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Portuguese Research Report, 1962

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The present paper provides a summary of the sampling operations on cod (Gadus morhua L.) carried out on board the Portuguese Dory-Vessels during the 1962 fishery in Subarea 1 (Greenland) and 3 (Newfoundland).

The operations include: size and age composition, observation of weight, sex-ratio, stage of maturity and first spawning.

The methods used for sampling and the study are the same as in previous years (vide Portuguese Research Report, Annual Proceedings Vol.7).

I. Observations in Subarea 1 (Table 1\*).

Fifty-two samples, 7,300 individuals, were collected from dory-vessels. 4,300 otoliths were collected, which 3,000 were taken for age determination. The samples were grouped by divisions and months of capture as far as it was possible (Table 2, Fig.1).

1. Age distribution (Tables 3\*, 4\*, 5\*, and 6\*; Fig.1)

Division 1D (Table 3\*)

- Group A (May) - the following age groups are predominant V (533 0/00) and VI (193 0/00); the remaining groups are represented by less than 100 0/00.
- Group D (June) - this group presents a dominance of age-groups V (395 0/00), VI (221 0/00) and IV (114 0/00).
- Group I (July) - this group presents a differing distribution with the following dominance of old age-groups: IX (178 0/00); and VIII (115 0/00) simultaneous with the age-groups VI (173 0/00 and V (115 0/00).

Division 1C (Tables 4\* and 5\*)

- Group B (May) - the following age-groups predominate: IX (384 0/00) and VIII (131 0/00); the remaining age-groups are represented by less than 100 0/00.
- Group C (June) - dominance of age-groups V (487 0/00) and VI (123 0/00).
- Group F (July) - a similar situation to that found in June with age-group V (600 0/00) and VI (127 0/00) dominant.

\*Tables 1, 3-9, 13 and 15 referred to in the text of Document 72 (Revised) are published in ICNAF Sampling Yearbook Vol.7 for 1962.

- Group G (July) - this group, although from the same division and date, presents a differing distribution with the following dominance of age-groups: V (220 ‰), IX (190 ‰) and VIII (150 ‰).
- Group Q (September) - dominance of age-groups V (550 ‰) and VI (190 ‰).

Division 1B (Table 6\*)

Groups L, N, and P. (July, August and September): in these three groups age-group V predominates (638, 647 and 669 ‰). In Group N, the age-group IV, which was almost non-existent, is now present in 108 ‰.

SUMMARY: The predominating year class in the samples investigated is the 1957.

In Division 1C in May and July, and also in Division 1D in July are predominate the year-class 1953, that was predominate since 1959. The 1958 year-class appeared for the first time this year.

2. Length distribution (Fig. 1, Tables 7\*, 8\* and 9\*)

Division 1D (Table 7\*)

- Group A (May) : the range of length distribution is from 46-94 cm, the length curve is bimodal, with the peaks of 64.0 and 79.0 cm; the mean length is 66.4 cm.
- Group D (June) : the length curve is unimodal, with the peak at 61.0 cm; the distribution is limited to the classes 40 to 106 cm; the mean length is 67.0 cm.
- Group H (July) : the ranges of length varies between 52-106 cm; the length curve is regular and the mean length is 76.5 cm.
- Group I (July) : the length curve is unimodal, with the peak at 79.0 cm; the distribution is limited to the classes 52-115 cm; the mean length is 77.4 cm.

Division 1C (Table 8\*)

- Group B (May) : the length distribution ranges between 49-112 cm; the length curve is bimodal with the peak of 76.0 and 82.0 cm; the mean length is 78.7 cm.
- Group C (June) : the range of lengths is from 40-106 cm. The curve is unimodal with the peak at the 64 cm class. The mean length is 66.1 cm.
- Group E (June) : the length curve is plurimodal with the peak at the classes 61-67 cm; the lengths range from 43 to 112 cm. The mean length is 68.6 cm.

- Group F (July) : the range of lengths is from 43-94 cm; the length curve is unimodal, with the peak at the 68 cm class; the mean length is 54.2 cm.
- Group G (July) : the range of lengths is from 49-106 cm; the length curve is multimodal, with the peak at the 61-76 and 85 cm classes; the mean length is 78.7 cm.
- Group J (July) : the length distribution ranges between 40 and 60 cm; the length curve is unimodal, with the peak at the 61 cm class; the mean length is 64.6 cm.
- Group Q (September) : the length curve is unimodal with the peak at the 67.0 cm class; the range of lengths is from 40 - 100 cm; the mean length is 67.7 cm.

Division 1B (Table 9\*)

- Group L (July) : the length distribution ranges between 40-109 cm; the length curve is unimodal with the peak at the 58 cm class; the mean length is 63.9 cm.
- Group M (July) : the curve length is unimodal with the peak at the 61.0 cm class; the distribution is limited to the classes from 43 to 118 cm; the mean length is 71.9.
- Group N (August) : the ranges of lengths vary between 40 to 100 cm; the length curve is unimodal with the peak at 58 cm; the mean length is 62.5 cm.
- Group O (August) : the range of lengths is between 37 and 97 cm. The length curve is unimodal, with the peak at 58 cm; the mean length is 58.6 cm.
- Group P (September) : the length distribution is between 40-97 cm; the length curve is unimodal with the peak at 58 cm; the mean length is 62.3 cm.

3. Growth (Table 10; Fig. 2)

The mean length of males and females separately are shown combined for all the samples from Divisions 1B, 1C and 1D. The male and female growth curves intersect at the 5th year. The growth rate is a little higher for the females than for males; from the 7th, for females, and from the 9th year for males, a decrease growth rate is observed.

4. Sex-ratio

All samples combined show a slight predominance of females (517 ‰ to 667 ‰), except for one sample from Division 1D and other one from Division 1B, where the males are abundant (518 ‰).

5. Stage of maturity (Table 11; Fig. 3)

- Males : From May to September, the majority (38 to 64%) are in the resting or the recovering stage; 26 to 61 ‰ are in the developing stage and the remaining are in the spawning stage (0.4-3.0 ‰) and the post spawners (1-9 ‰).

Females : In May 50 o/o are in the resting stage and 50 o/o post-spawners. In August and September 85-87 o/o of females are in the resting stage and 15-13 o/o are post-spawners. In July and June 61-66 o/o are in resting-stage and 34-30 o/o are post-spawners and the remaining are spawning (0.3 o/o) and in the developing stage (0.3-0.2 o/o).

6. Age at first maturity (Table 12; Fig. 4)

The spawning zones showed that first maturity is reached at ages from 5 to 8, and especially at age 7 (22-77 o/o); apparently the females mature earlier than males; important numbers of females (45 o/o) reached maturity in the 6th year.

II. Observations in Subarea 3 (Tables 13\* and 14)

A total of five samples were collected from the Portuguese Dory-Vessels. Positions and dates of capture are indicated in Table 13.

For the present only 500 specimens were studied to determine the length composition. (For sample groups see Table 14).

1. Length distribution (Table 15\*; Fig. 5)

División 3L

Group A (September) : The size distribution ranges from 40 to 73 cm; the length curve is unimodal, with a peak at 46 cm; the mean length is 51.9 cm.

Division 3N

Group B (September) : The length curve is bimodal with peaks at 52 and 73 cm; the range of variation is from 40 to 130 cm. The mean length is 67.1 cm.

Division 3O

Group C (May) : The length curve is multimodal, with the highest peaks at 76 (105 o.o) and 70 cm. The range distribution is from 43 to 121 cm. The mean length is 80.8 cm.

Table 2 - Greenland 1962, Table showing the sample groupings.

<u>Sample Group</u>	<u>Sample no.</u>	<u>Division</u>	<u>Date</u>	<u>Gear</u>
A	1-2	1D	25/26-V	Line
B	3	1C	30/V	"
C	4-7-13-14	1C	1/29-VI	"
D	8-10-11	1D	12/23-VI	"
E	6-15	1C	8/30-VI	"
F	16-25-27	1C	2/21-VI	"
G	24	1C	17-VII	"
H	18	1D	7-VII	"
I	17-19-20-22	1D	6/14-VII	"
J	28	1C	22/VII	"
L	29-30-32	1B	25/29-VII	"
M	31	1B	27-VII	"
N	33-36-38-41-47	1B	3/31-VIII	"
O	39-42-45	1B	18/29-VIII	"
P	48-49	1B	1/2-IX	"
Q	50-51-52	1C	6/8-IX	"

Table 10 - Greenland 1962 , Mean growth of males and females of the richer year-classes based on total samples.

Year-Class	Age Group	Mean Length	
		♂♂ cm	♀♀ cm
1959	III	41.8	43.9
58	IV	51.3	51.8
57	V	60.4	61.0
56	VI	67.4	66.2
1955	VII	74.8	76.2
54	VIII	78.3	76.3
53	IX	80.4	84.4
52	X	81.1	85.8
51	XI	86.2	88.8
1950	XII	88.6	90.7
49	XIII	90.1	94.6
48	XIV	89.0	91.6
47	XV	89.2	93.6
46	XVI	92.8	94.6
1945	XVII	96.5	95.0
44	XVIII	-	96.0
43	XIX	-	89.0

Table 11 - Greenland 1962, Stages of maturity of gonads determined by macroscopic observation in the months, May to September, for all samples.

Stage of Maturity	May		June		July		August		September	
	♂♂ o/o	♀♀ o/o	♂♂ o/o	♀♀ o/o	♂♂ o/o	♀♀ o/o	♂♂ o/o	♀♀ o/o	♂♂ o/o	♀♀ o/o
Resting or Recovering	44	50	52	66	64	61	54	87	38	85
Developing	48	-	36	0.3	26	0.2	45	-	61	-
Spawning	1	-	3	0.3	2	-	-	-	0.4	-
Post-Spawning	7	50	9	34	8	39	1	13	1	15
	92	157	290	359	521	578	242	258	240	260

Table 12 - Greenland 1962, Age at first maturity, males and females of age-groups V-XIV

Age Group	♂♂ 1st spawning								♀♀ 1st spawning							
	V	VI	VII	VIII	IX	0	?	Total	V	VI	VII	VIII	IX	0	?	Total
V	N 37	-	-	-	-	573	51	666	44	-	-	-	-	675	54	773
	% 5	-	-	-	-	87	8	100	6	-	-	-	-	87	7	100
VI	N 10	52	-	-	-	78	46	186	10	77	-	-	-	86	47	220
	% 5	28	-	-	-	42	25	100	5	35	-	-	-	39	21	100
VII	N 4	28	13	-	-	3	12	60	2	35	34	-	-	6	14	91
	% 7	47	22	-	-	5	20	101	2	39	37	-	-	7	15	100
VIII	N 6	26	31	1	-	-	3	67	2	27	52	3	-	-	7	91
	% 9	39	46	1	-	-	4	99	2	30	57	3	-	-	8	100
IX	N 12	44	49	16	-	-	1	122	6	31	66	29	-	-	-	132
	% 10	36	40	13	-	-	1	100	5	23	50	22	-	-	-	100
X	N -	22	19	6	-	-	-	47	1	4	17	9	-	-	-	31
	% -	47	40	13	-	-	-	100	3	13	55	29	-	-	-	100
XI	N 6	4	17	1	-	-	-	28	1	2	24	4	-	-	-	31
	% 21	14	61	4	-	-	-	100	3	6	77	13	-	-	-	99
XII	N 2	10	13	4	1	-	-	30	-	15	13	3	1	-	1	33
	% 7	33	43	13	3	-	-	99	-	45	39	9	3	-	3	99
XIII	N 3	4	4	1	-	-	-	12	-	4	7	2	2	-	-	15
	% 25	33	33	8	-	-	-	99	-	27	47	13	13	-	-	100
XIV	N -	3	12	12	1	-	-	28	2	11	11	5	-	-	-	29
	% -	11	43	43	3	-	-	100	7	38	38	17	-	-	-	100

Table 14 - Newfoundland 1962, Table showing the sample groupings

Sample Group	Sample no.	Division	Date	Gear
A	1-2	3O	11/13-V	Line
B	4-5	3N	27/29-VI	"
C	3	3L	24-IX	"

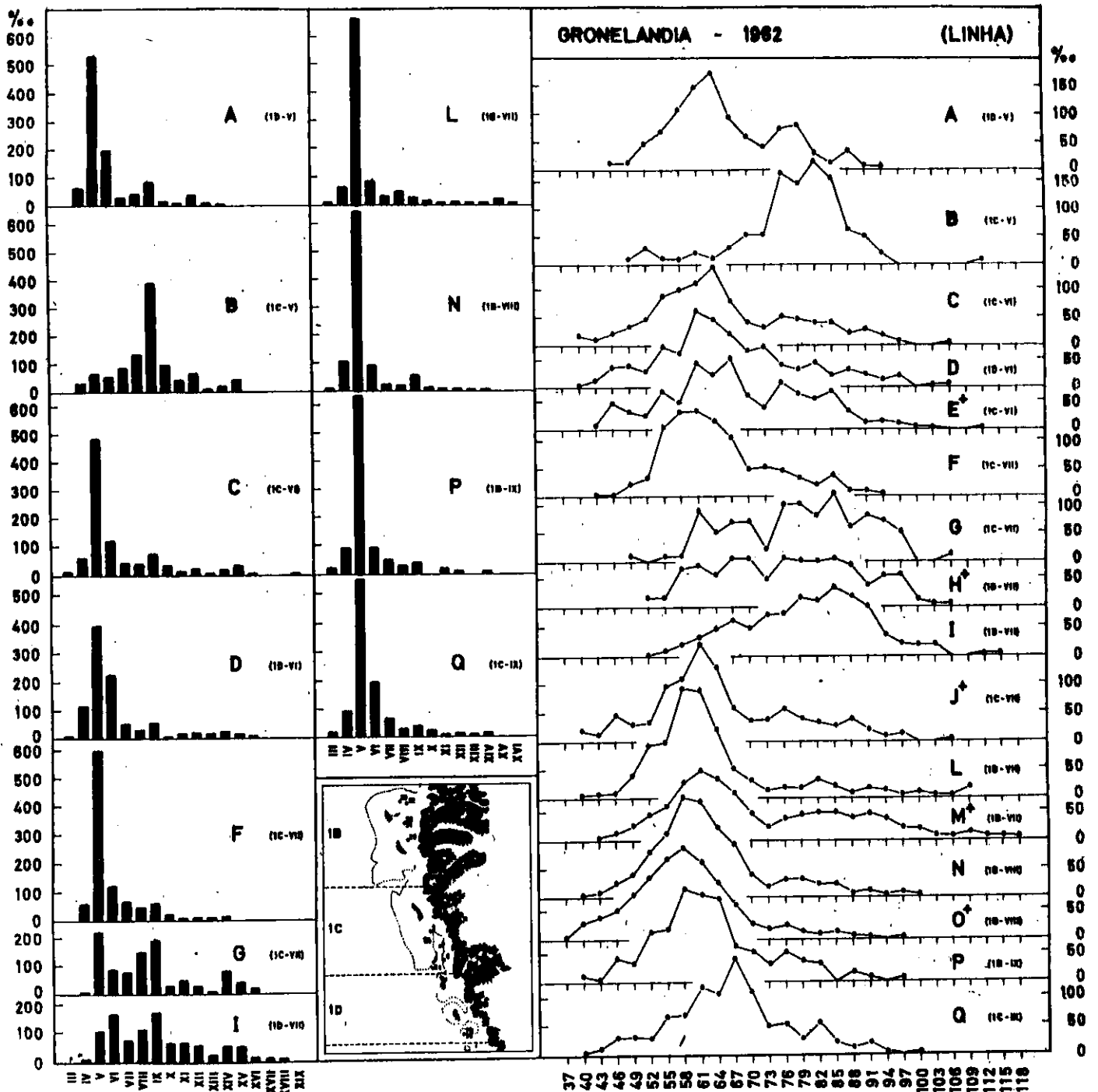


Figure 1 - Cod, Subarea 1. Age and length distribution.

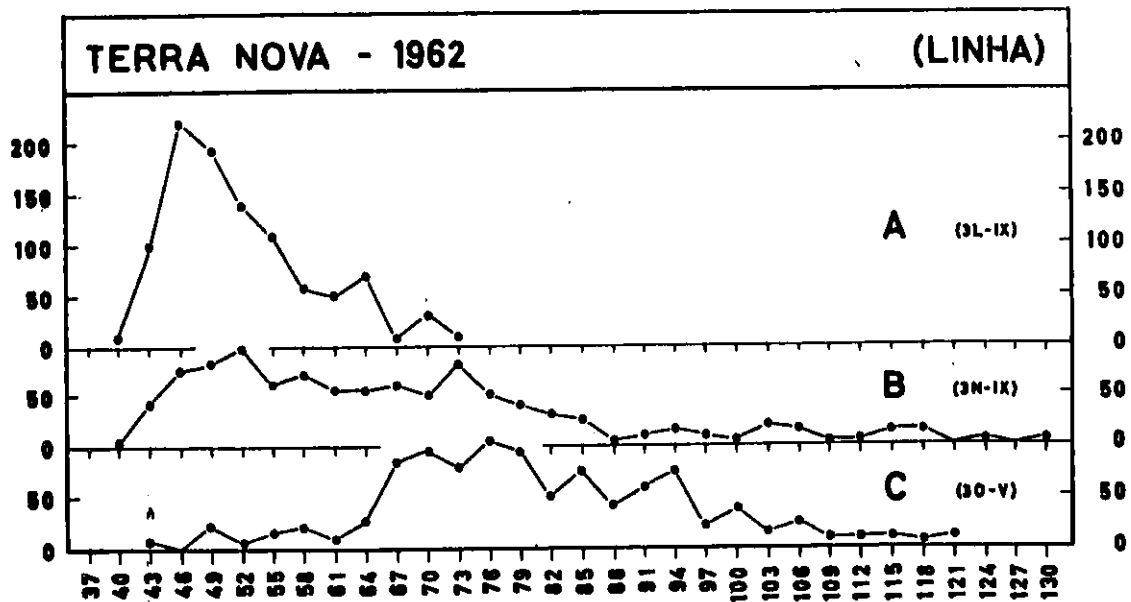


Figure 5 - Cod, Subarea 3. Length distribution

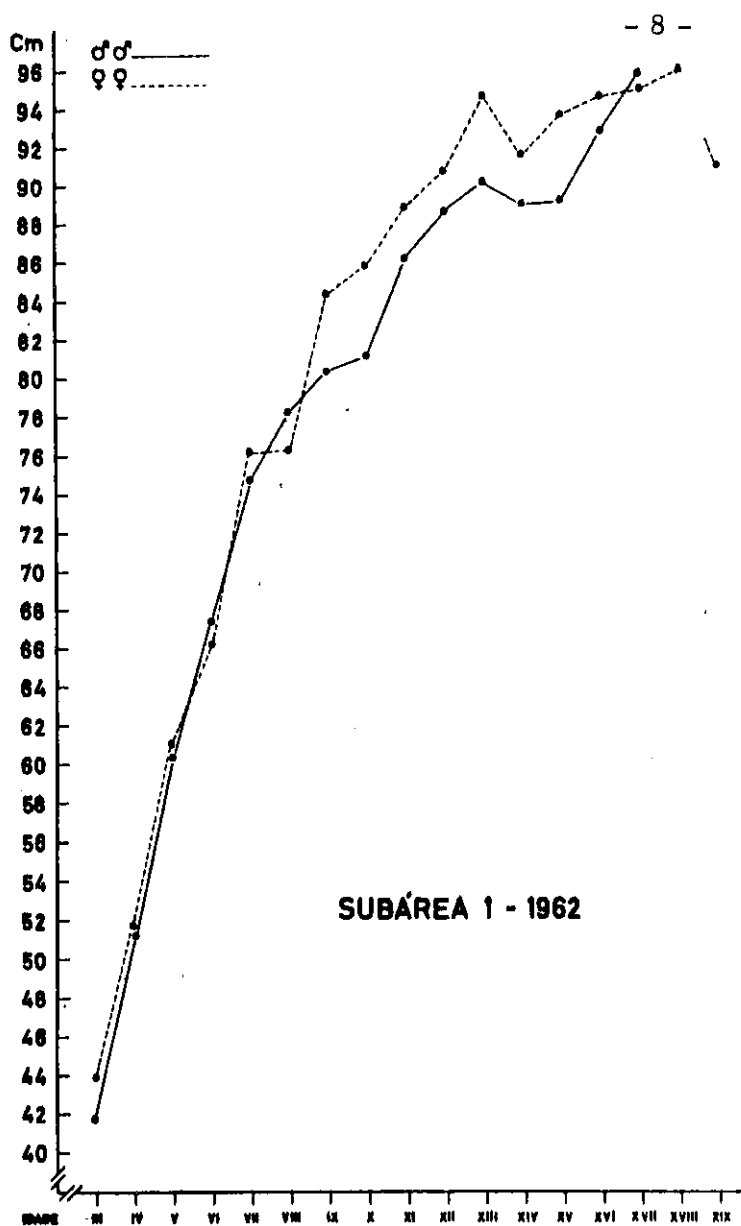


Figure 2 - Cod, Subarea 1. Mean length of age-groups.

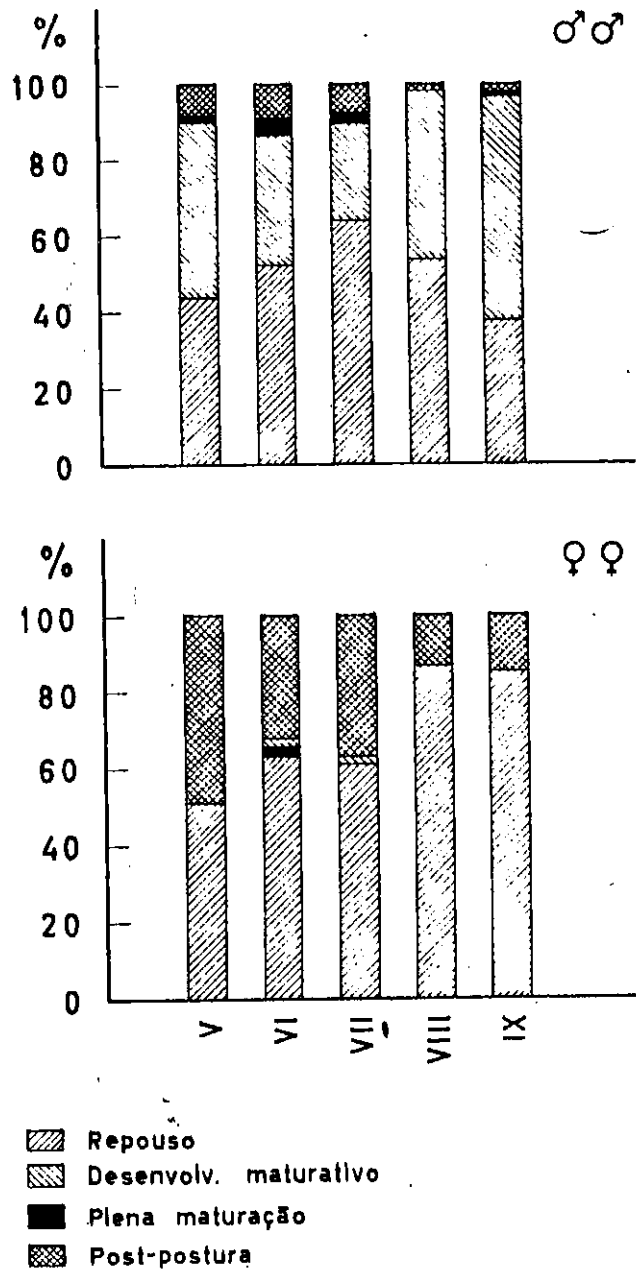


Figure 3 - Cod, Subarea 1. Stages of maturity from May to September, 1962.

Figure 4 - Cod, Subarea 1. Age (5-9) at first maturity for males (black) and females (white) of the age-groups V-XIV

