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Variations in the Conad Weight and the Percentage Occurrence

at Length of Maturing Female Cod on the Flemish Cap

by

R. Wells

Science Branch, Department of Fisheries and Oceans P. O. Box 5667, St. John's, Newfoundland, Canada AlC 5X1

INTRODUCTION

If the number of female cod maturing to spawn in the current year is known, and a fecundity relationship applied, estimates of potential egg production can be derived. Egg production may be related to eventual year-class success.

MATERIALS AND METHODS

Observations were made on the maturity stages of cod during winter cruises to the Flemish Cap in 1978-85. Female cod maturing to spawn in the immediate spawning season have opaque eggs clearly visible to the naked eye. From samples returned to the laboratory, gonad weights were observed.

RESULTS

The average ovary weight of maturing females increases with length (Table 1). Sample sizes were usually small (Table 2).

Of the total cod observed, the proportion which were females maturing to spawn in the current year increases from a few percent at length 40 cm to 50 percent by about 90 cm. There is a clear tendency for cod greater than about 90 cm to leave more than half their number as maturing females.

In 1978 and 1979, there appear to be clear discontinuities in the pattern of increasing percentages. In 1978, percentages in the range 55 cm to 82 cm were rather lower than expected, while in 1979 the dip extended from about 64 cm to 79 cm. Such anomalies do not appear in the other years.

There appears to be a trend towards maturing to first spawning for females at a somewhat greater length from 1978-84. The lengths at which first maturing occurred were:

1978	34
1979	40
1980	46
1981	43
1982	52
1983	58
1984	58
1985	40 🕠

It is notable that the trend seems to have been reversed in 1985 when at least some females were maturing to spawn at each of lengths 40, 43, 46, 49, 52, and 55 cm.

Table 1. Weight (gm) of ovaries in the opaque egg stage in the January-February period 1978-85. Sample sizes are in Table 2.

Length group	1978	1979	1980	1981	1982	1983	1984	1985	All years
43		. '						29	29
46	72								72
49	63	106						10	69
52	93	128:			90				110
55	96	136		34	147				107
58	137			68	124				113
61		159	104	94	77	142			117
64	·		182	101	206	155	134		155
67	22		183	•	194	117		149	140
70	235		217	22	230	224		131	192
73	191		130	131	452	186	315	271	249
76	25		192	168	270	318	326	203	230
79			139	82	332	398	647	407	317
82	382	420	173	195	599	560	640	399	443
85	324		211	94.	440	354	642	325	398
88	VL .	280	37.3	401	573	1258	779	581	631
91	530	200	310	484	646	1230	612	955	574
94	715	86	757	253	818	601	824	931	657
97	716	817	417	782	992	1262	1177	914	921
100	812	708	117	550	939	1717	1177	1268	921
103	1324	, 00		769	1168	1978	790	1200	1181
106	1210	1068		1588	1452	2398	801		1489
109	12.0	950		1000	1507	1317	001	1916	1419
112	1194	1045	856		2040	1435		2243	1725
115		10.0	000		2010	1176	2838	1924	1979
118		2395	1474			1367	2338	1721	1893
121	1525	2030	1354			1007	2000	2138	1672
124	1050	1027	1004					2100	1027
127	_		_	_	٠	_	_	_	1027
130		1765			•	•	4629		3197
133		1,00				3001	7063	•	3001
100					4	3001			2001
Total									•

Table 2. Number of observations of ovaries in the opaque egg stage used to derive average weights in Table 1.

Length group	1978	1979	1980	1981	1982	1983	1984	1985	All years
43			· · · · · · · · · · · · · · · · · · ·					1	1
46	2								2
49	2 2 1	2						1	1 2 5 4 6 4 8 12 18 20 13 15
52 55	1	2 2 2			1				4
55	2	2		1					6
58	1				2				4
61		2	2.	1 2 2	1	1			8
64			2· 1	2	1 2 1 2 1 3 3 2 5 4	1 2 3 4 5 2 3 7	- 1		8
67	1		2		1	3		5	12
70	1 1		5	1	3	4		4	18
73	1		1	3	3	5	2	5	20
76	1		2 5 1 2 3 3 2 3 2	1 3 2 4 2 5 4 2 4 2 2 4 2 2	2	2	2 2 1 3 6 3 5 3	5 4 5 3 2 3	13
79			2	2	5	3	$\bar{1}$	2	15
82	1	1	3	4	4	7	3	3	26
85 88	1 3		3	2	1	1	6	ī	26 17
88	_	1	2	2	2	1 2	3	1 5 3 3 1	.17
91	2		3	5	1		3	3	17
94	1	1	2	4	2	1	5	3	19
97	2	1	2	2	5	2	3	i	18
100	3	1		4	5	2		ī	16
103	3			2	1	1	1		8
106	2 1 2 3 3 2	2		2	1 2 1 2 5 5 1 4 2	1 2 2 1 3 2	1 2		16 8 15
109 112	•	1			2	2		1	6 11
112	2	1	1		$\bar{1}$	$\bar{1}$. 5	11
115							1	. 5 1	3
118		1	1			1	1 1	_	4
121	1		1			_	-	1	3 4 3 1
124		1						_	ĺ
127	-		-	-	_	_	_	_	
130		1					1		2
130 133						1	_		2
Total	32	20	32	41	49	45	35	46	300

Table 3. Percentage of cod which are females maturing to spawn in the year of observation, that is, with opaque eggs present.

	1978	1979	1980	1981	1982	1983	1984	1985	Total
34	.2	0	0	0	0	0	0	Ó	+
37	0	0	0	Ō	Ō	Ö	Ö	Ŏ.	Ö
40	2.6	.3	0	0	0	Õ	Ŏ	.7	.5
43	14.5	.9	0 .	.9	0	0	0	1.2	2.2
46	25.1	1.8	3.7	1.6	0	0	0	1.8	4.3
49	25.0	9.8	5.8	3.0	0	0	0	2.4	5.8
52	21.5	24.4	10.4	2.6	3.0	0	0	.7	7.8
55	10.4	35.6	7.7	10.1	9.3	0 .	0 1.5	1.0	9.3
58	5.4	38.7	24.8	16.4	12.1	13.6	1.5	7	14.2
61	2.6	34.2	30.4	26.0	26.1	10.6	1.6	7.1	17.3
64 67	1.4	10.3	42.7	29.7	40:4	26.6	7.1	6.3	20.6
70	3.8 .8	16:9	39.4 61.7	37.0 32.7	25.0	19.8	0	40.0	22.7
70 73	2.9	11.4 0	52.4	32.7 46.9	50.0 57.1	37.8 31.3	0 33.3	26.7	27.6
75 76	17.1	18.8	58.8	47.5	27.3	50.0	20.5	40.0 29.2	33.0
70 79	14.3	9.1	58:0	48:4	55:6	35:7	28.6 25.0	17.7	34.7 33.0
82	14.3	40.0	53.7	63.6	50.0	54.2	50.0	37.5	45.4
85	25.0	25.0	50.0	44.4	40.0	42.9	63.2	16.7	38.4
88	24.0	25.0	57.1	35.0	75.0	33.3	58.3	55.6	45.4
91	38.5	0	50:0	58.8	50.0	.0	69.2	44.4	38.9
94	25.0	25.0	75.0	60.9	100.0	33.3	53.9	75.0	56.0
97	83.3	50.0	100.0	42.9	83.3	60.0	60.0	25.0	63.1
100	87.5	25.0	<u>-</u>	71.4	83.3	100.0	33.3	50.0	64.4
103	84.6	50.0	0	100.0	33.3	33.3	50.0	- 0	50.2
106	100.0	100.0	0	66.7	80.0	80.0	100.0		65.8
109	100.0	100.0	100.0	0	100.0	66.7	0	33.3	62.5
112	83.3	33.3	50.0	0	100.0	100.0	.0 .	100.0	66.7
115 118	50.0 100.0	0 100.0	50.0	U	0	$100.0 \\ 100.0$	100.0	100.0	50.0
121	100.0	0	100.0			100.0	100.0	100.0	90.0 75.0
124	100.0	50.0	100.0					100.0	75.0
127	-		<u>-</u>	<u>-</u>	-	<u>:</u>	=		, , , ,
130	÷	100.0					100.0	• • •	100.0
133	-	-				100.0	- -		100.0
Total								,	
Grand	1627	311	455	409	114	205	. 106	. 93	
Total	13246	3194	3262	4778	1020	3768	3361	4250	