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Portuguese Research Report  
1963.

Portugal landed a total of almost 230,500 metric tons of cod from Subareas 1,2,3 and 4 in 1963. This is a considerable increase from the 217,700 metric tons of the same species taken in 1962.

Cod caught by commercial trawlers were sampled, at random after discarding, for data on length and age composition, weight, girths, sex ratio, stage of maturity and age at first maturity. Details of length and age composition will be published in ICNAF Sampling Yearbook Vol. 8 for 1963. Data on girth, length and weight measurements have been analysed for the 1964 Annual Meeting in Meeting Document No. 51.

This report is co-authored by Rui Monteiro and Manuel Lima Dias. The latter who is in charge of age reading wishes to thank Mr. B. O. Edford for help at the Lowestoft Laboratory, England.

SUBAREA 1

A. Status of the Fisheries.

I. Cod.

Landings from Subarea 1 decreased over 30% from 1962 to 63,200 metric tons in 1963. Landings were sampled in Div. 1F between 6-9 July, as follows:

Sample Group.	Sample no.	No. Fish	Depth m
A	1	100	139
	3	75	159
	4	74	137
B+	2	200	145

+ = sample not aged.

a. Lengths (Fig. 1) ranged from 43 to 85 cm classes with means for sample groups A and B, 61.5 and 61.7 cm respectively, although sample group B had a more irregular distribution.

b. Ages (Fig. 1) were determined on the sample group A only and were distributed from IV to X with a predominance of the V and VII age groups (1958 and 1956 year classes). Mean age is 6.2 years.

QUARTIN, from data collected in 1962, (1963 Redbook, Pt.II: 62-69) found the 1957 year class dominant in Divisions 1B, 1C and 1D with the 1958 year class making its first appearance. Data from 1963 show these year classes are still important but the 1956 year class which was second in importance in 1962 is now dominant.

c. Growth is shown in the following table of average lengths, male and female, of fish from age groups IV to X (1959-1953 year-classes). (Figures in brackets are numbers of fish).

Age Group	Mean length (cm)	
	♂	♀
IV	-	47.3(3)
V	54.8(43)	54.3(35)
VI	59.9(33)	58.9(24)
VII	67.8(46)	67.1(52)
VIII	71.8(4)	69.2(6)
IX	-	72.0(2)
X	-	77.0(1)

d. Sex ratio from combined samples was 51% males to 49% females, while sample Group B showed a ratio of 46% males to 54% females.

e. Stage of Maturity of male and female cod in samples from sample Group A are shown in Fig. 2.

f. Age at First Spawning for male and female cod in sample Group A (Div. 1F taken in July) are shown in the following table:

Age Group	1st spawn	♂				♀						
		VII	θ	?	Total no. %	VI	VII	VIII	IX	θ	?	Total no. %
IV	no.	-	-	-	-	-	-	-	-	3	-	3
	%	-	-	-	-	-	-	-	-	100	-	100
V	no.	-	43	-	43	-	-	-	-	34	1	35
	%	-	100	-	100	-	-	-	-	97	3	100
VI	no.	-	32	1	33	1	-	-	-	23	-	24
	%	-	97	3	100	4	-	-	-	96	-	100
VII	no.	4	35	7	46	-	3	-	-	42	7	52
	%	9	76	15	100	-	6	-	-	81	13	100
VIII	no.	-	2	2	4	-	-	1	-	4	1	6
	%	-	50	50	100	-	-	17	-	67	17	101
IX	no.	-	-	-	-	-	-	-	-	2	-	2
	%	-	-	-	-	-	-	-	-	100	-	100
X	no.	-	-	-	-	-	-	-	1	-	-	1
	%	-	-	-	-	-	-	-	100	-	-	100
No. of observ.		4	112	10	126	1	3	1	1	108	9	123

As may be seen, the majority of fish taken in Div. 1F in July have not yet reached first maturity.

SUBAREA 2

A. Status of the Fisheries.

I. Cod.

Landings of cod in Subarea 2 increased in 1963 by about 10,500 metric tons to almost 73,300 metric tons. Landings were sampled in Div. 2J during May and September as follows. (Numbers of fishes taken at night are shown in brackets).

Sample Group	Sample no.	No. of fish	Depth m	Date
A	2	99	256	3 May
	3	100	265	5 May
	4	100	293	8 May
	B+	1	150	402
	5	150	304	9 May
	8	250	457	14 May
	10	392(147)	402	16 May
C	12	100	259	1 Sept.
	23	49	267	13 Sept.
	26	100	183	17 Sept.
	27	50	201	18 Sept.
	28	99	192	19 Sept.
D+	14	400(150)	183	3 Sept.
	17	400(150)	172	7 Sept.
	20	400(150)	304	10 Sept.
	25	400(150)	192	16 Sept.

+ = samples not aged

a. Lengths (Fig. 3) of cod in samples taken in May show quite similar distribution. For sample Group A, mean length is 56.0 cm, for Sample Group B, means are 55.4 cm for day catches and 56.4 for night catches. In September distributions are similar. For sample Group C, the mean is 53.7 cm; for Group D, 53.4 cm, for day catches and 51.9 for night catches.

b. Ages. (Fig. 3) of cod in May samples showed that the 1956 year class (age group VII) was dominant while in September samples the 1957 year class (Age group VI) was dominant. Mean age in May is 8.1 years, in September 6.6 years.

c. Growth is shown in the following table of average lengths of male and female fish of age groups II to XX (1961 to 1943 year classes) taken in May and September in Division 2J. (Figures in brackets are numbers of fish).

Age Group	May		September	
	♂ cm	♀ cm	♂ cm	♀ cm
II	-	-	-	43.0(1)
III	-	-	-	50.0(1)
IV	39.0(1)	-	45.3(9)	43.1(12)
V	42.6(8)	48.4(5)	46.9(27)	48.9(34)
VI	49.4(42)	49.8(29)	51.5(84)	52.9(86)
VII	52.5(43)	53.1(40)	55.3(40)	56.7(45)
VIII	57.5(17)	59.7(27)	59.7(8)	60.5(12)
IX	63.0(10)	59.2(10)	61.5(4)	67.9(9)
X	63.0(3)	62.8(15)	61.7(3)	60.5(2)
XI	66.5(4)	63.2(12)	62.5(4)	62.7(3)
XII	73.7(3)	64.2(6)	-	67.5(4)
XIII	68.0(1)	71.8(6)	-	78.3(3)
XIV	-	63.5(4)	-	70.0(1)
XV	64.0(1)	63.0(4)	61.0(1)	67.0(3)
XVI	72.0(1)	72.0(2)	-	-
XVII	78.0(2)	67.0(1)	-	76.0(2)
XVIII	-	67.0(1)	-	-
XIX	-	-	-	-
XX	-	65.0(1)	-	-

d. Sex Ratio

May-Sample Group A: 45% males to 54% females

Sample Group B: Day catches, 49% males to 51% females

Night catches, 69% males to 31% females.

September-Sample Group C: 45% males to 55% females

Group D: Day catches, 45% males to 55% females.

Night catches, 46% males to 54% females.

e. Stage of Maturity of male and female cod in samples taken in May (Sample Group A) and September (Sample Group C) are shown in Fig. 4.

f. Age at First Maturity for male and female cod taken in Div. 2J in May (Sample Group A) and in September (Sample Group C) are shown in the following table:

May (2J)

Age Group	Lat. Above	♂♂								Total No. %	♀♀								Total No. %								
		V	VI	VII	VIII	IX	X	θ	?		V	VI	VII	VIII	IX	X	XI	θ		?							
IV no. %	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
V no. %	-	-	-	-	-	-	-	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	5	100
VI no. %	1	-	-	-	-	-	-	39	2	42	1	3	-	-	-	-	-	-	-	-	-	-	24	1	29	100	
VII no. %	-	-	-	-	-	-	-	43	-	43	-	1	3	-	-	-	-	-	-	-	-	-	31	5	40	100	
VIII no. %	-	1	1	2	-	-	-	12	1	13	-	3	5	-	-	-	-	-	-	-	-	-	9	10	23	100	
IX no. %	-	1	2	3	-	-	-	1	3	10	-	-	1	1	1	-	-	-	-	-	-	-	3	4	10	100	
X no. %	-	-	1	1	-	-	-	1	-	3	-	-	1	3	6	1	-	-	-	-	-	-	3	1	15	100	
XI no. %	-	-	-	-	-	-	-	1	1	4	-	-	1	3	6	1	-	-	-	-	-	-	1	-	12	100	
XII no. %	-	-	-	-	-	-	-	2	1	3	-	-	1	1	1	1	-	-	-	-	-	-	1	2	5	100	
XIII no. %	-	1	-	-	-	-	-	-	-	1	-	-	1	1	1	-	-	-	-	-	-	-	-	2	6	100	
XIV no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	1	-	4	100	
XV no. %	-	-	-	-	-	-	-	1	-	1	-	-	2	1	1	-	-	-	-	-	-	-	2	-	4	100	
XVI no. %	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2	100	
XVII no. %	-	-	-	-	1	-	-	-	-	1	2	-	-	-	1	-	-	-	-	-	-	-	-	-	1	100	
XVIII no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	100	
XX no. %	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	100	
No. of observ.	1	3	4	6	1	2	108	11	136	2	7	17	11	20	2	1	77	26	163								

September (2J)

Age Group	Lat. Above	♂♂								Total No. %	♀♀								Total No. %							
		V	VI	VII	VIII	X	θ	?	V		VI	VII	VIII	IX	X	XII	θ	?								
II no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	100	
III no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	100
IV no. %	-	-	-	-	-	-	-	8	1	9	-	-	-	-	-	-	-	-	-	-	-	-	12	-	12	100
V no. %	1	-	-	-	-	-	-	23	3	27	1	-	-	-	-	-	-	-	-	-	-	-	33	-	34	100
VI no. %	3	11	-	-	-	-	-	53	17	64	4	9	-	-	-	-	-	-	-	-	-	-	37	46	86	100
VII no. %	-	5	9	-	-	-	-	18	8	40	1	2	8	-	-	-	-	-	-	-	-	-	24	10	45	100
VIII no. %	-	-	1	-	-	-	-	13	5	18	-	1	1	1	-	-	-	-	-	-	-	-	5	4	12	100
IX no. %	-	-	-	1	-	-	-	2	1	4	-	1	1	1	-	-	-	-	-	-	-	-	2	4	9	100
X no. %	-	-	1	-	-	-	-	1	1	3	-	-	-	1	-	-	-	-	-	-	-	-	1	-	2	100
XI no. %	-	-	1	-	1	-	-	2	1	4	-	-	1	-	-	-	-	-	-	-	-	-	1	1	3	100
XII no. %	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	1	2	100
XIII no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	3	7	100
XIV no. %	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	100
XV no. %	-	-	-	-	-	-	-	1	1	2	-	-	1	-	1	-	-	-	-	-	-	-	1	1	3	100
XVI no. %	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	100
XVII no. %	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	2	100
XVIII no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
XX no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
No. of observ.	4	16	13	1	1	106	39	180	6	13	11	7	1	2	1	137	40	218								

The table shows that in both May and September and particularly in May the majority of cod sampled have not yet reached first maturity. Some males and females reach first maturity between age groups V to XII.

SUBAREA 3

A. Status of the Fisheries

I. Cod.

Landings of cod in Subarea 3 increased about 60% in 1963 to 50,600 metric tons. Landings were sampled in Divisions 3K and 3L in June, July, August and September as follows (numbers of fish taken at night are in brackets):

Sample Group	Sample no.	No. of fish	Depth m	Date
<u>For ICNAF Division 3K</u>				
A	20	50	218	26 July
	21	100	223	27 July
	22	99	243	29 July
B+	25	400(150)	276	2 August
	29	150	218	10 August
C+	37	400(150)	256	24 September
<u>For ICNAF Division 3L</u>				
D	4	74	192	17 June
	5	100	182/192	20 June
	8	50	165	24 June
	12	100	172	30 June
E+	3	150	110/220	16 June
	6	350(100)	177/183	21 June
	11	150	165	28 June
F	13	50	274	16 July
	17	100	294	22 July
G+	15	150	287	18 July
	18	400(150)	274	23 July
H+	34	400(150)	258	22 August
I+	40	250	287	28 September
J	38	100	221	26 September
	39	100	271	27 September
	41	50	223	29 September

+ = samples not aged.

a. Lengths (Fig. 5)

	Mean Length (cm)	
	Day	Night
<u>From Division 3K</u>		
July	56.5	-
Aug.	53.5	51.9
Sept.	58.1	57.9
<u>From Division 3L</u>		
June	66.4	-
June	69.0	64.2
July	58.4	-
July	54.9	53.8
Aug.	62.4	62.9
Sep.	63.5	-
Sep.	58.3	-

b. Ages (Fig. 5)

- Div.3K - July - Mean age, 6.7 years; 1957 year class (age group VI) is dominant.
- Div.3L - June - Mean age, 7.9 years; 1955 year class (age group VIII) is dominant.
- July - Mean age, 6.7 years; 1957 year class (age group VI) is dominant.
- Sept.- Mean age, 6.2 years; 1958 year class (age group V) is dominant.

c. Growth is shown in the following table of average lengths of male and female cod of age groups III to XXIV (1960 to 1939 year class) taken in Div. 3K in July and Div. 3L in June, July and September.

Age Group	Div. 3K (July)		Div 3L (June)	
	♂	♀	♂	♀
III	39.0(1)	-	-	-
IV	45.7(3)	46.4(7)	-	47.8(4)
V	49.1(17)	50.8(24)	52.9(22)	53.3(19)
VI	54.3(41)	54.5(51)	55.0(28)	53.4(22)
VII	57.0(23)	58.3(35)	62.5(30)	63.0(23)
VIII	64.3(6)	63.5(11)	67.5(43)	69.9(30)
IX	62.0(2)	65.3(6)	70.4(30)	74.1(14)
X	66.5(2)	69.8(13)	78.2(13)	78.2(11)
XI	67.0(3)	-	88.2(6)	81.0(5)
XII	63.0(1)	-	84.5(2)	86.5(4)
XIII	-	-	87.3(4)	94.3(4)
XIV	63.0(1)	-	86.0(2)	97.0(2)
XV	-	-	80.3(3)	-
XVI	68.0(1)	-	-	-
XVII	109.0(1)	-	87.0(1)	124.0
XVIII	-	-	-	.02.0(1)
Age Group	Div. 3L (July)		Div. 3L (September)	
	♂	♀	♂	♀
III	-	-	41.3(3)	41.0(2)
IV	45.0(1)	47.3(4)	47.0(12)	49.0(27)
V	49.5(8)	51.5(19)	51.4(33)	52.4(48)
VI	55.3(23)	55.2(34)	56.1(28)	57.3(27)
VII	58.5(10)	59.1(14)	57.3(7)	65.9(20)
VIII	67.0(9)	67.8(12)	72.3(8)	75.3(10)
IX	65.3(4)	72.0(2)	75.5(2)	74.5(2)
X	66.0(2)	69.0(1)	74.5(2)	74.0(4)
XI	75.0(1)	85.5(2)	76.0(2)	-
XII	-	72.0(1)	81.0(2)	84.5(4)
XIII	-	-	85.0(1)	112.0(1)
XIV	79.5(2)	84.0(1)	77.0(1)	113.0(1)
XV	-	-	-	110.0(1)
XVI	-	-	-	83.0(1)
XXVI	-	-	-	121.0(1)

d. Sex ratio (%)

	From Div. 3K		Day		Night	
	♂	♀	♂	♀	♂	♀
July	41	59	-	-	-	-
Aug.	43	57	48	52		
Sept.	46	54	51	49		
<u>From Div. 3L</u>						
June	57	43				
	55	45	40	60		
July	40	60				
	86	14	39	61		
Aug.	51	49	35	65		
Sept.	70	30				
	40	60				

e. Stage of Maturity of male and female cod in samples taken in Div. 3K in July and in Div. 3L in June, July and September are shown in Fig. 6.

f. Age at First Maturity for male and female cod taken in Div. 3K in July and in Div. 3L in June, July and September are shown in the following table.

July (3K)

Age Group	St. Obs.	♂♂								Total No. %	♀♀								Total No. %						
		V	VI	VII	VIII	IX	XI	θ	?		V	VI	VII	VIII	IX	X	θ	?							
III	no %	-	-	-	-	-	-	1	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	
IV	no %	-	-	-	-	-	-	3	-	3	100	-	-	-	-	-	-	-	7	-	7	100	-	7	100
V	no %	1	-	-	-	-	-	16	-	17	100	1	-	-	-	-	-	-	21	2	23	100	8	24	100
	%	6	-	-	-	-	-	74	-	80	100	4	-	-	-	-	-	-	88	8	96	100	8	100	
VI	no %	1	2	-	-	-	-	35	3	41	100	3	9	-	-	-	-	-	36	3	39	100	6	54	100
	%	2	5	-	-	-	-	85	7	92	100	6	18	-	-	-	-	-	71	6	77	100	6	101	
VII	no %	1	-	2	-	-	-	12	2	14	100	-	1	3	-	-	-	-	24	7	31	100	7	35	100
	%	4	-	35	-	-	-	52	9	61	100	-	3	9	-	-	-	-	69	20	89	100	20	109	
VIII	no %	-	-	1	1	-	-	3	1	4	100	-	-	2	3	-	-	-	4	1	5	100	1	11	100
	%	-	-	17	17	-	-	50	17	64	100	-	-	27	27	-	-	-	36	4	40	100	4	104	
IX	no %	-	-	1	-	-	-	1	-	2	100	-	1	1	2	-	-	-	2	1	3	100	2	6	100
	%	-	-	50	-	-	-	50	-	100	100	-	17	17	33	-	-	-	33	33	66	100	33	100	
X	no %	-	-	1	-	-	-	1	-	2	100	-	-	2	3	4	-	-	4	1	5	100	2	13	100
	%	-	-	50	-	-	-	50	-	100	100	-	-	15	23	31	-	-	31	8	39	100	15	100	
XI	no %	-	-	1	2	-	-	-	-	3	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	33	67	-	-	-	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XII	no %	-	-	-	-	-	-	1	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	100	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XIV	no %	-	-	-	-	-	-	1	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	100	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XVI	no %	-	-	-	-	-	-	1	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	100	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XVII	no %	-	-	-	-	-	-	1	-	1	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	100	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No. of obs.		3	2	12	3	1	1	70	10	102	102	4	11	9	8	4	1	93	17	147	147	147	147	147	147





September (31.)

Age group	No. of fish	♂♂								Total no. %	♀♀										Total no. %					
		IV	V	VI	VII	VIII	X	Θ	?		IV	V	VI	VII	IX	X	XI	XIII	Θ	?						
III	no. %	-	-	-	-	-	-	3	-	3	-	-	-	-	-	-	-	-	2	-	2	-	-	100	-	100
IV	no. %	-	-	-	-	-	-	12	-	12	-	-	-	-	-	-	-	-	27	-	27	-	-	100	-	100
V	no. %	-	1	-	-	-	-	32	-	33	-	4	-	-	-	-	-	-	43	1	48	-	-	90	2	100
VI	no. %	2	-	-	-	-	-	25	1	28	1	1	3	-	-	-	-	-	22	-	27	-	-	81	-	100
VII	no. %	-	-	-	1	-	-	5	1	7	-	1	2	1	-	-	-	-	13	3	20	-	-	65	15	100
VIII	no. %	-	-	1	-	2	-	3	2	8	-	-	2	2	-	-	-	-	4	2	10	-	-	40	20	100
IX	no. %	-	-	-	1	-	-	1	-	2	-	-	-	-	-	-	-	-	1	1	2	-	-	50	50	100
X	no. %	-	-	-	1	-	-	1	-	2	-	-	-	-	2	-	-	-	1	1	4	-	-	25	25	100
XI	no. %	-	1	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XII	no. %	1	-	1	-	-	-	-	-	2	-	-	-	1	-	-	-	-	2	1	4	-	-	50	25	100
XIII	no. %	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-	100	-	100
XIV	no. %	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	100	-	100
XV	no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	100	-	100
XXI	no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	100	-	100
XXIV	no. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	100	-	100
No. of charr.		3	2	2	3	4	1	82	4	101	1	6	7	3	1	2	1	2	116	10	149					

Again in all samples the majority of the cod from age group III to XXIV have not yet reached maturity.

SUBAREA 4

A. Status of the Fisheries.

I. Cod.

Landings of cod from Subarea 4 decreased slightly from 14,400 metric tons in 1962 to 13,600 metric tons. One sample was taken from Div. 4R in 91 m. on 7 August. Mean length of 150 fish was 62.5 cm. Length frequency is shown in Fig. 7. Sex ratio determined from 100 fish was 60% males to 40% females.

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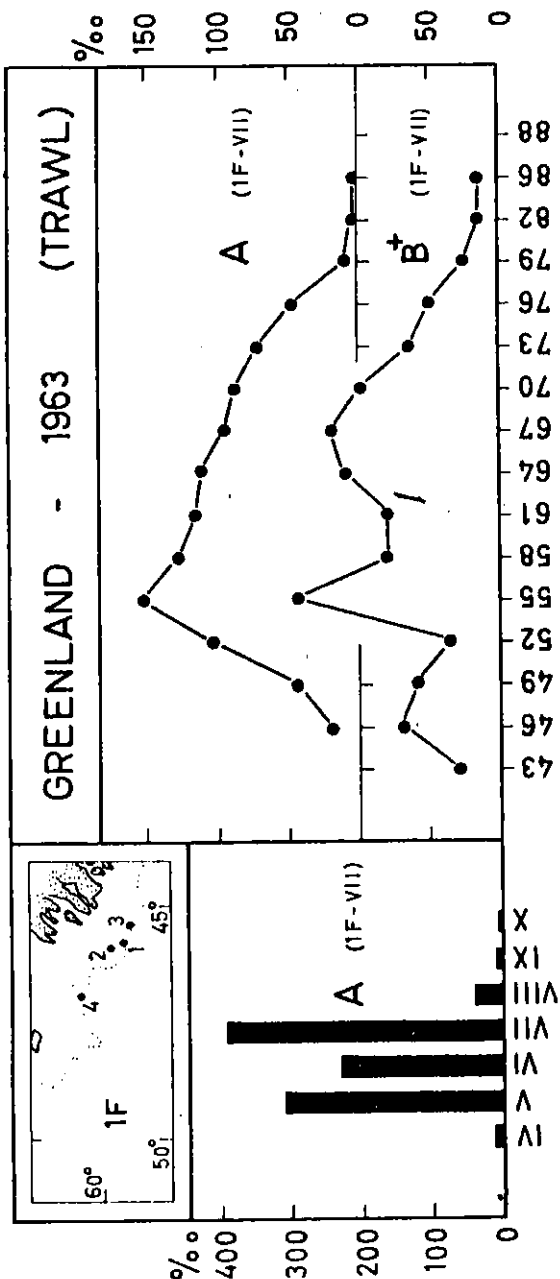


Fig. 1. Cod. Div. 1F. Length and age composition, July 1963.

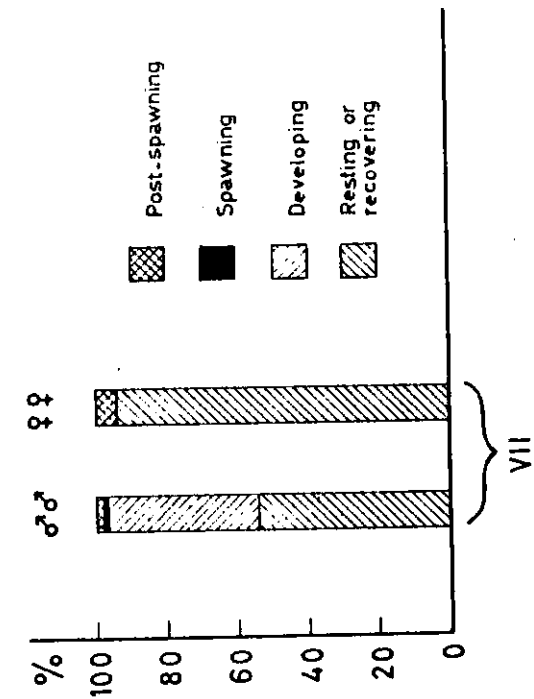


Fig. 2. Cod. Div. 1F. Stages of maturity, July, 1963.

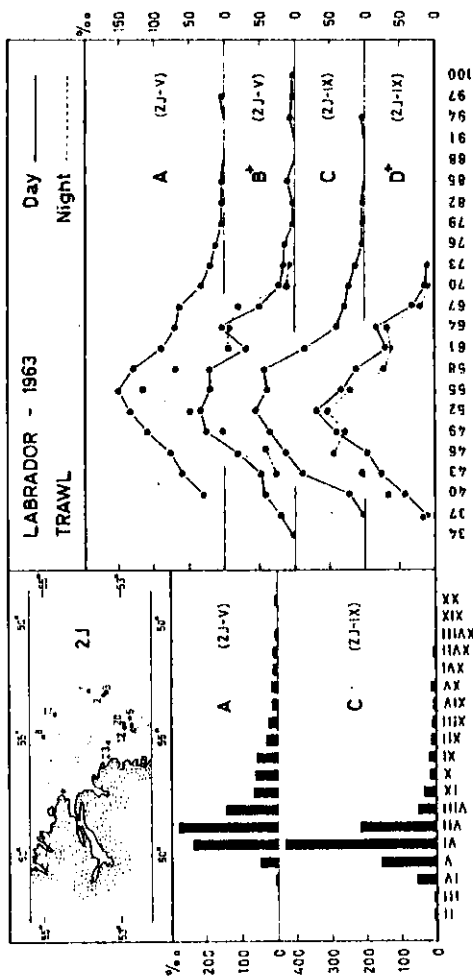


Fig. 3. Cod. Div. 2J. Length and age composition, May and Sept. 1963.

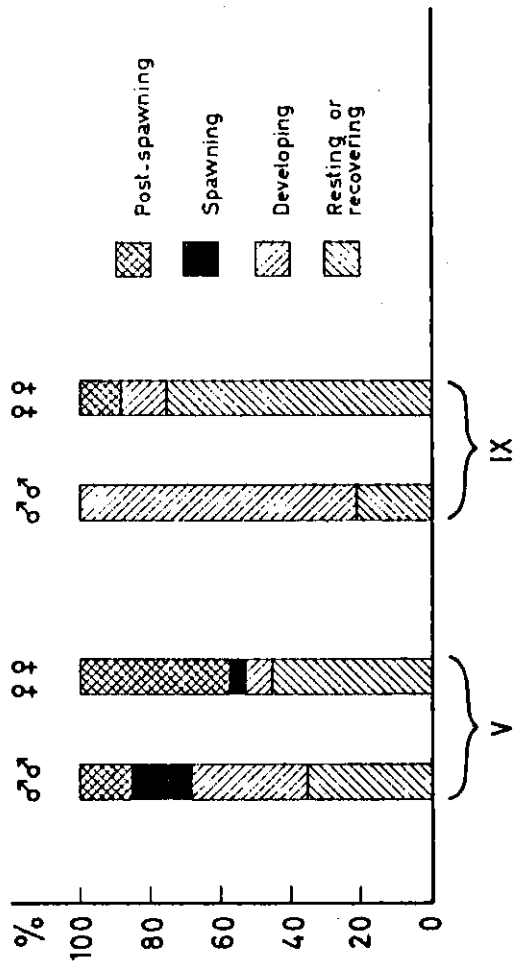


Fig. 4. Cod. Div. 2J. Stages of maturity, May and September, 1963.

