International Commission for the Northwest Atlantic Fisheries

Serial No. 5096
(D.a.76)

ICNAF Summ.Doc. 77/VI/30

ANNUAL MEETING - JUNE 1977

Portuguese Research Report, 1976

Section I - Statistical Data

by

Maria Luisa Portugal and Ana Maria Tavares
Secretaria de Estado das Pescas, Lisbon

Section II - Special Research Studies

by

Manual Lima Dias and Maria de Lourdes Marecos
Secretaria de Estado das Pescas, Lisbon

0 - INTRODUCTION

SECTION I concerns with an analysis of the statistical data about Portuguese total catches, mainly of cod, but also of the other species, by subareas.

SECTION II summarizes the portuguese research carried out on cod from a stern trawler and concerns some informations about populations sampled in 3L and 3M ICNAF divisions in 1976.

I - STATISTICAL DATA

1. Total Portuguese catch in 1976 in ICNAF area, (Trawlers and Gill Nets), amounted 72 608.7 tons, compared to 99 789.0 tons in 1975, which means a decrease of 27%. However, this decrease is smaller than the one verified when we compared 1975 to 1974 data, where we had a decrease of 30%.

   This decrease can be explained by two facts, which can be observed in Table 2:

   1) Although we have catches of 4 more species in 1976, all the species (with an exception for witch flounder), had a smaller catch in 1976, having some of them, almost half of the catch of 1975 (cases like Redfish, White Hake, American Plaice, Rays, etc..).

   2) Catch of Capelin was nil in 1976, while we had 574 tons caught in 1975

* Executive Secretary, ICNAF, P.O. Box 638, Dartmouth, Nova Scotia, Canada B2Y 3Y9

2 - TOTAL CATCHES BY SUBAREA

TABLE 1 - NOMINAL CATCHES AND PERCENTAGES IN ICNAF AREA BY SUBAREA
1976 and 1975

	1976		1975	
SUBA.	TONS	%	TONS	%
1	3 003.8	4.1	5 014.6	5.0
2	758.8	1.0	11 299.7	11.3
3	57 622.1	79.3	68 589.8	68.7
4	11 224.0	15.4	14 885.3	14.9

Table 1 shows that the largest amount of catches took place, both in 1976 and 1975, in subarea 3 (79.3% in 76 and 68.7% in 75). One can notice that although the amount of catch in this subarea has decreased in 76, the percentage increased.

We can also see that, also in both years, subarea 4 occupies the second place in amount of catch (15.4% in 76 and 14.9% in 1975). Also in this case, the percentage has increased even if the amount of catch decreased.

The only difference noticed comparing these two years, is that while in 1976 subarea 1 occupies the third place (4.1%), in 1975 the third place is occupied by subarea 2. This means obviously, that the samllest amount of catch took place, in 1976, in subarea 2 (1.0%) and in 1975 in subarea 1 (5.0%)

It is important to notice the great decrease in amount of catch (and percentage) that took place in subarea 2, from 1975 to 1976. We had a catch of 11 299.7 tons in 1975 and only 758.8 in 1976 (See Fig.1).

3 - TOTAL CATCHES BY SPECIES

Redfish is in both years the second species in amount of catch, although it has decreased, in 1976, both in amount of catch and percentage. With an exception for the three first species (Cod, Red and White Hake), it can be seen that the other species don't follow the same order in 1976 that they did in 1975.

As referred in point 1., we caught in 1976, 4 more species than in 1975, that is: Flounders, n.e.i., Squids, saithe (=Pollock) and Leerfish. On the other hand, as it was also mentioned before, we had no catches of Capelin in 1976.

TABLE 2 - NOMINAL CATCHES AND PERCENTAGES BY SPECIES IN ICNAF AREA (1976-1975)

Nº. OF ORDER	1976			1975		
	SPP	TONS	%	SPP	TONS	%
1	COD	63 472.4	87.4	COD	84 279.7	84.4
2	RED	3 266.5	4.5	RED	7 638.0	7.6
3	WHITE HAKE	1 486.2	2.0	WHITE HAKE	2 500.0	2.5
4	WITCH FLOUNDER	976.1	1.3	AMERICAN PLAICE	1 568.4	1.6
5	FLOUNDERS n.e.i.	631.5	0.9	RAY	1 093.2	1.1
6	AMERICAN PLAICE	597.9	0.8	CATFISHES	753.3	0.8
7	RAYS	545.1	0.8	WITCH FLOUNDERS	715.5	0.7
8	CATFISHES	488.8	0.7	CAPELIN	574.0	0.6
9	SQUIDS	264.5	0.4	YELLOWTAIL FLOUNDER	342.0	0.3
10	GREENLAND HALIBUT	143.5	0.2	GREENLAND HALIBUT	325.3	0.3
11	YELLOWTAIL FLOUNDER	136.5	0.2			
12	SAITHE (=POLLOCK)	87.4	0.1			
13	LEERFISH'	64.1	0.1			
14	OTHERS	448.2	0.6			

TABLE 2 shows that Atlantic Cod is the most important species caught. It is to be noticed that although there was a decrease (from 1975 to 1976) in amount of cod catch, its percentage respecting the other species, has increased (from 84.4% to 87.4%).

We would like to make a special reference and compare data of Witch Flounder in both years. While in 1975 it occupied the 7th place (0.7% of all species) it occupies in 1976 the fourth place (1.3%). It is important to notice that this species increased not only in amount of catch (715.5 tons in 1975 to 976.1 tons in 1976) but also in percentage.

4- SPECIES BY SUBAREA

4.1. COD

4.1.1. Observing Table 3, it can be seen that total Cod catches reached in 1976, only 63 472.4 tons compared to 84 279.7 tons in 1975, that is a decrease of about 25%.

Considering catches by subarea, we can see that the biggest catch took place, in both years, in subarea 3. Also in both years, as it happened when we considered all the species, subarea 3 is followed by subarea 4, for what concerns the amount of cathes.

Also in this case (cod catches), the only difference noticed between catches in 1976 and 1975, concernssubareas 1 and 2. In 1976, the smallest catch took place in subarea 2 (0.9%) while in 1975 it took place in subarea 1, (5.9%).
It is important to notice, in this case, too, the great decrease of cod catch in subarea 2 from 1975 to 1976. In 1975 we caught in this subarea, 9 774.9 tons (11.6%), While in 1976, cod catches only reached 619.3 tons in this subarea (0.9%).

Figure 2 compares Cod catches by subarea in 1976 and 1975.

4.1.2. Once subarea 3 is the most important in amount of catches, Fig.3 will show the distribution of Cod cathes by the different divisions of this subarea.

TABLE 3 - NOMINAL CATCHES AND PERCENTAGES OF COD BY SUBAREA IN 1976 AND 1975

SUBA.	1976		1975	
	TONS	%	TONS	%
1	2 495.8	3.4	4 940.0	5.9
2	619.3	0.9	9 774.9	11.6
3	49 850.3	68.7	55 575.7	65.9
4	10 507.0	14.5	13 989.1	16.6

4.2. REDFISH

Redfish catch in 1976 amounted to 3 266.5 tons compared to 7 638.0 tons in 1975. Although this species is, also this year, the second one in amount of catch, it is important to observe that it decreased of about 57%.
The largest amount was caught in subarea 3, followed by subarea 4. Subarea 2 had the samllest catch. (as shown in Table 4).

TABLE 4 - NOMINAL CATCHES AND PERCENTAGES OF REDFISH BY SUBAREA IN 1976 AND 1975

SUBA.	1976		1975	
	TONS	%	TONS	%
1	62.0	1.9	32.7	0.4
2	53.3	1.6	1 052.5	13.8
3	2 831.2	86.7	5 925.4	77.6
4	320.0	9.8	627.4	8.2

4.3. OTHER SPECIES

Considering catches by subarea, all the other species show that the biggest catch also took place in subarea 3.

It is important to mention that some of these species (White Hake, Squids and Yellowtail) had 100% of their catches in subarea 3.

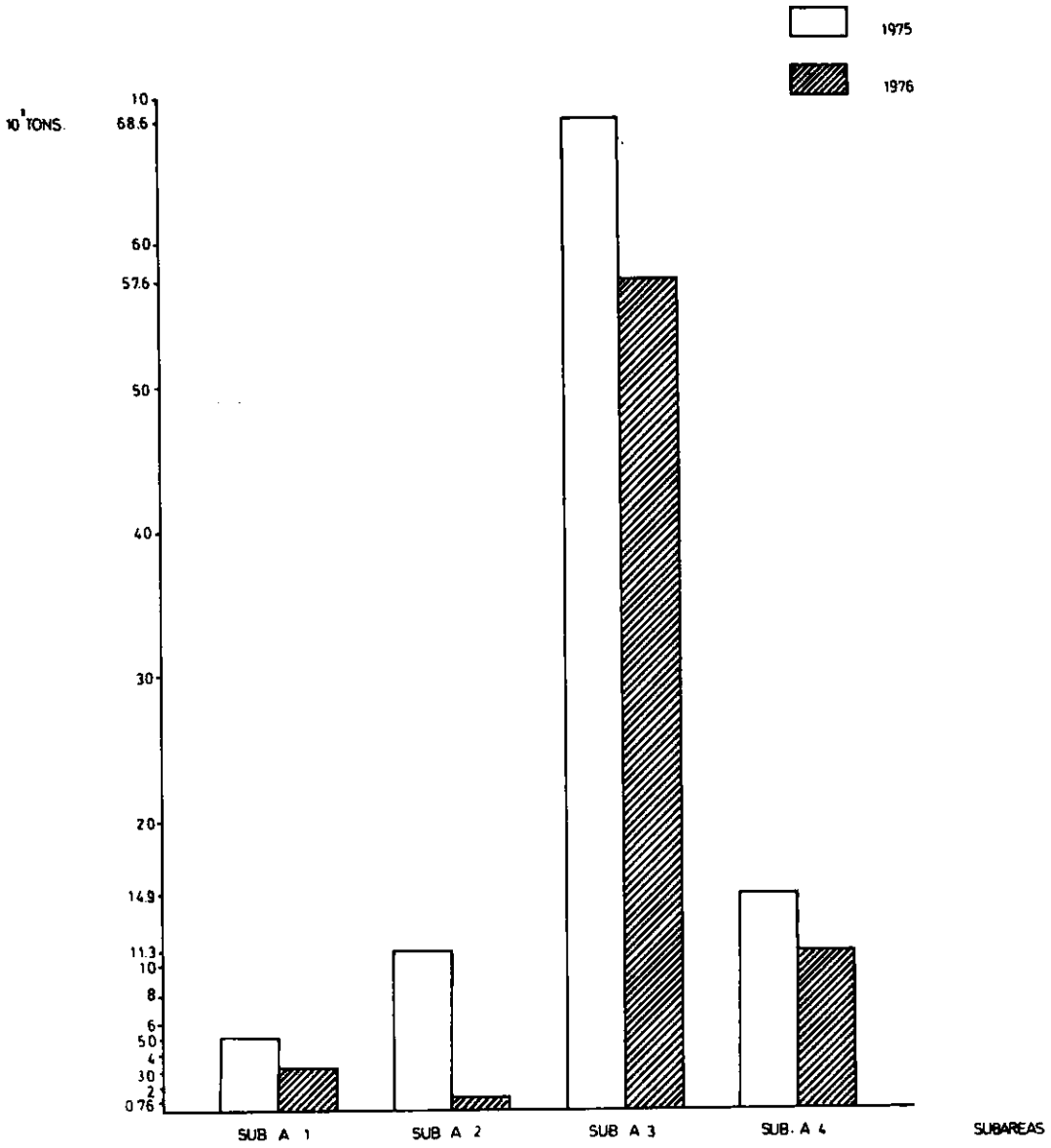

FIG 1 - TOTAL PORTUGUESE CATCHES BY SUBAREAS - 1975 AND 1976

10^3 TONS

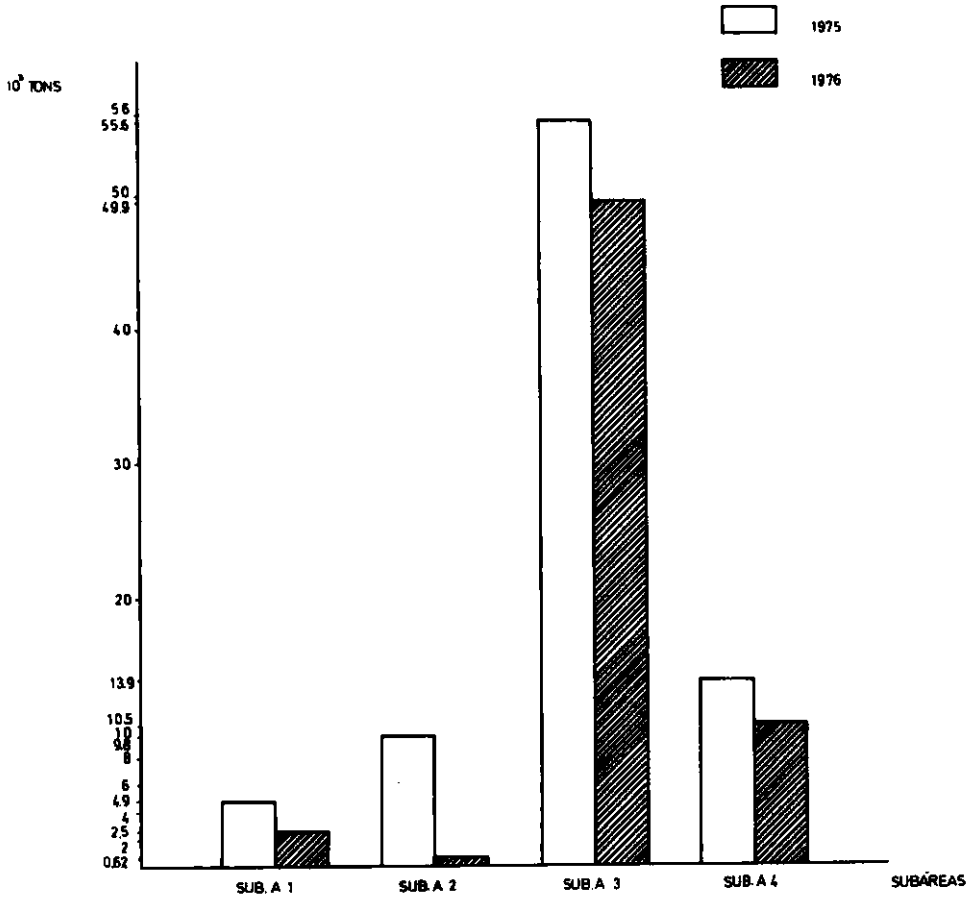

FIG 2 - COD CATCHES BY SUBAREA 1976 AND 1975

10^3 TONS

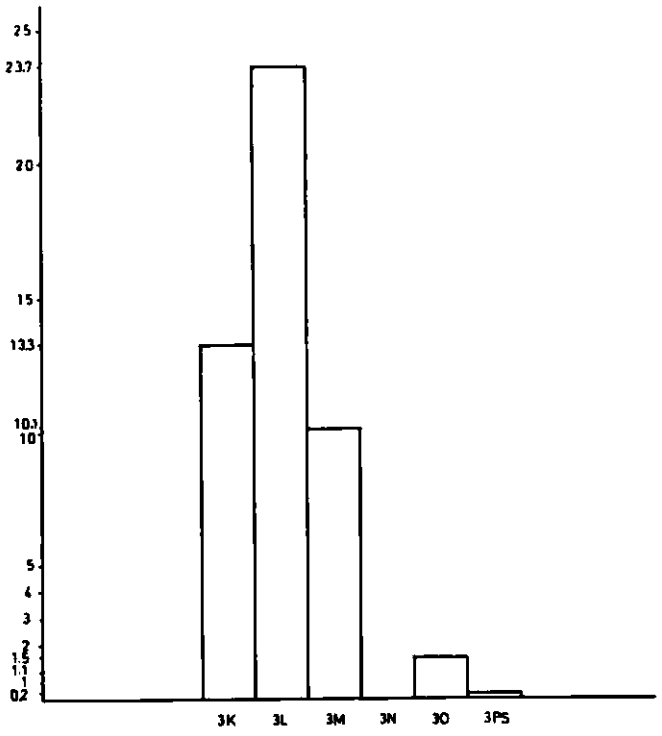

FIG 3 - SUBAREA 3 - COD CATCHES BY DIVISION - 1976

10^3 TONS

II - SPECIAL RESEARCH STUDIES

It was initially our purpose to carry out some observations on board trawlers as well as on board gill nets ships.
It was not possible to make more observations than the ones carried out on board a stern trawler, because our observers had some difficulties in changing to another boat.
The division studied during this period were only 3L (along September) and 3M, (August, September and October.)

1. Division 3L

Samples for biological studies were collected from the trawl catches in Division 3L, in September.

1.1. Length and Age Composition

Only one sample was aged covering only 90 fishes. The total number of specimens measured in this division and period was 379 fishes. Fishing depths were 300 meters.
The mean length of the samples studied was 483 mm and the mean age 4.9 years old.
The lengths observed ranged from 27 cm. to 99 cm., 3 cm. classes (Fig. 1). The ages ranged 3 years old to 9 years old.
Growth is shown in table 1, where figures in brackets represent number of fishes.

1.2. Stages of maturity

Concerning the stages of maturity observed on cod sampled (males and females), we can observe in Figure 2, that the resting or recovering stage was the best represented on males (70%) followed only by the developing one (30%). In females we observed a different percentage concerning these two groups of stages of maturity. The higher value (in terms of percentages) was 56% in developing stage and the resting or recovering one, only gave 44%, Fig.2.

1.3. Age at first maturity

The study of age at first maturity shows, as we expected, a very high percentage of immature fishes. The cases of mature fishes where it was possible to detect rings of maturity are represented in table 2, as well as the large amount of immature fishes.

TABLE 1 - MEAN LENGTH BY AGE-GROUPS

Year-class	Age-group	Length (mm)	Nº of fishes
1973	III	400	(1)
1972	IV	423	(21)
1971	V	485	(37)
1970	VI	555	(18)
1969	VII	660	(6)
1968	VIII	776	(3)
1967	IX	833	(3)
1966	X	-	-
1965	XI	-	-
1964	XII	-	-
1963	XIII	-	-
1962	XIV	1000 (a)	(1)

(a) - This value is based on the observation of one fish only.

TABLE 2. RINGS OF MATURITY IN MALES AND FEMALES, BY AGE-GROUP

	MALES				FEMALES			
Age Group / 1st. spawn	V	VI	θ	Total	VI	IX	θ	Total
III			1	1				
IV			13	13			8	8
V			15	15			22	22
VI	1		7	8			10	10
VII			1	1	1		4	5
VIII		1		1	1		1	2
IX			1	1	1		1	2
X								
XI								
XII								
XIII						1		1
XIV								
Nº. of observ.	1	1	38	40	3	1	46	50

2. Division 3M

In this division were observed some samples during the 3rd and 4th quarter of the year as follows.

TABLE 3 - SAMPLES IN DIVISION 3M

Date	Sample	Depth	Nº of fish measured	Aged	Weighted
29-31 August	A	150-250	310	121	310
1-25 Sept.	B	200-350	2.148	176	118
3-4 Octob.	C	240-280	220	70	-

2.1. Length Composition

Lengths ranged from 18 cm. to 93 cm. (3 cm. classes) in the 3rd quarter and from 24 cm. to 54 cm. (3 cm. classes) in October. (Figure 3)

2.2. Age Composition

Ages ranged in the 3rd quarter from 2 to 9 years and in the 4th one from 3 to 5 years; mean ages were in August and September 4.2 and in October 4.4 years.
In August V and III age-groups were dominant; in September IV, V and III, and in October IV and V were the more abundant age-groups (Fig. 3).

2.3. Weigths

The observations about weigths only concern the August samples and two samples in September. In the first case the mean weigths were 619 grs. (relatively to a length frequency from 18 cm. to 78 cm. (3 cm. classes).

In September, weigths were observed only in a small number of samples. The mean weigth was 584 grs. relatively to a distribution from 21 cm. to 80 cm. (3 cm. classes).

2.4. Growth

Average length of cod caugth by trawl, sampled during the 3rd and 4th quarters of the year, are represented in Table 4. (Figures in brackets are number of fishes).

TABLE 4 - MEAN LENGTH (mm) BY AGE-GROUP

YEAR CLASS	AGE GROUP	3rd Quarter			4th Quarter	
		Aug.	Sep.	Nº of Fish	Oct.	Nº of Fish
1974	II	237	239	(24)	-	
1973	III	327	347	(73)	329	(7)
1972	IV	360	428	(86)	418	(29)
1971	V	419	501	(65)	467	(34)
1970	VI	504	571	(25)	-	
1969	VII	597	764	(13)	-	
1968	VIII	760	875	(8)	-	
1967	IX	760	820	(1)	-	

2.5. Stage of maturity

Fig. 4 shows the different values of the percentages (relatively to the three months where the observations occurred) of the stages of maturity observed. As we can see, all over the period of the sampling most part of the males and females were in resting or recovering stage; only a small percentage of the fishes observed were also in the developing stage.

2.6. Age at first maturity

The males and females were almost all in the immature stage. Nevertheless it was possible to observe some otoliths showing rings of maturity, as we can observe in Table 5.

TABLE 5 - RINGS OF MATURITY IN MALES AND FEMALES, BY AGE-GROUP

Age group \ 1st spw	MALES				FEMALES			
	VI	VII	0	Total	VI	VII	0	Total
II			9	9			15	15
III			27	27			53	53
IV			52	52			63	63
V			54	54			45	45
VI			12	12			13	13
VII			7	7			6	6
VIII	2	1	-	3	3	2	-	5
IX			1	1			-	-
	2	1	162	165	3	2	195	200

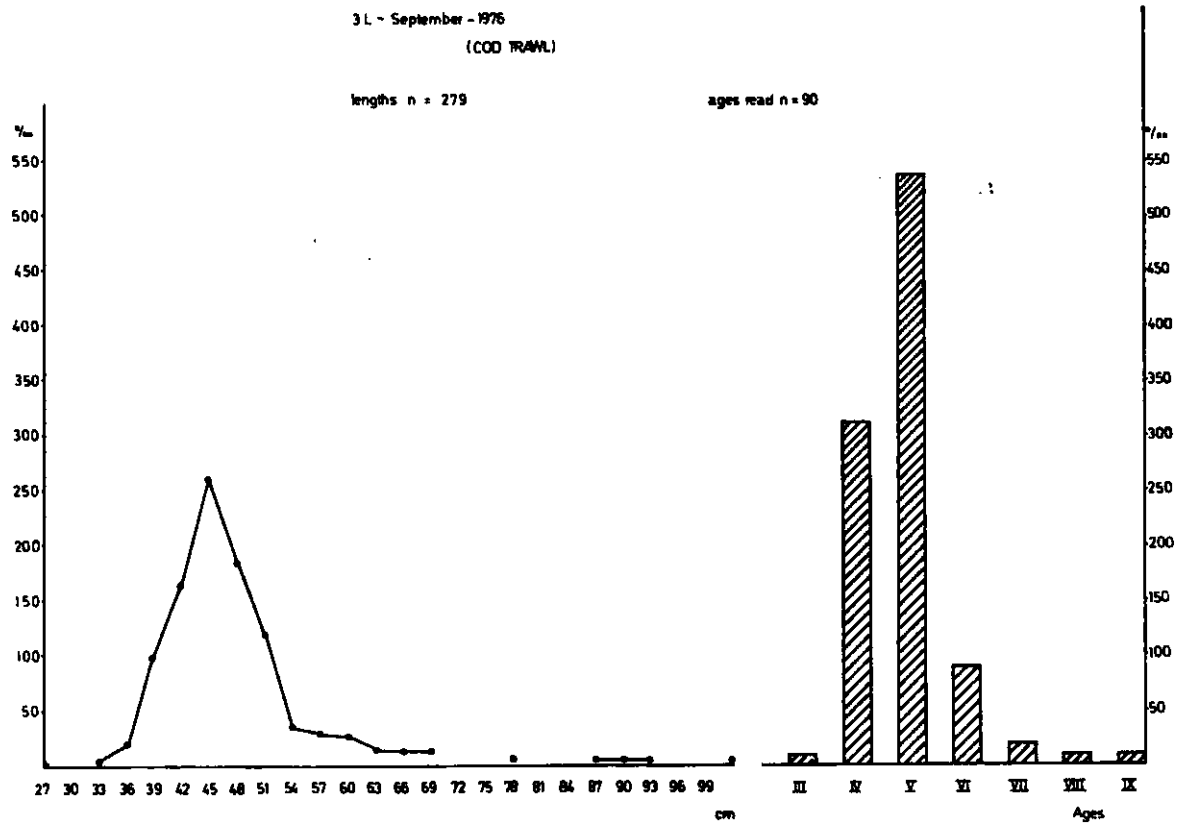

FIG. 1 Cod - length frequencies and age Compositions

DIVISION 3L - September 1976 (TRAW)

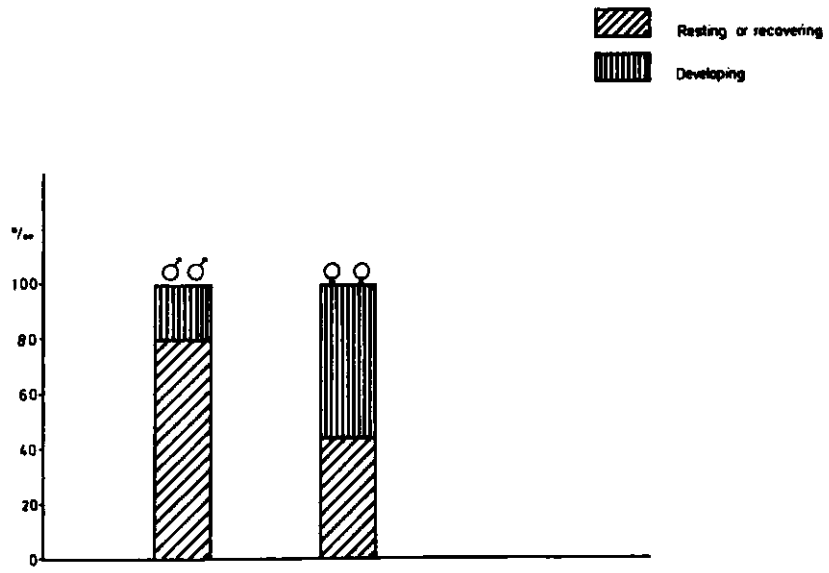

FIG 2 Stage of maturity (‰) in 1976

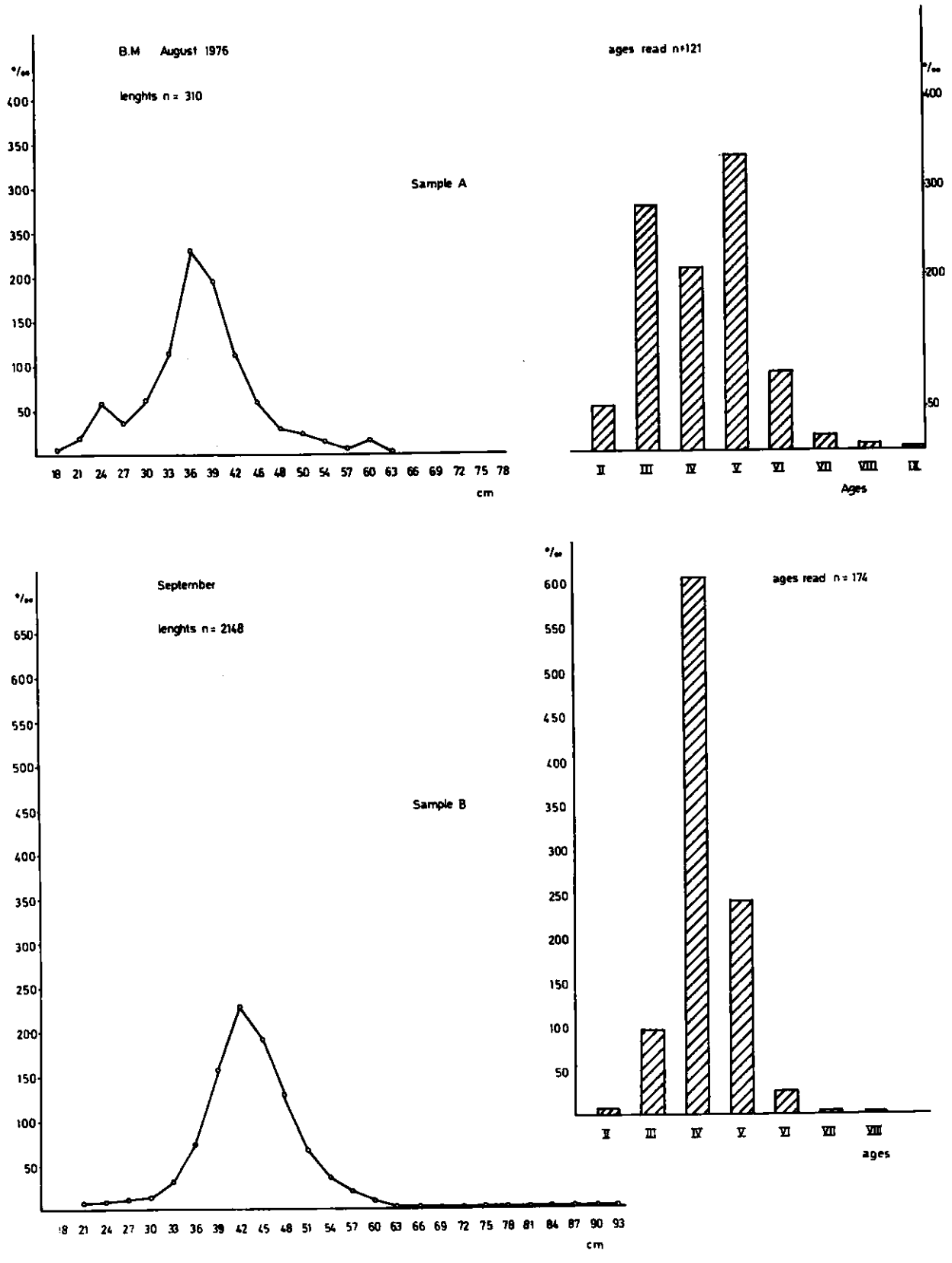

FIG 3 Cod - lengts frenquencies and age Compositions in Portuguese commercial trawe catches

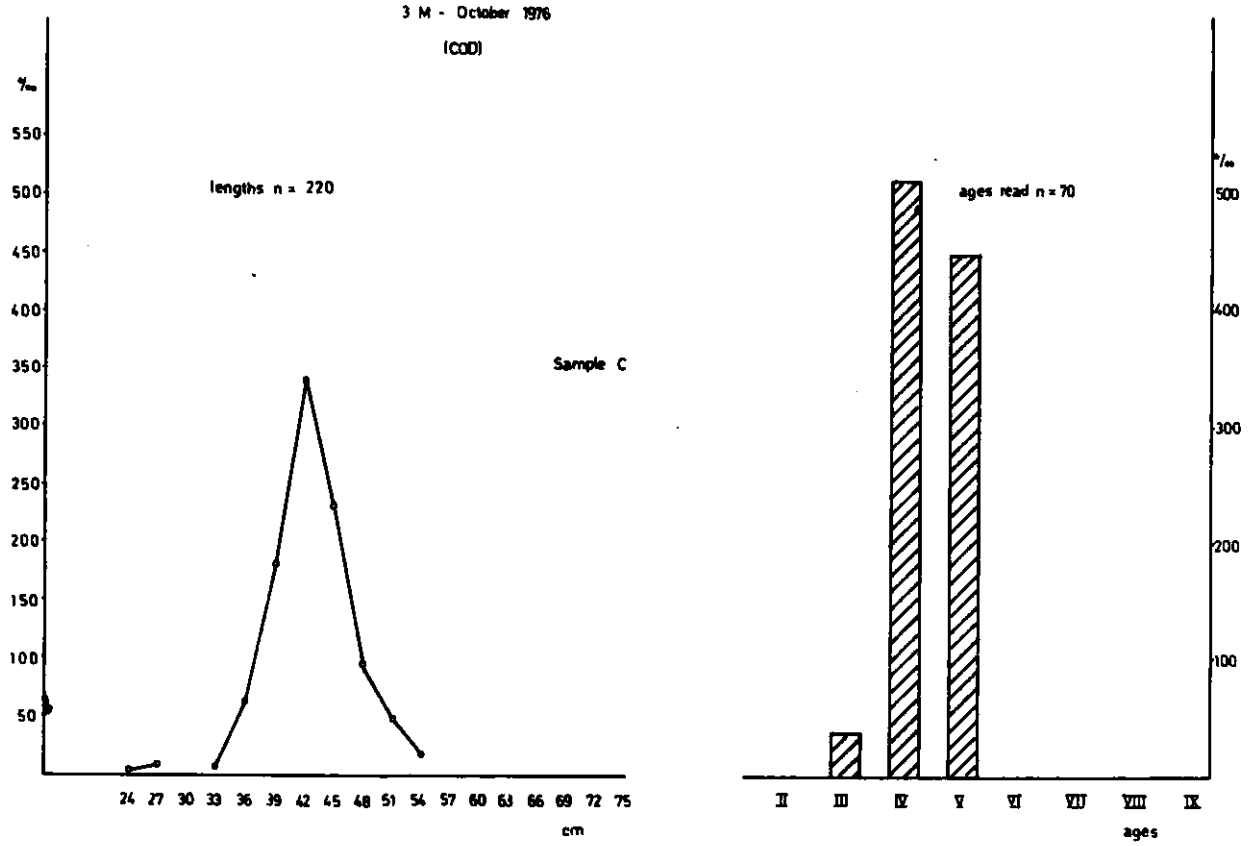
3 M - October 1976
(COD)
‰
550
500
450
400
350
300
250
200
150
100
50
lengths n = 220
Sample C
24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
cm
ages read n = 70
‰
500
400
300
200
100
II III IV V VI VII VIII IX
ages

FIG - 3 - (Contin)

DIVISON N 3 M – 1976 (TRAWL)

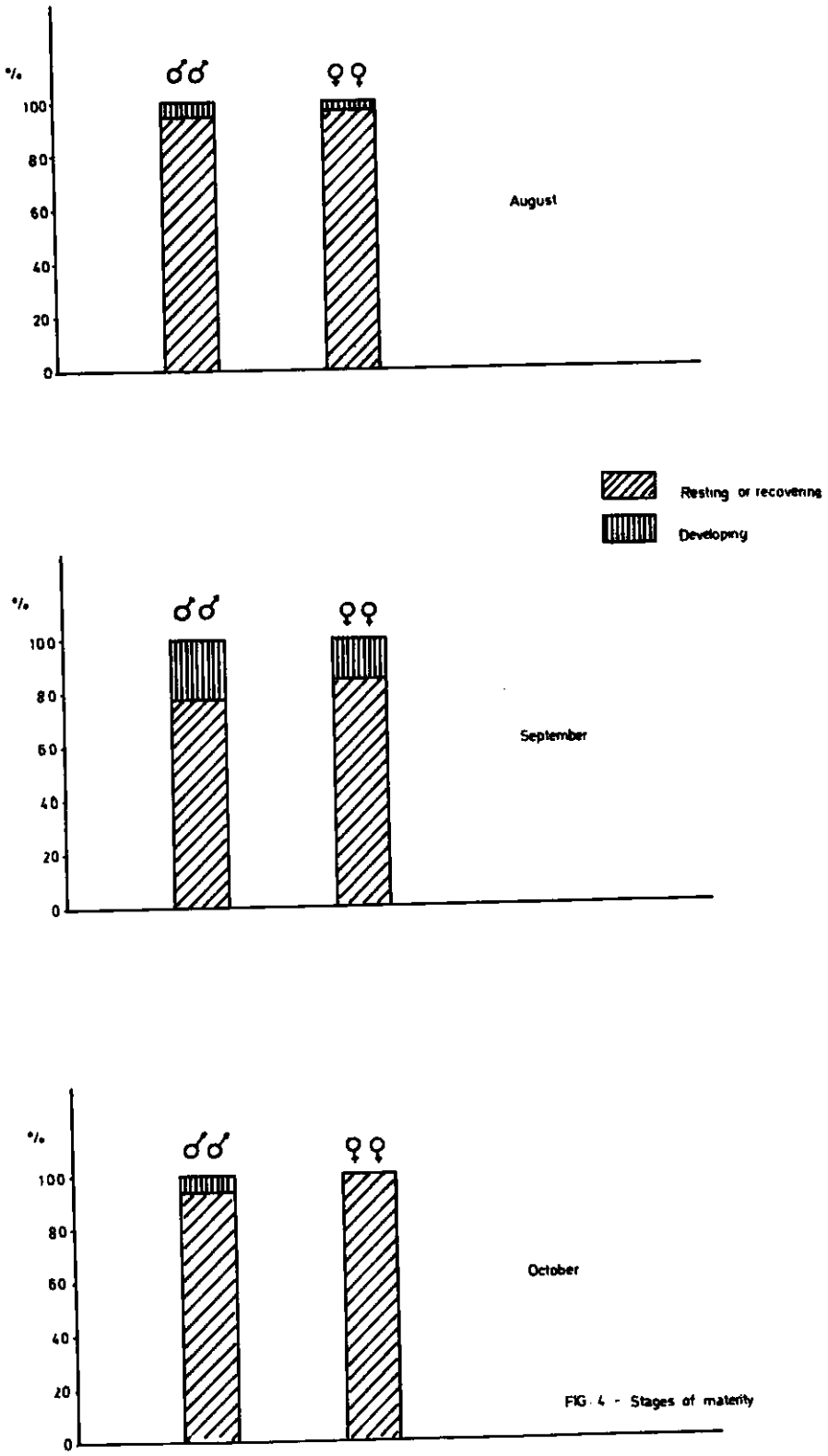

FIG. 4 - Stages of maturity