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the Northwest Atlantic Fisheries

Serial No. 5218

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Corrigendum

ANNUAL MEETING - JUNE 1978

Portuguese Research Report, 1977

Page 1, lines 3 and 14: Please change "Boreogadus saida" to read "Gadus ogac".

Page 2, first table: " " " " " " " "

Page 7, Fig. 1 (2nd figure): Please change Ages "XVIII" to read "XXIII".

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Portuguese Research Report, 1977

by

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The present paper summarises the biological studies carried out from cod (Gadus morhua) samples collected in Subarea 3 during 1977.

Gadus morhua and Boreogadus saida samples were also collected from Subarea 1 but the results are not included here.

I SUBAREA 1

Special Research Studies

1. Environmental Studies

No research studies were carried out on these subjects.

2. Biological Studies on Cod

Biological studies on cod were carried out on board of a commercial gillnets ship in Divisions 1.B, 1.C and 1.D in order to obtain informations about length composition of the catches, maturity and growth.

Gadus morhua and Boreogadus saida samples were collected at the same time but the otoliths are not yet observed. Only a table of the material collected is included.

Samples were obtained during the 2nd and 3rd quarter as follows:

				Gadus morhua		Boreog. saida	
Div.	Months	Depth	Samples	fish measured	fish aged	fish measured	fish aged
1B	Julho	85-114	5	243	118	252	22
1C	Junho	70-110	4	204	173	240	149
	Julho	145-180	5	294	235	169	104
1D	Junho	44-82	2	73	72	127	50

II SUBAREA 3

Special Research Studies

1. Environmental Studies

No research study was carried out on these subjects.

2. Biological Studies on Cod

Biological studies on cod were carried out on board of a commercial gillnets ship in Divisions 3L, 30 and 3N in order to obtain informations about lengths composition, growth and maturity.

Samples were collected in the 3rd quarter as follows:

Div.	Months	Depth	Samples	fish measured	fish aged
3L	JULY	70-77	4	379	314
	AUG	70-73	11	1144	405
30	AUG	60	2	82	82
	SEP	60	1	103	—
3N	AUG	60	4	215	209
	SEP	60	6	884	41

2.1. Length and age composition

DIVISION 3L

A total of 1523 individuals were measured and 719 taken for age determination. However not all the otoliths were observed. A subsample of 10 pairs of otoliths for each 3 cm length-group (42, 45 ...) was taken in an alienating way (Random Numbers)

(Fishes and Yates, 1963 Statistical Tables, sixth edition) so only 202 were observed.

Lengths and age composition of the cod sampled in this Division are given in Tables 1 and 2, Fig. 1. Lengths ranged from 42 cm to 120 cm with a mean length of 65.8 cm.

Ages ranged from III to XXIII (Fig. 1) being the age group VI, IX and VII (respectively 1971, 1968 and 1970 year classes) the best represented in the sampling, by order of importance.

DIVISION 30

A total of 1950 individuals were measured and 82 taken for age determination. Lengths and age composition observed are given in Tables 1 and 2, Fig. 2. Lengths ranged from 54 cm to 144 cm, with a mean length of 84.3 cm.

Age ranged from IV to XX (Fig. 2) with two predominant age groups (VI and IX), the age group VI corresponding the 1971 year class, with highest percentage (25.6 %) followed by the age group IX (1968 year class) with 20.0 %.

DIVISION 3N

A total of 1099 individuals were measured and 250 pairs of otoliths were taken for age determination.

Length and age composition are presented in tables 1 and 2, Fig. 3. Lengths ranged from 51 cm to 139 cm with a mean value of 84.8 cm and age ranged from IV to XVIII, with predominance to the age group VI, IX and VII, by order of importance, respectively 1971, 1968 and 1970 year classes.

2.2. Growth

Average length and weight, by year classes of cod sampled in the three Divisions 3L, 30 and 3N are presented in table 3.

2.3. Stages of maturity

Fig. 4 represents, in percentage, the stages of maturity for males and females identified monthly in each of the Divisions 3L, 30 and 3N. It seems evident that the spawning phase was almost finished in the three Divisions.

In all of them the greatest number of gonads was in a developing stage, followed by the resting or recovering one.

2.4. Age of first maturity

Some of the otoliths observed showed spawning marks, mainly at the 6th and 7th annual marks but for the most part of them it wasn't possible to identify any marks concerning spawning season. Tables 4, 5 and 6 show the results obtained for each one of the three Divisions.

TABLE 1. Length composition(°/oo) of cod sampled in Divisions 3L, 30 and 3N in the 3rd quarter.

Length Group	Div. 3 L	Div. 3 0	Div. 3 N
cm	°/oo	°/oo	°/oo
42	1		
45	3		
48	9		
51	39		4
54	85	27	10
57	106	5	16
60	114	22	23
63	143	49	23
66	156	49	52
69	116	124	86
72	70	65	80
75	46	65	77
78	29	59	59
81	12	43	56
84	17	54	57
87	10	32	55
90	11	65	54
93	9	49	57
96	7	54	46
99	7	43	59
102	3	38	46
105	3	38	36
108	1	27	30
111	2	22	22
114	1	27	18
117	1	27	15
120	1	-	9
123		5	5
126		5	4
129		-	1
132		-	-
135		-	1
138		-	-
141		-	-
144		5	-
FISH MEASURED	1523	185	1099
MEAN LENGTH	65.8	84.3	84.8
MEAN WEIGHT	3093	5917	6435

TABLE 2. Age composition of cod sampled in Divisions 3L, 30 and 3N in the 3rd quarter.

Age Group	Year Class	Div. 3 L	Div. 3 0	Div. 3 N
		°/oo	°/oo	°/oo
	1977			
I	1976			
II	1975			
III	1974	15		
IV	1973	114	49	32
V	1972	89	73	84
VI	1971	193	317	256
VII	1970	119	110	168
VIII	1969	94	85	108
IX	1968	129	195	200
X	1967	50	24	56
XI	1966	54	73	36
XII	1965	35	36	28
XIII	1964	50	-	16
XIV	1963	30	12	4
XV	1962	10	-	4
XVI	1961	10	-	-
XVII	1960	5	-	-
XVIII	1959	-	-	8
XIX	1958	-	-	-
XX	1957	-	12	-
XXI	1956	-	-	-
XXII	1955	-	-	-
XXIII	1954	5	-	-
AGED FISH		202	82	250
MEAN AGE		7.9	7.8	7.7

TABLE 3. Mean Length \bar{L}_t (mm) and mean Weight \bar{W} (gr) - by age group, in the Divisions 3L, 30 and 3N.

Age Group	Year Class	DIVISION 3L		DIVISION 30		DIVISION 3N	
		\bar{L}_t (mm)	\bar{W} (gr)	\bar{L}_t (mm)	\bar{W} (gr)	\bar{L}_t (mm)	\bar{W} (gr)
	1977						
I	1976						
II	1975						
III	1974	473	1100				
IV	1973	505	1187	573	1850	579	1750
V	1972	568	1906	627	2300	648	2676
VI	1971	651	2756	742	3550	730	3908
VII	1970	766	4338	782	4611	821	5560
VIII	1969	818	5037	869	6714	880	7146
IX	1968	854	5781	965	8769	962	9043
X	1967	961	8400	1025	10600	1006	10586
XI	1966	978	8464	1038	10167	1050	12844
XII	1965	958	9214	1037	10967	1094	12314
XIII	1964	1004	9530	-	-	1092	13000
XIV	1963	1030	9750	1170	12800*	-	-
XV	1962	1055	12033	-	-	1050*	-
XVI	1961	1150	15900	1180	15000*	-	-
XVII	1960	1100*	11000*	-	-	-	-
XVIII	1959	-	-	-	-	1090*	15200*
XIX	1958	-	-	-	-	-	-
XX	1957	-	-	1260	17000	-	-
XXI	1956	-	-	-	-	-	-
XXII	1955	-	-	-	-	-	-
XXIII	1954	1110*	13000*	-	-	-	-

* Value based on one fish only

TABLE 4. Spawning marks, by age group, for males and females in Division 3L

Age Group	Spawning marks $\uparrow\uparrow$ $\circ\circ$				Spawning marks $\circ\circ$ $\uparrow\uparrow$				T					
	V	VI	VII	VIII	IX	ϕ	T	V		VI	VII	VIII	IX	ϕ
III						1								2
IV						15								8
V						13								5
VI						20								19
VII			1	2		10				1				10
VIII			1			14				1				3
IX			2	1	1	7				1	1	1		10
X			3	2		2								3
XI			3			3				1				5
XII				2		1				2				4
XIII			1	2	1	1					2			3
XIV			1			2				1				3
XV			1	1										2
XVI						1								1
XVII				1										
XVIII														
XIX														
XX														
XXI														
XXII														
XXIII														
			7	13	5	2	92	119	2	3	6	2	70	83

ϕ Unknown including immature fish

TABLE 5. Spawning marks, age group, for males and females, in Division 30

Age Group	Spawning marks ♂♂							T	Spawning marks ♀♀							T
	V	VI	VII	VIII	IX	0	V		VI	VII	VIII	IX	0			
IV						3	3						1	1		
V						5	5						1	1		
VI						17	17						9	9		
VII						6	6						3	3		
VIII						5	5						2	2		
IX			1			8	9		1				6	7		
X						1	1						1	1		
XI						4	4						2	2		
XII			1				1						2	2		
XIII																
XIV			1				1									
XV																
XVI						1	1									
XVII																
XVIII																
XIX																
XX												1	1			
			3			50	53		1			28	29			

0 Unknown including imature fish

TABLE 6. Spawning marks, by age group, for males and females, in Division 3N

Age Group	Spawning marks ♂♂							T	Spawning marks ♀♀							T
	V	VI	VII	VIII	IX	0	V		VI	VII	VIII	IX	0			
IV						6	6						3	3		
V						14	14						6	6		
VI						33	33						31	31		
VII						27	27						15	15		
VIII	1	1				10	12		2				10	12		
IX		5	2	1		16	24		4	1	1		23	29		
X			2	2		5	9		1	2			2	5		
XI			1	3		1	5		1	1			3	5		
XII		1	1				2					3	2	5		
XIII				2			2			1	1			2		
XIV																
XV						1	1									
XVI																
XVII																
XVIII						1	1									
	1	7	6	8		114	136		5	6	3	4	95	113		

0 Unknown including imature fish

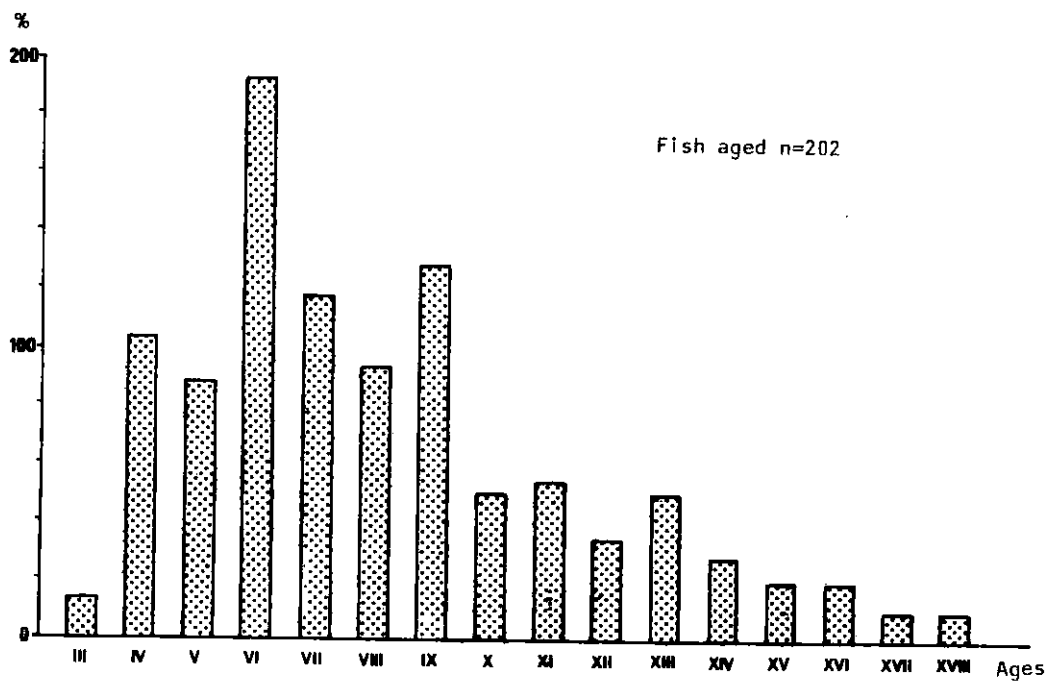
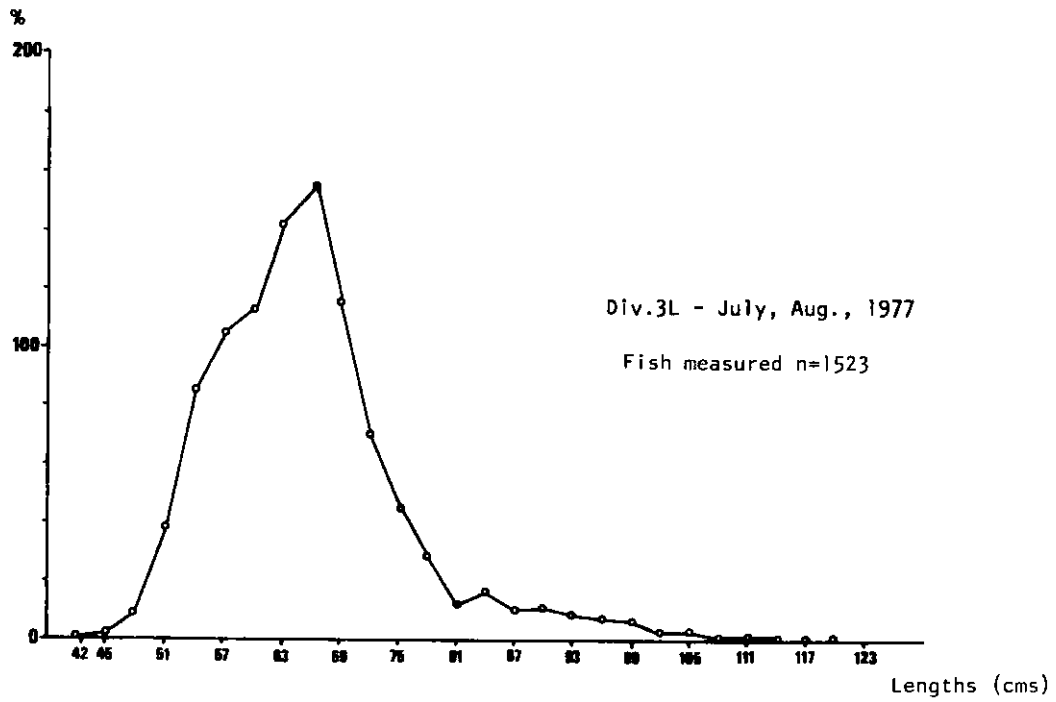


Fig.1 Cod length frequencies and age composition, Div.3L, 1977

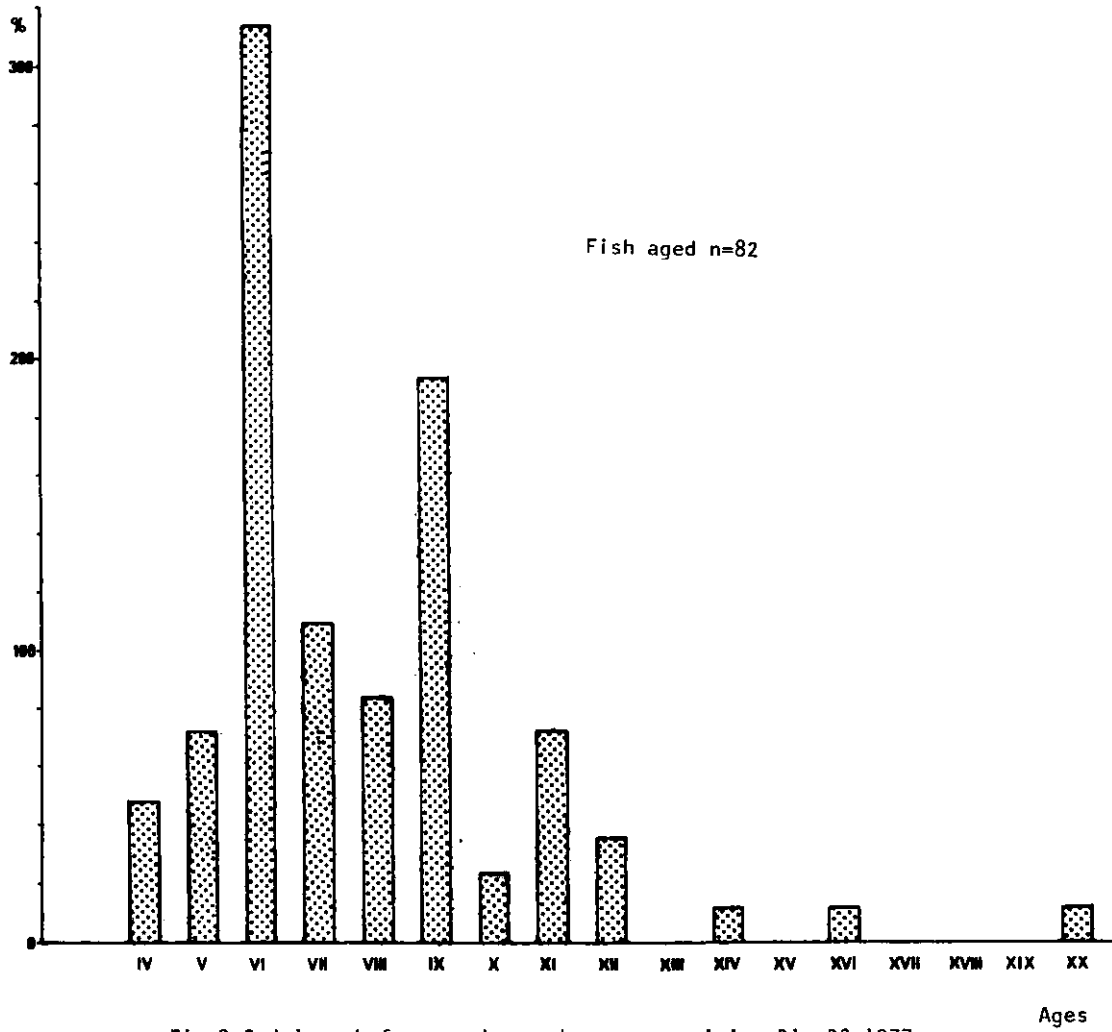
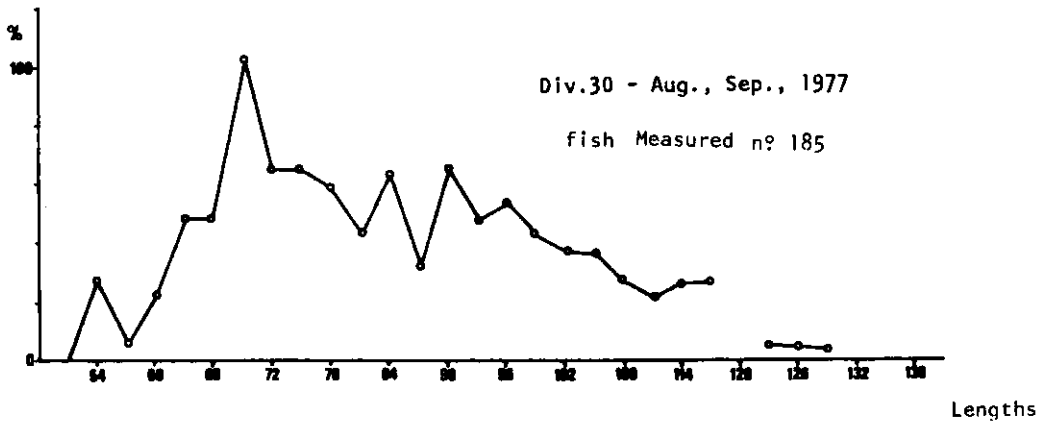


Fig.2 Cod length frequencies and age composition, Div.30 1977

Div.3N - Aug., Sep., 1977

Fish measured n=1099

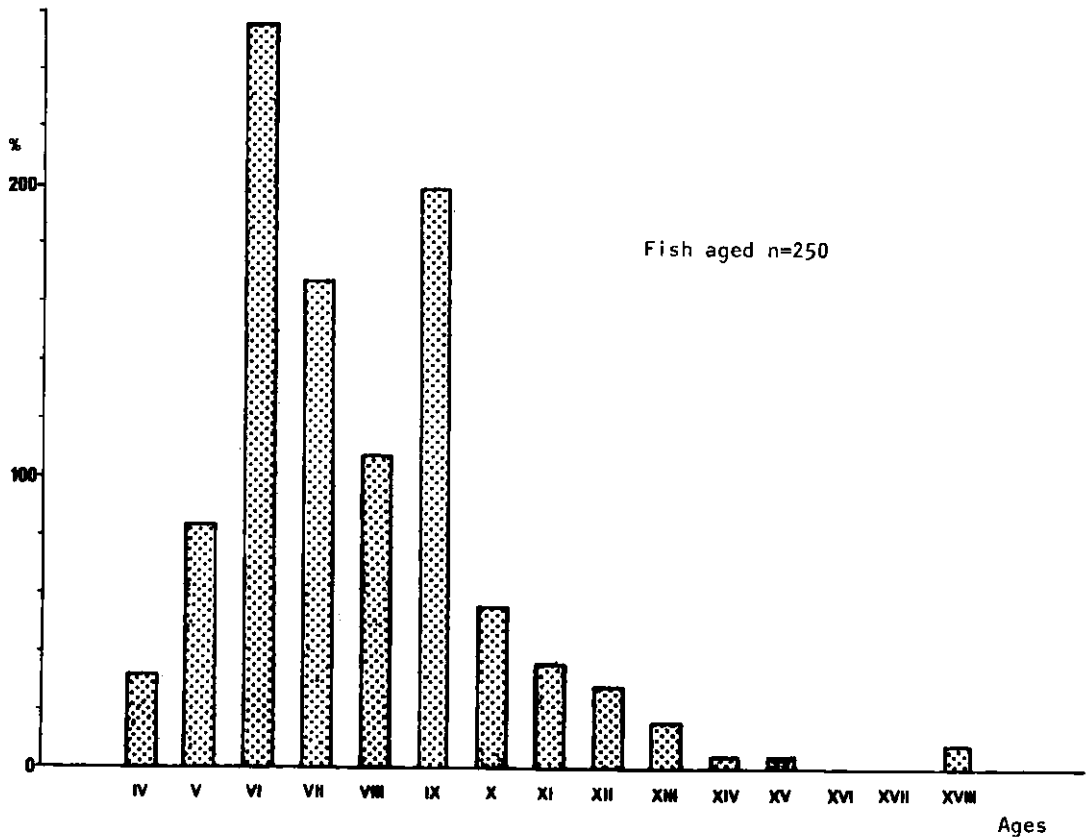
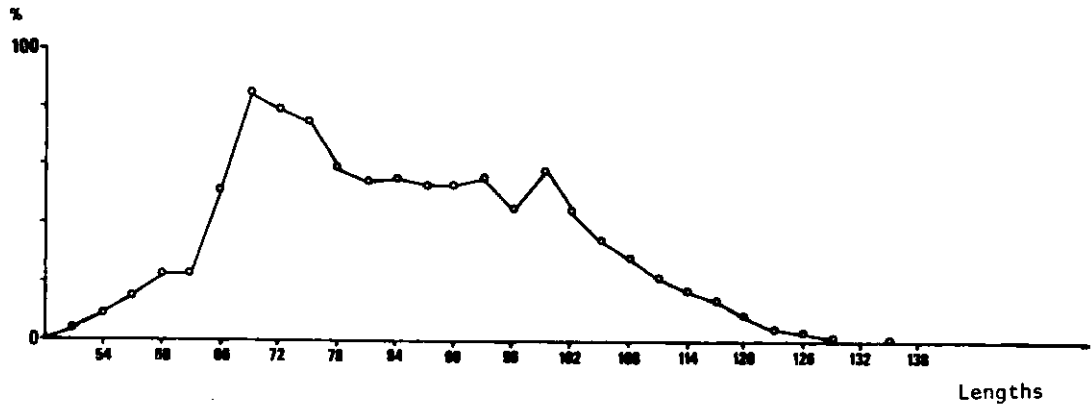


Fig.3 Cod length frequencies and age composition, Div.3N,1977

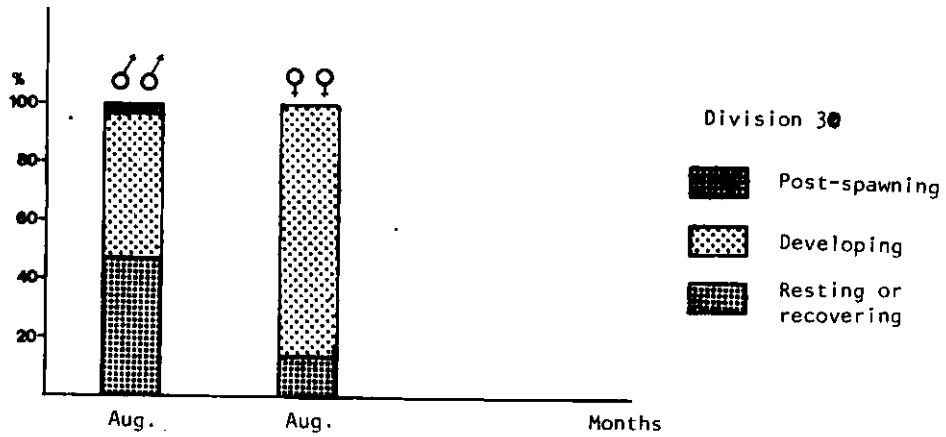
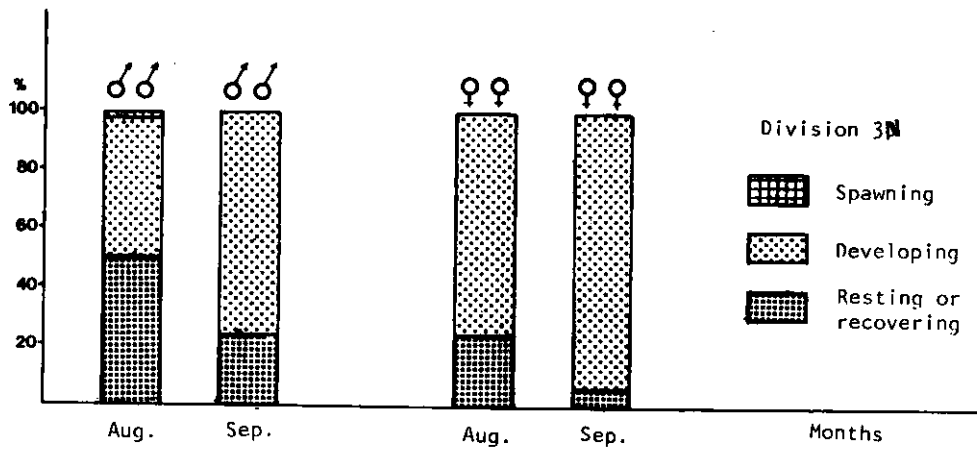
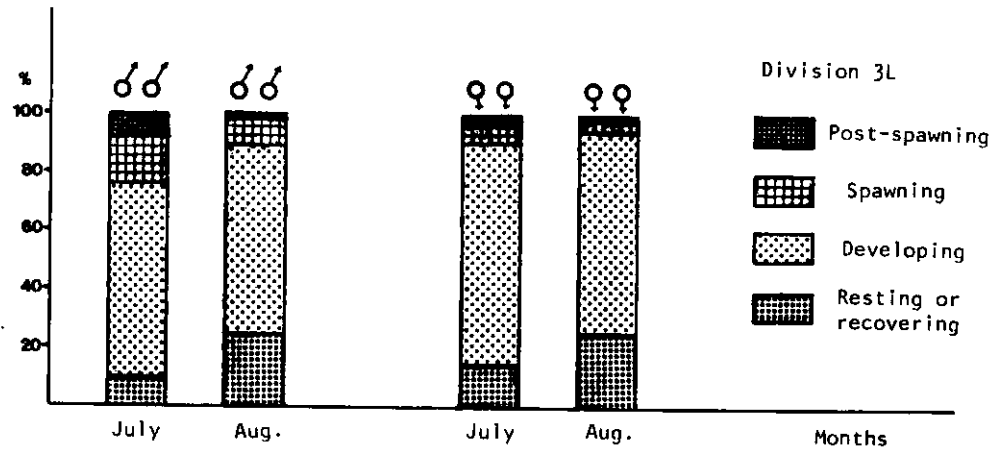


Fig.4 Stages of maturity in the 3 Divisions Sampled