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Portuguese Research Report 1968

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The present report summarises the data obtained aboard Portuguese cod fishing vessels. Besides the total catches for trawl and line by subareas and quarters of the year we present also the catches by divisions and monthly.

During 1968 Portuguese the catches of cod in the I.C.N.A.F. area amounted 219,365 metric tons as indicated below in table 1:

Subareas	1	2	3	4	Total
Side trawl	1,322	41,417	73,122	4,958	120,819
Stern trawl	12,972	18,919	11,629	1,972	45,492
Total trawl	14,294	60,336	84,751	6,930	166,311
Line (Dory vessel)	18,462	-	34,592	-	53,054
Total	32,756	60,336	119,343	6,930	219,365

Table 1

The total catch of 219,365 tons is lower than the correspondent amount in 1967 that was 237,275 tons. The decrease was more significative in the dory vessel (53,054 tons in the present year and 74,155 tons in 1967) that fished only in the subareas 1 and 3. The trawlers fished 166,311 tons in the four subareas, more or less the same that has been caught in 1967, which was 163,120 tons.

Table 2 (Fig. 1) shows the total catches in tons of the portuguese fleet (dory vessels and trawlers) by quarters and subareas. By

quarters we can see, that the best catch by otter trawl was in the 2nd with 58,210 tons; the dory vessels, only fishing in the subareas 1 and 3, present the higher catch in the 3rd quarter with 37,193 tons; By subareas the higher catch by trawl was in the subarea 3 with 84,751 tons, more or less half of the total trawl fishery in the 4 subareas (166,311 tons). The lowest catch was in the subarea 4 (6,930 tons).

In the table 3 and in the Fig. 2 we present the total catches, in tons, of the trawl fleet (side and stern trawlers).

This report presents the status of fisheries in the four subareas where the portuguese fleet fished and includes observations made in commercial trawlers in subareas 2 and 3. We present data of lengths, ages, stage of maturity and probable age at first maturity. All the samples were taken at random before discarding the undersized fish; for the age/length keys we use the procedure indicated in our previous report.

Detailed informations on the samples will be included in the Sampling Yearbook for 1968.

Subarea 1

A. Status of the fisheries

The portuguese fleet fished in this subarea, in Divisions 1C, 1D and 1E, only in the 2nd and 3rd Quarters with side and stern trawlers as well as dory vessels. The catches from the 2nd Quarter were higher than the 3rd ones (27,597 tons and 5,159 tons respectively); this last number concern only the line fishery which was the only made in this subarea in July (4,913 tons) and August (246 tons). The total of the catches in the 2nd Quarter was for trawl, 14,294 tons (1,322 from side trawlers and 12,972 from stern trawlers). The amount of the line catches was about the same (13,303 tons) than the trawl fishery.

The best catches were made;

Line fishery:

In Division 1C: 8,135 tons during the 2nd Quarter (4,318 tons in May)

In Division 1D: 2,240 tons during the 3rd Quarter (2,237 tons in July)

Trawlers: (only during 2nd Quarter)

In Division 1E: 2,934 from stern trawl in May, followed by 2,219 tons in Division 1D, also by stern trawlers.

For all the Divisions the amount of the stern fishery was higher than the side one - 12,972 and 1,322 tons respectively.

By Divisions and for both kinds of fishing (trawl and line), the best catch was made by trawl in Division 1D: 6,430 tons.

Subarea 2

I - Food

A. Status of the Fisheries

In this Division during 1968 only the trawl fleet has fished in the subareas 2G, 2I and 2J during the four Quarters of the year. Only in the subarea 2J the catches were made by side and stern trawlers with a amount of 51,435 tons during all the year (41,166 tons by side and 10,319 tons by stern trawlers). The total, also for all the year, in Div. 2G was 251 tons and 8,600 for the Division 2I.

Quarterly the best catch was in the first Quarter with 24,764 tons mainly from side trawlers (16,750 tons), against only 7,954 from stern trawl. In this quarter the best catches were made in February and January by side and stern trawlers (13,534 tons and 8,280 tons respectively). In the second and third quarters also the side trawlers made higher catches than stern ones - 15,351 tons and 1,432 in the 2nd; 5,544 tons and 1,510 tons in the 3rd. In the 4th Quarter the stern trawlers fished 5,023 tons and the side trawlers only 3,772 tons. For all the Subareas, and during the year, the total catch of side trawlers was 41,417 tons

and 18,919 tons from stern trawlers. By subareas the main catch came from 2J with 51,485 tons, which represents more than the total from 2G (251 tons) and 2A (8,600 tons).

Samples for biological study were obtained from trawl catches in Division 2J between 8 February and 21 February, as follows:

Sample Nos	Date	Depths (m)	No Lengths	No Aged
1-2-3-4-5- 6-7-8-9-10	8-21 Febr.	260 - 400 m.	1,401	575

a) Lengths (fig. 3)

The lengths ranged from 31 to 85 cm classes. Mean length: 51.5 cm.

b) Ages (fig. 3)

The most import age-group was VI, followed by the V and VII (1962, 1960 and 1961 respectively). The mean-age for this month was 6.3 years.

Growth is shown in the following table of average lengths (figures in brackets are numbers of fishes for the whole quarter).

Div. 2J		
Year class	Age-group	February
1954	IV	37.8 (10)
1953	V	43.9 (154)
1952	VI	50.1 (205)
1951	VII	56.7 (113)
1950	VIII	61.4 (31)
1949	IX	67.1 (19)
1948	X	73.1 (12)
1947	XI	64.9 (6)
1946	XII	69.0 (4)
1945	XIII	- -
1944	XIV	73.0 (1)

d) Stage at maturity (fig. 4)

The observations on the stages of maturity in the females shown that in this month more or less 60% are in the resting or recovering stage and that about 40% in the developing one; in the males we have detected these two stages in more or less 20% and 60% respectively and also about 20% in the spawning stage too.

e) Age at first maturity

Div. 2J

Age-Group	♂					Total	♀					total
	VI	VII	VIII	θ	?		VII	VIII	θ	?		
IV	-	-	-	1	-	1	-	-	9	-	9	
V	-	-	-	82	-	82	-	-	72	-	72	
VI	2	-	-	112	-	115	-	-	110	-	110	
VII	5	3	-	52	-	60	2	-	51	-	53	
VIII	1	4	-	9	3	17	4	-	8	2	14	
IX	1	4	-	3	-	8	3	3	1	3	10	
X	1	-	1	-	2	4	6	2	-	-	8	
XI	1	-	1	-	1	3	2	1	-	-	3	
XII	-	2	-	-	1	3	1	-	-	-	1	
XIII	-	-	-	-	-	-	-	-	-	-	-	
XIV	-	-	1	-	-	1	-	-	-	-	-	
No observed	12	13	3	259	7	294	18	6	251	5	280	

θ - Unknown including immature fish

? - Doubtful first maturity

Subarea 3

A. Status of the Fisheries

In this subarea the trawlers fished during all the Quarters of the year and in the 2nd, 3rd and 4th the line too; the trawlers visited the Divisions 3K, 3L, 3M, 3N, 3Pn and 3Ps and the dory vessels only the 3L, 3N and 3Ps. The total catches in this subarea amounted to 119,343 tons; the total trawl represents the mainly catch with 84,751 tons (73,122 tons from side trawlers and 11,629 tons from stern ones). The line fishery was lower (34,592 tons).

By Quarters the best catches were made in the 3rd the trawlers, with 30,767 tons (22,806 tons from side trawl and 7,961 tons from stern one) and the dory vessels, with 32,034 tons.

By Divisions the highest catch by trawlers was obtained in Division 3L with 60,621 tons (50,610 tons from side trawl and 10,011 tons from stern). The totals from 3K and 3M were also significant, 12,512 tons from the total catch by trawlers in the first one and 10,917 from the second one. The catches from 3N, 3Pn and 3Ps were very small.

Relatively to the line catches by Divisions the highest catch occurred in Div. 3L with 27,855 tons which represents almost the total fished by these ships in subarea 3 (34,592 tons).

The catches from the dory vessels were made mainly during the 3rd quarter (32,034 tons against 1,087 tons from the 2nd quarter and 1,471 tons from the 4th).

The highest catches by months were: for trawl, August, with 13,569 tons (9,905 tons from side trawl and 3,664 from stern). The lowest catch occurred in January with only 383 tons (379 from side trawl and 4 tons from stern trawlers); for line fishery with catches only in the 2nd, 3rd and 4th Quarters the best catch occurred in August with 12,921 tons and the lower in May with 397 tons.

Observing the tables 2 and 3 as well as figures 1 and 2 we can see all the results of the catches by line and trawl during 1968 by months and Divisions and also the final total catch of each fishery.

Samples for biological study were obtained in Divisions 3L and 3B from trawl catches between 26 February and 31 March in Div. 3L and from 6 March to 10 March in Div. 3B as follows.

Sample Group	Sample Nos.	Date	Depth (m)	No of Lengths	No of Ages
<u>For Div. 3L</u>					
A	1-2-3	26-28 Feb.	180	400	200
B	4-9-11 12-13-14	1-31 Marc.	175-260	650	400
				1050	600
<u>For Div. 3B</u>					
C	5-6-7-8	6-10 Marc.	400-410	750	300

a) Lengths (fig. 5)

Lengths ranged from 46 to 112 cm classes. The mean lengths were: A - 54.7 cm; B - 50.1 cm; C - 64.8 cm.

b) Ages (fig. 5)

In Div. 3L we observed in February ages from 3 to 16 years with a marked predominance of the V, VI and VII age groups (1963, 1962 and 1961 year-classes) and in March the IV, V and VI age groups (1964, 1963 and 1962 year-classes) in March. In Div. 3B we observed ages from 5 to 14 years; the most abundant age groups were V, VI and VII (1963, 1962 and 1961 year-classes). The mean ages were as follows: A - 6.2; B - 5.7; C - 6.7 years.

c) Growth

Growth is shown in the following table of average lengths (figures in brackets are numbers of fishes for the whole quarter).

Year class	Age group	Div. 3L		1 st Quarter	
		Feb.	March	Feb.	March
1965	III	31.0	234	(3)	
1964	IV	42.2	39.9	(68)	
1963	V	46.6	44.7	(231)	
1962	VI	54.5	53.0	(153)	
1961	VII	62.3	62.7	(62)	
1960	VIII	71.0	71.3	(18)	
1959	IX	73.0	73.5	(15)	
1958	X	78.0	78.6	(15)	
1957	XI	80.5	80.2	(7)	
1956	XII	84.2	87.2	(8)	
1955	XIII	89.9	88.2	(11)	
1954	XIV	96.0	96.8	(13)	
1953	XV	82.0	82.0	(1)	
1952	XVI	109.8	104.0	(3)	
1951	XVII	112.0	-	(1)	
1950	XVIII	-	-	-	
1949	XIX	-	-	-	
1948	XX	-	-	-	
1947	XXI	-	109.0	(1)	

d) Stage of maturity (fig. 6)

The observation of stages of maturity during 1968 in the 2nd quarter gave us the following percentages of different stages in males and females.

In the males we have observed that for both February and April; 50% of the fishes were in the stage of resting or recovering, about 40% in the developing and 10% in the spawning stage. In March the observations from Division 3L were somewhat unexpected, mainly because of the percentage concerning the spawning stage, which appears in more than 80% of the observed fishes; the Developing stage appears also as well as the resting one, but with a very low percentage.

In the females, in Division 3L, we can see that in February and March the highest percentages concern the Resting or recovering stage; this same stage appears in February with about 80% of the observations and in March with about 60%; the Developing stage was also detected in about 20% in February and more or less 30% in March.

The spawning stage appears in very low percentages in both months.

In Division 3B the females observed present almost only two stages: the Developing and spawning. A very low percentage of fishes are in the resting or recovering stage.

e) Age at first maturity

Age- - group	Div. 3L													
	1 st spawn	♂ ♂						♀ ♀						
	VI	VII	VIII	IX	0	?	Total	VI	VII	VIII	0	?	Total	
III	-	-	-	-	1	-	1	-	-	-	2	-	2	
IV	-	-	-	-	34	-	34	-	-	-	34	-	34	
V	-	-	-	-	97	-	97	-	-	-	134	-	134	
VI	4	-	-	-	66	1	71	1	-	-	81	-	82	
VII	1	5	-	-	22	1	29	2	5	-	26	-	33	
VIII	2	1	-	-	4	-	7	2	3	-	6	-	11	
IX	-	1	1	-	10	-	12	-	-	-	2	1	3	
X	-	3	1	-	6	-	10	-	-	-	2	3	5	
XI	-	1	-	1	2	-	4	-	1	-	2	-	3	
XII	-	1	-	-	5	-	6	-	-	1	1	-	2	
XIII	-	3	2	-	3	-	8	1	-	1	1	-	3	
XIV	-	-	-	-	-	1	1	-	1	-	1	-	2	
XV	-	-	-	-	-	-	-	-	-	1	+	-	1	
XVI	-	-	-	-	1	-	1	-	1	1	-	-	2	
XVII	-	-	-	-	-	-	-	-	-	-	-	1	1	
XVIII	-	-	-	-	-	-	-	-	-	-	-	-	-	
XIX	-	-	-	-	-	-	-	-	-	-	-	-	-	
XX	-	-	-	-	-	-	-	-	-	-	-	-	-	
XXI	-	-	-	-	-	-	-	-	-	1	-	-	1	
No ob- served	7	15	4	1	251	3	281	6	11	5	292	5	319	

Div. 3H

Age group	1 st spawn					Total	♀ ♀					Total
	VI	VII	VIII	θ	?		VI	VII	VIII	θ	?	
V	-	-	-	38	-	38	-	-	-	12	-	12
VI	3	-	-	74	-	77	1	-	-	60	-	61
VII	1	1	-	14	-	16	1	3	-	18	-	22
VIII	2	5	-	10	-	17	2	1	-	6	-	9
IX	-	3	-	3	-	6	1	5	1	2	-	9
X	-	5	-	1	1	7	-	11	2	1	1	15
XI	-	-	1	1	-	2	-	3	1	-	-	4
XII	-	-	1	-	-	1	-	-	-	-	1	1
XIII	-	2	-	-	-	2	-	-	-	-	-	-
XIV	-	-	-	-	-	-	-	1	-	-	-	1
Not observed	6	16	2	141	1	166	5	24	4	99	2	134

θ - Unknown including immature fish

? - Doubtful first maturity

Subarea 4

In this subarea only the trawlers have fished (during the 1st, 2nd and 3rd quarters of the year). The total caught was 6,930 tons (4,958 tons from side trawl and 1,972 tons from stern) from the Divisions 4R and 4Vn but only the catches from the Division 4R were important (6,905 tons), while from the Division 4Vn only 25 tons were caught in April. The best catch in Division 4R was made in March with 5,759 tons (4,303 by side trawl and 1,456 by stern ones).

By Quarters the highest catch occurred in the 1st quarter with 5,798 tons (4,303 tons from side trawlers and 1,456 from stern trawlers).

We can see in the tables 2 and 3 (fig. 1 and 2) the totals caught by months of the year and by Division as well as the results of the total catches from the whole subarea.

TABLE 2

Total catches in tons of the portuguese fleet (dory vessels and trawlers), by quarters and subareas

		Subarea 1	Subarea 2	Subarea 3	Subarea 4	TOTAL	
1st Quarter	Line	-	-	-	-	-	
	Trawl	Side	-	16,750	14,476	4,342	35,568
		Stern	-	7,954	843	1,456	10,253
		Total trawl	-	24,704	15,319	5,798	45,821
	TOTAL (Line + trawl)	-	24,704	15,319	5,798	45,821	
2nd Quarter	Line	13,303	-	1,087	-	14,390	
	Trawl	Side	1,322	15,351	24,791	526	41,990
		Stern	12,972	1,432	1,429	387	16,220
		Total trawl	14,294	16,783	26,220	913	58,210
	TOTAL (Line + trawl)	27,597	16,783	27,307	913	72,600	
3rd Quarter	Line	5,159	-	32,034	-	37,193	
	Trawl	Side	-	5,544	22,806	90	28,440
		Stern	-	1,510	7,961	129	9,600
		Total trawl	-	7,054	30,767	219	38,040
	TOTAL (Line + trawl)	5,159	7,054	62,801	219	75,233	
4th Quarter	Line	-	-	1,471	-	1,471	
	Trawl	Side	-	3,772	11,049	-	14,821
		Stern	-	8,023	1,396	-	9,419
		Total trawl	-	11,795	12,445	-	24,240
	TOTAL (Line + trawl)	-	11,795	13,916	-	25,711	
TOTAL LINE		18,462	-	34,592	-	53,054	
TOTAL SIDE		1,322	41,417	73,122	4,958	120,819	
TOTAL STERN		12,972	18,919	11,629	1,972	45,492	
TOTAL TRAWL		14,294	60,336	84,751	6,930	166,311	
TOTAL (LINE + TRAWL)		32,756	60,336	119,343	6,930	219,365	

Mo.	Day	10	11	12	Total	20	21	22	Total	30	31	32	33	34	35	36	37	38	Total	40	41	42	Total	50	51	52	Total
Jan.	Side				4373	251			4644	251	24	53							372	5			377	5			5028
	Stem				3927				6481		4								4				4				6485
	Total				8300	251			11125	251	28	53							353	5			357	5			11513
Feb.	Side				12732				12732	751	7294								3153	34			3187	34			15726
	Stem				1496				1496	51	51								55				55				1454
	Total				13534				13534	756	2450								3205	34			3260	34			16774
Mar.	Side				10				10	524	2510				15				12947	3303			13277	3303			15560
	Stem				35				35	45	321				574				783	1456			1229	1456			2274
	Total				45				45	569	3231				15				13030	2759			13506	2759			17834
Apr.	Side				1533				1533	402	1552				73				13167	402			13569	402			14663
	Stem				709				709	240	240				73				242	357			600	357			4945
	Total				2242				2242	642	1792				146				13409	759			14069	759			19610
May	Side				10518				10518	1212	2432								3551				3551				14559
	Stem				2934				2934	1219	2434								3553				3553				6947
	Total				13452				13452	2431	4866								7104				7104				20516
Jun.	Side				3700				3700	5728	1777	438							7943	93			8036	93			13058
	Stem				158				158	498	552	33			?				1185	1185			1185				5074
	Total				3858				3858	6226	2430	471			2				9128	93			9221	93			18132
Jul.	Side				13				13	818	8172				31				9021	90			9111	90			9124
	Stem				13				13	116	1231				29				2036	123			2159	123			2165
	Total				26				26	934	10403				25				11057	213			11270	213			11289
Aug.	Side										9342	553							9380				9380				9905
	Stem										3335	325							3664				3664				3564
	Total										12677	878							13044				13044				13569
Sep.	Side				5531				5531	2710	1168								3880				3880				9411
	Stem				1510				1510	1916	345								2761				2761				3771
	Total				7041				7041	4626	1513								6641				6641				13182
Oct.	Side				3102				3102	1731	3727								5508				5508				8510
	Stem				2017				2017	452	452								452				452				2578
	Total				5119				5119	2183	3727								5960				5960				11188
Nov.	Side				182				182	1460	2473	126							4070				4070				4252
	Stem				1115				1115	1463	753								733				733				1848
	Total				2937				2937	2923	3206	128							4803				4803				6100
Dec.	Side				488				488	455	755	331							1671				1671				1959
	Stem				4782				4782	455	211								211				211				4953
	Total				5270				5270	910	966	231							1882				1882				6952
Total	Side				474				474	1153	50610	9989			15				6312				6312				120819
	Stem				1022				1022	553	547				31				11629				11629				15492
TOTAL	FRANK				1427				1427	50621	10917	46			46				84751				84751				166311

Table 3 (Cont.)

Total catches in tons by portuguese line fleet (dory vessels) 1968

Divisions	1B	1C	1D	Total	3L	3N	3PS	Total	Total
Months									
May	11	3,817	461	4,289	114	283	-	397	4,686
June		4,318	4,696	9,014	666	24	-	690	9,704
Total	11	8,135	5,157	13,303	780	307	-	1,087	14,390
July	1,725	951	2,237	4,913	6,467	-	33	6,500	11,413
August	232	11	3	246	11,341	1,580		12,921	13,167
September					8,491	4,122		12,613	12,613
Total	1,957	962	2,240	5,159	26,299	5,700	33	32,034	37,193
October					776	695		1,471	1,471
TOTAL	1,968	9,097	7,397	18,462	27,855	6,704	33	34,592	53,054

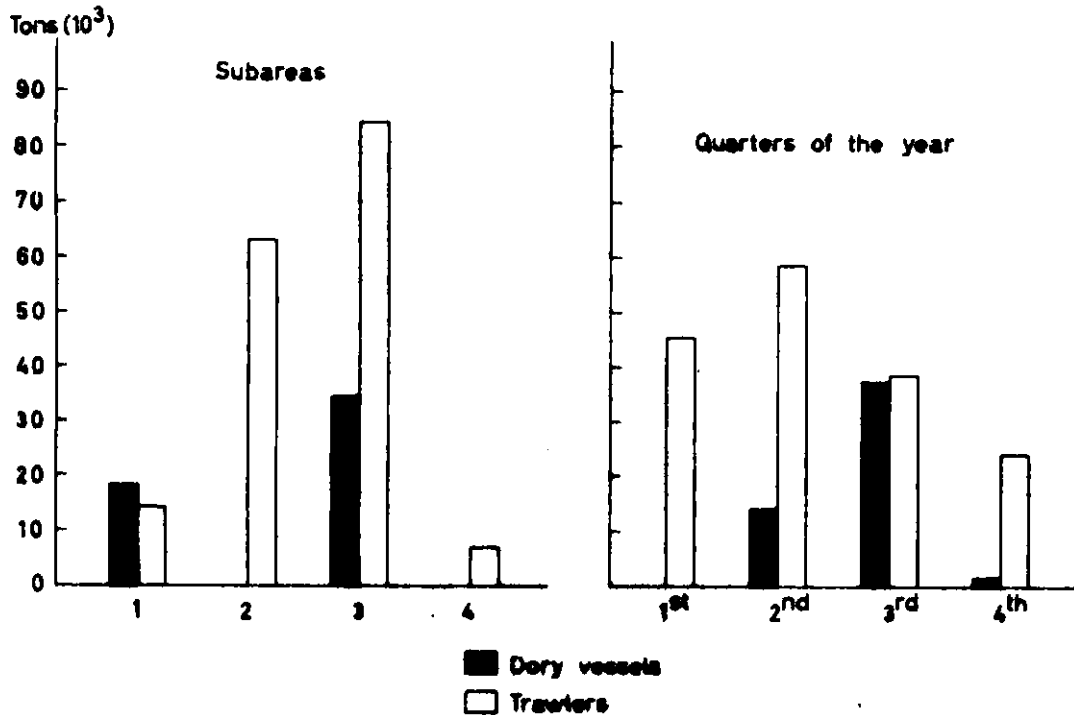


Fig 1 - Total catches in tons of the portuguese fleet (dory vessels and trawlers)

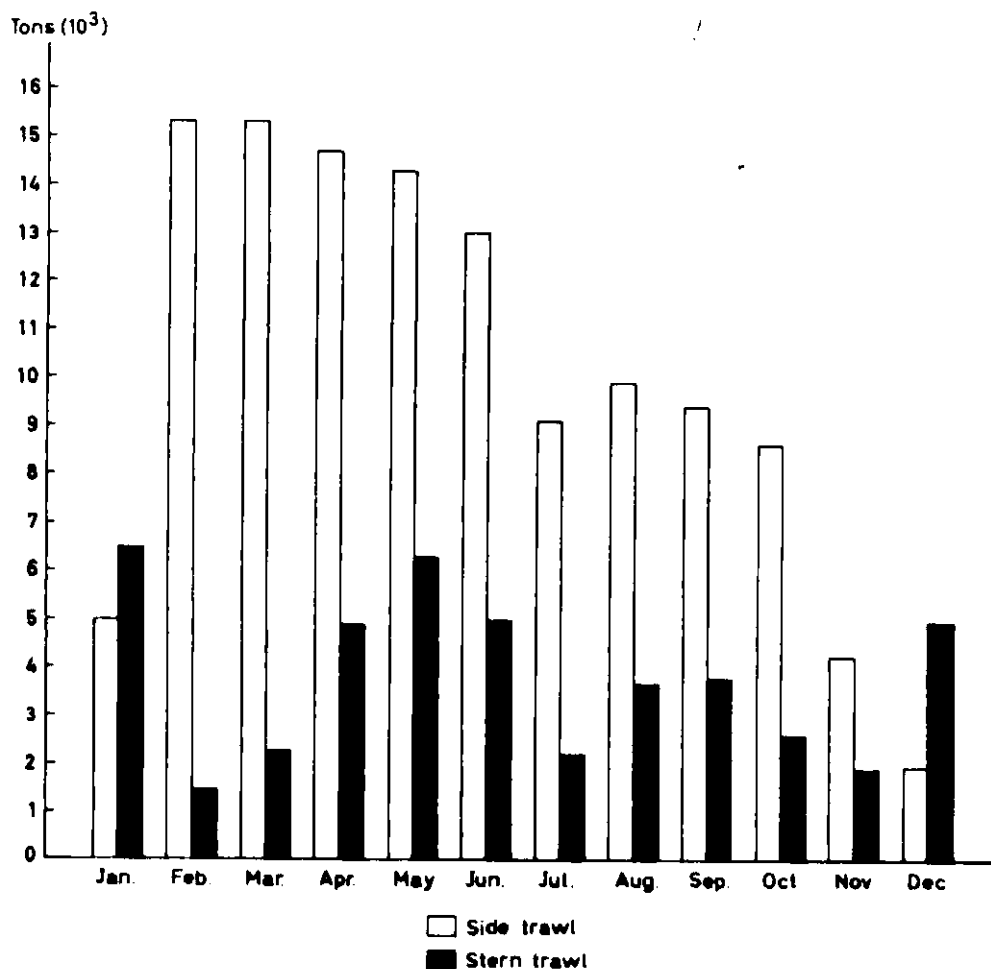


Fig. 2 - Total catches in tons of portuguese trawl fleet (side and stern trawlers) by months - 1968

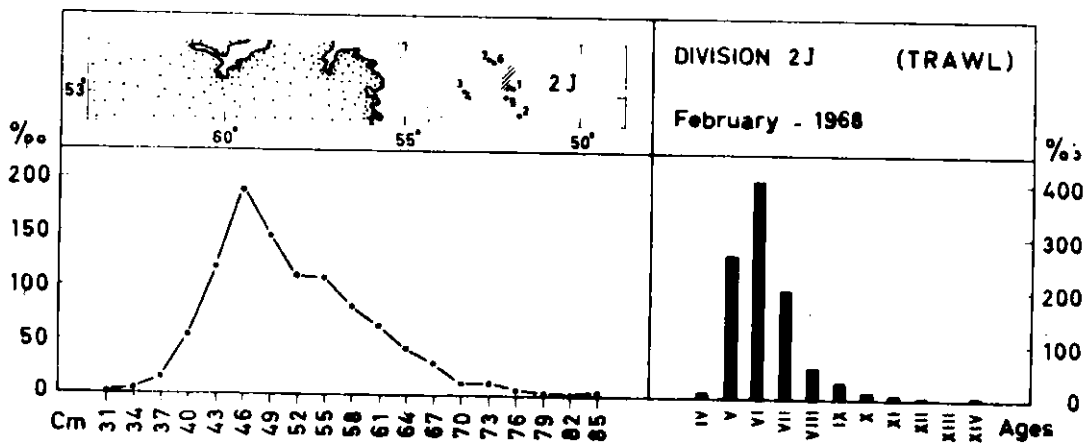


Fig. 3

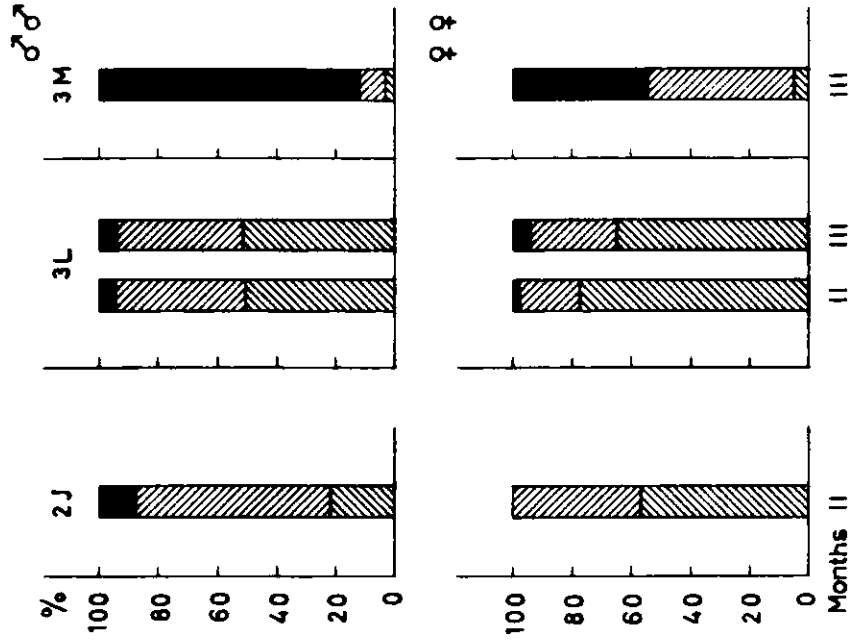


Fig. 4

Fig. 6

- Spawning
- ▨ Developing
- ▩ Resting or recovering

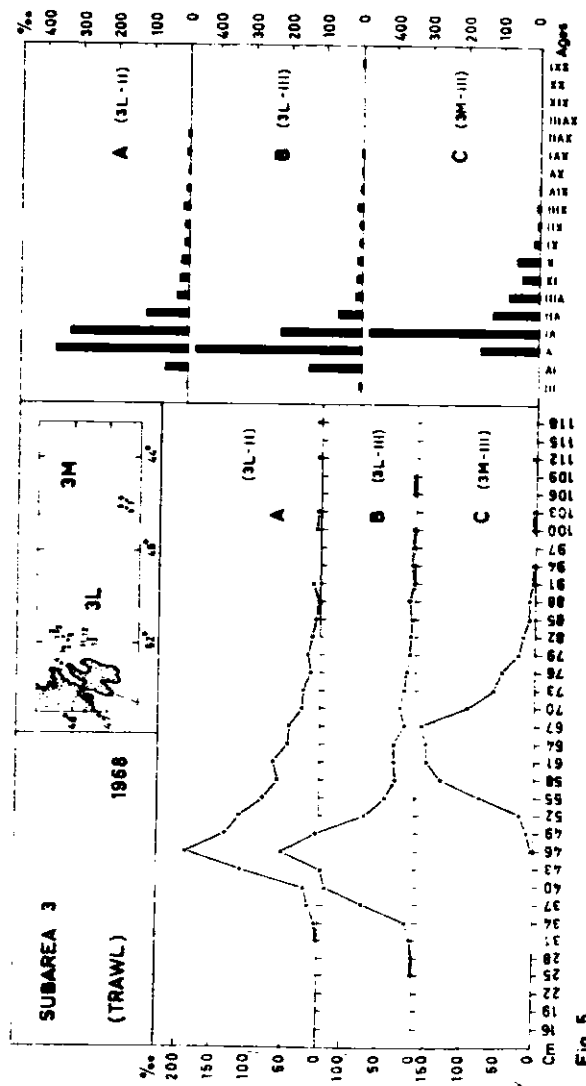


Fig. 5

RESTRICTED

INTERNATIONAL COMMISSION FOR



THE NORTHWEST ATLANTIC FISHERIES

Serial No. 2220
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ICNAF Res. Doc. 69/14
Part II

ANNUAL MEETING - JUNE 1969

PORTUGUESE RESEARCH REPORT - 1968

2nd Part - Line Fishery

by

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Lisboa

The present paper summarises the data obtained onboard portuguese dory vessels during 1968. As we have already refered in the first part of this report the line fleet fished cod only in the Subarea 1 and Subarea 3.

Subarea 1

Samples for biological study were obtained from division 10 between 18th May and 21st June, as follows:

Sample	Date	Depths /m/	Nos. lengths	Nos. ages
A	18-19 May	128-177	152	152
B	4-21 June	183-220	<u>724</u>	<u>474</u>
			876	626

a/ - Lengths /Fig.1/

The lengths ranged from 34 to 130 cm classes. Mean lengths were: A - 69.3 cm and B - 71.7 cm.

14 p^{ts}

b)- Ages (Fig. 1)

Both in May and June the most important age group has been the VII followed by the VIII and VI.

Mean-ages: A - 7.3 years and B - 6.5 years.

c)- Growth (Figures in brackets are numbers of fish)

Age Group	2nd Quarter		
	May-June (cm)		
III	38.7	38.4	(10)
IV	45.8	44.5	(18)
V	55.6	56.2	(45)
VI	62.5	63.5	(67)
VII	68.8	69.3	(187)
VIII	75.3	75.5	(159)
IX	78.5	80.3	(43)
X	81.1	84.1	(32)
XI	83.3	87.4	(41)
XII	83.6	87.1	(9)
XIII	87.4	92.1	(3)
XIV	82.7	90.6	(4)
XV	87.5	94.2	(7)
XVI	-	-	-
XVII	-	100.0	(1)

d)- Stage of maturity / Fig. 2 /

The observations made on the stages of maturity show that the most frequent were the resting or recovering on the males and the developing on the females. We have also observed other stages specially the post-spawning.

•/ - Age at first maturity

Division 1 C

Age group	♂♂							♀♀						
	VI	VII	VIII	IX	⊖	?	Total	VI	VII	VIII	⊖	?	Total	
III					7		7						3	3
IV					10		10						8	8
V					25		25						20	20
VI					28		28	1					38	39
VII	1	12			81	2	96	4	10				77	91
VIII	4	33	2		33		72	2	19	1			64	87
IX	1	12	1		12	2	28	1	9				5	15
X		9	2		5	2	18	1	6	3			3	14
XI		6	3		5	1	15		9	14			3	26
XII		5	2		1		8			1				1
XIII			1			1	2		1					1
XIV			2		1		3			1			-	1
XV		2		1			3			2			1	4
XVI														
XVII						1	1							
No. observed	6	79	13	1	208	9	316	9	54	22	222	3	310	

Subarea 3

Sample Group	Date	Depths (m)	n ² lengths	n ² ages
A	7-31 July	18-55	948	399
B	3-29 Aug	18-37	900	350
C	6-28 Sept	18-37	<u>825</u>	<u>225</u>
			2,671	974

a)- Lengths (Fig.3)

Lengths ranged from 40 to 132 cm classes. Mean lengths were:
A - 70.4 cm; B - 65.9 cm; C - 65.9 cm.

b)- Ages (Fig. 3)

In the three months of the Quarter the most important age groups were VI and VII followed by V and VIII. The mean ages were: A - 7.5 years; B - 6.9 years ; C - 6.9 years

c)- Growth (figures in brackets are number of fish)

Age group	July	August	September
IV	49.0	48.0	48.4 (16)
V	53.1	52.0	52.2 (102)
VI	60.5	59.7	59.8 (247)
VII	68.7	68.5	68.1 (256)
VIII	75.1	74.2	74.3 (129)
IX	80.6	78.3	78.4 (73)
X	87.9	85.9	86.1 (67)
XI	91.2	86.5	88.2 (41)
XII	93.7	90.7	91.0 (20)
XIII	91.8	91.5	90.8 (11)
XIV	95.3	93.2	101.4 (7)
XV	115.0	115.0	.. (1)
XVI	106.0	106.0	106.0 (1)
XVII	112.0	112.0	- (1)
XVIII	124.0	115.0	.. (2)

d) - Stage of maturity Fig. 4

The observations made on the stages of maturity have shown that in the females the most abundant was resting or recovering in the females; in the males the developing was also important. The post-spawning stage is very low in the males and a little higher in the females.

e) - Age at first maturity

Div. 34

Age Group	♂						♀						
	VI	VII	VIII	♀	?	Total	VI	VII	VIII	IX	♀	?	Total
IV				7		7					9		9
V				54		54					48		48
VI	2			116		118	1				128		129
VII	8	3		105	1	117	3	6			125	5	139
VIII	3	6		57		66	3	15	1		43	1	63
IX		11	1	20	2	34	1	9	2		25	2	39
X	1	6	6	10	4	27	1	9	11		16	3	40
XI			1	2	8	2		5	6	1	9	7	28
XII			3	3	5	3					4	2	6
XIII			1	1		2		1	4		1	1	7
XIV					3	1		1	1	1			3
XV											1		1
XVI										1			1
XVII					1	1							1
XVIII				1		1					1		1
No Observed	14	31	14	385	16	460	9	46	25	3	409	21	514

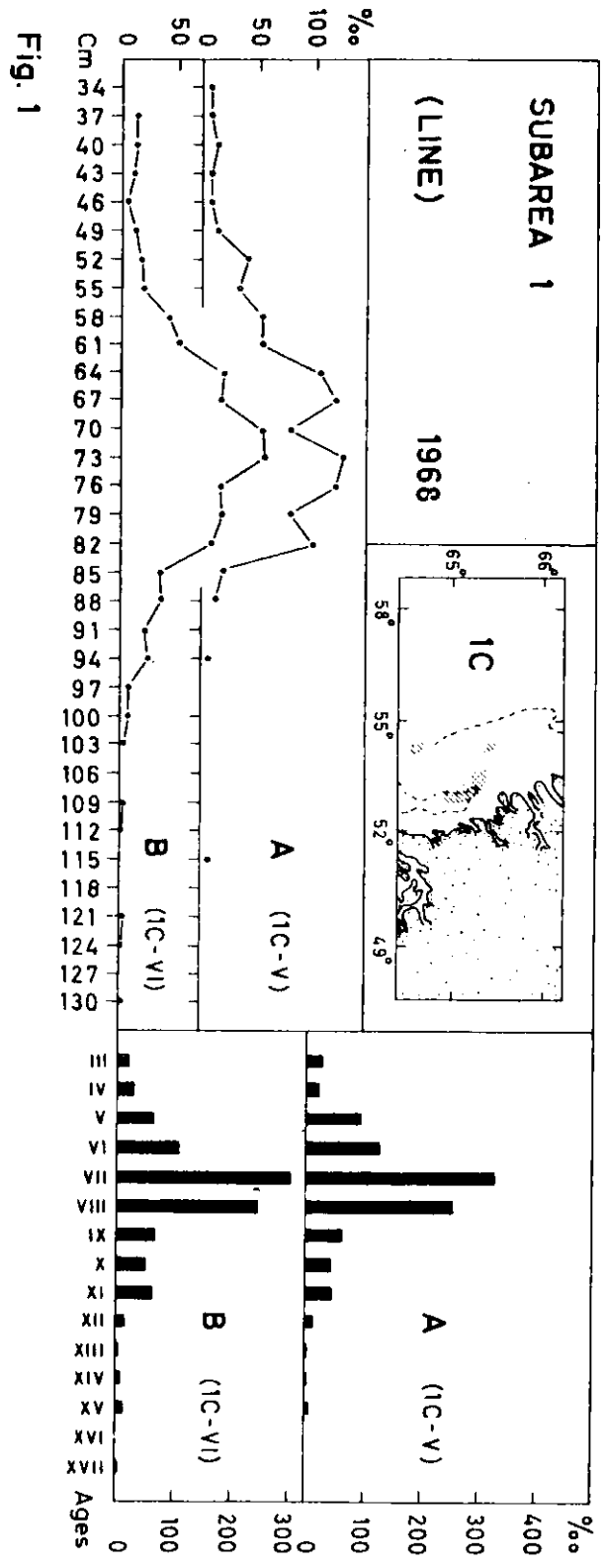


Fig. 1

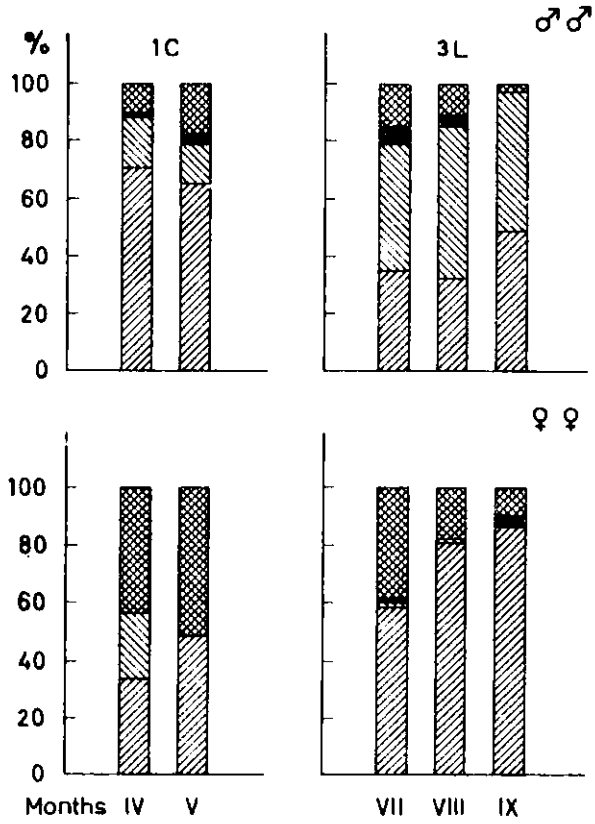


Fig. 2

Fig. 4

- Post-spawning
- Spawning
- Developing
- Resting or recovering

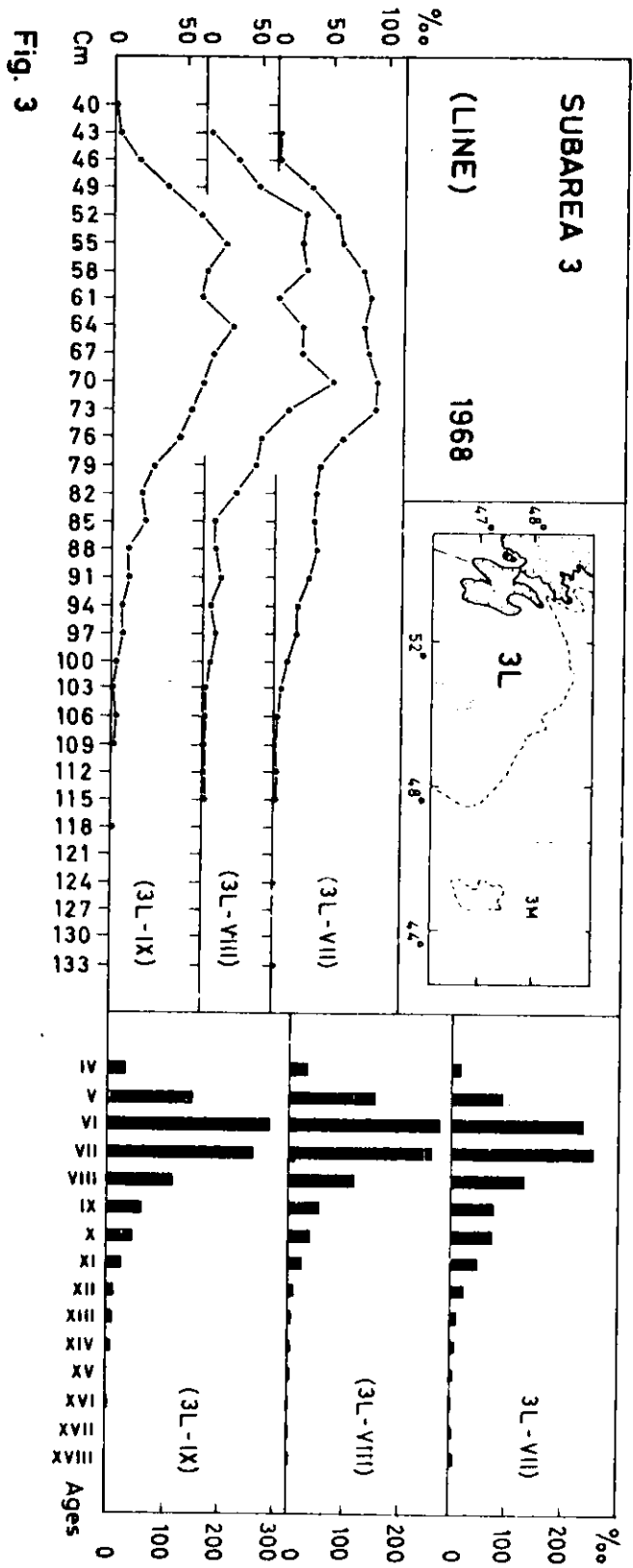


Fig. 3