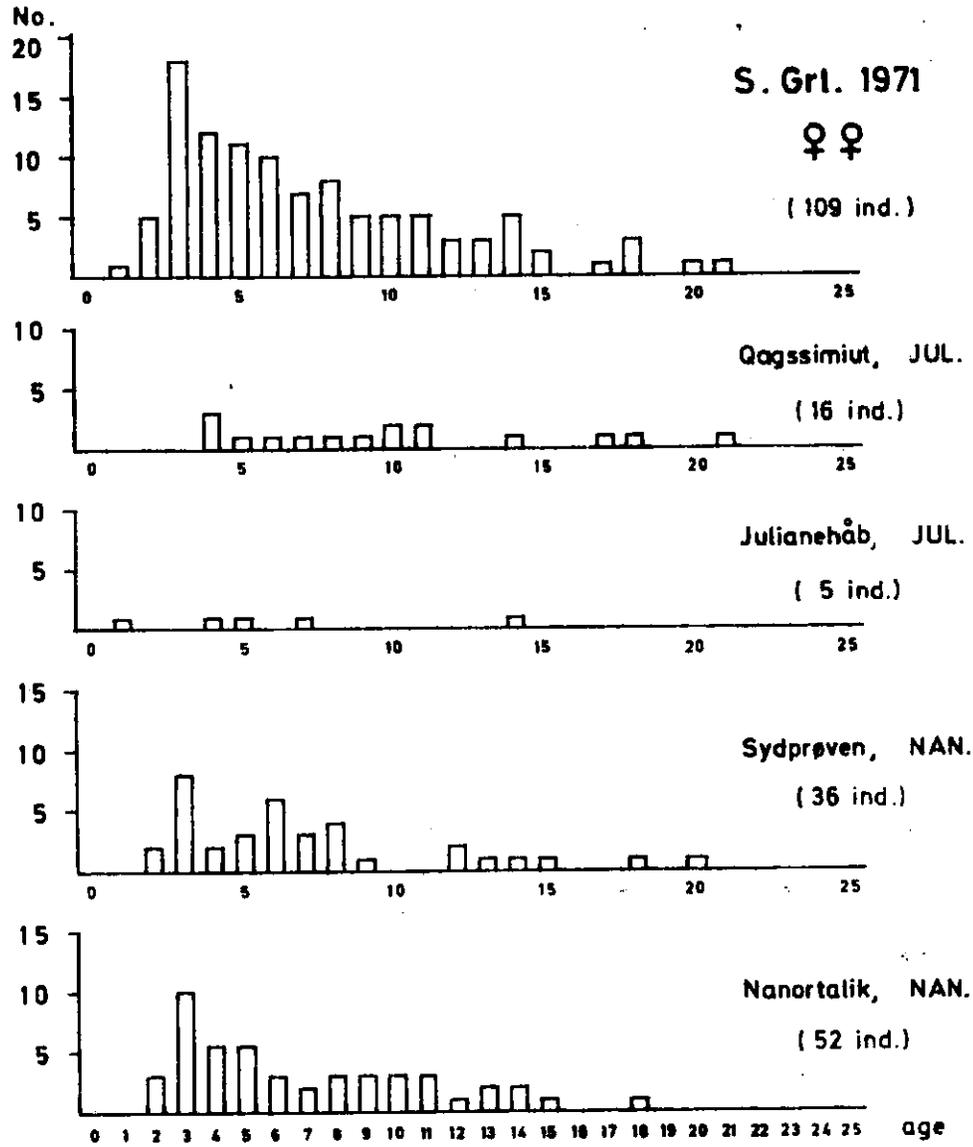


Fig. 6. Age Samples of Male Hooded Seal.

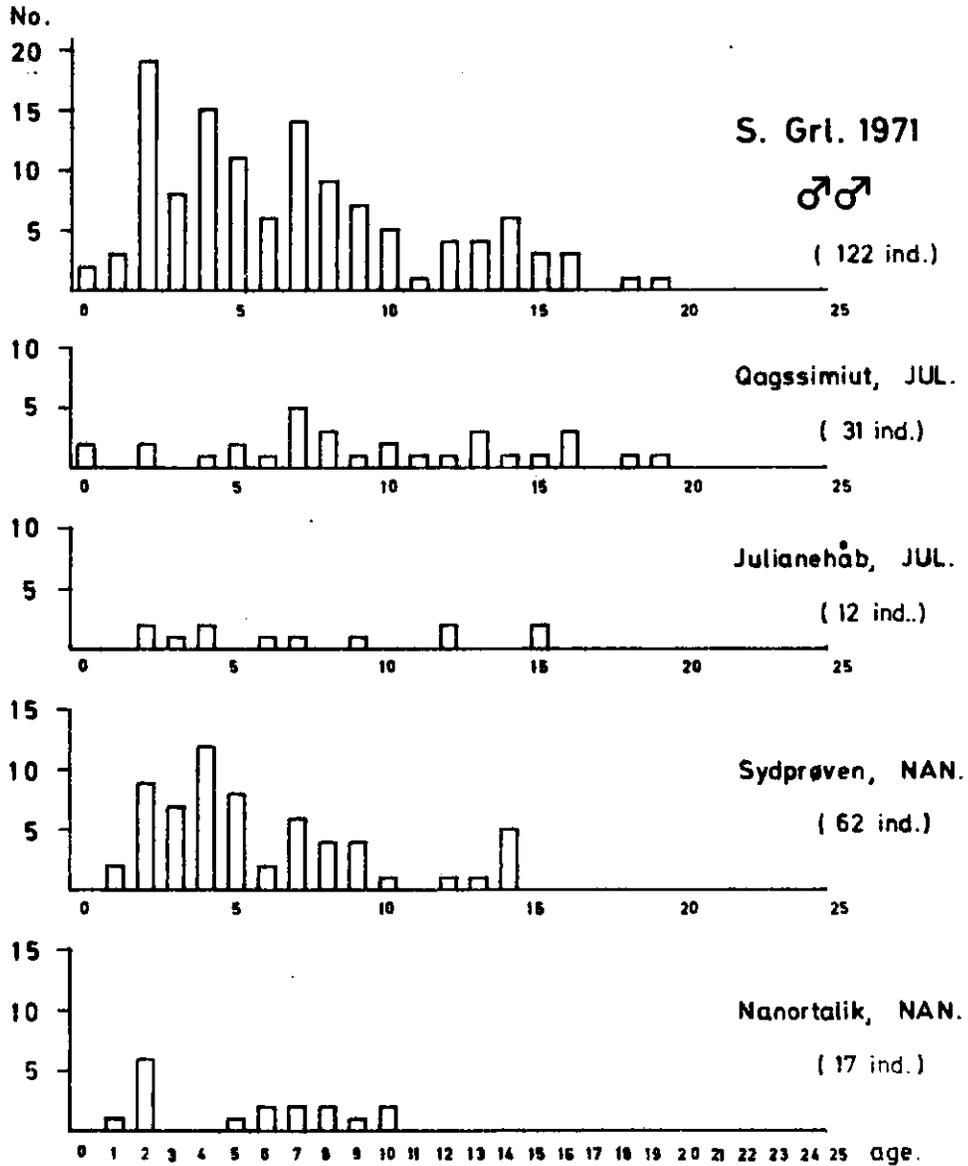


Fig. 7. Estimated Mortality of Hooded Seals.

