Ödsmål, Kville sn, Bohuslän

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THE SWEDISH HERRING FISHERIES IN THE NORTH SEA, SKAGERAK AND KATTEGAT IN 1970

by

Hans Ackefors

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CONTENTS

Introduction

The Swedish landings of herring decreased during 1970 in comparison with 1969. The landings for human consumption amounted to 60 000 tons (cf. table 1). This is a decrease of about 32%. The landings for industrial purposes decreased by 22% to 43 000 tons. The total yield amounted to 103 000 tons, which is a decrease of 28% in comparison with 1969.

Table 1. Herring landed in Sweden and abroad by fishermen from the Swedish west-coast in 1970.

Consumption herring			Industrial herring			Grand
Sweden	abroad	total	Sweden	abroad	total	total
16 157	43 866	60 023	12 490	30 410	42 900	102 923

The fishing for industrial fish has increased in Sweden. In 1970 about 130 000 tons industrial fish were taken by fishermen from the Swedish west-coast. 73% were landed abroad and the rest in Sweden. The percentage herring in catches landed in Sweden was about 30%. The same percentage has been used in order to calculate the amount herring in the industrial catches which were landed abroad. Table 2. shows the catches of consumption herring and industrial herring by month.

Table 2. The amount of industrial herring and consumption herring landed in Sweden and abroad by month in 1970.

	Industrial herring	Consumption herring	Total
January	882	5 616	6 498
February	3 107	4 768	7 875
March	3 991	4 211	8 202
April	3 817	4 368	8 185
May	2 275	1 514	3 789
June	3 539	2 874	6 413
July	3 869	3 707	7 576
August	5 812	6 380	12 192
September	4 722	7 710	12 432
October	3 537	7 676	11 213
November	3 002	4 820	7 822
December	2 617	6 351	8 968
	41 170	60 025	101 195

Due to the limited official Swedish fishery statistics it is impossible to say in what areas the catches have been taken. However, Danish authorities have given information about most of the herring landed in Denmark, and 30 Swedish fishing boats have reported about their catches comprising about 10% of the total Swedish catch of herring (table 3).

Table 3. The fishing areas of the herring landed in Denmark according to Danish authorities. Reports from 30 Swedish fishing boats about their catches, comprising about 10% of the total Swedish catch.

	Danish reports		Swedish reports	
	in tons	%	in tons	%
Kattegat	24 477	40.0	5 622	55.6
Skagerak	13 908	22.7	1 040	10.2
NE North Sea	2 873	4.7	272	2.7
NW North Sea	2 322	3.8	115	1.1
C North Sea	12 725	20.8	1 718	16.9
S North Sea			540	5.3
The Baltic	4 888	8.0	838	8.2
Total	61 193	100	10 186	100

When studying table 3 it is evident that the most important fishing area was the Kattegat in 1970. According to different sources of information I have calculated that about 35 000 tons of herring were taken in this area. The central North Sea and the Skagerak were also important fishing areas. The catch quantities in the two areas were about half of that taken in the Kattegat. The small amounts of herring taken in the NE North Sea are surprising when comparing with the conditions before 1970, when this area was of great importance. In 1970 the total catch for all nations in that area was only 20 000 tons. In the NW North Sea the international herring fleet took about half of the total catch in the North Sea. The main reason for the small Swedish herring catches from this area seems to be that Swedish fishermen have not been so far to the west of Shetland were the great concentrations of herring appeared. Both the southern North Sea and the Baltic have been of a certain significance in 1970. In the Baltic 5 000 tons of herring (about 50% for human consumption) were taken and landed in Denmark according to Danish authorities.

The Kattegat

In the end of 1969 the herring fishery were based on spring spawners in the Kattegat area. In the beginning of 1970 there were taken rather good catches although there were no dense concentrations of herring in the area. The fishery were also hampered of ice in January and especially in February. The samples taken for analyses in the northern Kattegat (K 1 - K 4) consisted mainly of one and two year old herring. The 1967 year class dominated and the analyses indicated that the herring mostly belonged to the autumn spawning North Sea herring (table 4). However, the one year old herring in sample K 1 belonged probably to the Kattegat autumn spawners.

In the beginning of March dense concentrations of herring appeared near the Nidingen light in the northern Kattegat. Pelagic pair-trawlers made good catches at night and bottom trawlers at day. In April there were still concentrations of herring in the area but the big herring were not available for the trawlers, and the catches taken by the pair-trawlers consisted mainly of young herring. Near the coast in shallow areas the purse seiners got the biggest herring although the catches were mixed with small herring. In sample K 5 from the northern Kattegat the autumn spawning 1-group herring and spring spawning 0-group herring were most abundant (cf. table 4). In the end of april the fishery were dominated by the purse seiners south of Tistlarna. In May the fishing was poor in the Kattegat and some boats began to fish in the Baltic proper between Bornholm and Gotland. But the fishery were not so succesful as the previous year. The fishery were, however, better in the Baltic both in May and June than in the Kattegat.

In the beginning of August there were great amounts of herring in the Kattegat. The main Swedish herring fishery took place in the area. The 1967 year class dominated in two samples (K 5 and K 7) and in sample K 8 the 1968 year class. In all three samples the 1967/68 year class had a very low V.S. (55.95,55.93, 55.61). The same thing appeared in 1969 that herring, which did not belong either to the Kattegat autumnspawners or to the North Sea autumn spawners, appeared in the Kattegat. Probably they belonged to a spawning stock from areas south of the Kattegat or to local races, which have not been abundant earlier. In September there were still good herring concentrations in the Kattegat. The herring were caught by pelagic trawlers during the night and by bottom trawlers during the day. The net fishing was common along certain parts of the coast. In the samples (K 9 - K 12) there were probably three types of herring. This is evident when studying the average number of V.S. for the different year classes in the samples (table 4). In October the fishery continued along the whole coast with bottom trawlers and pair-trawlers. Two samples taken by bottom trawlers were analysed (K 14 and K 15). In the first sample the 1968 year class dominated. The herring had a low V.S. (55.93), and seemed to belong to the same unknown stock as mentioned above. K 15 consisted of different types of autumn spawners. Along the coast a net fishing occurred. The spring spawning herring appeared in one sample for the first time this year (sample K 16). In November there were still a good fishery with pelagic trawlers in the Kattegat but the small herring dominated in the catches. The concentrations of herring decreased in December, but there were still a fishing going on to the end of the year.

Inshore Waters of inner Skagerak

In the beginning of the year there was a rather good fishery along the Bohuslän coast especially north of Koster. As usual there were both net fishing with small purse seines. However, the fishing was very soon hampered by the ice. On sample (In 1) from Marstrandsfjorden (cf. table 5) showed that the herring consisted of Skagerak spring spawners (V.S.=57.10), which begin to spawn in the end of February. The sample from February 26th, showed that the majority of the herring were in maturity stages V and VI. In April there were still good concentrations of spring spawning herring along the coast but also other types of herring were found in the catches. In a sample from Brofjorden (In 2, fig.4 and table 5) the 2-ringers consisted mainly of Skagerak spring spawners and the 3-ringers of herring belonging to the unknown stock mentioned above. As the maturity stages IV/V and V dominated it is possible that this new type of herring is a spring spawning stock. It is now so common in the samples, that it must be of a great importance for the fishery both in the Kattegat and in the Skagerak.

The two samples from Ulsholmen and Ramsvik (In 3 and In 4) consisted of pure Skagerak spring spawners. The spring spawners of 1967 year class were most abundant in the three samples with pure Skagerak spring spawners (In 1, In 3 and In 4).

The three samples taken at Klätten, Bissen and Tjurpannan (In 5- In 7) were dominated by autumn spawning North Sea herring. The 1967 year class was most abundant.

In the end of summer the fishing with net and small purse seines started again. From this time and onward there were at least three types of herring in the samples (In 9 - In 15). The samples from Flatholmen - Jämningarna and Sälö sund were dominated by 1966 and 1965 year classes of Kattegat autumn spawners. In the sample from Kosterfjorden (In 11) immature herring of Skagerak spring spawning herring (1968 year class) were most abundant.

In October the sample from Ramsö (In 12) consisted mainly of spring spawners of 1968 year class and herring of the unknown stock of 1966/67 year class. Not far away from the place where this herring had been fished we got herring of quite another type. The sample (In 13) consisted mainly of herring in maturity stage IV. V.S. = 56.23 indicates that the herring probably were Kattegat autumn spawners. The high K_2 count (14.30) also indicates that this herring was autumn spawners.

In November we got a sample from Nordkoster which consisted of a mixture of autumn and spring spawners. The 1-ringers were spring spawners born in 1968, the 2- and 3-ringers seemed to be a mixture of spring and autumn spawners, but the dominating part was autumn spawners.

Finally in December we got a sample from Kornö, where most of the herring seemed to be the North Sea autumn spawners.

Outer Skagerak and the North Sea

As in the previous year there was no real invasion of adult North Sea herring into the Skagerak area during autumn-winter (1969/70) and the fishing was poor in the Skagerak. According to the reports from the fishermen the main fishery took place from May to November in this area. In July there were heavy concentrations of herring from an area NW Hirtshals to Måseskär near the Swedish coast. Unfortunately we have no samples from the Skagerak, when the main fishery took place. The two samples taken in February refer to samples taken by R/V Thetis during the international trawling survey for young herring. The first sample (NO 1) consisted of 81% of 0-group herring. The main part was autumn spawners mixed with spring spawners. The next sample (NO 2) from the same area consisted mainly of North Sea autumn spawners born in 1967.

The fishery in the NE/North Sea was a great disappointment this year as mentioned above. The biggest Swedish catches in the North Sea were taken this year in the central North Sea, especially in January, February and December. One sample from January at Horns Rev (NO 3) consisted of autumn spawning herring of 1967 and 1968 year classes.

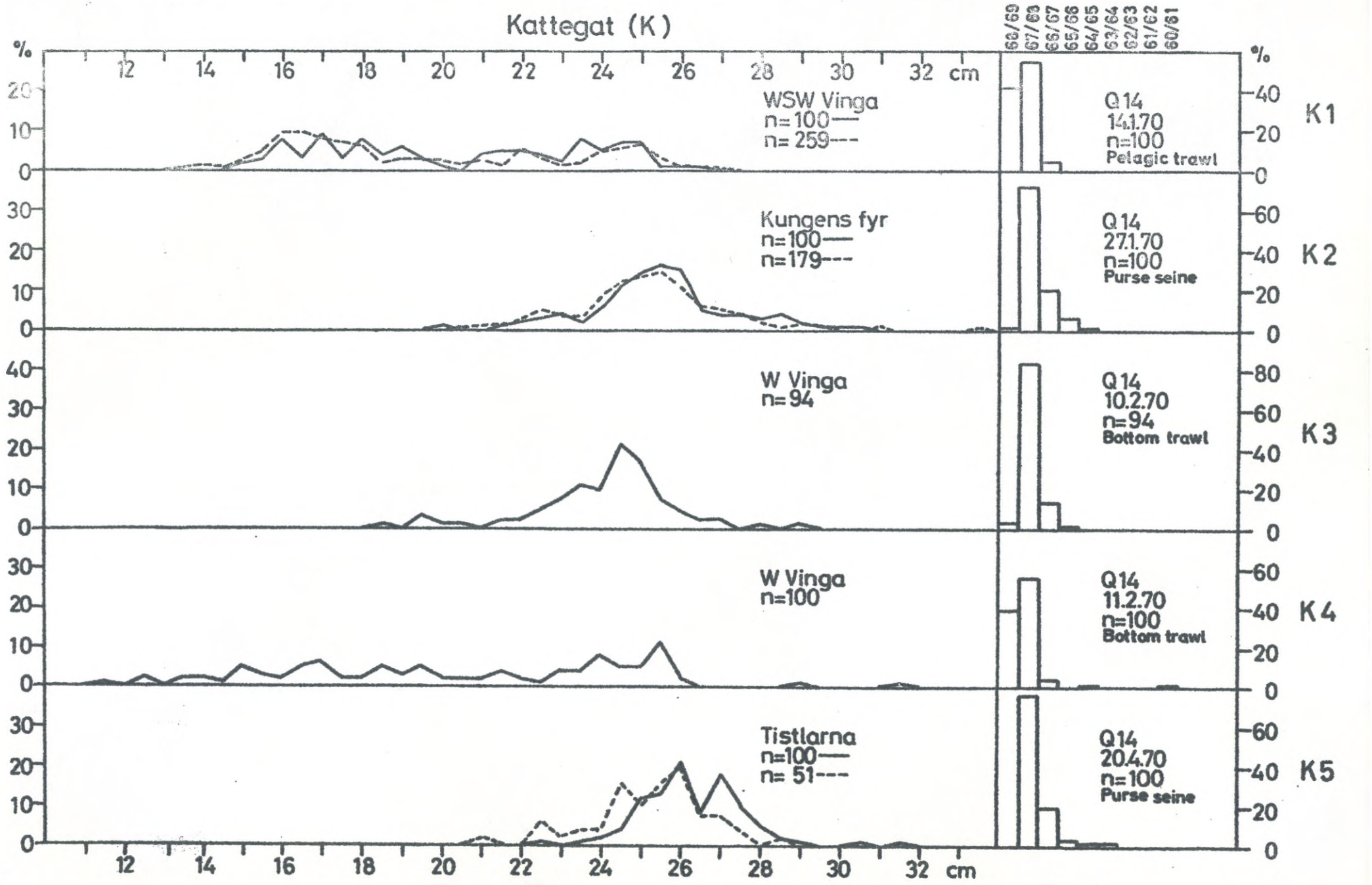
Kattegat (K)
%
12 14 16 18 20 22 24 26 28 30 32 cm
WSW Vinga
n=100
n=259
Q 14
14.1.70
n=100
Pelagic trawl
K1
Kungens fyr
n=100
n=179
Q 14
27.1.70
n=100
Purse seine
K2
W Vinga
n=94
Q 14
10.2.70
n=94
Bottom trawl
K3
W Vinga
n=100
Q 14
11.2.70
n=100
Bottom trawl
K4
Tistlarna
n=100
n=51
Q 14
20.4.70
n=100
Purse seine
K5
68/69
67/68
66/67
65/66
64/65
63/64
62/63
61/62
60/61

Fig. 1

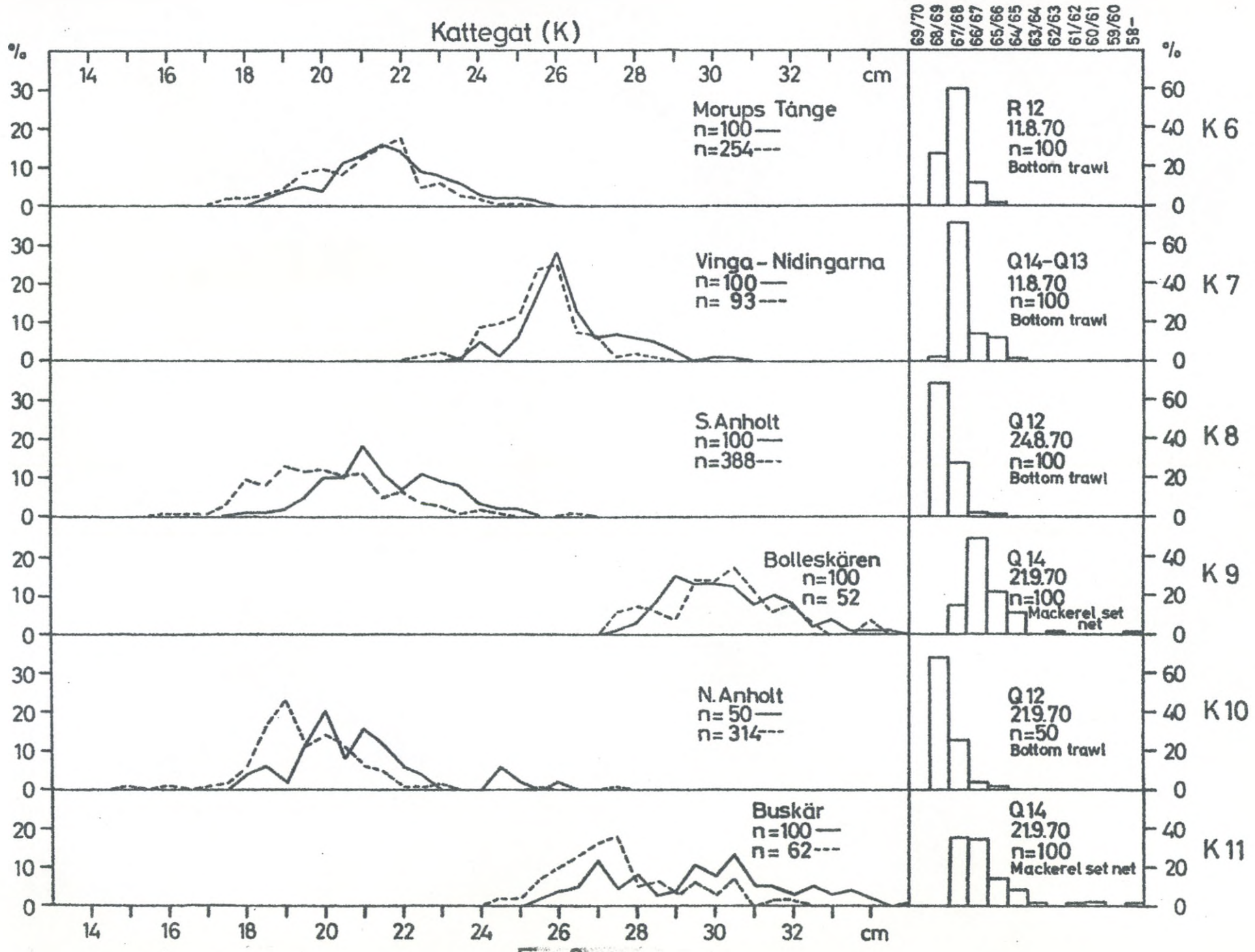
Kattegat (K)
%
14 16 18 20 22 24 26 28 30 32 cm
Morups Tånge
n=100 —
n=254 ---
R 12
11.8.70
n=100
Bottom trawl
K 6
Vinga - Nidingarna
n=100 —
n= 93 ---
Q 14-Q 13
11.8.70
n=100
Bottom trawl
K 7
S. Anholt
n=100 —
n=388 ---
Q 12
24.8.70
n=100
Bottom trawl
K 8
Bolleskären
n=100
n= 52
Q 14
21.9.70
n=100
Mackerel set net
K 9
N. Anholt
n= 50 —
n=314 ---
Q 12
21.9.70
n=50
Bottom trawl
K 10
Buskär
n=100 —
n= 62 ---
Q 14
21.9.70
n=100
Mackerel set net
K 11
69/70 68/69 67/68 66/67 65/66 64/65 63/64 62/63 61/62 60/61 59/60 58-
0 10 20 30
0 20 40 60

Fig. 2

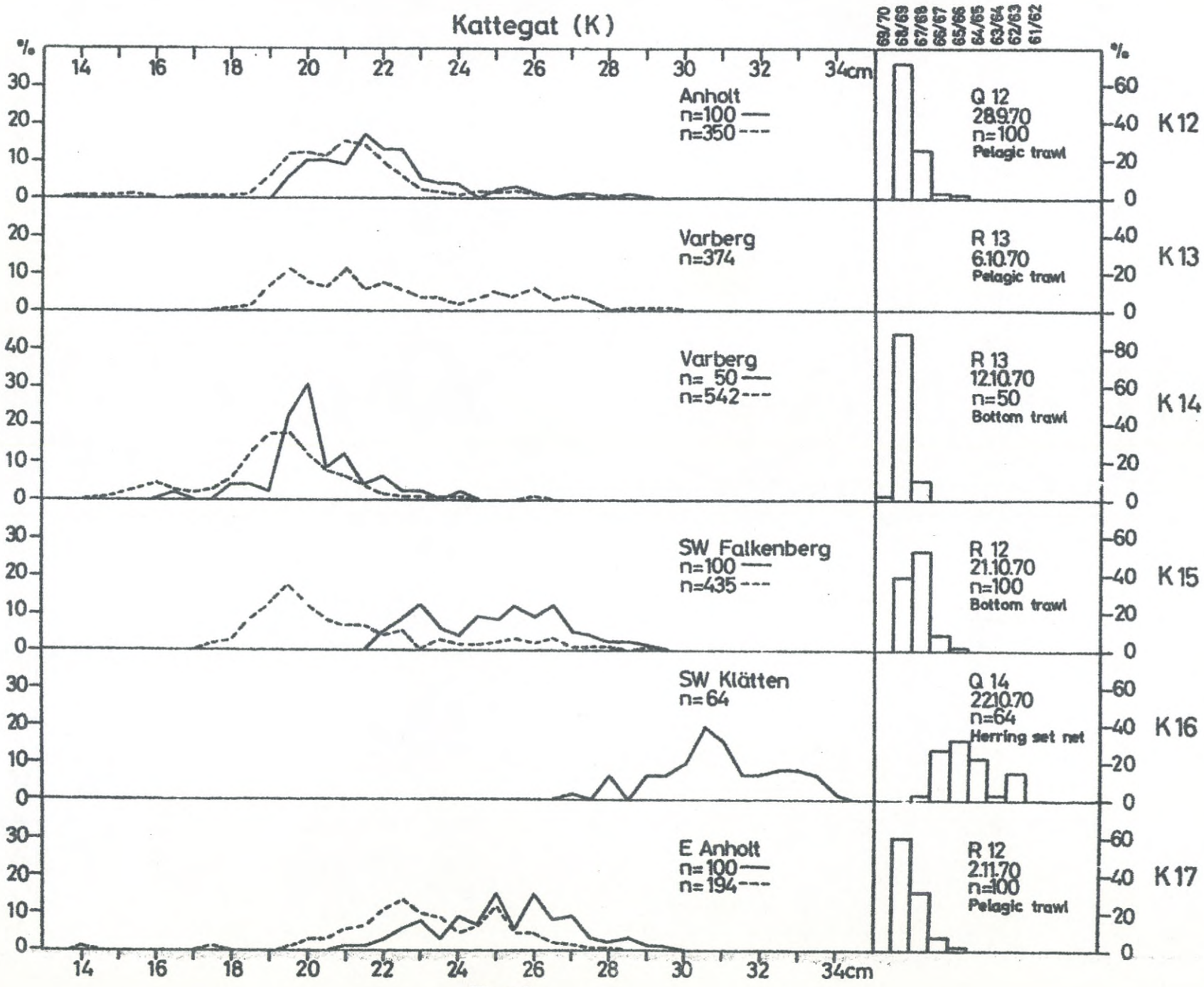
Kattegat (K)
69/70
68/69
67/68
66/67
65/66
64/65
63/64
62/63
61/62
%
14 16 18 20 22 24 26 28 30 32 34cm
Anholt
n=100 ——
n=350 ---
Q 12
28.9.70
n=100
Pelagic trawl
K 12
Varberg
n=374
R 13
6.10.70
Pelagic trawl
K 13
Varberg
n= 50 ——
n=542 ---
R 13
12.10.70
n=50
Bottom trawl
K 14
SW Falkenberg
n=100 ——
n=435 ---
R 12
21.10.70
n=100
Bottom trawl
K 15
SW Klätten
n=64
Q 14
22.10.70
n=64
Herring set net
K 16
E Anholt
n=100 ——
n=194 ---
R 12
2.11.70
n=100
Pelagic trawl
K 17

Fig. 3

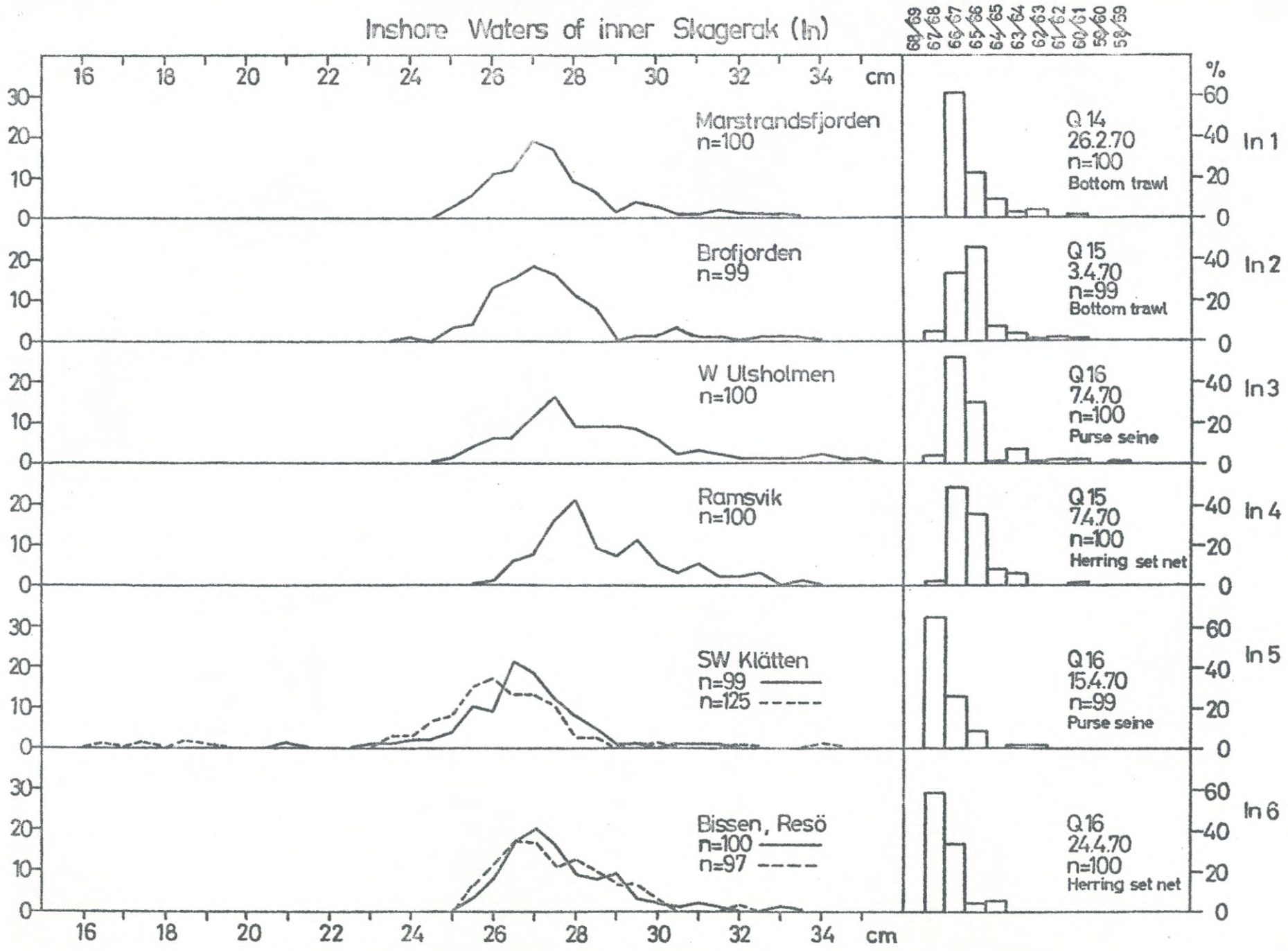
Inshore Waters of inner Skagerak (In)
68/69
67/68
66/67
65/66
64/65
63/64
62/63
61/62
60/61
59/60
58/59
16 18 20 22 24 26 28 30 32 34 cm
%
Marstrandsfjorden
n=100
Q 14
26.2.70
n=100
Bottom trawl
In 1
Brofjorden
n=99
Q 15
3.4.70
n=99
Bottom trawl
In 2
W Ulsholmen
n=100
Q 16
7.4.70
n=100
Purse seine
In 3
Ramsvik
n=100
Q 15
7.4.70
n=100
Herring set net
In 4
SW Klätten
n=99
n=125
Q 16
15.4.70
n=99
Purse seine
In 5
Bissen, Resö
n=100
n=97
Q 16
24.4.70
n=100
Herring set net
In 6

Fig. 4

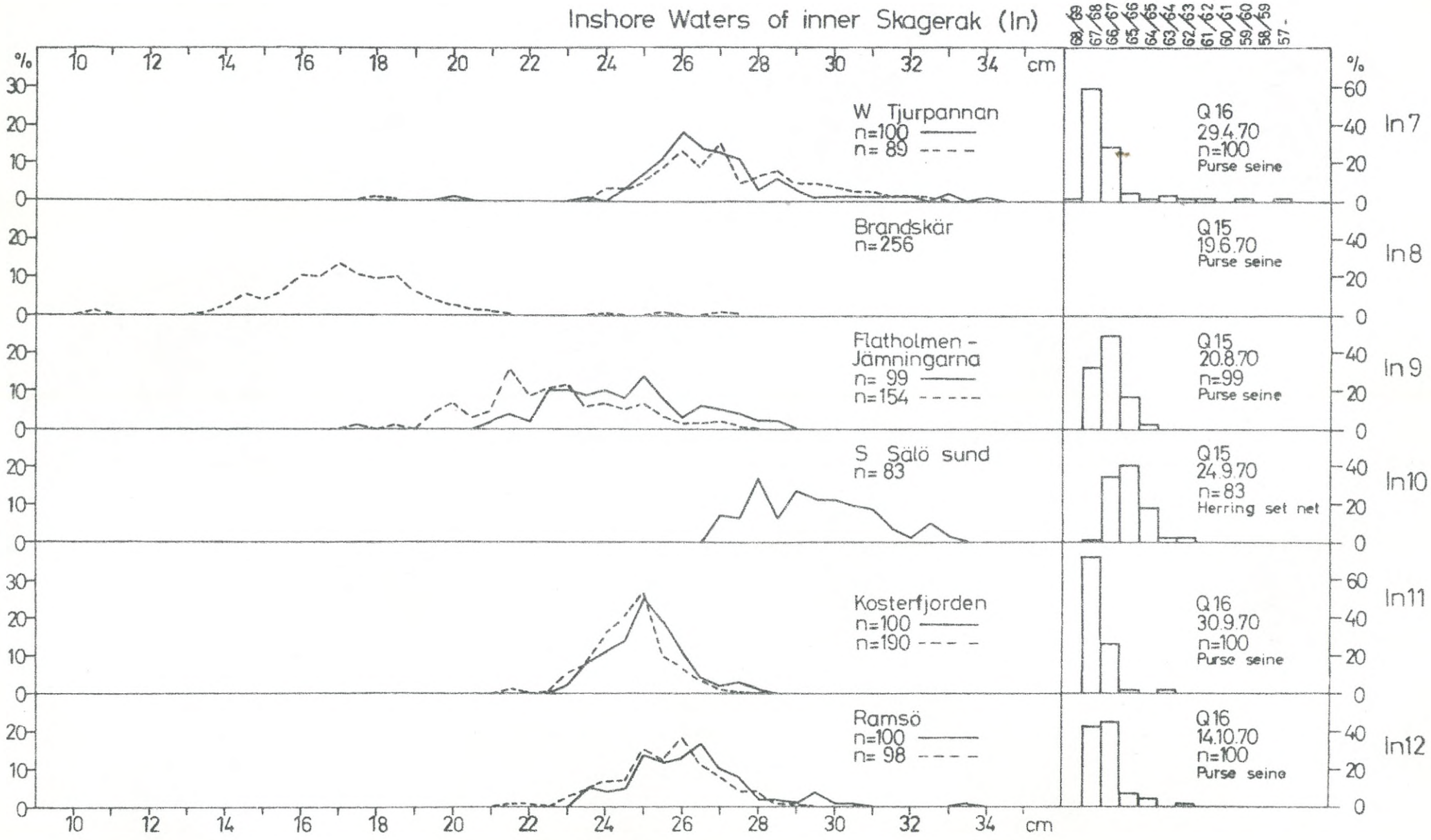
Inshore Waters of inner Skagerak (In)
68/69
67/68
66/67
65/66
64/65
63/64
62/63
61/62
60/61
59/60
58/59
57 -
%
10 12 14 16 18 20 22 24 26 28 30 32 34 cm
W Tjurpannan
n=100
n= 89
Q 16
29.4.70
n=100
Purse seine
In 7
Brandskär
n=256
Q 15
19.6.70
Purse seine
In 8
Flatholmen -
Jämningarna
n= 99
n=154
Q 15
20.8.70
n=99
Purse seine
In 9
S Sälö sund
n= 83
Q 15
24.9.70
n=83
Herring set net
In10
Kosterfjorden
n=100
n=190
Q 16
30.9.70
n=100
Purse seine
In11
Ramsö
n=100
n= 98
Q 16
14.10.70
n=100
Purse seine
In12

Fig. 5

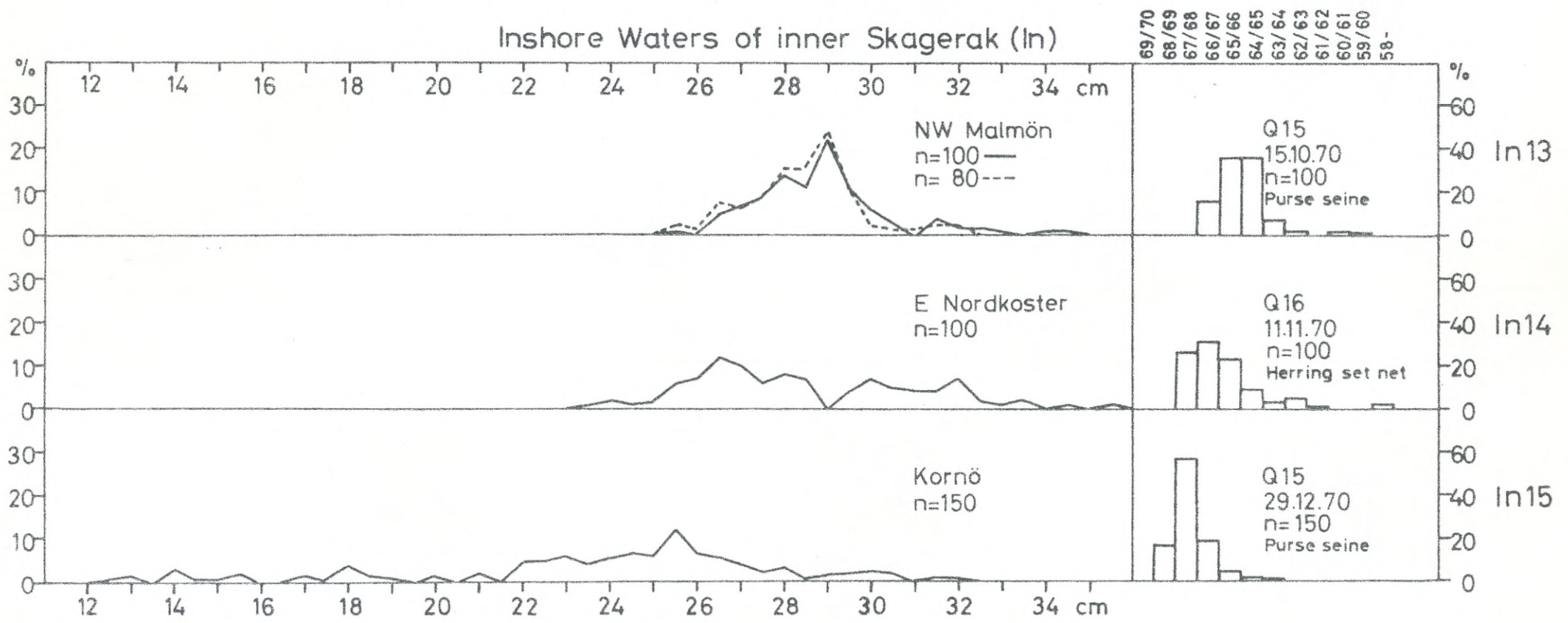
Inshore Waters of inner Skagerak (In)
69/70
68/69
67/68
66/67
65/66
64/65
63/64
62/63
61/62
60/61
59/60
58-
%
12 14 16 18 20 22 24 26 28 30 32 34 cm
NW Malmön
n=100
n= 80
Q15
15.10.70
n=100
Purse seine
In13
E Nordkoster
n=100
Q16
11.11.70
n=100
Herring set net
In14
Kornö
n=150
Q15
29.12.70
n=150
Purse seine
In15

Fig. 6

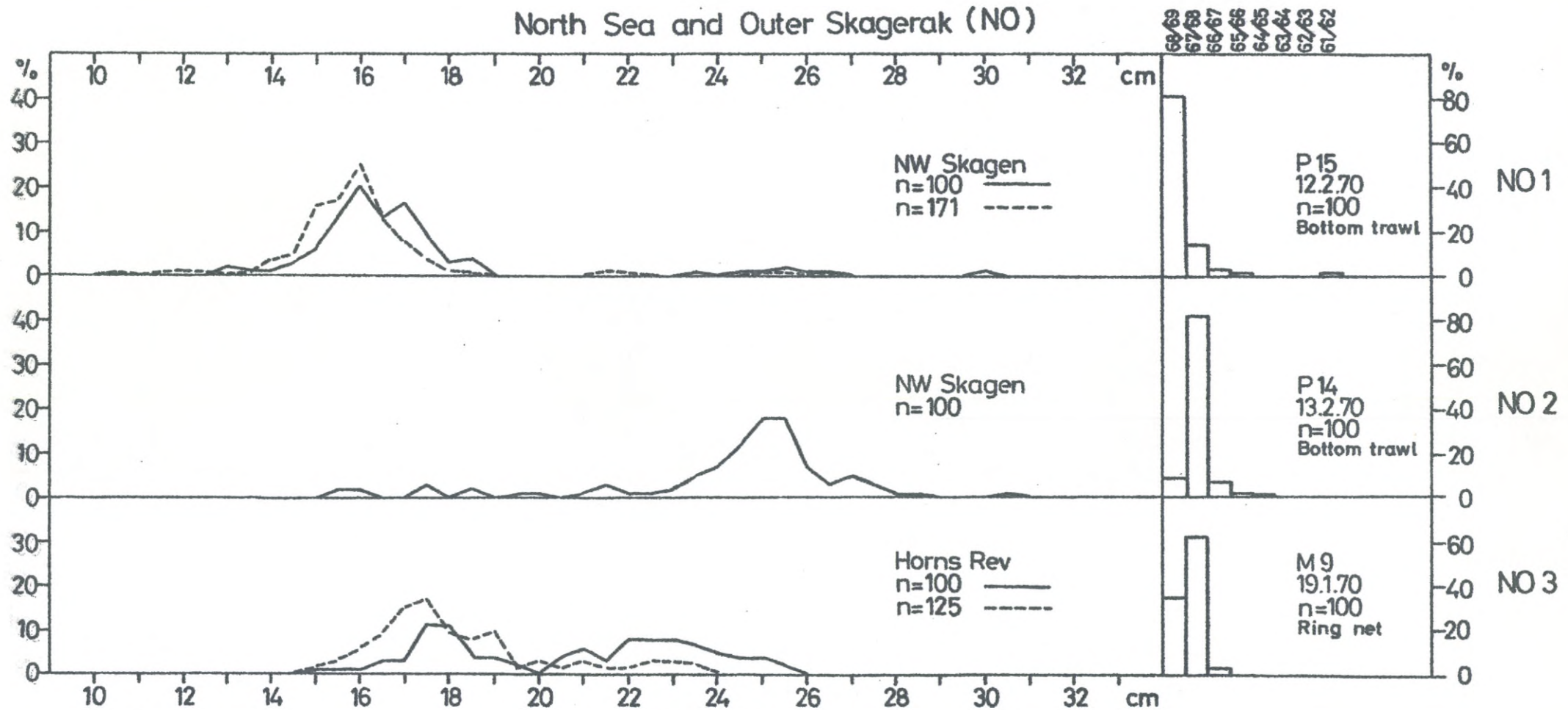
North Sea and Outer Skagerak (NO)
%
10 12 14 16 18 20 22 24 26 28 30 32 cm
68/69 67/68 66/67 65/66 64/65 63/64 62/63 61/62
NW Skagen
n=100
n=171
P 15
12.2.70
n=100
Bottom trawl
NO 1
NW Skagen
n=100
P 14
13.2.70
n=100
Bottom trawl
NO 2
Horns Rev
n=100
n=125
M 9
19.1.70
n=100
Ring net
NO 3

Fig. 7

TABLE 4, KATTEGAT (K)

K 1	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
14.1.70									
Q 14	0	1968/69	41.0	56.54	17.51	14.17	I	17.51	39.0
WSW Vinga	1	1967/68	55.0	56.24	22.71	14.23	I,I/II,II,II/III, III	14.11	88.9
n=100									
Pelagic	2	1966/67	4.0	56.00	24.50	14.75	II/III,III,VII/II	13.00	105.0
trawl		Mean value:		56.35	20.65	14.23			69.1
K 2	0	1968/69	1.0	-	20.00	-	I	20.25	60.0
27.1.70	1	1967/68	72.0	56.51	24.92	-	I,I/II,II	15.21	116.3
Q 14	2	1966/67	20.0	56.37	26.80	-	I/II,II,III,IV	12.80	150.0
Kungens	3	1965/66	6.0	55.67	28.25	-	II,IV	12.67	173.3
fyr	4	1964/65	1.0	56.00	30.50	-	II	-	250.0
n=100		Mean value:		56.42	25.75				155.1
Purse seine									
K 3	0	1968/69	3.2	56.67	19.42	14.00	I,I/II	19.42	53.3
10.2.70	1	1967/68	83.0	56.50	24.23	14.00	I,I/II,II,II/III	15.34	112.5
Q 14	2	1966/67	12.8	55.75	25.75	13.64	I/II,II,IV	12.75	140.0
W Vinga	3	1965/66	1.0	55.00	27.25	13.50	IV	9.75	180.0
n=94		Mean value:		56.39	24.30	13.95			114.9
Bottom trawl									
K 4	0	1968/69	39.0	56.75	17.15	14.23	I	17.15	35.1
11.2.70	1	1967/68	55.0	56.51	22.80	14.20	I,I/II,II	15.01	93.5
Q 14	2	1966/67	4.0	57.25	24.25	14.50	II,II/III,IV	11.37	117.5
W Vinga	4	1964/65	1.0	56.00	29.25	15.00	IV	11.25	220.0
n=100	8	1960/61	1.0	57.00	31.75	14.00	IV	10.75	300.0
Bottom trawl		Mean value:		56.63	20.81	14.24			75.0
K 5	1	1967/68	76.0	56.64	26.18	14.34	I,I/II,II,III, VII,VII/II	16.84	123.8
20.4.70									
Q 14	2	1966/67	19.0	56.28	27.43	14.05	II,IV,VII,VII/II	14.41	147.4
Tistlarna	3	1965/66	3.0	56.50	27.42	14.33	IV,VII/II	9.58	156.7
n=100	4	1964/65	1.0	56.00	30.75	13.00	VII/II	13.25	190.0
Purse	5	1963/64	1.0	58.00	31.75	14.00	VII/II	-	260.0
seine		Mean value:		56.58	26.55	14.27			131.3

TABLE 4, KATTEGAT (K), continued

K 6	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
11.8.70									
R 12	1	1968/69	27.0	56.11	20.71	14.24	I,I/II,II/III	14.64	73.0
Morups	2	1967/68	60.0	55.95	22.06	14.06	I,I/II,II,III	12.81	87.3
Tånge	3	1966/67	12.0	56.00	23.67	14.09	I/II,II,II/III	12.16	100.0
n=100	4	1965/66	1.0	57.00	23.25	14.00	I/II	11.25	100.0
Bottom trawl		Mean value:		56.01	21.90	14.11			94.1
K 7	1	1968/69	2.0	56.00	25.00	13.50	II,III	21.25	140.0
11.8.70	2	1967/68	71.0	55.93	25.82	14.08	I/II,II,II/III,	13.88	160.1
Q 14-Q 13							III,IV		
Vinga-	3	1966/67	14.0	55.92	27.28	13.73	II,II/III,III,IV	13.00	182.1
Nidingarna	4	1965/66	12.0	55.92	28.37	13.91	II,II/III,IV	12.63	203.8
n=100	5	1964/65	1.0	56.00	30.75	-	II	13.25	260.0
Bottom trawl		Mean value:		55.93	26.37	13.99			169.5
K 8	1	1968/69	69.0	56.33	21.31	14.28	I,I/II,II,II/III,	14.84	73.9
24.8.70							III		
Q 12	2	1967/68	28.0	55.61	22.98	13.80	I,I/II,II,III,	13.05	91.8
S Anholt							III/IV,IV		
n=100	3	1966/67	2.0	55.00	23.00	14.50	II	11.25	90.0
Bottom	4	1965/66	1.0	58.00	24.75	-	II	13.25	90.0
trawl		Mean value:		56.11	21.85	14.15			79.4
K 9	2	1967/68	15.0	56.47	29.08	13.93	II,IV,V	15.55	224.0
21.9.70	3	1966/67	50.0	56.43	30.42	14.37	II,II/III,III,	14.87	264.6
Q 14							IV,V,VI		
Bolle-	4	1965/66	22.0	56.10	30.79	14.10	II,II/III,III,IV	12.58	267.3
skären	5	1964/65	11.0	56.09	32.29	14.00	II,III,IV,V	14.33	312.7
n=100	7	1962/63	1.0	58.00	33.75	16.00	IV	13.75	340.0
Mackerel > 10			1.0	57.00	34.75	-	VI	17.25	400.0
set net		Mean value:		56.35	30.58	14.21			266.5
K 10	1	1968/69	78.0	56.15	20.60	-	I,I/II,II	-	61.0
21.9.70	2	1967/68	20.0	55.70	22.65	-	I/II,II	-	81.0
Q 12	4	1965/66	2.0	56.00	24.75	-	II	-	110.0
N Anholt		Mean value:		56.06	21.09				66.0
n=50									
Bottom trawl									

TABLE 4, KATTEGAT (K), continued

	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
K 11									
21.9.70									
Q 14	2	1967/68	36.0	56.30	25.00	14.11	II,IV,V,VI	16.01	181.1
Buskär	3	1966/67	35.0	56.28	30.05	14.13	II,III,IV,V,VI, VII/II	14.77	258.0
n=100									
Mackerel	4	1965/66	15.0	56.53	31.42	14.40	III,IV,V	14.38	290.0
set net	5	1964/65	9.0	56.37	32.58	14.62	II,III,IV,V	14.62	336.7
	6	1963/64	1.0	56.00	32.75	15.00	IV	12.75	410.0
	8	1961/62	1.0	56.00	35.25	15.00	IV	15.75	420.0
	9	1960/61	2.0	56.00	33.25	14.00	IV,V	14.25	370.0
	>10	_____	1.0	57.00	33.75	14.00	V	-	410.0
		Mean value:		56.34	29.83	14.22			249.1
K 12	1	1968/69	72.0	56.08	21.38	14.16	I,I/II,II	14.15	70.6
28.9.70	2	1967/68	25.0	55.75	22.99	14.09	I/II,II,II/III, III,IV	13.40	102.8
Q 12									
Anholt	3	1966/67	2.0	55.00	24.75	13.00	II	12.00	95.0
n=100	4	1965/66	1.0	56.00	28.75	-	III/IV	13.75	200.0
Pelagic trawl		Mean value:		55.98	22.17	14.12			80.4
K 13									
6.10.70									
R 13		Only length measurements							
Varberg									
n=374									
Pelagic trawl									
K 14	0	1969/70	2.0	57.00	16.75	14.00	I	-	30.0
12.10.70	1	1968/69	90.0	55.93	20.31	13.86	I,I/II,II	12.75	57.3
R 12	2	1967/68	8.0	55.67	22.88	14.25	II	12.88	85.0
SW Falkenberg		Mean value:		55.94	20.44	13.90			59.0
n=50									
Bottom trawl									
K 15	1	1968/69	39.0	56.49	23.70	14.24	I/II,II,II/III	15.88	93.8
21.10.70	2	1967/68	52.0	56.10	25.88	14.15	I/II,II,II/III,III, III/IV,IV,VII/II	13.04	136.7
R 12									
SW Falken- berg	3	1966/67	8.0	55.62	26.81	13.86	II,II/III,III, III/IV,IV,VII/II	12.25	153.8
n=100	4	1965/66	1.0	56.00	28.75	-	IV	-	210.0
Bottom trawl		Mean value:		56.21	25.13	14.16			122.1

TABLE 4, KATTEGAT (K), continued

K 16	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
22.10.70									
Q 14	2	1967/68	3.2	57.00	30.00	14.50	II/III,IV	13.50	260.0
SW Klätten	3	1966/67	27.4	56.71	29.90	14.37	II/III,III,IV, IV/V,VII/II	12.84	255.3
n=64									
Herring	4	1965/66	32.0	56.68	30.65	14.63	IV,IV/V	11.06	283.5
set net	5	1964/65	22.4	56.93	32.11	14.43	IV,IV/V,V	12.21	332.1
	6	1963/64	3.2	57.50	33.00	16.50	IV	12.50	340.0
	7	1962/63	14.4	56.78	33.08	14.44	III,IV,IV/V	11.38	367.8
		Mean value:		56.79	31.16	14.55			299.5
K 17	1	1968/69	60.0	56.41	24.55	14.14	I,I/II,II	16.37	106.4
2.11.70	2	1967/68	31.0	55.97	26.38	13.89	I/II,II,II/III, III,IV,VII/II	12.94	139.3
R 12									
E Anholt	3	1966/67	7.0	56.00	27.61	14.00	II,II/III,IV	10.25	181.4
n=100	4	1965/66	2.0	56.00	29.50	14.00	IV,VII/II	13.00	215.0
Pelagic trawl		Mean value:		56.24	25.41	14.05			124.4

TABLE 5, INSHORE WATERS OF INNER SKAGERAK (In)

In 1 26.2.70	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
Q 14 Marstrands-	2	1967	61.0	57.09	26.91	14.03	IV,IV/V,V,V/VI, VI,VI/VII	13.13	174.1
fjorden	3	1966	22.0	57.05	27.98	13.70	IV,V,V/VI,VI	10.94	202.7
n=100	4	1965	9.0	57.33	29.64	14.00	IV,V,V/VI,VI	13.37	250.0
Bottom	5	1964	3.0	57.00	30.42	14.00	V,VI	12.50	253.3
trawl	6	1963	4.0	56.75	32.25	14.50	V,VI	10.13	342.5
Spring	8	1961	1.0	58.00	32.75	15.00	V/VI	15.25	330.0
spawners		Mean value:		57.10	27.77	13.99			197.9
In 2	1	1967/68	5.1	56.20	25.65	14.80	I/II,II	17.25	128.0
3.4.70	2	1966/67	33.3	56.75	27.07	14.03	II,IV,IV/V,V, V/VI,VI,VII/II	12.19	163.0
Q 15 Brofjorden	3	1965/66	46.5	55.93	27.45	14.14	II,IV,IV/V,V, V/VI,VII/II	10.55	183.5
n=99	4	1964/65	7.1	56.00	28.18	14.14	IV,IV/V,V,V/VI, VII/II	12.75	185.7
Bottom trawl	5	1963/64	4.0	57.00	31.00	14.50	II,VII,VII/II	9.75	222.5
	6	1962/63	1.0	56.00	32.75	13.00	VII/II	15.25	260.0
	7	1961/62	2.0	59.00	32.00	15.50	VII,VII/II	11.75	230.0
	8	1960/61	1.0	58.00	33.75	14.00	VII	-	280.0
		Mean value:		56.35	27.63	14.16			178.3
In 3	1	1968	4.0	56.50	26.00	14.00	I/II,IV,VI	16.25	130.0
7.4.70	2	1967	52.0	56.82	27.71	13.87	II,IV,V,V/VI,VI	12.25	176.0
Q 16	3	1966	30.0	57.30	29.12	13.70	IV/V,V,V/VI,VI	11.37	217.0
Ulsholmen	4	1965	1.0	59.00	31.75	16.00	VII/II	13.25	240.0
n=100	5	1964	7.0	56.29	31.32	14.50	V,V/VI,VI	10.96	278.6
Purse	6	1963	1.0	57.00	34.75	14.00	V/VI	-	340.0
seine	7	1962	2.0	57.00	34.25	14.00	V,V/VI	13.00	365.0
Spring	8	1961	2.0	57.50	33.50	14.00	IV/V,V	13.00	340.0
spawners	10	1959	1.0	57.00	35.25	14.00	VI	12.75	350.0
		Mean value:		56.96	28.50	13.91			204.7

TABLE 5, INSHORE WATERS OF INNER SKAGERAK (In), continued

	W.r.		Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
In 4 7.4.70										
Q 15	1		1968	2.0	56.00	27.00	14.00	II	17.50	140.0
Ramsvik	2		1967	48.0	56.98	28.06	13.98	IV,IV/V,V,V/VI, VI,VII/II	12.71	177.5
n=100										
Herring	3		1966	35.0	56.84	29.06	13.97	I/II,IV,V,V/VI,VI	11.25	207.1
set net	4		1965	8.0	57.63	30.94	13.75	V,V/VI,VI,VII	14.50	248.8
Spring	5		1964	6.0	56.67	32.17	13.83	V,VI	8.75	273.3
spawners	8		1961	1.0	58.00	33.75	14.00	VI	12.25	330.0
			Mean value:		56.96	28.92	13.95			200.1
In 5	1	A	1967	60.6	56.45	26.46	14.26	I/II,II,III	16.67	132.3
15.4.70	2	A	1966	12.1	56.45	27.63	14.17	I/II,II	11.11	146.7
Q 16	3	A	1965	3.0	55.67	27.75	14.00	II	15.75	146.7
SW Klätten			Mean value:		56.41	26.70	14.24			135.2
n=99	1	S	1968	4.0	57.00	25.63	14.00	I/II,II	14.75	120.0
Purse	2	S	1967	12.1	56.58	27.88	14.09	II,II/III,III, VII/II	11.79	154.2
seine	3	S	1966	5.0	56.40	29.15	14.20	II,II/III,VII/II	12.25	172.0
	5	S	1964	1.0	58.00	31.75	15.00	V	10.25	220.0
	6	S	1963	1.0	57.00	30.75	14.00	II	11.75	250.0
	?	S	____	1.0	58.00	35.25	14.00	II/III	-	310.0
			Mean value:		56.75	28.42	14.13			166.7
In 6	1	A	1967	46.0	56.48	27.03	14.24	I/II,II	17.64	138.7
22.4.70	2	A	1966	2.0	55.20	29.00	14.00	II	17.50	170.0
Q 16			Mean Value:		56.44	27.11	14.23			140.0
Bissen,	1	S	1968	12.0	56.83	27.08	14.09	I/II,II,VII/II	17.00	133.3
Reső	2	S	1967	31.0	56.50	28.56	14.14	I/II,II,IV,VII/II	13.89	161.9
n=100	3	S	1966	4.0	57.00	29.13	14.00	VII/II	11.38	180.0
Herring	4	S	1965	5.0	57.20	31.65	14.00	VII/II	12.95	206.0
set net			Mean value:		56.53	28.56	14.10			161.0

TABLE 5, INSHORE WATERS OF INNER SKAGERAK (In), continued

	W.r.		Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
In 7										
29.4.70										
Q 16	0	A	1968	1.0	57.00	20.25	-	I	20.25	60.0
W Tjur-	1	A	1967	54.0	56.64	26.27	14.06	I/II,II	16.72	138.1
pannan	2	A	1966	5.0	55.50	27.65	14.40	II	14.95	164.0
n=100			Mean value:		56.57	26.28	14.09			139.0
Purse seine	1	S	1968	5.0	57.00	26.05	13.20	I/II,II,VII	13.45	126.0
	2	S	1967	23.0	57.00	27.75	14.10	II,VII,VII/II	12.95	159.6
	3	S	1966	4.0	56.25	28.50	13.75	VII,VII/II	10.25	177.5
	4	S	1965	1.0	59.00	31.75	14.00	II	13.75	280.0
	5	S	1964	3.0	57.33	31.25	14.33	VII,VII/II	9.92	250.0
	6	S	1963	1.0	57.00	30.75	16.00	VII	10.75	210.0
	7	S	1962	1.0	58.00	34.25	15.00	VII/II	12.25	310.0
	9	S	1960	1.0	-	33.25	15.00	VII/II	9.25	250.0
	>10	S	____	1.0	58.00	33.25	15.00	VII	11.25	260.0
			Mean value:		57.05	28.49	14.08			176.8
In 8										
19.6.70										
Q 15										
Brandskär			Only length measurements							
n=256										
Purse										
seine										
In 9	1		1967/68	32.3	56.78	23.37	14.10	I,I/II,III	16.64	114.4
20.8.70	2		1966/67	49.5	56.24	24.70	14.26	I,I/II,II,III,IV	12.57	141.0
Q 15	3		1965/66	16.2	56.33	26.56	14.13	I/II,II,III,IV	10.59	177.5
Flatholmen-	4		1964/65	2.0	55.50	27.00	13.00	II	9.75	190.0
Jämningarna			Mean value:		56.41	24.62	14.17			156.2
n=99										
Purse										
seine										

TABLE 5, INSHORE WATERS OF INNER SKAGERAK (In), continued

	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
In 10 24.9.70 Q 15 S Sälö sund n=83 Herring set net	1	1967/68	1.2	55.00	27.25	14.00	I/II	-	170.0
	2	1966/67	34.8	56.21	28.59	13.90	I/II,II,II/III, III,IV,V	14.83	220.0
	3	1965/66	40.8	56.42	30.00	14.06	II,II/III,III, III/IV,IV,V	13.93	256.2
	4	1964/65	18.0	56.33	30.62	14.33	II,II/III,III IV,V,V/VI	12.22	282.7
	5	1963/64	2.4	56.50	30.25	14.00	III,IV	11.75	245.0
	6	1962/63	2.4	56.00	31.50	14.00	V	11.75	285.0
		Mean value:		56.30	29.63	14.04			247.7
In 11 30.9.70 Q 16 Koster-fjorden n=100 Purse seine	1	1967/68	72.0	57.00	25.08	14.22	I/II,II,III	-	128.1
	2	1966/67	26.0	56.19	25.90	14.08	I/II,II,II/III, III,IV	-	149.6
	3	1965/66	1.0	55.00	27.75	14.00	III	-	170.0
	5	1963/64	1.0	54.00	25.25	14.00	IV	-	140.0
		Mean value:		56.74	25.32	14.18			134.2
In 12 14.10.70 Q 16 Ramsö n=100 Purse seine	1	1967/68	42.0	56.78	25.42	13.97	I/II,II,III	-	133.8
	2	1966/67	45.0	55.86	26.72	13.91	I/II,II,II/III, III,III/IV,IV, VII/II	-	165.3
	3	1965/66	7.0	56.43	28.96	14.14	II,III,III/IV,IV	-	210.0
	4	1964/65	5.0	56.20	28.55	13.60	II/III,IV,IV/V	-	218.0
	6	1962/63	1.0	58.00	33.75	13.00	IV	-	320.0
		Mean value:		56.33	26.49	13.93			159.4
In 13 15.10.70 Q 15 NW Malmön n=100 Purse seine	2	1966/67	16.0	56.37	27.62	14.12	II,II/III,III, III/IV,IV,IV/V	13.00	199.4
	3	1965/66	36.0	56.28	29.00	14.45	II,II/III,III, III/IV,IV,IV/V	12.44	243.1
	4	1964/65	36.0	56.08	29.10	14.26	II,II/III,III, III/IV,IV,IV/V	11.40	244.2
	5	1963/64	7.0	55.77	30.68	13.86	II/III,IV,IV/V	11.96	292.9
	6	1962/63	2.0	56.50	32.00	15.00	IV,IV/V	11.25	340.0
	8	1960/61	2.0	58.00	33.50	15.00	IV	12.75	385.0
	9	1959/60	1.0	57.00	34.25	15.00	IV	15.25	400.0
		Mean value:		56.23	29.14	14.30			246.3

TABLE 5, INSHORE WATERS OF INNER SKAGERAK (In), continued

In 14 11.11.70 Q 16 E Nord-koster n=100 Herring set net	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
	1	1967/68	26.0	56.92	26.04	14.23	I/II,II/III,III	16.98	137.7
	2	1966/67	31.0	56.13	27.96	14.20	I/II,II,II/III, III,III/IV,IV,VII/II	13.25	167.4
	3	1965/66	22.0	56.64	29.89	13.84	II,II/III,III, III/IV,IV,IV/V,VII/II	12.82	221.4
	4	1964/65	10.0	57.20	31.15	14.11	IV,IV/V	10.55	278.0
	5	1963/64	3.0	57.33	32.08	13.67	IV	11.25	330.0
	6	1962/63	5.0	56.40	32.35	14.20	IV	10.05	324.0
	7	1961/62	1.0	57.00	31.75	15.00	IV	13.25	310.0
	10	1958/59	2.0	57.50	34.75	14.50	IV	10.25	355.0
		Mean value:		56.63	28.72	14.13			200.5
In 15 29.12.70 Q 15 Kornö n=150 Purse seine	0	1968/69	16.0	56.54	16.56	14.14	I,I/II,II	16.56	29.2
	1	1967/68	57.3	56.50	24.51	14.25	I,I/II,II,II/III, III	15.50	105.1
	2	1966/67	18.7	56.35	26.89	14.27	I/II,II,II/III, III,IV,VII/II	12.52	142.9
	3	1965/66	5.3	56.60	29.19	13.60	IV,VII/II	11.13	205.0
	4	1964/65	2.0	56.67	30.08	14.00	III,IV	10.75	233.3
	5	1963/64	0.7	57.00	32.25	14.00	IV	14.25	310.0
		Mean value:		56.49	24.09	14.19			109.3

TABLE 6, NORTH SEA AND OUTER SKAGERAK (NO)

NO 1	W.r.	Year-class	%	V.S.	Length cm	K_2	Maturity stages	L_1 cm	Weight g
12.2.70	0	1968/69	81.0	56.73	16.42	14.03	I,I/II,II	16.42	30.0
P 15	1	1967/68	14.0	56.77	18.93	14.38	I,I/II,II,III/IV	12.75	52.1
NW Skagen	2	1966/67	3.0	56.00	26.25	14.00	II,III	12.42	140.0
n=100	3	1965/66	1.0	56.00	24.75	14.00	III/IV	9.25	120.0
Bottom	7	1961/62	1.0	56.00	30.25	14.00	III/IV	10.25	250.0
trawl		Mean value:		56.70	17.29	14.07			39.5
NO 2	0	1968/69	9.0	56.67	17.92	14.11	I,I/II,II	17.92	41.1
13.2.70	1	1967/68	82.0	56.44	24.91	14.28	I,II	16.04	120.5
P 14	2	1966/67	7.0	56.14	26.46	13.86	II,III	14.96	144.3
NW Skagen	3	1965/66	1.0	56.00	27.75	15.00	II	10.75	160.0
n=100	4	1964/65	1.0	57.00	30.75	14.00	IV	11.75	240.0
Bottom		Mean value:		56.44	24.47	14.24			116.6
trawl									
NO 3	0	1968/69	35.0	56.39	18.11	14.47	I	18.11	39.1
19.1.70	1	1967/68	62.0	56.46	22.42	14.34	I,I/II,II	14.48	81.5
M 9	2	1966/67	3.0	56.00	24.58	14.33	I/II,II	13.92	106.7
Horns Rev		Mean value:		56.41	20.97	14.39			67.4
n=100									
Ring net									