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91

THE SWEDISH HERRING FISHERIES IN THE NORTH SEA,
SKAGERAK AND KATTEGAT IN 1969

Det svenska sillfisket i Nordsjön, Skagerack och
Kattegatt 1969

by

Hans Ackefors

September 1970

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by

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Svensk sammanfattning

Sillfångsterna minskade under 1969 i jämförelse med 1968. Landningarna för konsumtion uppgick till 88.000 ton, vilket innebär en minskning med 15% i förhållande till fångsten under 1968. Industrisillfångsterna sjönk med 24%. Fångstmängden under 1969 minskade därvid till 55.000 ton. Den totala sillfångsten under 1969 blev således 143.000 ton, vilket innebär en minskning med 18% i förhållande till föregående år. På grund av den ofullständiga svenska fiskeristatistiken är det svårt att säga hur mycket sill som fångades i Östersjön av fiskare från västkusten. Denna sill har ju till största delen transporterats till Danmark och sålts i Skagen. De ovannämnda siffrorna är därför något osäkra, då man kan räkna med att en del sill som nu är registrerad för Västerhavet i stället är fångad i Östersjön. Under 1968 fångade svenska västkustfiskare 18.100 ton sill i Östersjön enligt dansk fiskeristatistik. Huvuddelen av sillen landades i Danmark. Inte mindre än 85% av sillen för konsumtion landades i Skagen och Hirtshals. Återstoden, d.v.s. 15%, gick till svenska hamnar.

Sillfisket i inre Skagerack och Kattegatt

I början av år 1969 fick snörpvadsfiskare relativt goda fångster i Lysekilstrakten. Sillen utgjordes mest av vårlekande sill blandad med skarpsill (prov 2, fig. 2a, tabell 2). Under samma tid fick flyttrålsfiskare sill av olika storlekar i sina fångster i Kattegatt. I februari påträffades de största sillkoncentrationerna från Anholt till Tistlarna. De tätaste sillstimmen förekom vid Nidingen.

I februari månad deltog undersökningsfartyget Thetis tillsammans med fyra andra forskningsfartyg från Holland, Skottland och England i den internationella trålöversikten av ungsill. (Ingår i Internationella Rådets för Havsforskning undersökningsprogram.) Den allra största koncentrationen av ungsill (1967 årsklass) påträffades i Skagerack NW och N om Skagen och Hirtshals. Detta visar betydelsen av Skagerack som uppväxtområde för den sill som senare skall rekryteras till det vuxna beståndet. Två prov (K 1, K 2) tagna vid Vinga (fig. 1a, tabell 1) och ett prov (In 3) från området norr om Skagen (fig. 2a, tabell 2) visade att ungsillen huvudsakligen tillhörde Nordsjöns banksill. Fisket under mars, april, maj och juni var relativt dåligt i Skagerack och Kattegatt. Flera av västkustbåtarna fiskade därför i Östersjön under våren.

I början av augusti rapporterades goda sillförekomster från området norr om Skagen och in mot djupa rännan av Skagerack. Ett analyserat sillprov (In 5) visade att 1967 års klass dominerade. Medelkottalet var 56.48 och detta tyder

på att det var Nordsjöns banksill och inte Kattegatts höstsill. Samtliga sillprover från augusti och september visade att sillen var mycket fet.

Sillprover från Kattegatt i början av september visade att icke könsmogen Kattegatts höstsill (K 3, K 5) och Nordsjönsill (K 4) dominerade i proverna. Först i andra hälften av september (K 7) förekom rikligt med äldre könsmogen sill av typ Kattegatts höstlekande sill. I proverna K 3 - K 5 förekom också sill av 1966 års klass med så låga medeltal för kotanalyserna, att man på starka grunder kan misstänka att sill från Östersjön eller andra områden söder om Kattegatt fanns i Kattegatt under september.

Rikliga sillförekomster rapporterades från inre Skagerack vid bohuskusten under september. Analyserade prover (In 6, In 7) visade att det var icke könsmogen sill av 1967 och 1966 års klass. Från oktober och till årets slut stod en del sill mycket nära kusten ("sillen stod på land"). Sillgarn och små och stora snörpvadar användes flitigt i fisket. Både i Kattegatt och Skagerack bestod sillen mest av vårlekande bestånd. Det var dock inte fråga om norsk vårlekande sill, vilket bl.a. framgick av fjäll- och otolitstudier.

Sillfisket i yttre Skagerack och i Nordsjön

Liksom under föregående vinter (1967/68) trängde inga nämnvärda mängder av Nordsjöns banksill in i Skageracksområdet under sin vintervandring. I stället koncentrerade sig sillen vid Egersundsområdet och senare i områden norr därom. Otjänlig väderlek med många stormar hindrade emellertid fisket i stor utsträckning. Den största delen av sillen i området bestod av höstlekande Nordsjönsill av 1966 års klass, d.v.s. $2\frac{1}{2}$ år gammal sill som ännu aldrig hade lekt (prov N.O. 1 - N.O. 5, fig. 3, tabell 3).

Det traditionella sillfisket utanför Ålesund och Kristiansund i det Norska Havet efter norsk vårlekande sill (Atlanto-Scandisk sill) blev detta år misslyckat. Båtarna återvände istället till norra Nordsjön för att fiska i området mellan Patch-Utsira och Vikingbanken.

Under mars månad analyserades prover från Patch området (N.O. 6, N.O. 7). Sillen i proverna bestod av många olika årsklasser dock mest av 1965-1961 års klasser ($3\frac{1}{2}$ - $7\frac{1}{2}$ år gammal sill) och en hel del av sillen var av nollans storlek. Ungefär samtidigt fiskade våra ringnotsbåtar norsk vårlekande sill öster om Färöarna.

I april och maj fiskade bottenrålare sill dels i området Egersundsbanken-Vikingbanken och dels vid Shetland. I juni var fisket mycket dåligt i Nordsjön. Flera båtar började därför fiska i Östersjön.

I juli fiskade ringnotsbåtarna vid Shetland medan de vanliga fisketrå-larna användes att transportera fångsten till Danmark. I början av au-gusti gjorde båtarna stora fångster i området från Egersundsbanken till Skagen och in mot Kattegatt. Höstlekande sill 4-5 år gammal och vår-lekande sill av 1966 års klass dominerade i ett analyserat prov (N.O.8) från Egersundsbanken. Sillen var mycket storvuxen . Vid Shetland på-gick också sillfiske under den här tiden och denna sill (NS 1, fig. 4, tabell 4) liksom vid Egersundsbanken hade stora utvecklade rom- och mjölkesäckar, alltså höstlekande sill.

Under hösten blev sillfisket åter dåligt i Nordsjön och väderleksför-hållandena var tidvis mycket ogynnsamma. Många båtar brydde sig inte om att leta efter sill i Nordsjön då man fann det lönlöst. Man fiskade istället sill i Skagerack.

Introduction

The Swedish landings of herring decreased during 1969 in comparison with 1968. The landings for human consumption amounted to 88,000 tons. This is a decrease of nearly 15%. The landings for industrial purposes decreased by 24% to 55,000 tons. The total yield amounted to 143,000 tons which is a decrease of 18% in comparison with 1968. (Due to the limited Swedish herring statistics, it is difficult to estimate the extent of the catches taken from the Baltic by fishing boats from the west-coast. Most of the herring have been transported by cars to Denmark and are probably included in the above mentioned figures.) The main part of the yield for human consumption was brought to Danish ports. No less than 85% was landed at Skagen and at Hirtshals and 15% only in Swedish ports.

The inner Skagerak and the Kattegat

In January purse seine fishery in the archipelago of Lysekil and in the Gullmars Fiord took place. Mixed catches of sprat and herring were taken. Two samples (In 1, In 2) were analysed (fig. 2a, table 2). The samples partially consisted of a very small herring, which may be a local dwarf race. Besides the small herring, the second sample consisted mostly of spring spawning herring. In the Kattegat area the pelagic trawlers got mixed catches of small and big herring.

In February the herring fishing took place between Anholt and Tistlarna in the Kattegat. The greatest density of herring appeared near the Nidingen light.

During three weeks in February 5 research vessels from Holland, Scotland, England and Sweden took part in the international trawling survey for young herring in the North Sea area. The Swedish R/V "Thetis" investigated the Skagerak and the northern Kattegat. The greatest density of young herring were found west and north of the Dogger Bank and in the Skagerak. In the latter area, where "Thetis" trawled for herring, most herring were found north-west of Hirtshals and north of Skaw. Two samples (K 1, K 2) taken near Vinga during the survey (fig. 1a, table 1) and two samples (In 3, In 4) from the area north of Skaw (fig. 2a, table 2) were analysed. Most of the herring consisted of autumn spawners belonging to the 1967 year class. V.S. for the samples taken near Vinga in the northern Kattegat were calculated to 56.44 and 56.57. This indicates that the young herring in the area were probably North Sea herring.

In March and April the fishing was poor in the Skagerak. In the southern Kattegat rather good fishing took place north and north-east of Anholt. Teams of pair-trawlers from the west coast were, however, fishing as far to the north in the Baltic proper as Hävringe light, due to the lack of herring in the Skagerak and the North Sea. Rather good catches were made in the Baltic and they were sent by car to Denmark.

In the end of April the catches decreased in the southern Kattegat and a lot of the fishing boats from this area moved to the southern Baltic proper. The fishermen expected to get as good catches in this part of the Baltic during May and June as they had got the previous year, however, the fishing was not as good as in 1968 and part of the fleet returned back to the Kattegat in the end of May. Since the fishing was bad in June, both in the Kattegat and the Skagerak, about 40 fishing boats remained or went back to the Baltic, where they fished at the Adler Ground, south of Bornholm, and south-east of Trelleborg. In the beginning of August good herring concentrations were reported from north of the Skaw and southwards towards the deep furrow of the Kattegat. At the end of the month a sample (In 5) taken NNE of Skaw was analysed (fig. 2a, table 2). The 1967 year class dominated in the sample. V.S. = 56.48 indicated that it consisted of autumn spawning North Sea herring and not the Kattegat autumn spawning herring. Usually one expects the Kattegat herring to migrate at this time into the Kattegat from the North Sea and pass the area north of Skaw. The herring were extremely fat. Samples taken in the beginning of August were analysed and showed a fat content of 28%. A high fat content was characteristic of all the analysed samples taken from the Kattegat and the inner Skagerak (In 6, In 7, K 3-K 8).

Rather good herring fishing took place in September in the Kattegat. Mostly there were younger herring and it was evident that the adult Kattegat autumn spawners were delayed this year. The three samples analysed between the 9th and the 17th of September (K 3-K 5) showed that most of the herring belonged to the 1967 year class - in two cases of adolescent Kattegat autumn herring (V.S. = 56.27 resp. 56.16) and in one case of North Sea herring (V.S. = 56.56). In all three samples the autumn spawners of the 1966 year class had a low V.S. (55.79, 55.86, 55.72). This indicates that the three year old herring may have been herring from areas south of the Kattegat - the Sound, the Belt Sea or the Baltic.

In the second part of September great herring concentrations occurred in the area Tistlarna-Nidingen. The herring were caught by pelagic trawls during the night and bottom trawls during the day. From this time forth adult Kattegat autumn herring began to occur in the area although most of the herring did not appear in the catches until the end of the month or the begin-

ning of October. In one sample (K 7) from September 19th mature herring occurred in the stage IV, but still the main part consisted of immature herring of the year class 1967. The sample K 9 caught October 16th was analysed and found to consist probably only of adult Kattegat herring most of which had spawned and recovered.

From September and onwards great herring concentrations also appeared in the inner Skagerak outside the Bohuslän coast. Samples taken in September (In 6, In 7) consisted mostly of immature autumn spawners from the 1967 and 1966 year classes.

In October the herring began to occur very near the coast both in the Kattegat and the Skagerak. Suddenly net fishing and fishing with small purse seines became very common along the whole Swedish west coast. From the middle of October to December a great herring fishery took place close to the coast. Both in the Kattegat and the Skagerak most of the herring consisted of spring spawners (K 10-K12, In 9-In 11). However, in the end of November or in the beginning of December the herring concentrations decreased a little. Autumn spawners began to appear mixed with the spring spawners although the latter still dominated in the samples analysed. In the sample K 12 e.g., about 30% consisted of autumn spawners. Some of the spring spawning herring in the samples from October-November seemed to belong to some local races along the Swedish coast. Most of the herring were however typical Skagerak spring spawners. No Norwegian spring spawning herring appeared in the samples. This was evident both from scale and otolith studies.

The 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 the autumn-winter (1968/69) and the fishing was poor in the Skagerak. The best catches were taken on the fishing banks in the NE North Sea in January and February. Rather good catches were taken from Utsira in the north to the Egersund Bank in the south-east. The fishing was, however, hampered by rough weather. A south-east gale was prevailing for nearly three weeks in January. In February too the weather was very bad for half of the month. In general the herring fishing for the Swedish fleet was poor in the North Sea and especially in the Skagerak.

Three samples (N.O. 1 - N.O. 3) taken in the NE North Sea were analysed (fig. 3, table 3). Most of the herring (31-72%) consisted of autumn spawners, year class 1966. The 1965 year class made up 10-16% of the samples. In one of the samples (N.O. 1) the 1963 year class was responsible for no less than 13% of the herring. Spring spawners occurred in all samples. In

sample N.O. 2 taken at "Märllspiken" no less than 25% consisted of spring spawners.

In February a part of the herring fleet moved northwards to the Ålesund and the Kristiansund area of the Norwegian Sea in order to catch the spawning population of the Atlanto-Scandian herring. However, most of the boats (about 10 teams of pair-trawlers) returned without any catches and began to fish NW Utsira and east of the Viking Bank. One sample from the Patch (N.O. 5) was analysed. About 80% consisted of autumn spawners from the 1966 and 1967 year classes.

One sample taken in February in the outer Skagerak during the international trawling survey for young herring (sample N.O. 4) was analysed. About 90% of the sample consisted of autumn spawners, year class 1967.

In March the greatest density of herring was found a little further to the north in the area between the Patch-Utsira and the Viking Bank. Two samples from the Patch area (N.O. 6, N.O. 7) consisted of many year classes. The herring in sample N.O. 7 was big; the mean length was 30.54 cm and the mean weight 191.5 g. Sample N.O. 6 consisted mostly of the year classes 1965, 1964 and 1962, and sample N.O. 7 of the year classes 1963, 1962 and 1961. At the same time the Swedish ring net boats caught the Atlanto-Scandian herring east of the Faroe Islands. In April fishing for herring and mackerel with bottom trawls took place east of the Patch and on the Egersund Bank. Most boats were, however, fishing further to the north in the NE North Sea east of the Viking Bank. The herring was concentrated in deep waters, usually more than 200 m in depth. As a result of this fact the fishing was not so successful. A lot of the boats were also fishing in the Shetland area, west of the Dutch Bank. These boats were also fishing with bottom trawls. The catches consisted mostly of big herring.

In May the best herring catches were taken east of Shetland between the Halibut Bank and the Forty Mile Ground. The herring were concentrated close to bottom. The catches consisted of mixed adult and young herring. In the NE North Sea a lot of pair-trawlers were fishing between the area east of the Viking Bank and the Patch area.

In June the fishing was poor in the North Sea. Fishing occurred mostly in the Shetland area. Many fishing boats moved already in May to the southern Baltic proper, where the pair-trawlers sometimes made rather good catches. About 40 fishing boats from the Swedish west-coast were fishing in the Baltic proper. The fishing was, however, not so successful as in the previous year. Most catches were taken in the waters round Bornholm, Christiansö, on the Adler Ground and in the area towards the Utklippan light. The herring were

usually landed at Skaw in Denmark.

The Swedish ring net boats were fishing during July in the area north and west of Shetland. The catches were loaded in trawlers and brought to Danish ports. In the beginning of August successful herring fishing took place in the Egersund area and N-NW of Skaw and Hirtshals towards the deep furrow leading into the Kattegat. Both bottom trawls and pelagic trawls were used. Autumn spawners of the year classes 1965 and 1964 together with spring spawners born in 1966 dominated in the analysed sample (N.O. 8) from the Egersund Bank (fig. 3, table 3). The herring were very big. The autumn spawners from the year classes 1965-1969 had average weights of 213, 253, 306, 330, 323, 364 and 408 g and corresponding average lengths of 27.8, 29.3, 33.4, 32.3, 31.8, 33.1 and 33.7 cm. Simultaneously with the herring fishing in August in the Skagerak area, bottom trawlers were fishing in the area west of Shetland. One analysed sample (NS 1, fig. 4, table 4) indicates that the herring consisted of both autumn and spring spawners. The size of the herring in the sample was less than the size of the herring in sample N.O. 8 from the Egersund Bank. Most of the autumn spawners in both samples had gonads in stage IV of development.

In the autumn the herring fishing was very poor in the North Sea. Small catches were made near the Shetland coast and on the Fladen Ground. In the NE North Sea the herring occurred so sparsely that very few fishing boats tried to fish in that area. Instead most of the boats were fishing in the inner Skagerak. Very bad weather with strong gales in September and very windy weather in October-November also hampered the fishing.

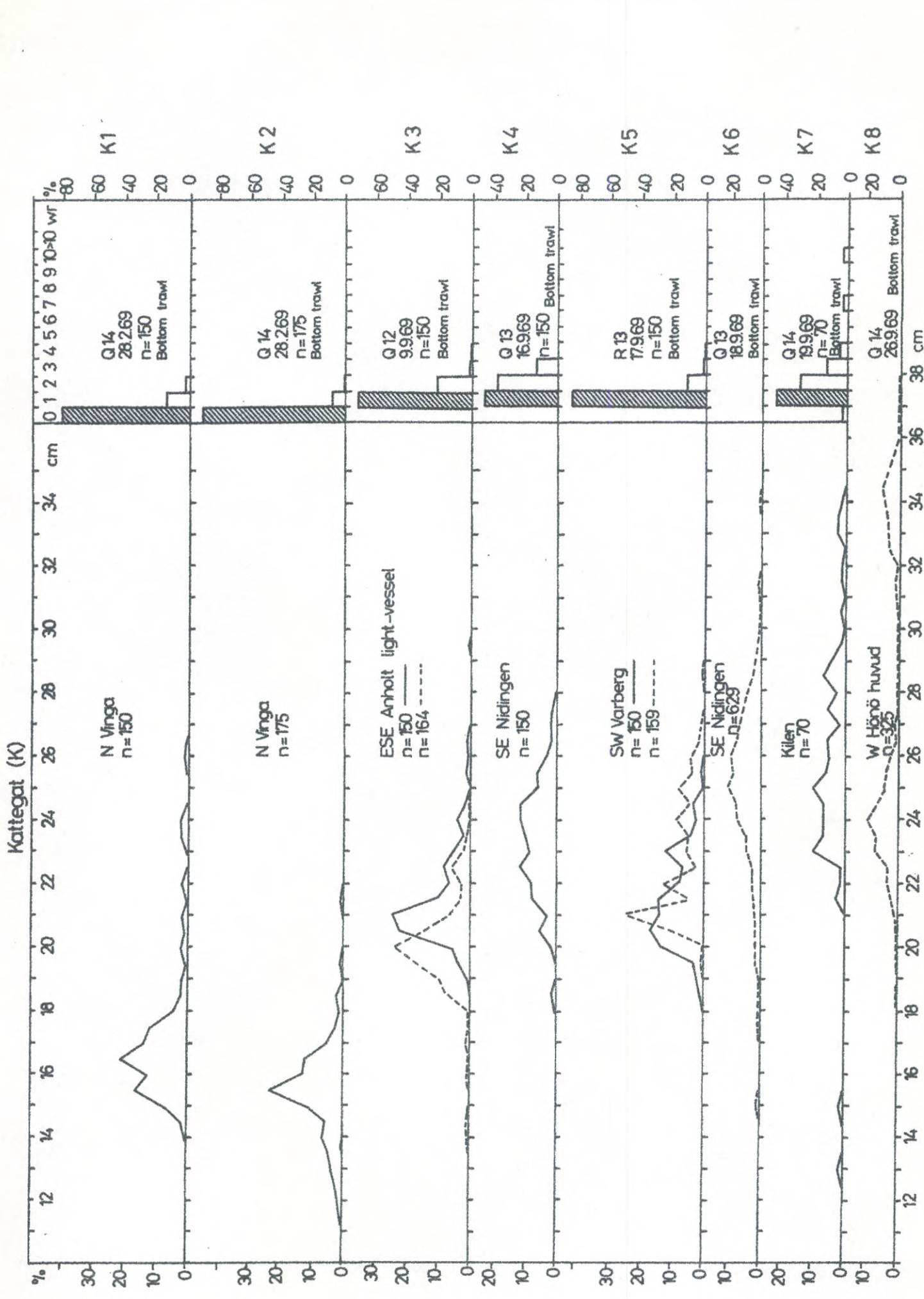


Fig. 1a

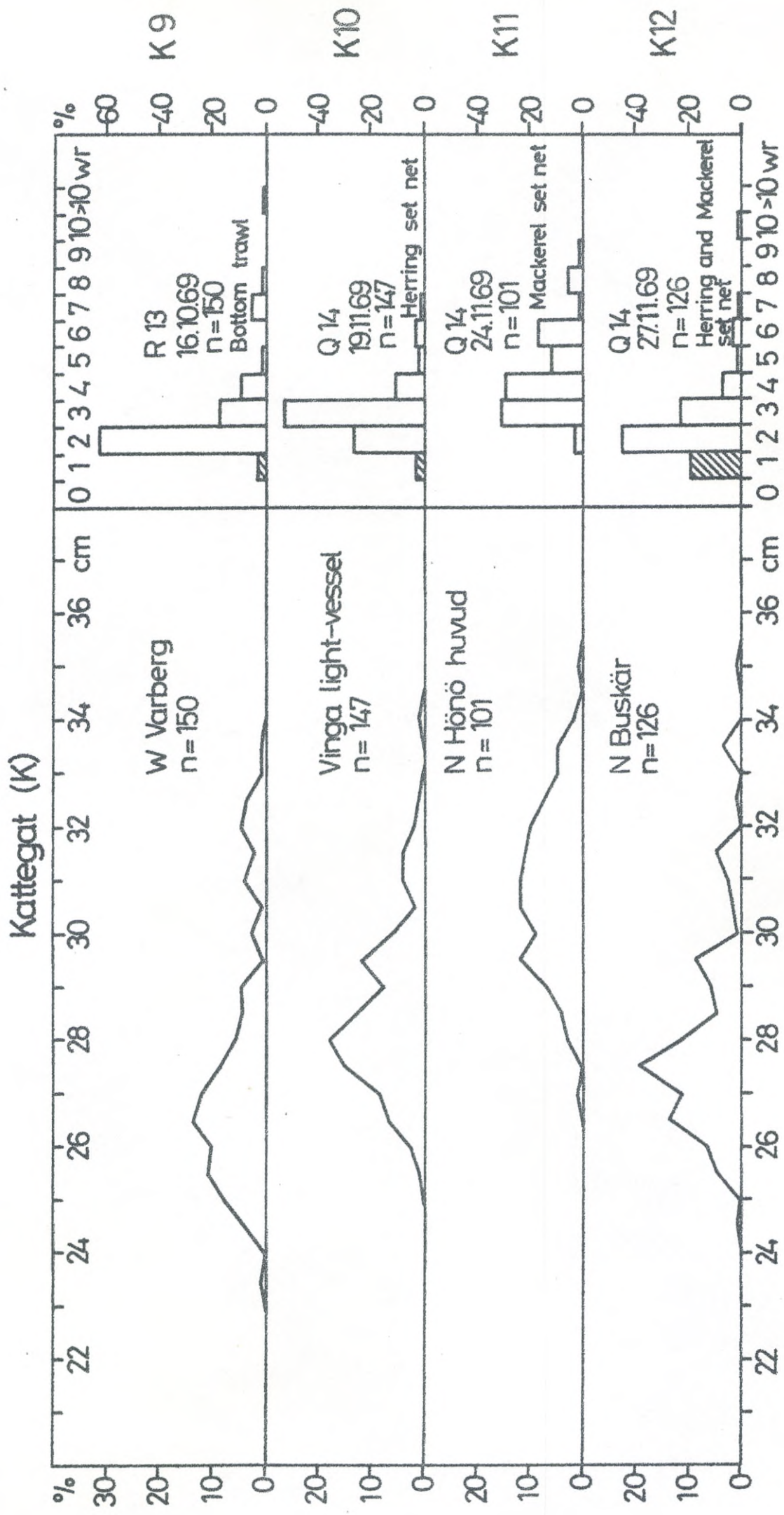


Fig. 1b

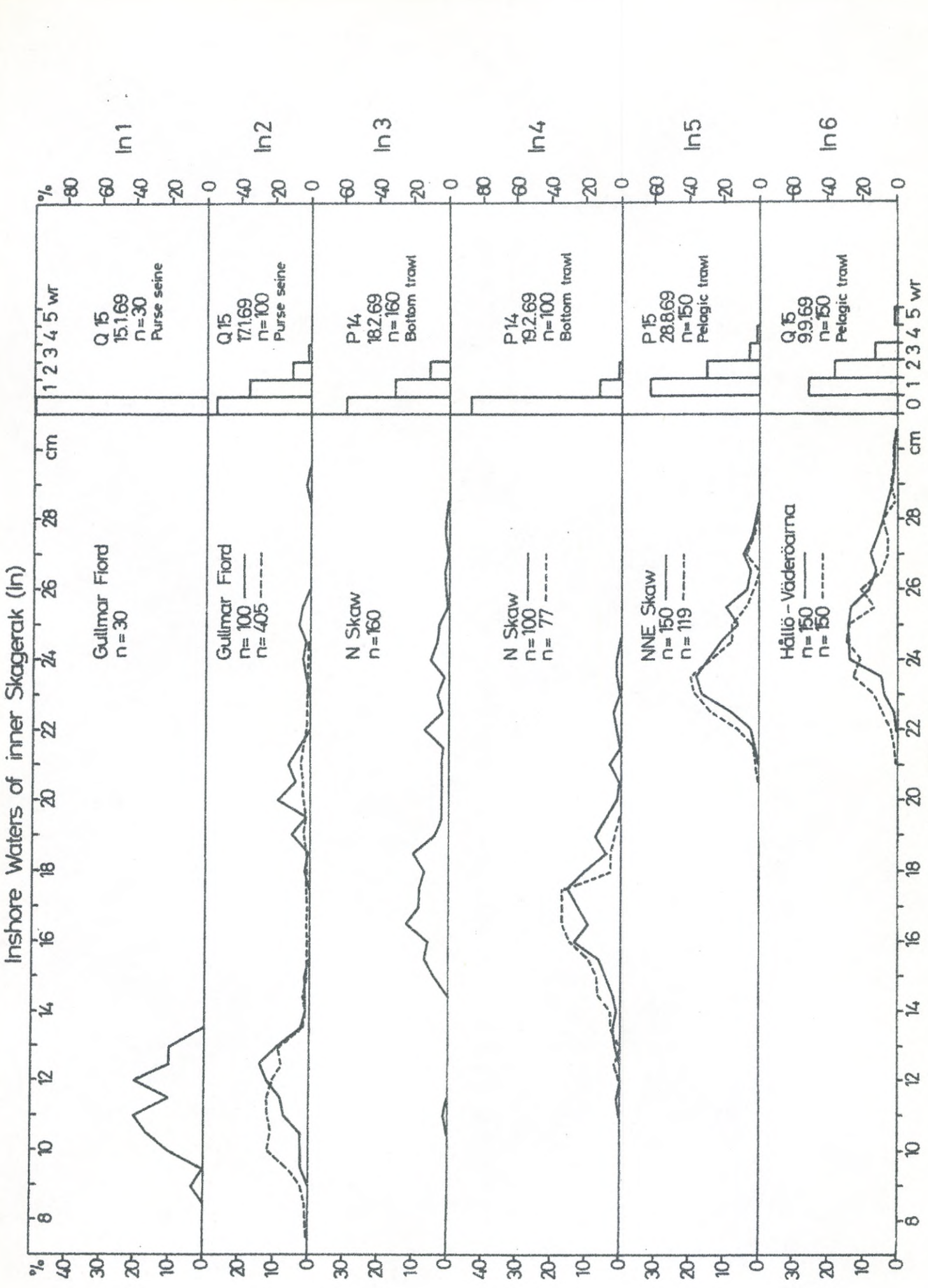


Fig. 2a

Inshore Waters of inner Skagerak (In)

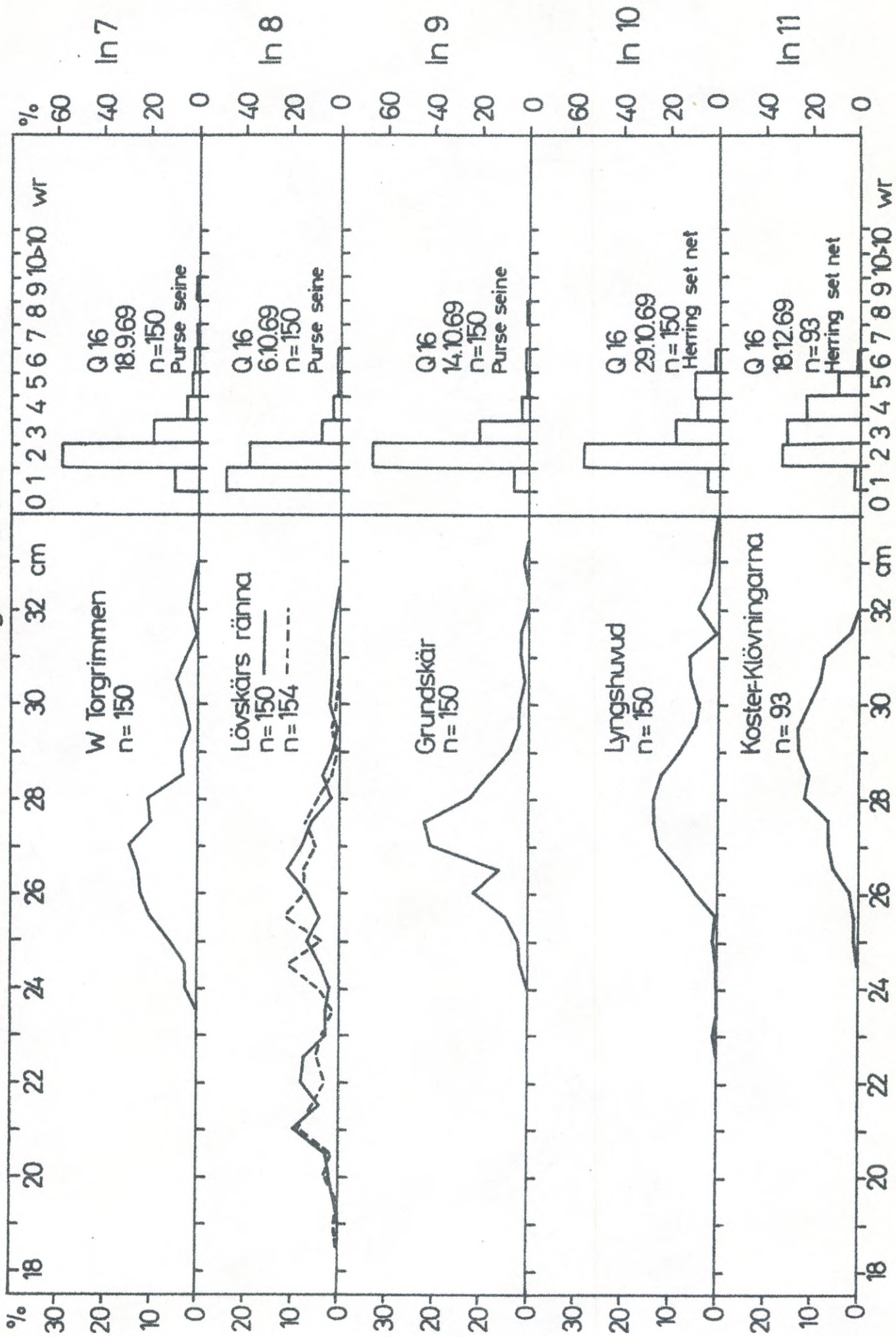


Fig. 2 b

NE North Sea and Outer Skagerrak (NO)

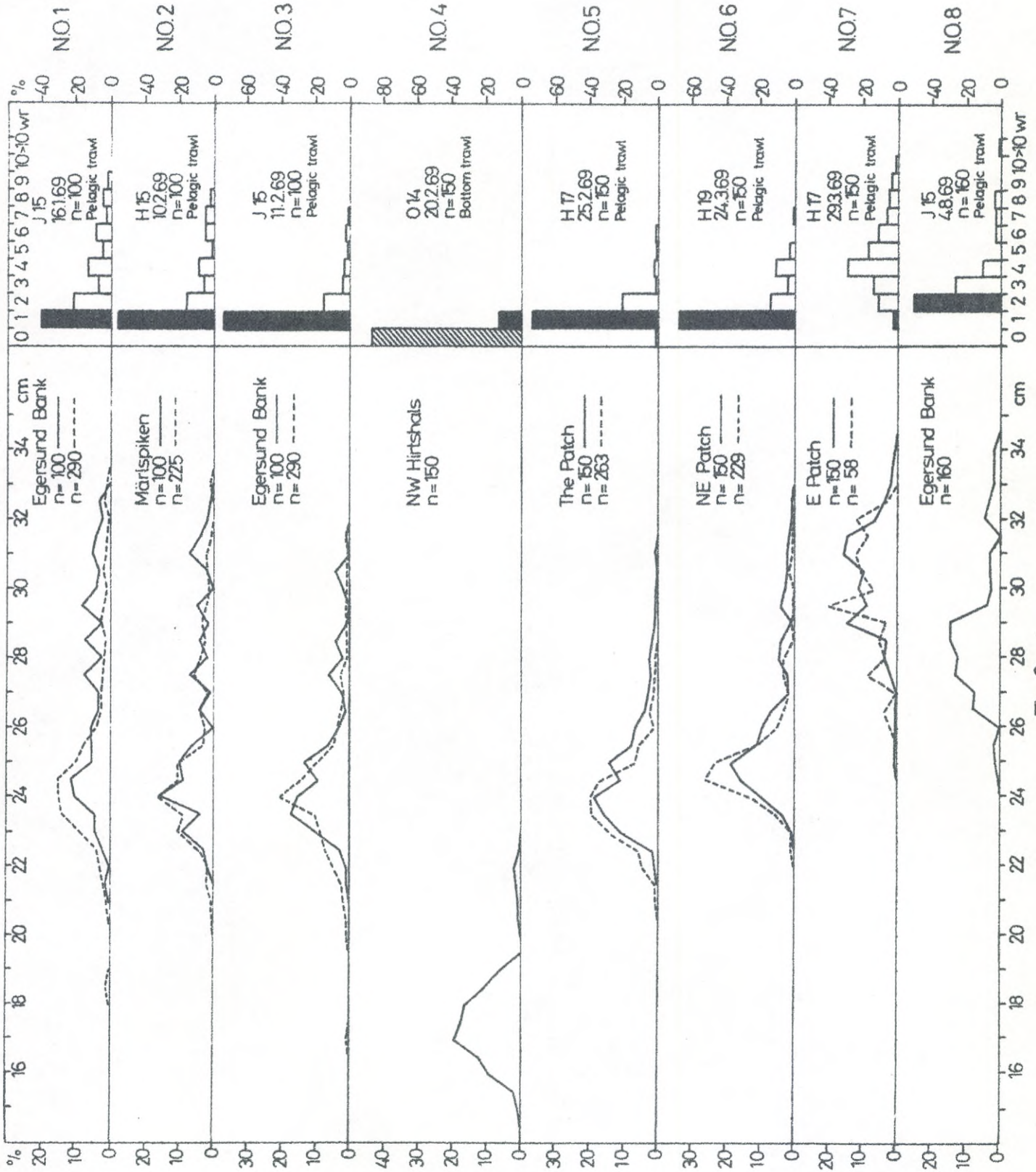


Fig. 3

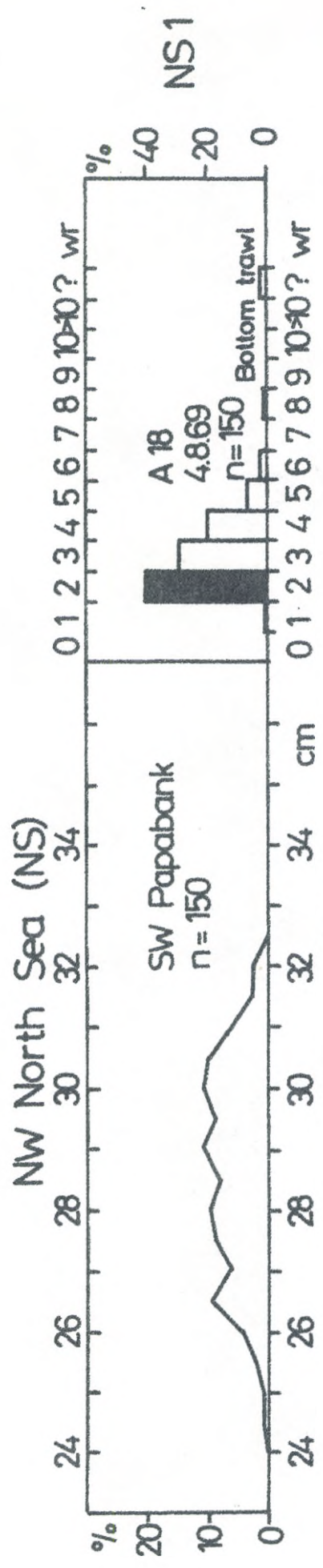


Fig. 4

NS 1

TABLE 1, KATTEGAT (K)

	W.r.	Year-class A. or S. spawners	%	V.S.	Length cm	L ₁ cm	Weight g	Maturity stages
K 1	0	A 1967	86.7	56.44	16.63	16.63	27.6	I
28.2.69	0	S 1968	0.7	57.00	17.25	17.25	30.0	I
Q 14	1	A 1966	8.7	56.85	20.90	-	63.1	I, I/II, II
N Vinga	1	S 1967	1.3	55.50	20.50	-	60.0	II, IV
n=150	2	A 1965	1.3	56.00	22.50	-	75.0	I/II, III
Bottom	2	S 1966	1.3	56.00	25.25	-	125.0	IV
trawl		Mean value:		56.45	17.25		33.1	
K 2	0 or 1	A. or S.	11.4	56.45	15.08	-	20.4	I
28.2.69		A local dwarf race? Cf. In 2						
Q 14	0	A 1967	81.7	56.57	15.60	-	22.7	I
N Vinga	0	S 1968	2.3	56.25	15.88	-	25.0	I
n=175	1	A 1966	2.3	55.75	19.25	-	47.5	I, I/II, II, III
Bottom	1	S 1967	1.7	57.00	19.75	-	50.0	I, I/II
trawl	2	A 1965	0.6	56.00	18.25	-	40.0	I
		Mean value:		56.53	15.72		23.4	
K 3	1	A 1967	74.0	56.27	21.14	14.09	75.0	I, I/II, II/III, III
9.9.69	2	A 1966	23.3	55.79	23.11	12.93	99.1	I, I/II, II, III, IV
Q 12	3	A 1965	2.0	56.00	25.08	12.58	123.3	I/II, III
ESE Anholt	4	A 1964	0.7	56.00	29.75	14.75	240.0	IV
light-vessel		Mean value:		56.16	21.81		82.7	
n=150								
Bottom trawl								
K 4	1	A 1967	47.3	56.56	22.43	14.86	93.7	I, I/II, IV
16.9.69	2	A 1966	38.7	55.86	22.46	12.71	131.4	I, I/II, II, II/III
Q 13								III/IV
SE Nidingen	3	A 1965	14.0	56.00	25.51	11.87	148.1	I/II, II, IV
n=150		Mean value:		56.21	23.65		115.9	
Bottom trawl								
K 5	1	A 1967	86.0	56.16	21.42	14.03	86.0	I, I/II, II/III, IV
17.9.69	2	A 1966	12.0	55.72	23.61	12.69	107.8	I, I/II
R 13	3	A 1965	1.3	56.00	24.50	11.75	130.0	I/II, II
SW Varberg	4	A 1964	0.7	55.00	24.75	-	120.0	II
n=150		Mean value:		56.09	21.75		83.7	
Bottom trawl								
K 6								
18.9.69								
Q 13								
SE Nidingen		Only length measurements						
n=629								
Bottom trawl								
K 7	0	A 1968	2.9	56.00	14.25	14.25	25.0	I
19.9.69	1	A 1967	44.3	56.60	24.01	17.13	117.4	I, I/II, II, II/III
Q 14	2	A 1966	29.9	56.28	26.89	15.96	190.5	I/II, III, IV
Kilen	3	A 1965	12.9	56.55	28.69	14.14	235.6	I/II, II/III, IV
n=70	4	A 1964	4.3	57.00	32.92	18.92	350.0	IV
Bottom	7	A 1961	2.9	55.50	32.75	-	355.0	IV
trawl	10	A 1958	2.9	57.50	34.00	13.75	405.0	IV
		Mean value:		56.49	26.09		230.8	

TABLE 1, KATTEGAT (K), continued

W.r.	Year-class	%	V.S.	Length	L ₁	Weight	Maturity stages		
	A. or S. spawners			cm	cm	g			
K 8									
26.9.69									
Q 14									
W Hönö									
huvud									
n=325									
Bottom									
trawl									
Only length measurements									
K 9	1	A	1967	2.7	57.00	25.12	17.25	135.0	I, I/II
16.10.69	2	A	1966	63.3	56.13	26.65	14.66	170.1	I/II, II, III, IV, V,
R 13									VI, VII, <u>VII/II</u>
W Varberg	3	A	1965	16.7	56.20	28.39	13.99	209.2	II, IV, IV/V, <u>VII/II</u>
n=150	4	A	1964	9.3	56.21	31.14	15.86	258.6	II, V, VII, <u>VII/II</u>
Bottom	5	A	1963	0.7	57.00	31.75	14.25	290.0	<u>VII/II</u>
trawl	7	A	1961	5.3	56.25	32.75	14.87	306.2	IV/V, V, VII/II
	8	A	1960	1.3	56.50	32.50	14.50	305.0	<u>VII/II</u>
	>10	A		0.7	<u>57.00</u>	<u>32.75</u>	15.25	<u>290.0</u>	<u>VII/II</u>
			Mean value:		56.20	27.80		194.6	
K 10	1	A	1967	2.7	56.50	26.75	18.08	160.0	I/II
19.11.69	2	S	1967	26.5	56.77	27.58	13.09	186.1	III, <u>IV</u>
Q 14	3	A	1965	2.0	56.00	30.92	15.92	230.0	II, <u>VII/II</u>
Vinga light-	3	S	1966	51.7	56.49	28.70	11.93	210.8	I, II, III, <u>IV</u>
vessel	4	S	1965	11.6	56.87	30.25	11.81	258.2	III, <u>IV</u>
n=147	5	S	1964	2.0	57.33	31.25	10.92	256.7	IV
Herring	6	S	1963	2.7	56.50	32.62	13.08	310.0	IV
set net	7	S	1962	0.7	<u>57.00</u>	<u>32.75</u>	10.75	<u>310.0</u>	IV
			Mean value:		56.62	28.76		213.1	
K 11	2	S	1967	3.0	57.50	28.42	14.25	206.7	II/III, IV
24.11.69	3	S	1966	30.7	56.87	28.81	12.80	232.6	I, III, <u>IV</u>
Q 14	4	S	1965	29.7	57.20	31.00	12.98	263.3	II, <u>IV</u>
N Hönö	5	S	1964	11.9	56.83	32.00	11.34	296.7	IV
huvud	6	S	1963	16.8	56.87	32.72	12.37	294.1	II, III, <u>IV</u>
n=101	7	S	1962	1.0	56.00	33.75	10.75	370.0	IV
Mackerel	8	S	1961	5.9	57.17	32.83	12.92	330.0	IV
set net	9	S	1960	1.0	<u>58.00</u>	<u>34.25</u>	12.25	<u>350.0</u>	IV
			Mean value:		57.00	31.14		267.2	
K 12	1	A	1967	18.3	56.63	26.58	17.55	147.0	<u>I, I/II, II</u>
27.11.69	1	S	1968	0.8	57.00	26.25	16.75	150.0	I
Q 14	2	A	1966	7.1	55.78	28.36	15.50	174.4	II, III, VII/II
Buskär	2	S	1967	38.1	57.04	27.53	12.37	174.2	I/II, II, III, <u>IV</u>
n=126	3	A	1965	4.0	56.80	29.85	13.65	188.0	<u>VII/II</u>
Herring and	3	S	1966	18.3	57.09	28.84	11.36	215.2	III, <u>IV</u> , IV/v
Mackerel	4	A	1964	1.6	56.50	31.75	15.00	230.0	<u>VII/II</u>
set net	4	S	1965	6.3	57.00	31.12	12.37	268.0	IV
	5	S	1964	0.8	57.00	35.25	16.75	360.0	IV
	6	A	1962	0.8	57.00	33.75	14.75	320.0	<u>VII/II</u>
	6	S	1963	2.4	56.67	31.42	12.08	300.0	IV
	7	S	1962	0.8	57.00	33.75	11.25	370.0	IV
	10	S	1959	0.8	<u>56.00</u>	<u>33.75</u>	15.25	<u>340.0</u>	IV
			Mean value:		56.84	28.34		192.4	

TABLE 2, Inshore Waters of inner SKAGERAK (In)

W.r.	Year-class A. or S. spawners	%	V.S.	Length cm	L ₁ cm	Weight g	Maturity stages	
In 1 15.1.69 Q 15 Gullmar Fiord n=30 Purse seine	0	A. or S. 1967/68	100.0	56.63	11.60	11.60	8.3	I
		A local dwarf race? Cf. In 2						
In 2 17.1.69 Q 15 Gullmar Fiord n=100 Purse seine	0	A. or S. spawners	55.0	56.42	12.20	12.20	10.6	I
		This part of the sample consisted of the same type of herring as in In 1						
	0	A 1967	6.0	56.67	13.25	13.25	13.7	I, I/II, II
	1	A 1966	2.0	57.00	23.25	14.50	90.0	I/II, II
	1	S 1967	26.0	57.00	20.35	9.17	56.0	I/II, II, II/III
	2	S 1966	10.0	56.22	24.05	9.20	114.0	III, IV
	3	S 1965	1.0	58.00	29.25	11.75	230.0	IV
		Mean value:		56.59	15.57		35.3	
In 3 18.2.69 P 14 N Skaw n=160 Bottom trawl	0	A 1967	58.7	56.58	17.29	17.29	31.3	I
	1	A 1966	30.6	56.19	21.25	13.97	68.4	I, II, III, VII/II
	2	A 1965	10.6	56.20	24.75	13.06	111.8	I, II, IV, VII/II
		Mean value:		56.43	19.30		52.1	
In 4 19.2.69 P 14 N Skaw n=100 Bottom trawl	1	A. or S. spawners	4.0	56.25	13.88	-	15.0	I
		This part of the sample consisted of the same type of herring as in In 1						
	0	A 1967	87.0	56.38	17.27	17.27	30.8	I
	1	A 1966	9.0	56.67	22.14	13.44	72.2	I, II
		Mean value:		56.40	17.58		33.9	
In 5 28.8.69 P.15 NNE Skaw n=150 Pelagic trawl	1	A 1967	62.7	56.48	23.79	17.21	120.3	I, I/II, II, III
	2	A 1966	24.0	56.17	25.24	13.09	152.8	I/II, III, IV
	2	S 1967	6.0	56.88	25.08	11.31	145.6	I/II, II, II/III
	3	A 1965	2.7	55.20	26.25	11.88	177.5	I/II, II, II/III, IV
	3	S 1966	3.3	56.40	26.45	10.05	178.0	I/II, II, II/III
	4	A 1964	0.7	55.00	26.25	13.25	190.0	IV
	4	S 1965	0.7	57.00	27.25	13.25	180.0	II
		Mean value:		56.38	24.41		133.9	
In 6 9.9.69 Q 15 Hällö- Väderöarna n=150 Pelagic trawl	1	A 1967	50.7	56.58	24.77	17.82	121.0	I, I/II
	2	A 1966	36.0	56.04	25.28	13.71	160.5	I/II, II, III, IV
	3	A 1965	12.7	55.83	25.75	13.36	193.7	I/II, II, III, IV
	5	A 1963	0.7	56.00	30.25	14.25	240.0	II
		Mean value:		56.29	25.73		145.3	

TABLE 3, NE NORTH SEA & OUTER SKAGERAK (N.O.)

	W.r.	Year-class A. or S. spawners	%	V.S.	Length cm	L ₁ cm	Weight g	Maturity stages
N.O. 1	1	A 1966	31.0	56.71	24.38	16.50	96.4	I/II, II, III
16.1.69	1	S 1967	9.0	57.00	24.42	14.83	95.6	I/II, II
J 15	2	A 1965	16.0	56.69	26.97	15.79	138.8	II, VII/II
Egersund	2	S 1966	5.0	56.80	28.25	14.25	170.0	II, III, IV
Bank	3	A 1964	7.0	56.43	28.39	15.33	161.4	II/III, VII/II
n=100	4	A 1963	13.0	56.23	29.40	15.11	180.0	VII/II
Pelagic	5	A 1962	4.0	56.75	30.77	16.25	205.0	II, VII/II
trawl	6	A 1961	8.0	56.25	31.44	14.61	227.5	II/III, VII/II
	7	A 1960	2.0	56.00	32.25	14.75	230.0	VII/II
	8	A 1959	4.0	56.00	31.25	13.50	202.5	VII/II
	9	A 1958	1.0	56.00	32.75	-	240.0	VII/II
		Mean value:		56.57	27.26		144.6	
N.O. 2	1	A 1966	42.0	56.55	24.26	16.13	95.0	I, II, III
10.2.69	1	S 1967	14.0	57.50	24.39	15.00	97.1	II, III, III/IV, IV
H 15	2	A 1965	10.0	56.50	27.65	17.50	143.0	II, VII/II
Märilspiken	2	S 1966	6.0	57.00	27.92	13.05	163.3	II, III/IV, IV
n=100	3	A 1964	4.0	56.20	28.12	16.83	145.0	II, VII/II
Pelagic	3	S 1965	2.0	57.50	28.25	12.75	155.5	II, IV
trawl	4	A 1963	7.0	56.71	28.89	14.67	171.0	II
	4	S 1964	2.0	56.50	30.00	13.00	185.0	II
	5	A 1962	1.0	57.00	30.75	17.75	190.0	II
	6	A 1961	4.0	56.50	31.63	16.25	225.0	II, VII/II
	6	S 1962	1.0	56.00	31.25	12.25	190.0	II
	7	A 1960	5.0	56.60	31.65	16.45	212.0	II, VII/II
	8	A 1959	2.0	56.00	32.00	15.75	210.0	VII/II
		Mean value:		56.71	26.47		129.8	
N.O. 3	1	A 1966	72.0	56.72	24.26	16.12	96.4	I/II, II, III, VII/II
11.2.69	1	S 1967	2.0	57.00	25.25	15.25	105.0	III, III/IV
J 15	2	A 1965	11.0	56.36	26.93	15.31	132.7	II, VII/II
Egersund	2	S 1966	4.0	57.25	29.13	13.25	195.0	IV, IV/V
Bank	3	A 1964	4.0	56.50	29.00	15.25	167.5	II
n=100	4	A 1963	3.0	56.00	29.92	12.08	186.7	II
Pelagic	5	A 1962	1.0	56.00	28.75	13.75	140.0	VII/II
trawl	6	A 1961	2.0	56.50	30.75	13.25	205.0	II
	7	A 1960	1.0	57.00	30.75	13.75	210.0	II
		Mean value:		56.67	25.37		113.8	
N.O. 4	0	A 1967	89.2	56.50	17.60	17.60	34.5	I
20.2.69	0	S 1968	1.4	-	17.25	17.25	35.0	I
O 14	1	A 1966	7.4	56.27	20.11	-	45.7	I, I/II
NW Hirts-	1	S 1967	2.0	-	20.25	-	60.0	I
hals		Mean value:		56.48	17.84		36.07	
n=150								
Bottom								
trawl								
N.O. 5	0	A 1967	0.7	57.00	24.75	24.75	100.0	I/II
25.2.69	0	S 1968	0.7	57.00	23.75	23.75	90.0	I
H 17	1	A 1966	62.7	56.60	24.43	15.82	96.3	I, I/II, II, III
The Patch	1	S 1967	11.3	57.00	24.25	14.75	94.1	I, I/II, II, III, IV
n=150	2	A 1965	18.7	56.42	26.41	15.58	124.6	I/II, II
Pelagic	2	S 1966	2.0	57.00	27.42	13.58	150.0	IV
trawl	3	A 1964	1.3	57.00	29.25	14.00	170.0	II, VII/II
	4	A 1963	2.0	56.67	28.58	13.58	163.3	I/II, VII/II
	7	A 1960	0.7	57.00	31.25	16.25	210.0	VII/II
		Mean value:		56.70	25.03		105.5	

TABLE 3, NE NORTH SEA & OUTER SKAGERAK (N.O.), continued

W.r.	Year-class A. or S. spawners	%	V.S.	Length cm	L_1 cm	Weight g	Maturity stages
N.O. 6 24.3.69	1 A 1965	62.7	56.62	25.20	16.71	105.2	I/II, <u>II</u> , II/III, VII/II
H 19	1 S 1966	4.7	57.00	25.18	14.50	98.6	I/II, II, III, III/IV
NE Patch n=150	2 A 1964	12.7	56.53	27.09	14.62	125.3	I/II, <u>II</u> , VII/II
Pelagic trawl	2 S 1965	1.3	57.50	28.50	16.25	145.0	VII
	3 A 1963	2.7	57.00	29.00	13.25	165.0	I/II, II, <u>VII/II</u>
	3 S 1964	1.3	56.50	29.25	12.75	170.0	IV, VII
	4 A 1962	10.7	56.14	29.84	14.60	176.2	II, <u>VII/II</u>
	4 S 1963	0.7	55.00	29.75	12.75	180.0	VII
	5 A 1961	2.7	56.75	31.13	11.75	195.0	VII/II
	7 A 1959	0.7	<u>56.00</u>	<u>32.75</u>	7.75	<u>210.0</u>	VII/II
	Mean value:		56.59	26.37		117.8	
N.O. 7 29.3.69	1 A 1965	2.0	56.67	26.25	17.92	110.0	I/II, <u>II</u>
H 17	1 S 1966	0.7	57.00	26.25	-	110.0	II
E Patch n=150	2 A 1964	8.7	56.38	28.67	16.60	155.4	<u>II</u> , VII/II
Pelagic trawl	2 S 1965	2.0	56.67	29.75	16.08	176.7	IV
	3 A 1963	12.7	56.63	29.91	16.69	184.8	I/II, II, <u>VII/II</u>
	4 A 1962	19.3	56.31	30.27	15.65	187.1	II, <u>VII/II</u>
	4 S 1963	11.3	56.88	29.99	14.79	181.8	I/II, II, <u>VII</u> , <u>VII/II</u>
	5 A 1961	14.0	56.57	31.08	14.53	205.0	II, <u>VII/II</u>
	5 S 1962	2.7	56.60	31.40	12.75	207.5	IV/V, VII, VII/II
	6 A 1960	7.3	56.27	31.80	16.46	213.6	II, VII, <u>VII/II</u>
	6 S 1961	4.0	56.67	31.75	16.50	206.7	VII
	7 A 1959	4.7	56.57	31.96	16.18	215.7	II, <u>VII/II</u>
	7 S 1960	1.3	56.50	31.50	19.00	205.0	VII
8 A 1958	3.3	56.40	32.05	14.92	222.0	VII, <u>VII/II</u>	
8 S 1959	1.3	57.00	33.75	11.00	245.0	<u>VII/II</u>	
9 A 1957	2.0	56.00	31.25	13.92	213.3	VII/II	
9 S 1958	1.3	57.00	32.00	15.25	220.0	VII	
10 S 1957	0.7	57.00	32.25	-	200.0	VII	
? A	0.7	<u>57.00</u>	<u>32.25</u>	-	<u>210.0</u>	VII/II	
	Mean value:		56.54	30.54		191.5	
N.O. 8 4.8.69	2 A 1965	30.6	56.59	27.84	16.26	213.3	I/II, II, III, <u>IV</u>
J 15	2 S 1966	20.6	56.85	27.83	14.69	193.3	<u>I/II</u> , II, III
Egersund Bank	3 A 1964	18.8	56.40	29.30	14.02	253.0	I/II, II, III, <u>IV</u>
Pelagic trawl	3 S 1965	7.5	56.42	28.33	12.35	205.8	I/II, II, III
	4 A 1963	7.5	55.92	33.42	14.75	305.8	I/II, III, <u>IV</u>
	4 S 1964	3.1	57.20	28.95	12.15	244.0	II, III
	5 A 1962	0.6	56.00	32.25	15.25	330.0	IV
	6 A 1961	1.9	56.33	31.75	12.25	323.3	II, IV
	6 S 1962	1.3	56.00	29.50	13.50	240.0	I/II, II
	7 A 1960	3.1	56.80	33.05	14.95	364.0	IV
	8 A 1959	3.7	57.00	33.67	14.50	408.3	IV
	10 A	1.2	<u>57.50</u>	<u>33.50</u>	14.50	<u>395.0</u>	IV
		Mean value:		56.58	28.99		241.4

TABLE 4, NW NORTH SEA (NS)

NS 1	2	A	1965	22.0	56.55	27.19	-	174.5	I/II, <u>IV</u>
4.8.69	2	S	1966	16.0	56.79	27.83	-	165.8	I/II, <u>II</u> , III, VII/II
A 18	3	A	1964	18.0	56.70	28.84	-	225.6	III, <u>IV</u> , VII/II
SW Papa-	3	S	1965	13.3	56.95	30.03	-	220.5	<u>II</u> , III, <u>VII/II</u>
bank	4	A	1963	11.3	56.44	29.96	-	244.7	IV
n=150	4	S	1964	8.0	57.08	30.46	-	246.7	<u>III</u> , III/IV, VII/II
Bottom	5	A	1962	7.3	57.18	30.61	-	267.3	IV
trawl	5	S	1963	0.7	56.00	31.25	-	270.0	II
	6	A	1961	2.0	56.33	30.92	-	263.3	IV
	6	S	1962	0.7	56.00	32.25	-	280.0	III
	8	A	1959	0.7	<u>57.00</u>	<u>29.75</u>	-	<u>230.0</u>	IV
			Mean value:	56.74	28.95			211.2	

