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PRELIMINARY REPORT OF THE NORWEGIAN GROUND FISH SURVEY
AT BEAR ISLAND AND WEST-SPITSBERGEN IN THE AUTUMN 1982

by

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ABSTRACT

This report describes the results from a stratified bottom trawl survey with RV "Michael Sars" and MTr "Vikheim" in the period 7 September to 9 October 1982. The most abundant species in the area were long rough dab and redfish. Cod were mostly caught in the Bear Island area, and the most abundant year-class was the 1979 year-class. Haddock was very scarce. Redfishes were abundant, and the dominating species was Sebastes mentella. Fishes longer than 35 cm were few in the catches.

INTRODUCTION

The investigations described in this report are partly a supplement to the investigations carried out on cod and haddock in the Barents Sea during the winter and partly a monitoring of the other demersal fish stocks in the area. In earlier years the investigations at Spitsbergen have been carried out as an acoustic survey (Dalen, Rørvik and Smedstad, 1977, and Dalen and Smedstad, 1978). However, the drastic reduction of the cod stock in the area has made it almost impossible to record the cod with acoustic equipment. Therefore the investigations in

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1981 (Randa and Smedstad, 1982) and in 1982 were carried out as stratified bottom trawl surveys.

MATERIAL AND METHODS

The survey was carried out by two vessels, RV "Michael Sars" and the commercial trawler MTr "Vikheim". The survey started out from Hammerfest on 7 September 1982 and was finished 9 October. Both vessels used a Campelen 1800 meshes shrimp trawl with rubber bobbins and codend mesh size of 35 mm. Sweepwires were 80 m. The trawl was towed for 3 n.miles at a speed of 3 knots. The trawl stations are shown in Fig. 3. In addition to trawling RV "Michael Sars" made hydrographical observations using a CTD-sonde (Fig. 2).

The survey was designed as a stratified random trawl survey. The investigated area was divided into 45 strata based on depth boundaries and geographical areas (Fig. 1). The following depth intervals were used: 0-100 m, 100-200 m, 200-300 m, 300-400 m and >400 m. The total area was divided into two sub-areas. The area north of 76°N consists of the strata 1-22 and the southern area of the strata 23-45. The allocation of trawl hauls and the statistical calculations are described in last years report (Randa and Smedstad, 1982). The only difference from last years report is that the indices this year are given as swept area indices while last year used mean catch indices were used.

RESULTS

Hydrography

The temperatures in 100 m and at the bottom are shown in Fig. 4 and 5. The temperatures in the Storfjordchannel seems to be somewhat lower than at the same time in 1981, while the temperatures in the Bear Island channel seems to be somewhat higher.

Cod

Cod was caught in all strata except strata 2, 21 and 42. In the northern area the cod was very scattered and no dense concentrations were found (Fig. 6). The largest catches here were in stratum 12 which had a mean catch of 69 cod per trawl hour. In the southern area the greatest concentrations were found in strata 24, 25 and 32 with mean catches of 202 to 295 specimens per trawl-hour. By weight the biggest catches were taken in strata 32 with a mean catch of 305 kg per trawl-hour.

In 1981 concentrations of the 1979 year-class were found in stratum 42. In 1982, however, no fish were found in this stratum. The 1979 year-class was mainly found in strata 24, 25 and 32, which means that the 1979 year-class this year prefer depths between 100 and 200 m instead of the very shallow water where they were found last autumn. Fig. 13 and Tables 3 and 4 show the age distribution of cod in different depth zones and in different areas for 1981 and 1982.

The age distribution of 1981 given in this report is slightly different from the distribution given in last years report because there were some errors in the age-length key used last year. This shift of the 1979 year-class to deeper water are seen from the figure 13 and in the tables 1 and 2. It is also seen that the older fish tends to prefer deeper water than the younger ones. Fig. 13 H shows that the total year-class distribution in the stock is the same in 1982 as was found in 1981. As in 1981 the 1979 year-class was found as the most numerous. The 1981 and 1980 year-classes were found to be poor, and of the older year-classes the 1975 year-class is still the most numerous.

Table 5 indicates that there has been no reduction in the younger year-classes from 1981 to 1982. However, the confidence limits for these year-classes, and especially the 1979 year-class, was greater in 1981 (in the order of 100%) than in 1982. For fish 6 years and older a reduction is observed. This reduction is caused by both mortality and migration.

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Haddock

Haddock was caught in small numbers. In the northern area haddock was only caught in strata 2, 10, 12, 13 and 18, and in these strata the mean catches varied from 0.3 to 2.0 specimens per trawl-hour. All the haddock caught in the northern area were smaller than 20 cm (Fig. 11).

In the southern area haddock was more numerous but 80% of the specimens were 0-group fish. The catches were taken in strata 24, 28, 32, 37 and 41, and the mean catches varied from 1.0 to 4.3 specimens per trawl-hour.

The great proportion of 0-group haddock causes an increase in the trawl index by number from 1981 to 1982. The trawl index by weight, however, are strongly reduced from 1981 to 1982 (Tables 6 and 7).

Redfishes

Sebastes mentella is the dominating redfish species at Bear Island and West-Spitsbergen. In the northern area S.mentella amounts to about 99% of the redfish index, while it amounts to 95% in the southern area. By weight the corresponding percentages are 99% and 92%.

About 78% of S.mentella were found in the southern area, and the greatest concentrations were found between 200 and 300 m (Fig. 7, Table 1). Also in the northern area, S.mentella was most numerous between 200 and 300 m, but by weight the biggest concentrations were found deeper than 400 m in both areas (Table 2).

Fig. 15 shows that the length distributions change with depth. Fish smaller than 20 cm are dominating down to 300 m while specimens between 20 and 35 cm are dominating deeper than 300 m. This is in total agreement with last years result. The figure also shows that the fish in the northern area are

smaller than the fish in the southern, and that it is fish smaller than 35 cm that dominate in the samples.

Sebastes marinus amounts to about 4% of the total redfish index in numbers and about 7% by weight. 98% of S. marinus is recorded in the southern area. The length distributions of S. marinus are also changing with depth (Fig. 14).

The trawl index of S. marinus has decreased from 1981 to 1982 while the index for S. mentella has increased in the same period (Tables 6 and 7).

Greenland halibut

Greenland halibut was caught in all strata deeper than 200 m. Some small Greenland halibut were taken between 100 and 200 m. The greatest catches were taken in Kings Bay, Isfjord channel and in the Storffjord channel (Fig. 8).

Fig. 17 shows that the proportion of larger fish increases with depth, and that the fish in the southern area are larger than in the northern. This is seen from the trawl indices. The indices by number are almost equal in the two areas, while the weight index is greater in the southern area than in the northern (Tables 1 and 2). Also the trawl indices for Greenland halibut show an increase from 1981 to 1982 (Tables 6 and 7).

Blue whiting

Blue whiting was mainly caught in the southern area. The catches increased with depth (Tables 1 and 2), and it was mainly fish between 30 and 40 cm in the catches (Fig. 12).

Shrimps

Shrimps were caught in all strata deeper than 200 m. The greatest catches were taken north of Sjubrebanken, in Kings Bay, in Isfjord channel and in Storffjord channel (Fig. 10). In

the northern area the trawl index was highest between 200 m and 300 m, while it was highest between 300 m and 400 m in the southern (Table 2).

From 1981 to 1982 the trawl index increased with about 38% (Table 7).

Catfishes

Catfishes were caught in small numbers in the whole area. Jelly cat was the most numerous (Table 1). Both jelly cat and smaller catfish were most numerous between 100 and 200 m while catfish was caught in greatest numbers between 200 and 300 m.

For all three species the trawl indices increased from 1981 to 1982, except for the index by number of smaller catfish (Table 6 and 7).

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- Dalen, J. and Smedstad, O.M. 1978. Bunnfiskundersøkelser ved Bjørnøya og Vest-Spitsbergen høsten 1977. Investigations on demersal fish at Bear Island and West-Spitsbergen in autumn 1977. Fisken Hav., 1978(3): 1-14.
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Table 1. Stratified trawl indices on numbers for different depths and areas in 1982.

	North						South						TOTAL
	0-100	100-200	200-300	300-400	>400	TOTAL	0-100	100-200	200-300	300-400	>400	TOTAL	
Cod	471	3 145	294	137	93	4 140	10 050	21 890	5 965	1 986	1 569	41 460	45 600
Haddock	0	33	21	0	2	56	76	254	6	520	71	928	984
<u>S. marinus</u>	46	5	96	17	40	204	0	68	5 679	5 959	82	11 790	11 990
<u>S. mentella</u>	101	1 550	34 090	6 393	17 060	59 190	0	2 273	83 900	58 410	73 870	218 500	277 600
Greenland halibut	2	191	3 715	3 085	5 942	12 940	0	131	2 427	2 922	7 706	13 070	26 000
Long rough dab	673	5 346	22 750	3 161	2 264	34 190	5 371	164 900	89 720	21 010	8 212	336 100	370 300
Blue whiting	0	27	20	241	249	537	0	6	13 010	5 941	8 275	27 230	27 760
Jelly cat	0	0	16	5	9	30	0	519	419	255	17	1 360	1 391
Catfish	10	526	662	169	159	1 527	0	312	453	134	179	1 082	2 609
Smaller catfish	0	38	132	43	66	279	222	948	194	74	14	1 452	1 730

Table 2. Stratified trawl indices on weight for different depths and areas in 1982.

	North						South						TOTAL
	0-100	100-200	200-300	300-400	>400	TOTAL	0-100	100-200	200-300	300-400	>400	TOTAL	
Cod	150	1 094	1 052	448	604	3 348	3 171	25 870	14 620	7 601	6 611	61 180	64 530
Haddock	0	5	+	0	+	5	+	244	32	+	220	496	502
<u>S. marinus</u>	+	4	28	11	20	63	0	15	1 506	2 562	106	4 325	4 388
<u>S. mentella</u>	7	311	1 302	1 430	6 753	9 804	0	325	10 160	12 690	26 670	49 830	59 640
Greenland halibut	0	136	1 937	1 152	3 325	6 550	0	39	2 850	2 650	10 120	15 660	22 221
Long rough dab	74	528	1 594	292	370	2 858	1 866	24 540	11 020	2 101	1 603	45 510	48 370
Blue whiting	0	11	6	68	73	158	0	46	3 669	1 864	2 163	7 741	7 899
Jelly cat	0	0	29	39	61	130	0	5 223	2 730	2 531	1 825	12 590	12 720
Catfish	15	494	532	219	99	1 359	0	376	697	350	426	1 849	3 209
Smaller catfish	0	77	189	51	47	363	92	4 443	561	49	7	6 425	6 788
Shrimps	0	1 916	12 920	5 001	4 981	24 810	0	8 997	19 790	26 720	13 270	68 780	93 590

Table 3. Stratified trawl indices on numbers for different ages of cod in 1981.

		Age										TOTAL
Depth		1	2	3	4	5	6	7	8	9	10+	
North of 76°N	0-100	+	0.4± 0.4	0.1±0.1	+	+	+	+	0.0	0.0	0.0	0.5± 0.6
	100-200	0.0	0.1± 0.1	0.1±0.1	+	+	0.2±0.2	0.1±0.1	+	+	+	0.6± 0.4
	200-300	+	+	+	+	+	+	+	+	+	+	0.1± 0.1
	300-400	0.0	0.0	+	0.0	+	0.1±0.1	+	+	+	+	0.1± 0.1
	>400	0.0	0.0	+	0.0	+	+	+	+	+	+	0.1± 0.2
TOTAL		+	0.5± 0.5	0.2±0.2	0.1±0.1	0.1±0.1	0.3±0.2	0.1±0.1	0.1±0.1	+	+	1.5± 0.7
South of 76°N	0-100	+	20.1±34.8	8.1±7.1	4.7±4.0	0.5±0.3	0.4±0.3	0.1±0.1	+	+	+	33.9±41.9
	100-200	0.1±0.1	1.6± 2.6	0.5±0.7	0.3±0.2	0.1±0.1	0.8±0.7	0.6±0.6	0.1±0.1	0.1±0.1	0.1±0.1	4.3± 3.5
	200-300	0.0	+	0.1±0.1	0.2±0.2	0.2±0.2	2.1±2.7	1.6±2.3	0.4±0.4	0.2±0.2	0.2±0.2	5.0± 6.0
	300-400	0.0	0.1± 0.2	0.1±0.1	0.2±0.1	0.2±0.1	1.3±0.6	0.8±0.4	0.1±0.1	+	+	2.9± 1.5
	>400	0.0	0.0	+	0.1±0.1	0.2±0.1	1.1±0.5	0.6±0.2	+	+	+	2.2± 0.8
TOTAL		0.1±0.1	21.7±34.8	8.8±7.0	5.5±4.0	1.2±0.4	5.8±2.9	3.7±2.5	0.6±0.6	0.4±0.3	0.3±0.2	48.3±42.5
TOTAL		0.1±0.1	22.2±34.7	9.0±7.3	5.5±4.0	1.3±0.5	6.1±3.0	3.8±2.4	0.7±0.6	0.4±0.3	0.4±0.3	49.8±42.4

Table 4. Stratified trawl indices on numbers for different ages of cod in 1982.

		Age										TOTAL
Depth		1	2	3	4	5	6	7	8	9	10+	
North of 76°N	0-100	+	0.2±0.4	0.2± 0.3	+	0.0	0.0	0.0	0.0	0.0	0.0	0.5± 0.9
	100-200	0.5±0.6	1.7±2.5	0.8± 1.0	0.1±0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.1± 3.8
	200-300	0.1±0.1	0.1±0.1	+	+	+	+	+	+	+	+	0.3± 0.2
	300-400	+	+	+	+	+	+	+	0.0	0.0	0.0	0.1± 0.1
	>400	0.0	0.0	+	+	+	+	+	+	0.0	0.0	0.1± 0.1
TOTAL		0.6±0.6	2.0±2.6	1.0± 1.1	0.2±0.1	0.1±0.1	0.1±0.1	0.1±0.1	+	+	+	4.1± 3.9
South of 76°N	0-100	0.4±0.3	0.9±1.1	7.6± 9.2	1.1±1.5	+	0.0	+	0.0	0.0	0.0	10.0±11.9
	100-200	0.5±0.8	1.0±1.2	11.7± 8.5	6.1±5.6	1.2±0.9	0.5±0.3	0.7±0.4	0.1±0.1	+	+	21.9±15.3
	200-300	0.1±0.3	0.1±0.1	1.7± 2.1	1.7±1.7	0.9±0.7	0.4±0.3	0.7±0.4	0.1±0.1	0.1±0.1	+	6.0± 4.5
	300-400	+	+	0.1± 0.1	0.1±0.1	0.3±0.2	0.5±0.3	0.8±0.3	0.1±0.1	0.0	0.0	2.0± 1.0
	>400	0.0	0.0	0.1± 0.1	0.1±0.1	0.3±0.2	0.4±0.2	0.7±0.3	+	0.0	0.0	1.6± 0.5
TOTAL		0.9±0.9	2.0±1.6	21.2±12.8	9.2±6.2	2.8±1.1	1.8±0.4	2.8±0.7	0.3±0.2	0.1±0.1	0.1±0.1	41.5±20.1
TOTAL		1.5±1.1	4.0±2.9	22.2±12.9	9.3±6.1	2.8±1.1	1.9±0.5	2.9±0.8	0.4±0.1	0.1±0.1	0.1±0.1	45.6±20.4

Table 5. Stratified trawl indices on numbers for different year-classes of cod in 1981 and 1982.

Year of investigation	Year-classes											TOTAL
	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	
1981		0.1	22.2	9.0	5.5	1.3	6.1	3.8	0.7	0.4	0.4	49.8
1982	1.5	4.0	22.2	9.3	2.8	1.9	2.9	0.4	0.1	0.1		45.6

Table 6. Stratified trawl indices on numbers for 1981 and 1982.

	Year	Number of hauls	Cod	Haddock	<u>S.marinus</u>	<u>S.mentella</u>	Greenland halibut	Long rough dab	Blue whiting	Jelly cat	Catfish	Smaller catfish
North	1981	66	1 467	327	3 415	45 680	13 600	48 720	1 821	35	621	1 209
	1982	70	4 140	56	204	59 190	12 940	34 190	537	30	1 527	279
South	1981	119	48 310	481	58 250	133 800	6 492	287 500	26 650	1 235	790	1 242
	1982	121	41 460	928	11 790	218 500	13 070	336 100	27 230	1 360	1 082	1 452
TOTAL	1981	185	49 770	808	61 670	179 500	20 100	336 300	28 470	1 270	1 411	2 450
	1982	192	45 600	984	11 990	277 600	26 000	370 300	27 760	1 391	2 609	1 730

Table 7. Stratified trawl indices on weight for 1981 and 1982.

	Year	Cod	Haddock	<u>S.marinus</u>	<u>S.mentella</u>	Greenland halibut	Long rough dab	Blue whiting	Jelly cat	Catfish	Smaller catfish	Shrimps
North	1981	3 156	942	453	11 030	3 645	4 125	400	30	1 032	643	17 060
	1982	3 348	5	63	9 804	6 550	2 858	158	130	1 359	363	24 810
South	1981	73 270	988	10 230	31 510	5 794	40 770	4 968	9 427	1 054	3 764	50 650
	1982	61 180	496	4 325	49 830	15 660	45 510	7 741	12 590	1 849	6 425	68 780
TOTAL	1981	76 430	1 930	10 680	42 530	9 439	44 890	5 368	9 457	2 086	4 407	67 710
	1982	64 530	502	4 388	59 640	22 221	48 370	7 899	12 720	3 209	6 788	93 590

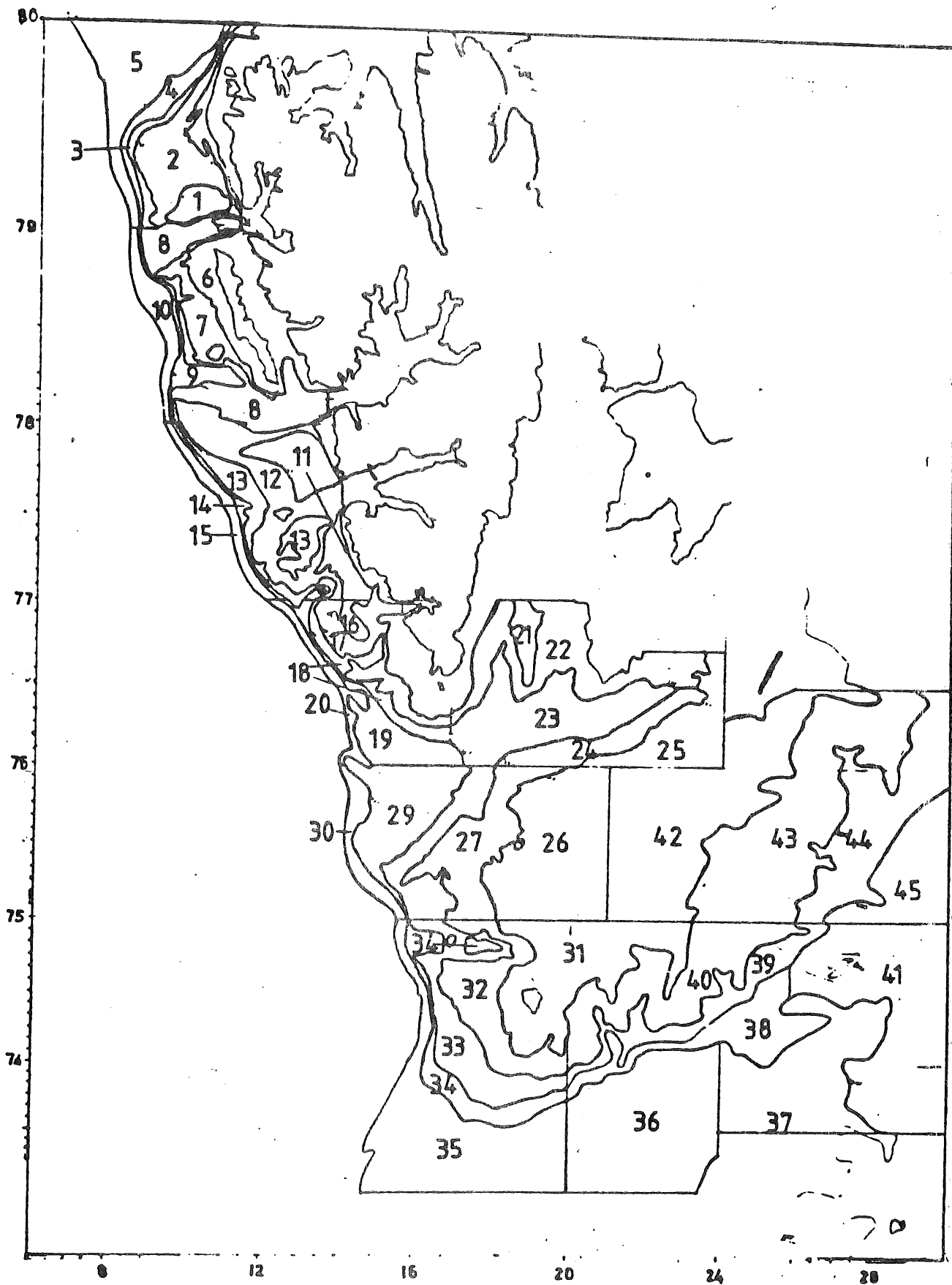


Fig. 1. The investigation area with the different strata.

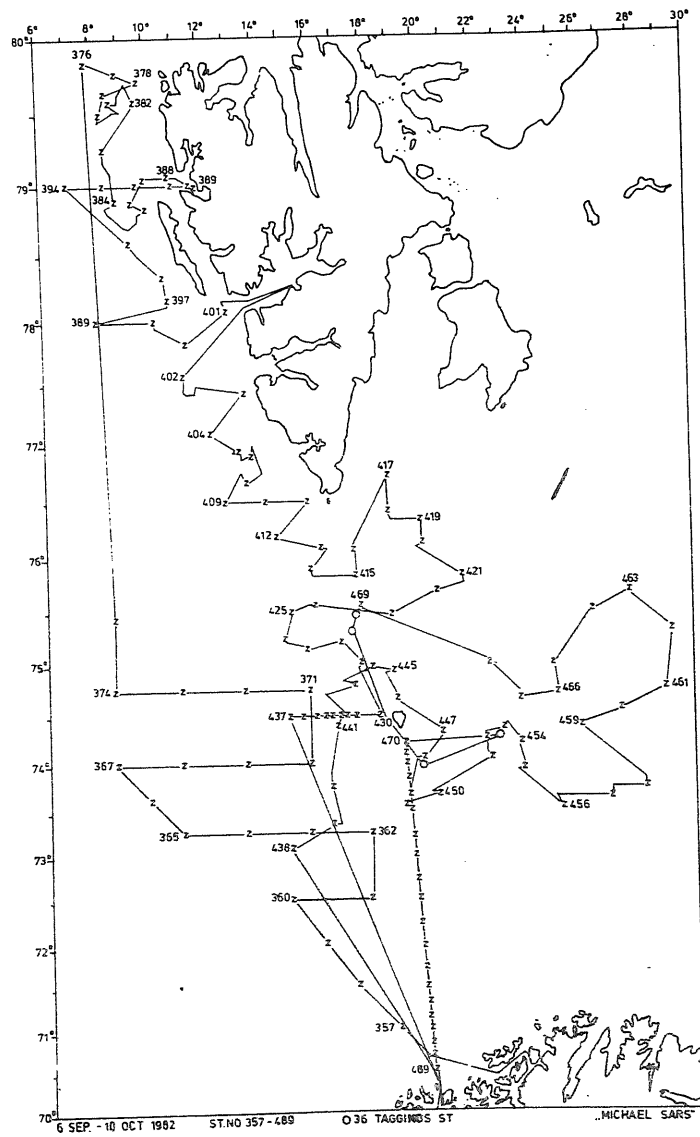


Fig. 2. Survey tracks and hydrographical stations taken by RV "Michael Sars" in the period 7 September - October 1982.

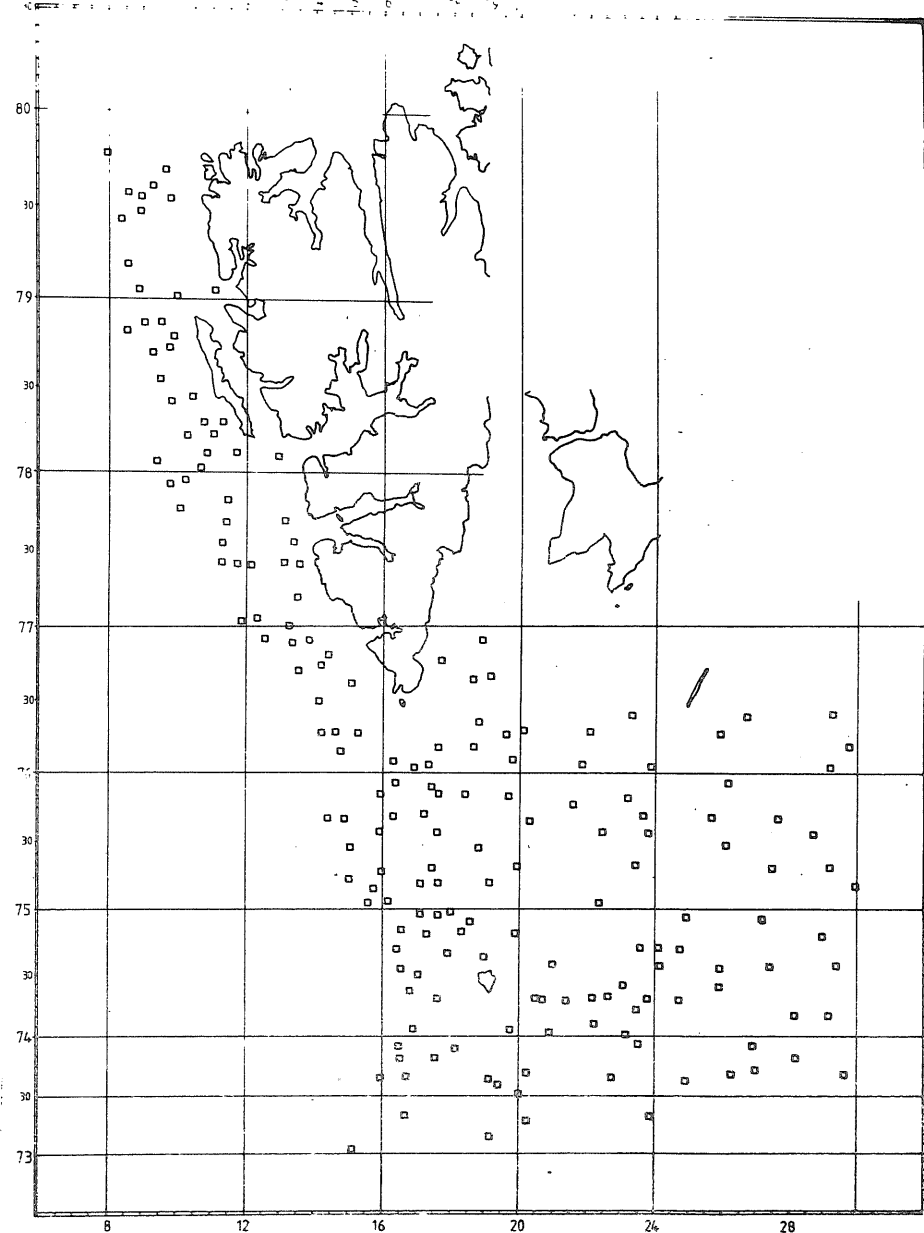


Fig. 3. Bottom trawl stations taken by RV "Michael Sars" and MTr "Vikheim" in the period 7 September-9 October 1982.

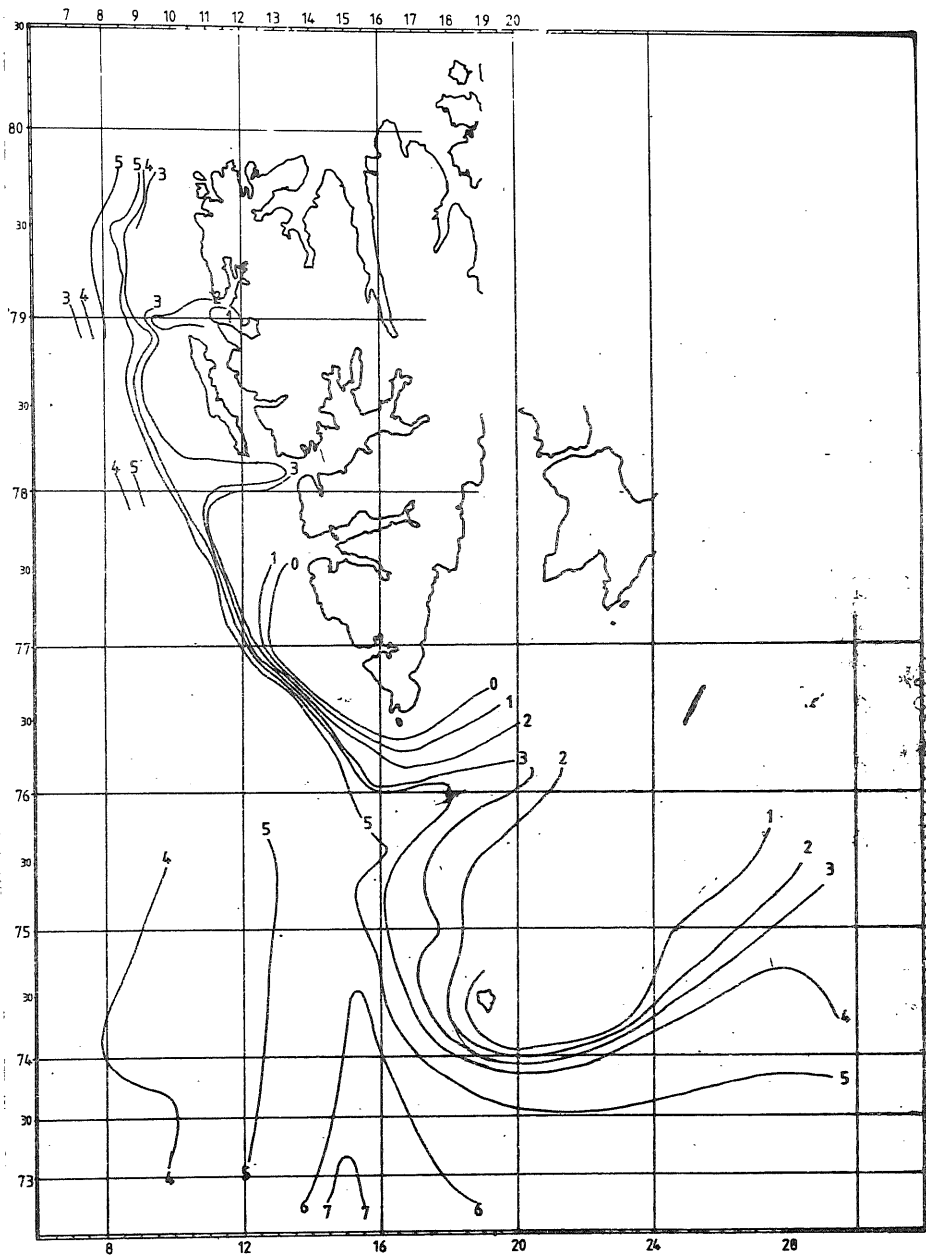


Fig. 4. Temperature distribution in 100 m depth.

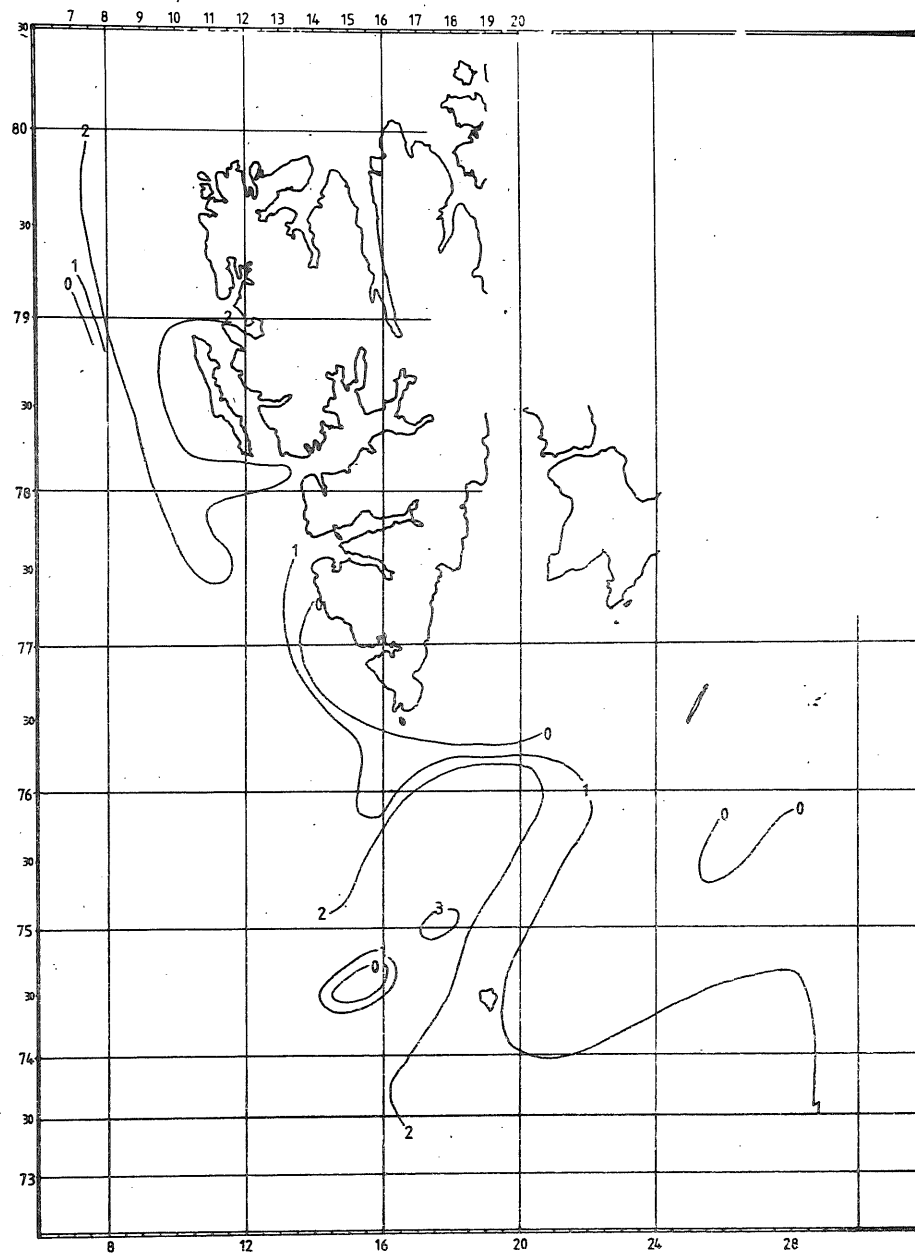


Fig. 5. Temperature distribution at the bottom.

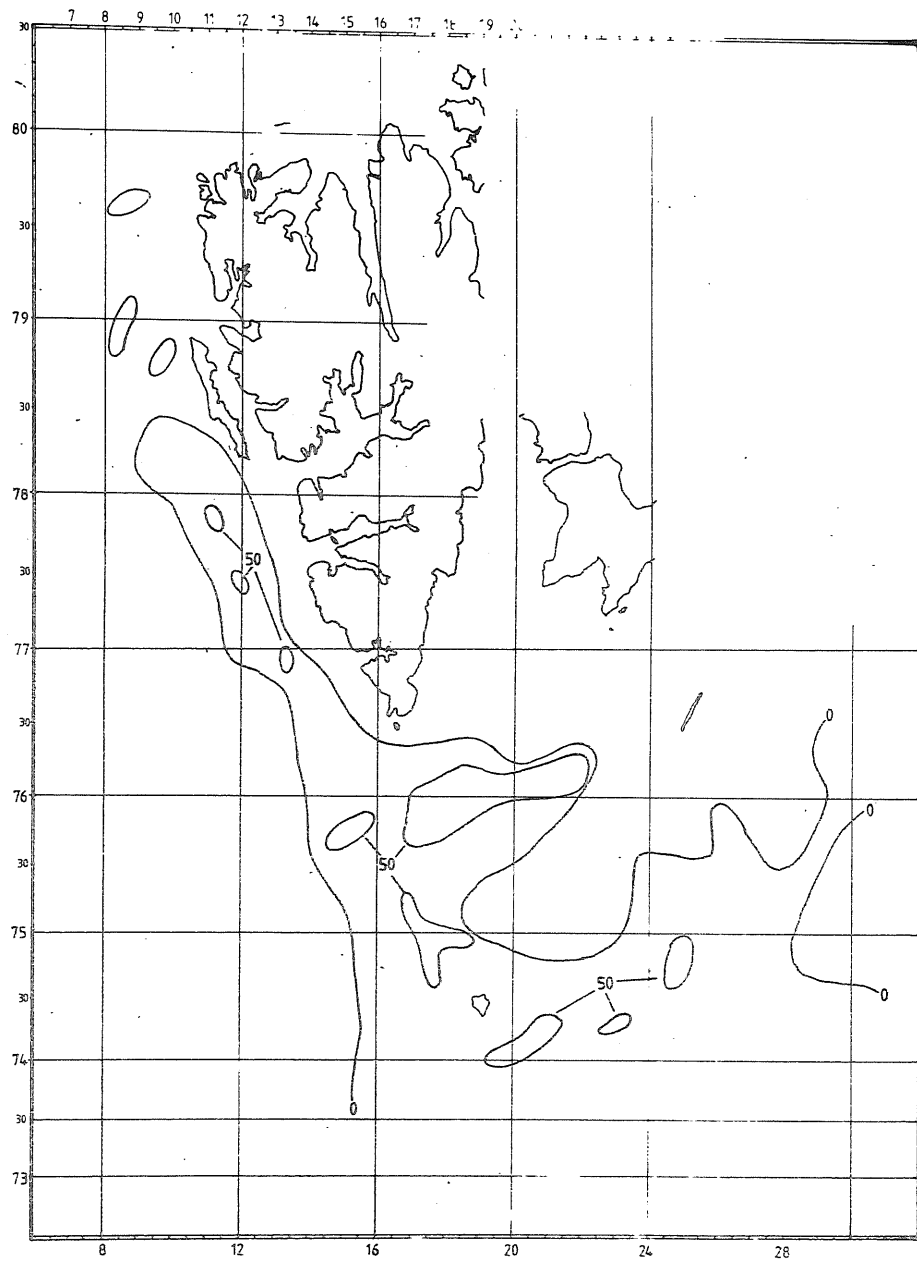


Fig. 6. Distribution of cod in the trawl catches (numbers per hour).

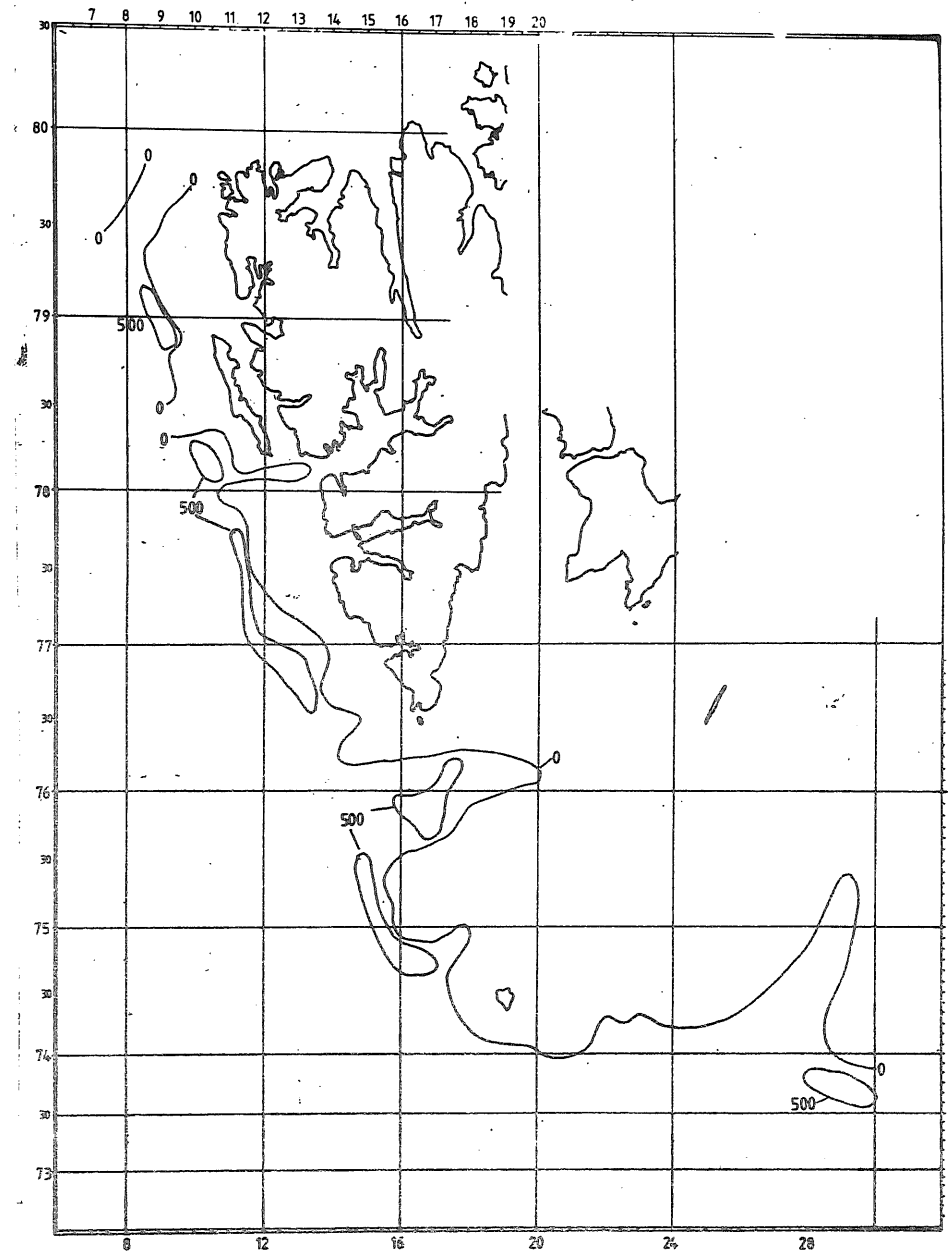


Fig. 7. Distribution of Sebastes mentella in the trawl catches (numbers per hour).

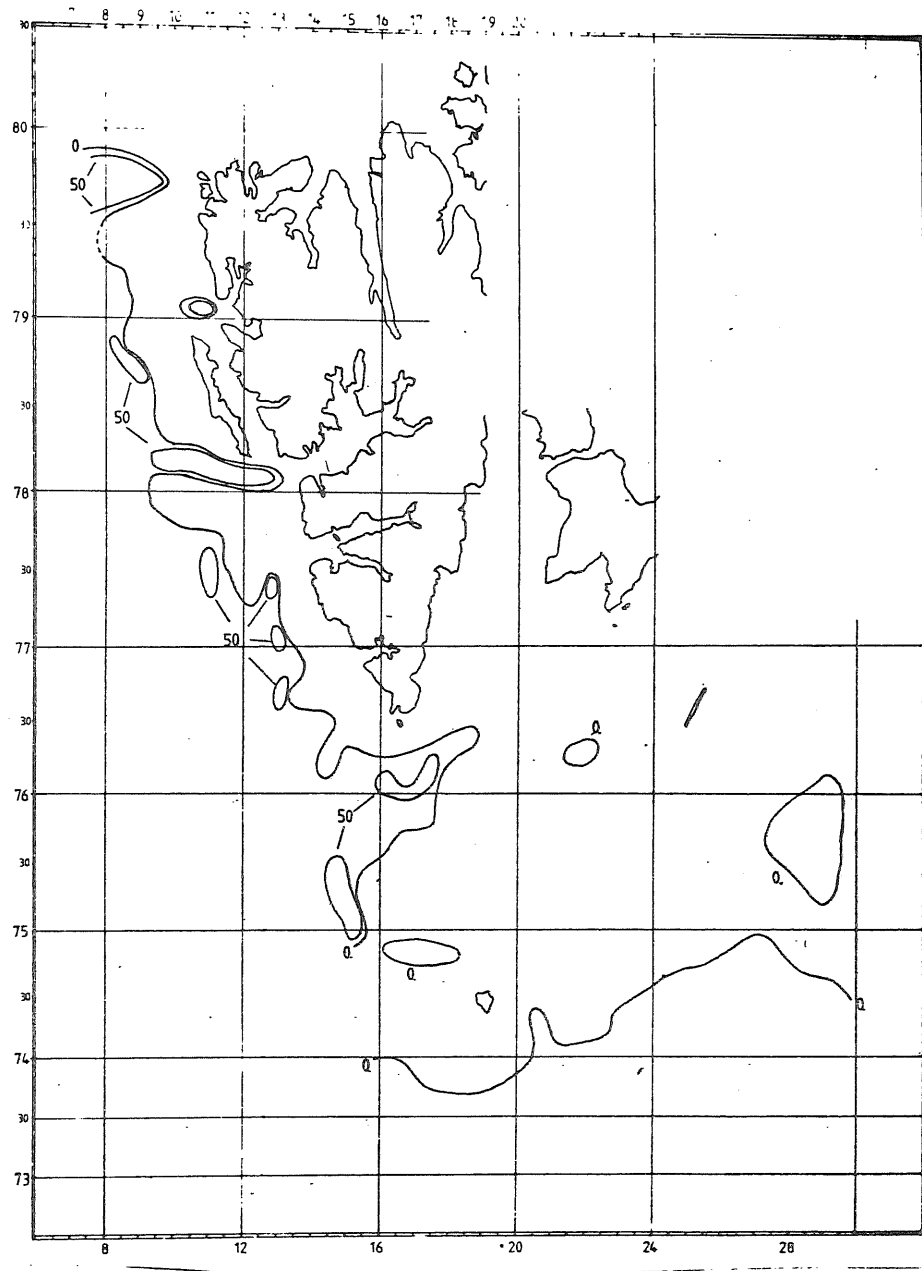


Fig. 8. Distribution of Greenland halibut in the trawl catches (numbers per hour).

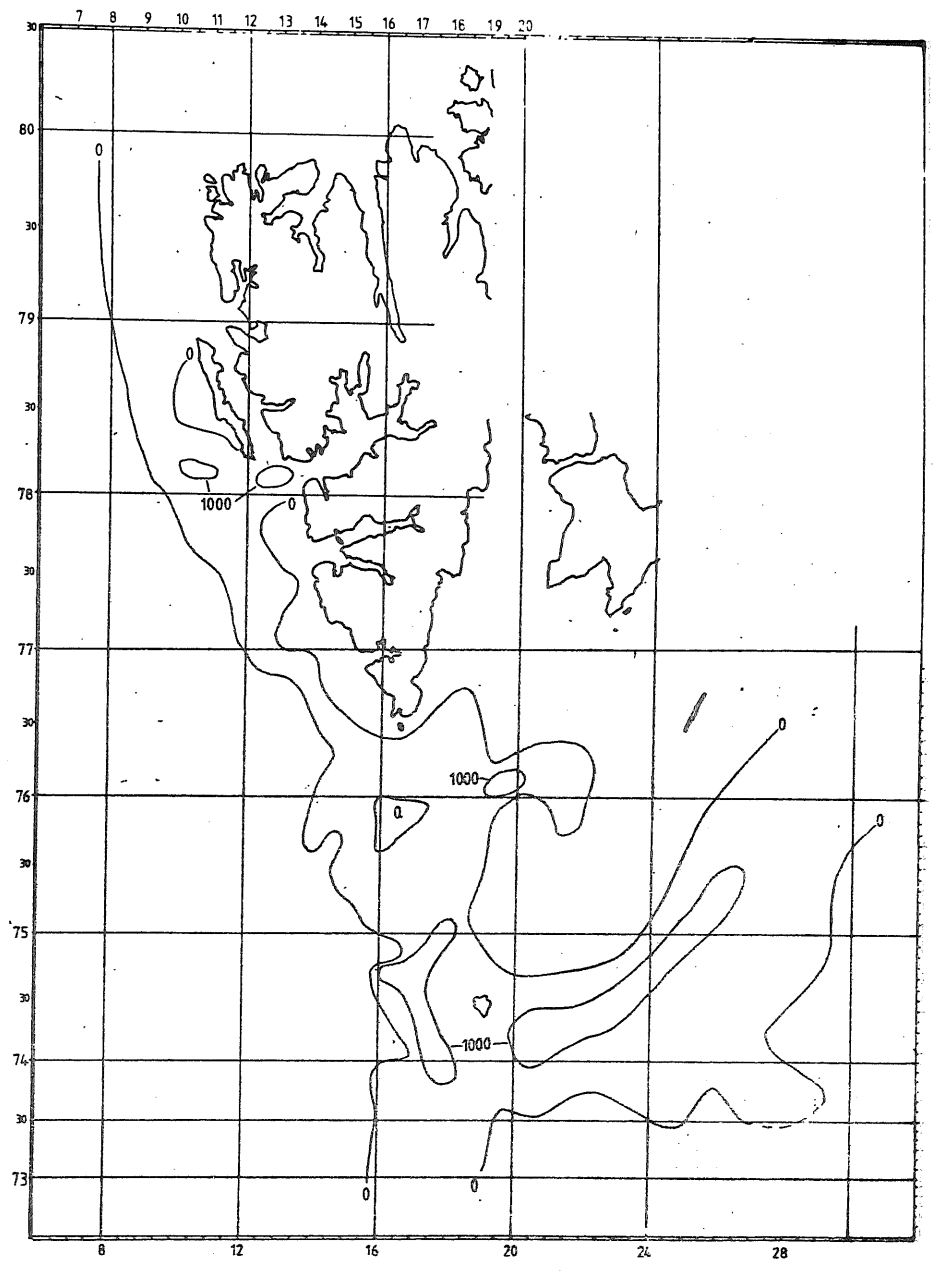


Fig. 9. Distribution of long rough dab in the trawl catches — (numbers per hour).

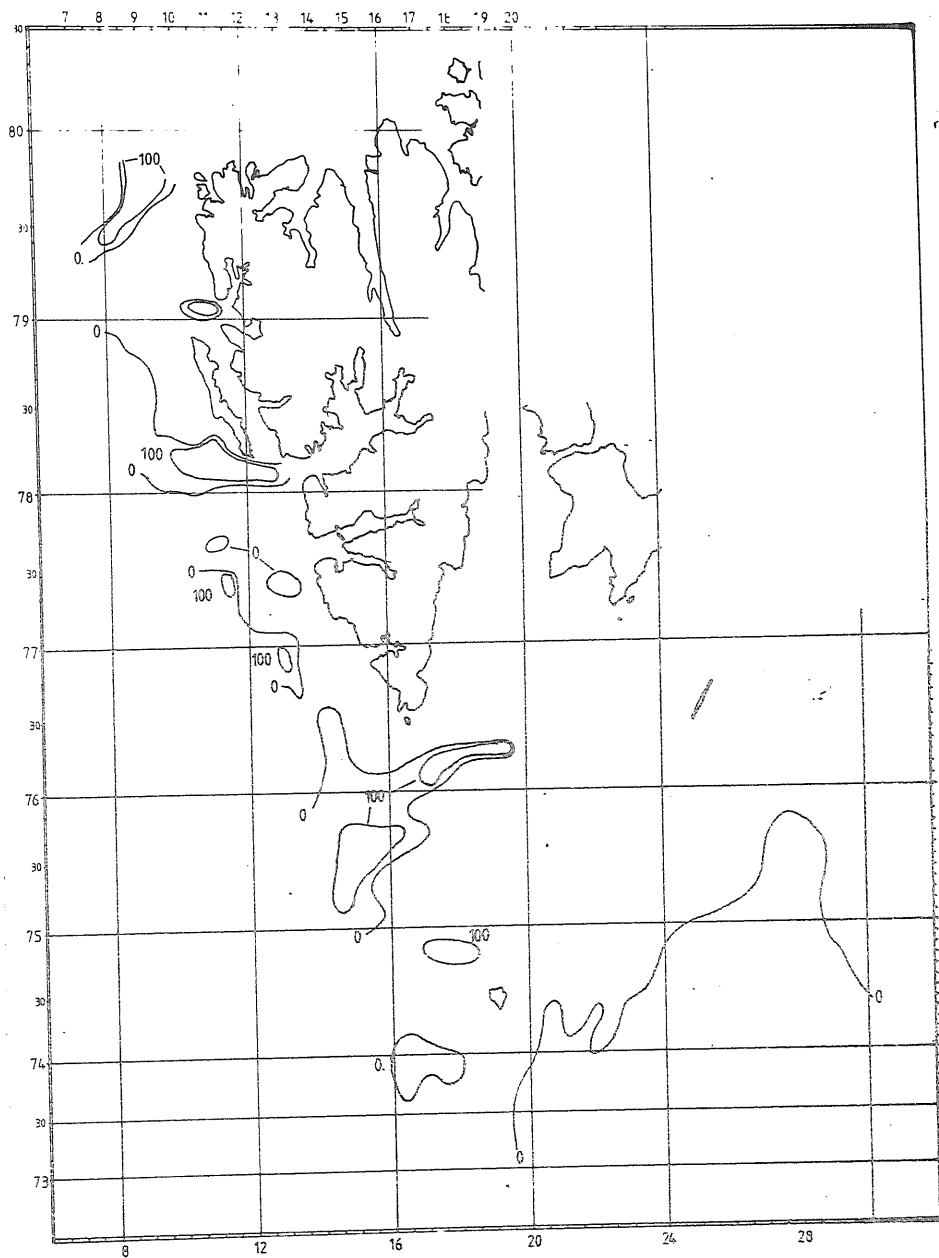


Fig. 10. Distribution of shrimps in the trawl catches (kg per hour).

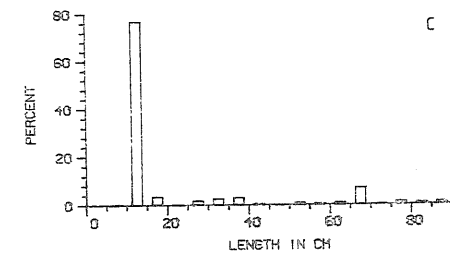
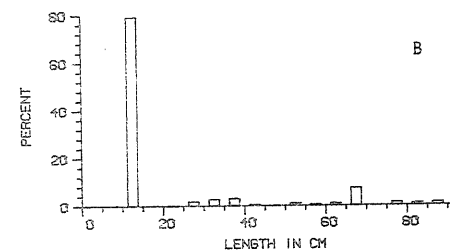
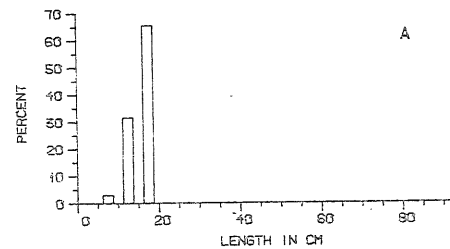


Fig. 11. Length distribution of haddock. A: Northern area, B: Southern area, C: The total area.

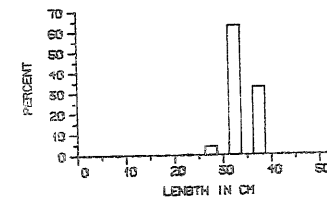


Fig. 12. Length distribution of blue whiting.

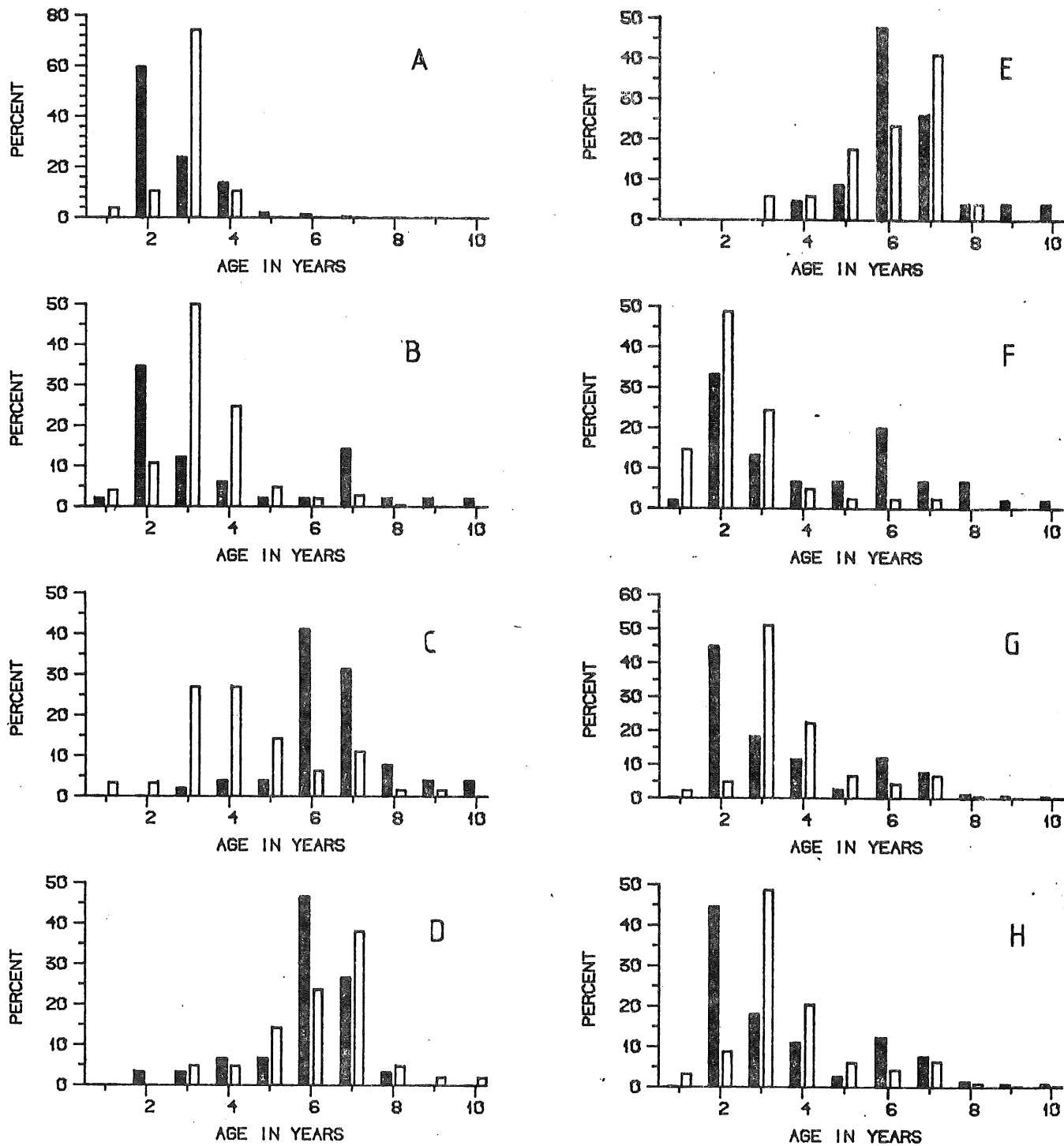


Fig. 13. Age distribution of cod: A: 0 m-100 m depth, B: 100 m-200 m depth, C: 200 m-300 m depth, D: 300 m-400 m depth, E: Deeper than 400 m, F: Northern area, G: Southern area, H: Total area. Filled columns: 1981. Open columns: 1982.

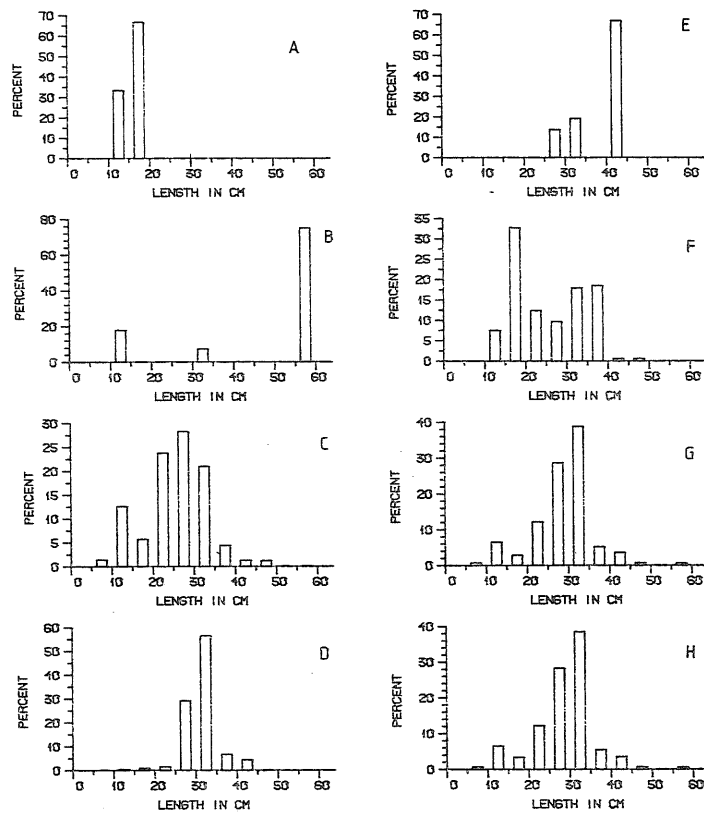


Fig. 14. Length distribution of Sebastes marinus.
(Legends as in Fig. 13).

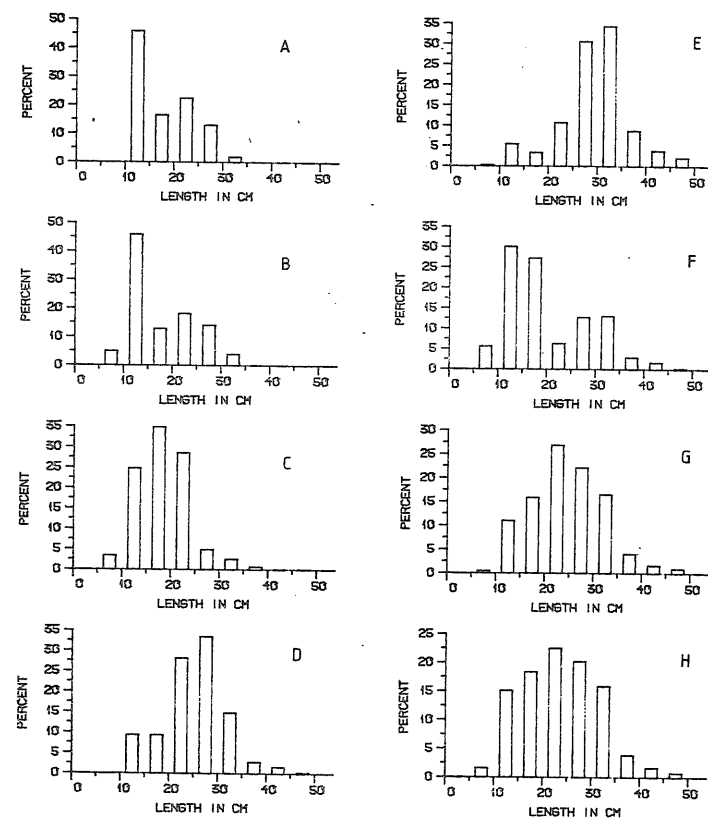


Fig. 15. Length distribution of Sebastes mentella.
(Legends as in Fig. 13).

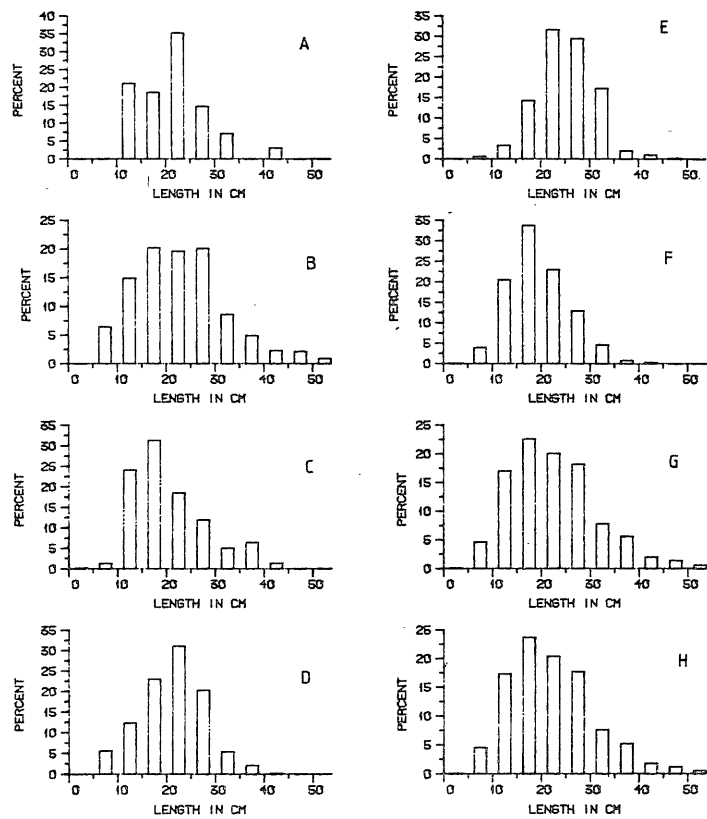


Fig. 16. Length distribution of long rough dab.
 — (Legends as in Fig. 13).

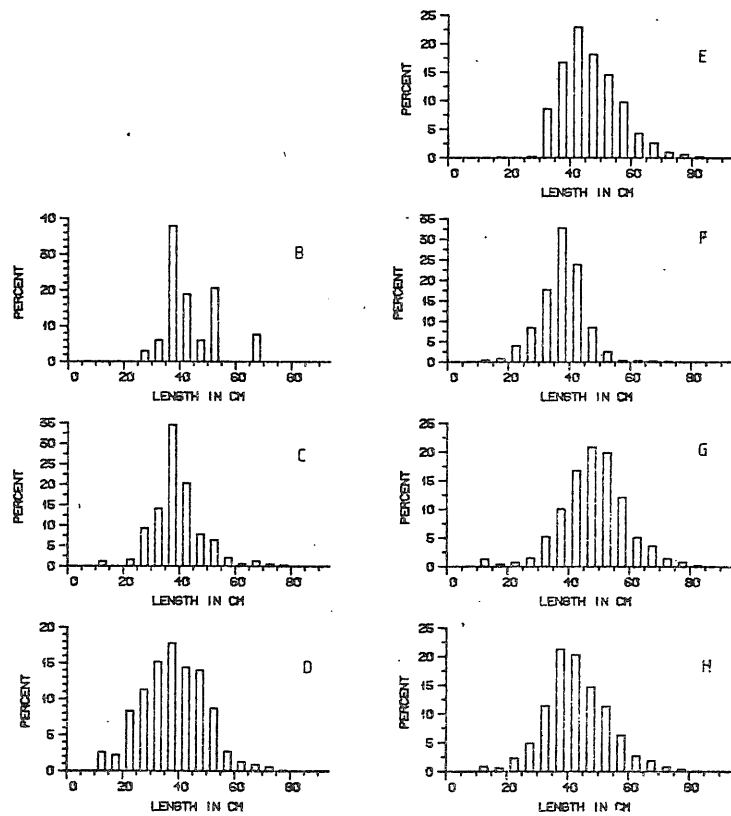


Fig. 17. Length distribution of Greenland halibut.
 (Legends as in Fig. 13).

