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Observations on board a Spanish pair-trawler in Subarea 1
of the ICNAF Area

by

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INTRODUCTION

In the present paper some biological data and observations on the cod catches, as well as on other species taken as a by-catch in the directed fishery for cod are summarized. These were carried out during September 1974 in Subarea 1 of I.C.N.A.F. area.

Fishing operations were carried out in the following banks: Tovqusaq and Sukkertop in Division 1C, and Danas, Fiskenas and Fyllas in Division 1D. Figures 1 and 2 hatched show the areas where trawls were carried out.

DESCRIPTION OF THE BOATS AND GEAR

The fishing gear used was made of nylon, and it is a bottom trawl with steel bobbins in the ground rope. The codend mesh size was 130 mm. The vessels integrating the fishing unit are of the stern trawler type, each one with 594 CRT, 1,400 HP and 45.69 meters carrying. The speed during the trawls was from 2.5 to 3 knots, and both vessels were separated by a distance of 0.25 miles approximately.

CHARACTERISTICS OF THE CATCH

The average trawling time per day was 10 hours and 16 minutes when fishing operations were observed. The average time per trawl was 4 hours and 14 minutes. Both average times were considered to be low and that was due to the high catches of cod in Sukkertop Bank.

Table 1 shows species, other than cod, caught in the different divisions, with the same abundance scale described by LOPEZ-VEIGA and VAZQUEZ (1974).

In Table 2, 3, 4 and 5, data referent to length-frequency distribution for cod and other species taken as by-catch in Divisions 1C and 1D, are shown. Figures 2, 4 and 5 show the histograms corresponding to this data, as well as length frequency distributions of discards of cod and greenland cod.

Division 1C

Fishing operations in this Division were carried out in Sukkertop and Tovqussaq banks. Figure 1 shows the trawling area (hatched). A total of 31 hauls were carried out during the 12 days of permanence in this Division. By-catch in this Division was more abundant than in Division 1D (Table 1).

Sukkertop Bank.- The permanence time on this area was 9 days, and the number of hauls was 23, those were made in depths between 20 to 45 fathoms, and the average time of them was 2 hours and 48 minutes.

From Figure 6 it can be seen that cod catches per hour trawled was higher in this bank than in the others visited.

Tovqussaq Bank.- Only 8 hauls were made in this bank, in depths ranging from 25 to 50 fathoms (average depth 32.2 fathoms) and the average trawling time was 4 hours and 34 minutes.

Division 1D

Fyllas, Fiskenas and Danas banks were visited during the period time of the observations. Hauled areas are shown (hatched) in Figure 2. Fishing time in this Division was 8 days and a total of 17 hauls were made. Cod catches in this Division were less important than in Division 1C (Figure 6). It could be observed that by-catch was more abundant in this Division than in Division 1C, as can be seen in Table 1.

Fyllas Bank.- Only 2 hauls were carried out in this bank, with an average depth of 71.3 fathoms. Catches were scarce in this

bank as can be seen in Figure 6.

Fiskenas Bank.- Permanence time in this bank was 2 days, a total of 5 trawls were carried out with an average time of 6 hours and 45 minutes in depths ranging from 52 to 70 fathoms.

Danas Bank.- Permanence time in this bank was 4 days and a total of 10 hauls were carried out with an average time of 5 hours and 54 minutes, on average depths of 58.9 fathoms. Cod catches in this bank were larger than Fyllas, Fiskenas and Tovqussaq but less than those in Sukkertop. The average length of cod in this bank (67.2 cm) was greater than that of the other banks (58.2 cm was the average length in Division 1C banks). Figure 3 shows the length frequency distribution for cod in this bank.

The general trend was to decrease catches as the depth increased, as it can be appreciated in Fig. 7, which shows the cod catch per hour trawled for the different depth intervals. The catches made on bottoms around 25 fathoms deep were largest (more than 2 tons per hour trawled), then the catches decreased constantly as the depth increased with a slight increase on 65 fathoms (more than half ton of cod per hour trawled) and decreased again at 85 fathoms.

SEXUAL MATURITY AND SEX RATIO

Cod.- Sex was determined for 536 individuals of different sizes. The sex proportions were 51.3% males and 48.7% females; these differences were not statistically significant.

Gonadal stages were observed for 134 individuals, 6.7 per cent of them were on a pre-ripening stage, all these individuals were over 75 cm length. 28.9 per cent showed signs of sexual activity, all of them were over 60 cm length. The remainder individuals, that is, 72.4 per cent, were immature (resting stage).

American plaice.- Gonadal stages were observed for 81 individuals of different sizes. Male individuals were all considered to be immature. 58.1 per cent of the females were in different stages of maturation, 9.8% were on a pre-ripening stage, and 32.1% were immature.

From the 81 individuals examined, 78.6% were females and 21.4% males. These percentages were found to be statistically different from the expected 50% proportion. Figure 9 shows the length frequency distribution for males and females. Mean length for females was 38.4 cm and for males 28.3 cm.

REFERENCES

López-Veiga, E.C. and A. Vázquez.- "Some observations on board two Spanish pair trawlers." I.C.N.A.F. Res. Doc. 74/88.

Table 1

By-catch of Spanish pair trawlers. Subarea 1. September 1974.

Species	1C		1D		
	Sukkertop	Torquaaq	Fyllas	Fiskenas	Danas
<i>Hippoglossoides platessoides</i>	++	+++	++++	++++	+++
<i>Anarhichas denticulatus</i>	-	+	+	++	++
<i>Anarhichas minor</i>	+	++	+	++	++
<i>Anarhichas lupus</i>	++	+++	++	+	++
<i>Hippoglossus hippoglossus</i>	+	++	+	+	++
<i>Sebastes marinus</i>			-	-	-
<i>Raja radiata</i>	-	+	+	+	+
<i>Raja fyllas</i>		+	+	+	-
<i>Ammodytes americanus</i>			+	+	++
<i>Cyclopterus lumpus</i>					-
<i>Eumicrotremus spinosus</i>					-
<i>Gadus ogac</i>	++		++	+	-
<i>Mallotus villosus</i>				-	
<i>Molva</i> sp.				-	-
<i>Myoxocephalus scorpius</i>	-				
<i>Melanogrammus aeglefinus</i>		-			

No sign = null or no observations
 - = rare
 + = present
 ++ = common
 +++ = abundant
 ++++ = very abundant

Table 2

Length frequency for cod in Subarea 1. September 1974.

Length groups	Div. 1C		Div. 1D	
	n ^{gr} measured	o/oo	n ^{gr} measured	o/oo
27- 29	-	-	1	1
30- 32	-	-	6	3
33- 35	-	-	23	12
36- 38	5	6	50	27
39- 41	5	6	122	66
42- 44	21	25	259	140
45- 47	45	53	344	186
48- 50	40	47	254	137
51- 53	49	58	125	68
54- 56	20	24	101	55
57- 59	34	40	90	49
60- 62	45	53	78	42
63- 65	61	72	85	46
66- 68	105	124	77	42
69- 71	91	108	40	22
72- 74	74	88	39	21
75- 77	61	72	35	19
78- 80	49	58	33	18
81- 83	41	49	23	12
84- 86	35	41	20	11
87- 89	25	30	14	8
90- 92	9	11	6	3
93- 95	8	9	6	3
96- 98	7	8	7	4
99-101	6	7	2	1
102-104	2	2	2	1
105-107	-	-	4	2
108-110	1	1	1	1
111-113	1	1	2	1
Total	844	993	1847	1001

Table 3

Length frequency for American plaice, Wolffish and Atlantic Halibut
in Divisions 1C and 10. September 1974.

Length groups	American plaice		Wolffish		Atlantic Halibut	
	n ^{OR} measured	o/e	n ^{OR} measured	o/e	n ^{OR} measured	o/e
20-21	1	-	-	-	-	-
22-23	2	1	-	-	-	-
24-25	3	1	-	-	-	-
26-27	10	2	-	-	-	-
28-29	12	2	-	-	-	-
30-31	21	5	-	-	-	-
32-33	27	6	1	1	-	-
34-35	39	9	-	-	-	-
36-37	46	11	1	1	-	-
38-39	56	13	6	6	-	-
40-41	61	14	3	3	-	-
42-43	64	15	1	1	-	-
44-45	41	9	4	4	-	-
46-47	24	5	5	5	1	2
48-49	15	4	12	12	3	6
50-51	5	1	19	18	4	8
52-53	2	-	10	10	8	16
54-55	-	-	6	6	12	24
56-57	-	-	7	7	9	18
58-59	-	-	6	6	7	14
60-61	-	-	4	4	2	4
62-63	-	-	8	8	3	6
64-65	-	-	4	4	1	2
66-67	-	-	2	2	1	1
68-69	-	-	1	1	-	-
70-71	-	-	1	1	-	-
Total	429	98	104	100	51	101

Table 4

Length frequency for Redfish and Sand eel in Divisions 1D and 1C.
September 1974.

<u>Length</u>	<u>Redfish (1D)</u>		<u>Sand eel (1C)</u>	
	<u>n^{or} measured</u>	<u>e/o</u>	<u>n^{or} measured</u>	<u>e/so</u>
14	-	-	1	1
15	-	-	-	-
16	-	-	4	5
17	-	-	6	8
18	1	2	8	11
19	2	4	11	14
20	2	4	13	17
21	6	12	15	20
22	3	6	10	13
23	5	10	5	7
24	8	16	2	3
25	5	10	1	1
26	4	8	-	-
27	1	2	-	-
28	3	6	-	-
29	2	4	-	-
30	5	10	-	-
31	1	2	-	-
32	1	2	-	-
33	-	-	-	-
34	1	2	-	-
Total	50	100	76	100

Table 5

Length frequencies for discarded individuals of cod and Greenland cod, in Division 1C. September 1974.

Length	Cod		Greenland cod	
	n ST measured	o/o	n ST measured	o/o
30	-	-	1	1
31	2	1	-	-
32	4	1	3	3
33	3	1	3	3
34	8	3	4	4
35	13	5	6	7
36	21	7	13	15
37	25	9	20	22
38	28	10	9	10
39	35	12	7	8
40	41	14	6	7
41	38	13	5	6
42	26	9	5	6
43	16	6	3	3
44	14	5	1	1
45	5	2	2	2
46	3	1	1	1
47	1	-	-	-
48	1	-	-	-
49	-	-	-	-
50	1	-	-	-
51	1	-	-	-
Total	286	100	89	99

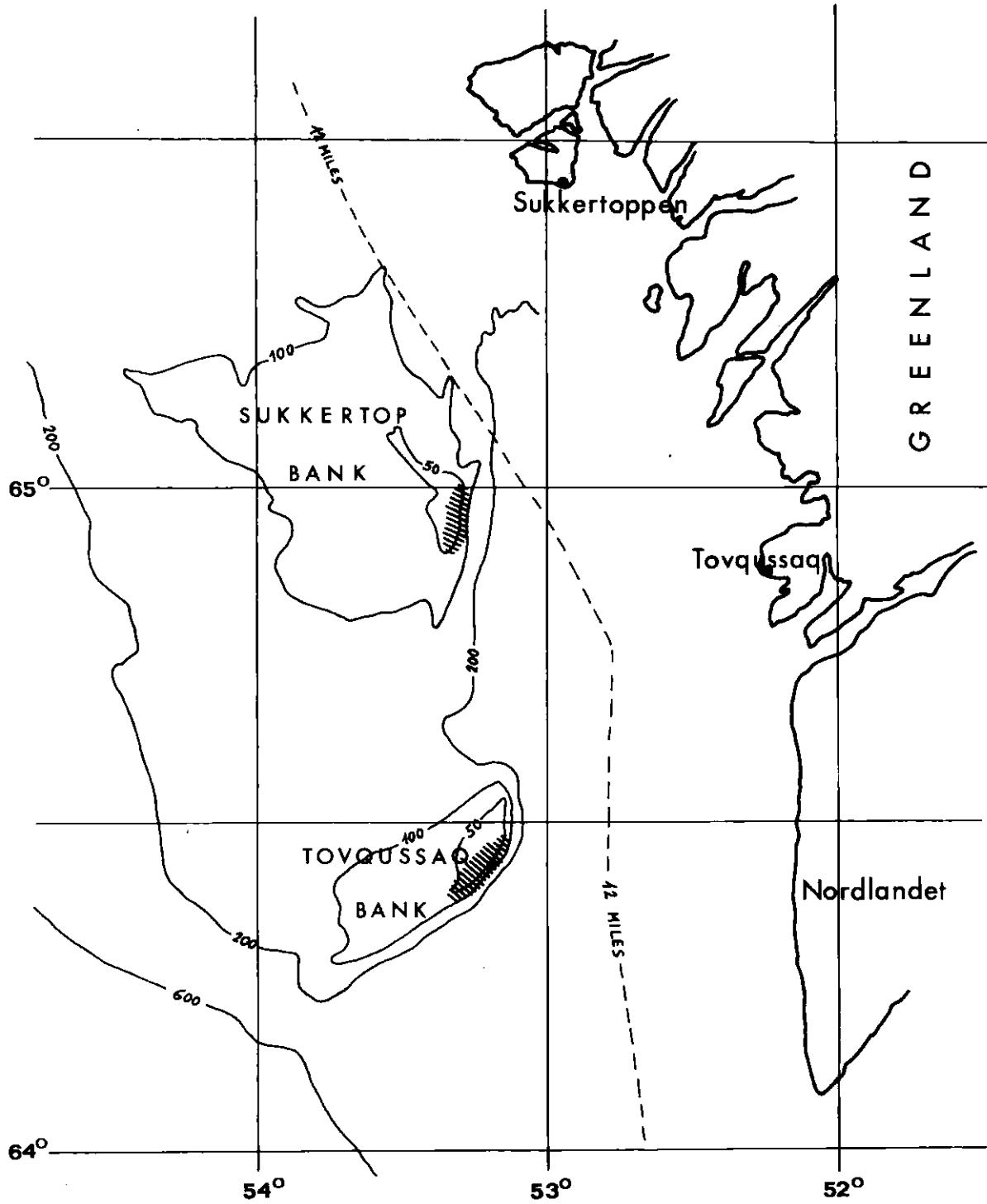


Fig. 1.— Division 1C. Hatched: areas where trawling operations have been carried out.

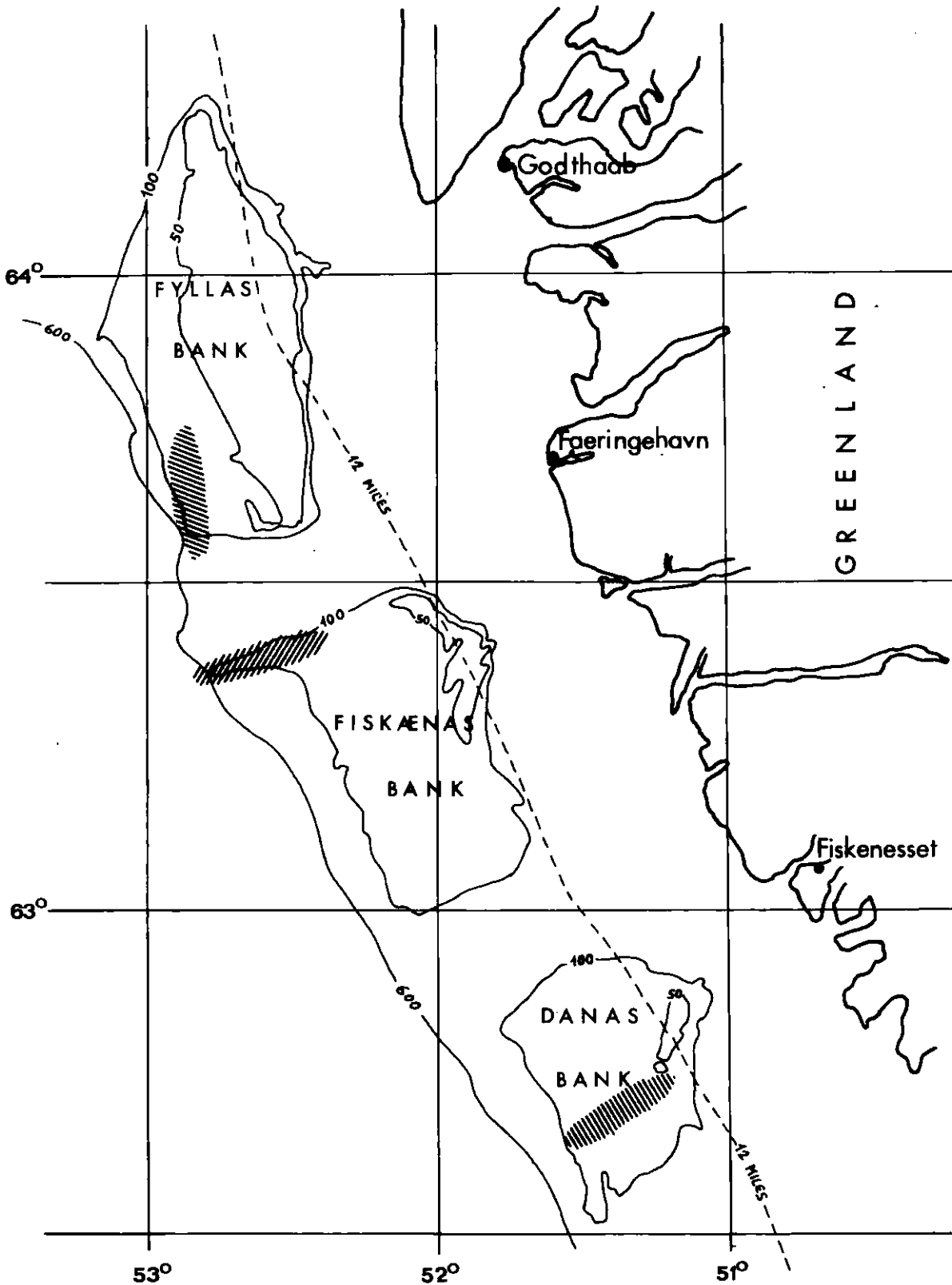
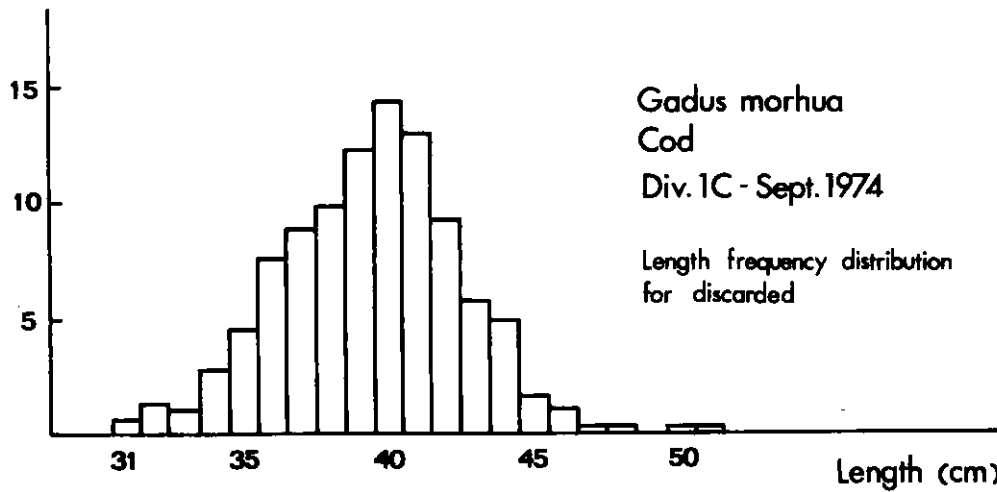
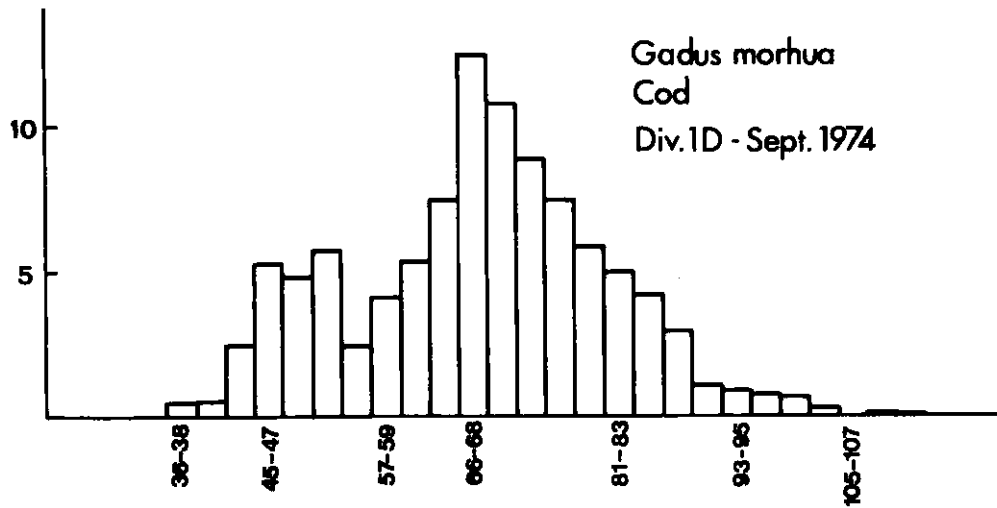
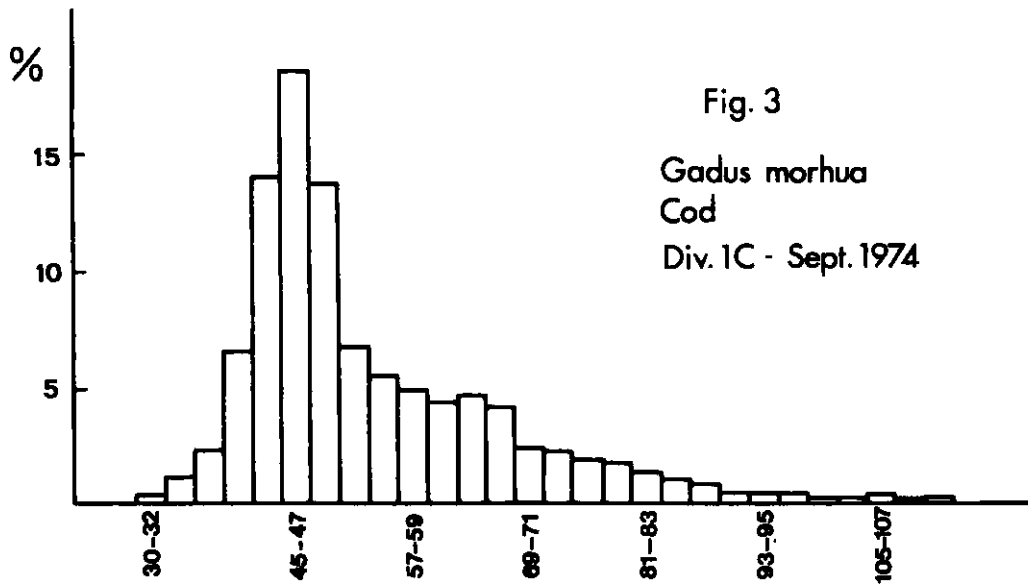
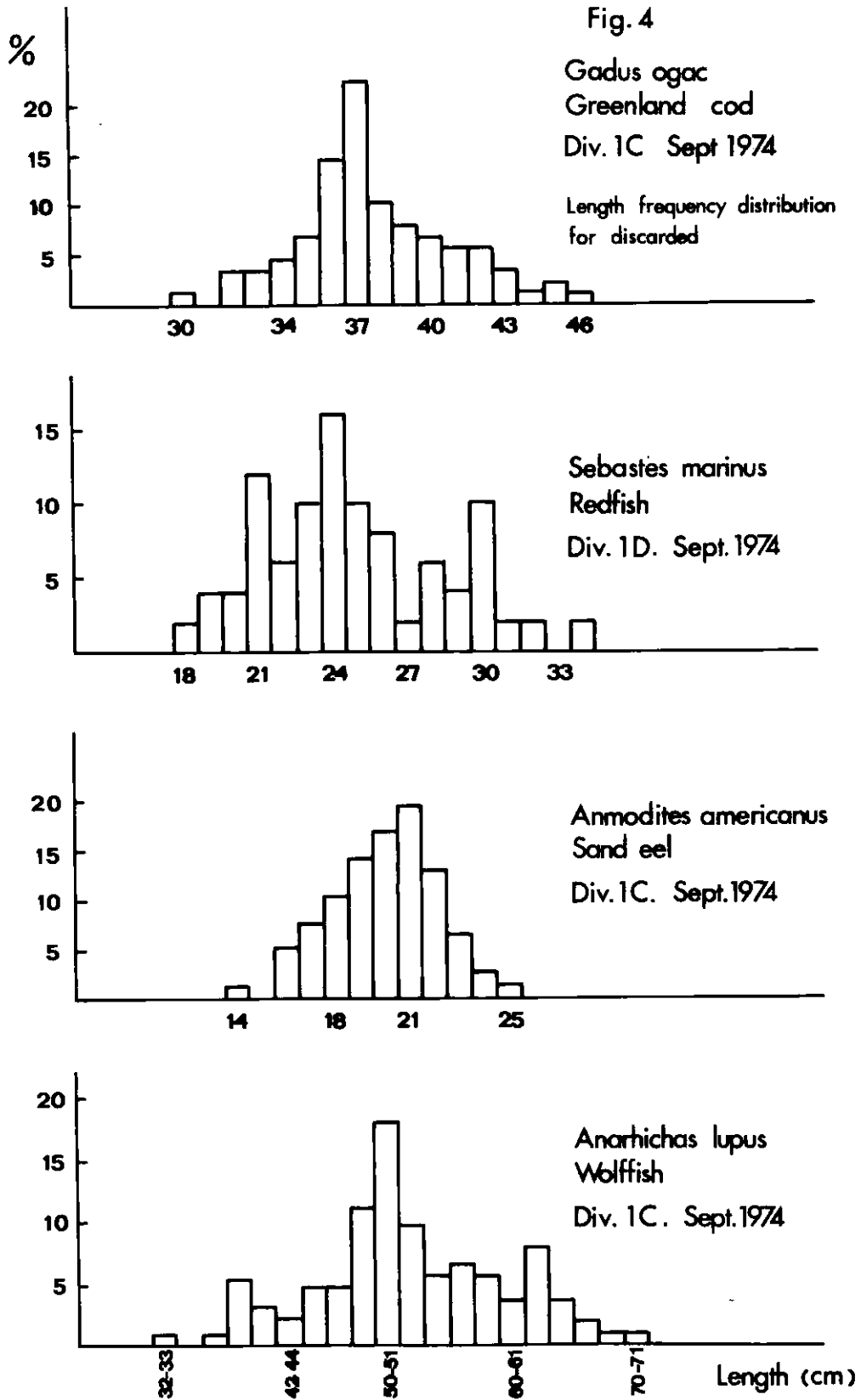
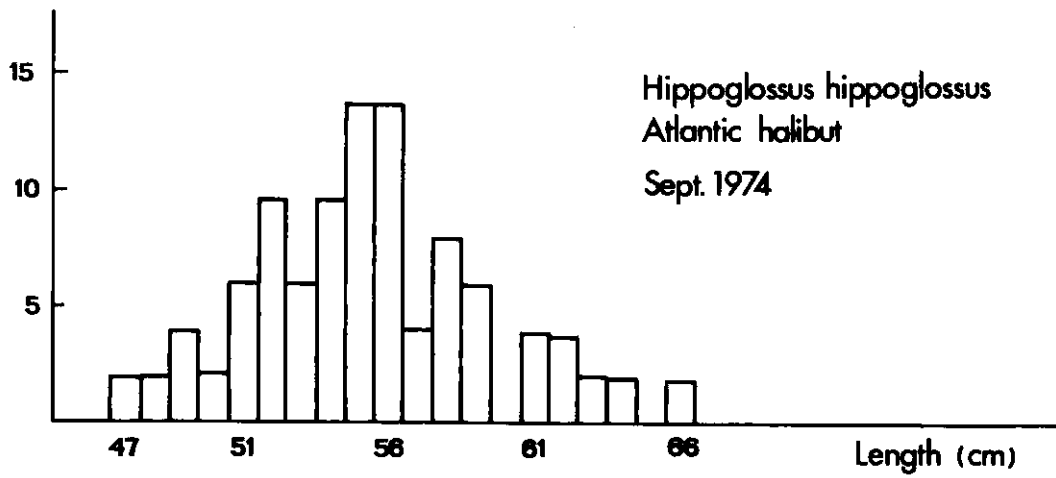
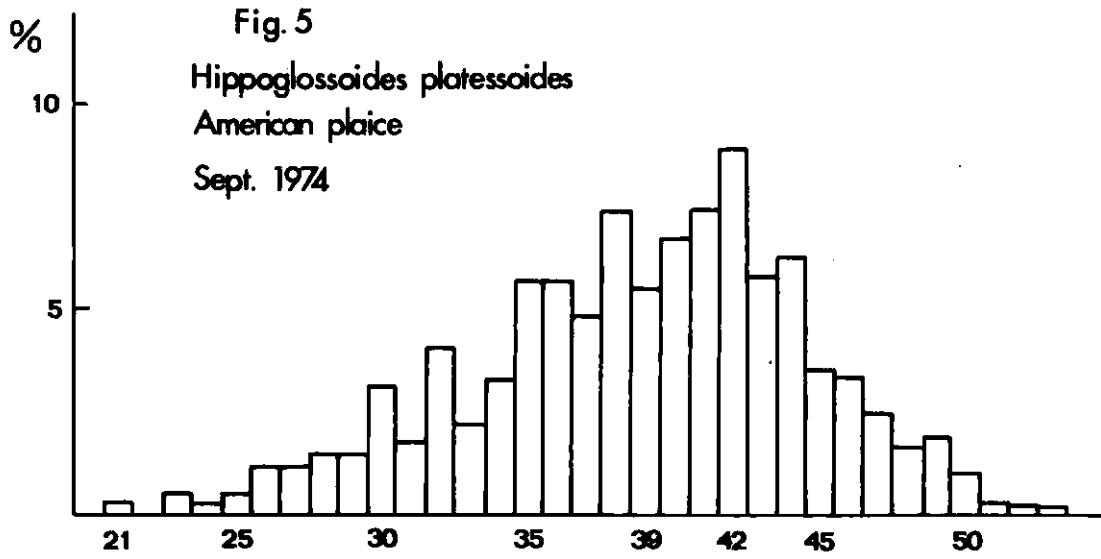


Fig. 2.— Division 1D. Hatched: areas where trawling operations have been carried out.







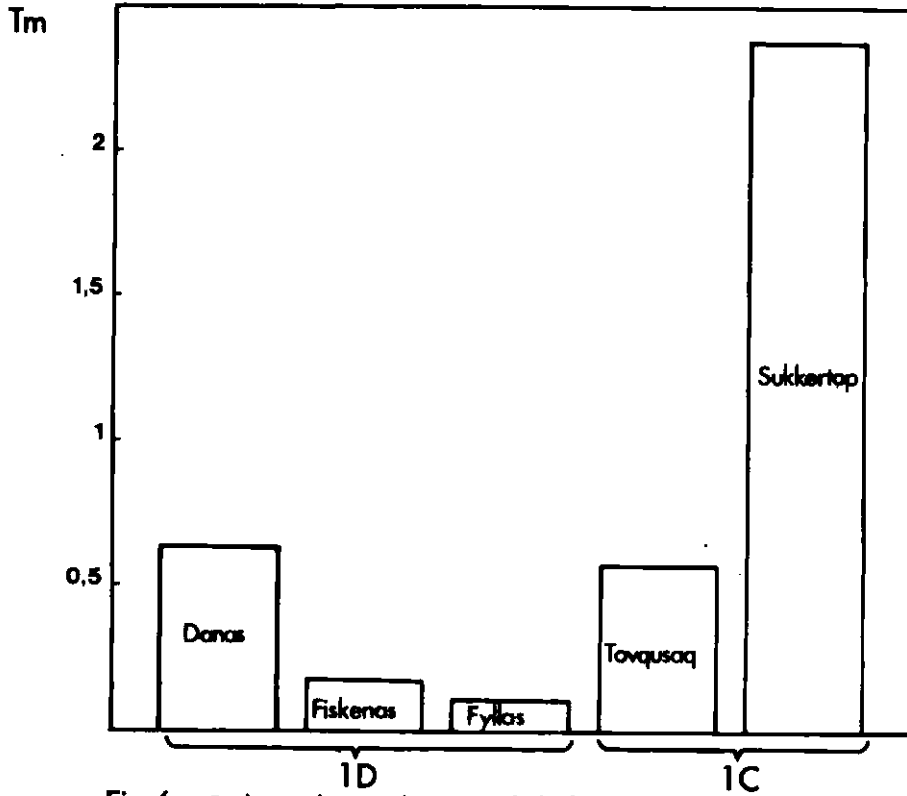


Fig.6. - Cod catch per hour trawled for each bank in divisions 1C and 1D. September 1974

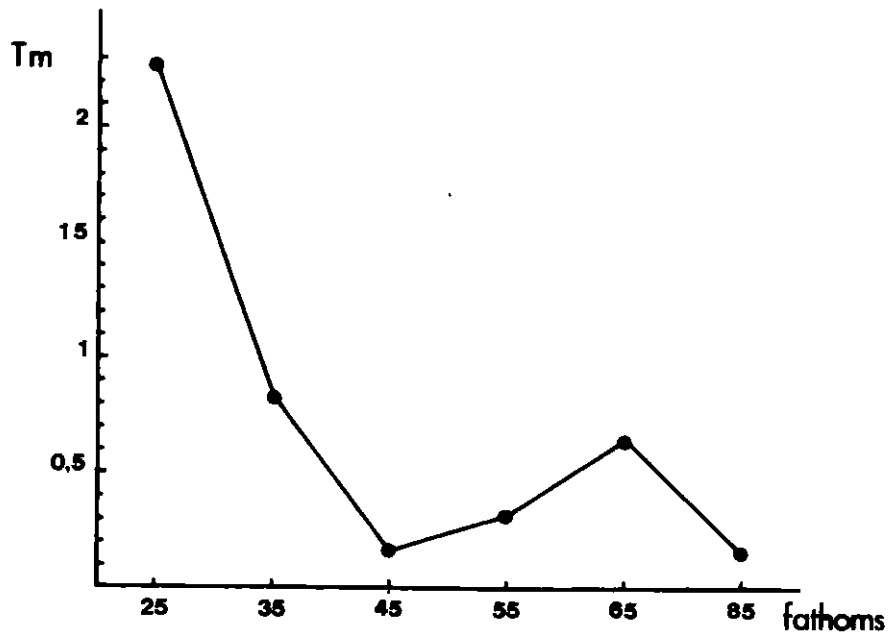


Fig.7. - Cod catch per hour trawled at different depths. Divisions 1C and 1D. September 1974

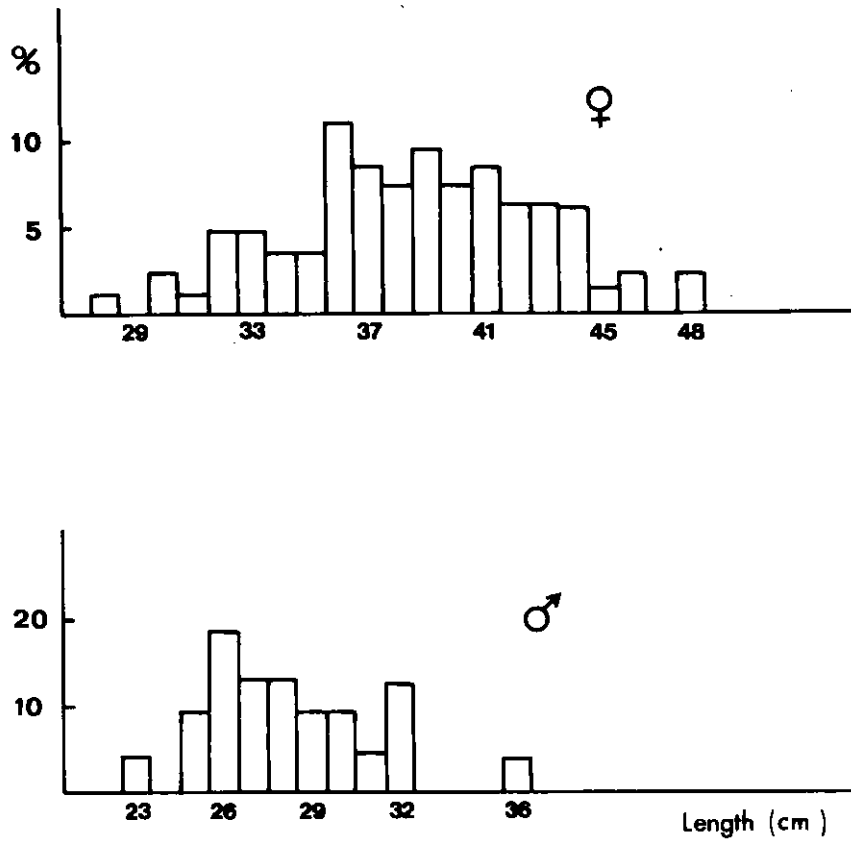


Fig. 8.— Length frequency distribution for american plaice (by sexes).
Division 1D. September 1974