

Northwest Atlantic



Fisheries Organization

Serial No. N1251

NAFO SCR Doc. 86/122

SCIENTIFIC COUNCIL MEETING - SEPTEMBER 1986

Estimates of Age and Length at Maturity for Cod in NAFO Divisions 2J+3KLNO

by

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INTRODUCTION

The current management practice for some fish stocks in the Northwest Atlantic is to attain some target (i.e. annual mean biomass, spawning stock biomass, etc.) before a change in TAC or projected fishing mortality levels occurs. When calculating spawning stock biomass for some stocks a "knife-edge" maturity at some plus age-group has been used as a proxy for maturity ogive. The purpose of this document is to provide maturity ogives which can be used when spawning stock biomass is being calculated.

MATERIALS AND METHODS

Information used for calculations in this paper were collected from research vessel cruises. Cruises in Div. 2J3KL were conducted during autumn while those in Div. 3NO were conducted during spring. Maturity at length data were taken during 1981-82 in Div. 2J3KL and 1978-84 excluding 1983 (when no survey was conducted) in Div. 3NO. During these years, virtually all cod caught were examined for maturity, which included about 25,000 specimens from Div. 2J3KL and about 14,000 specimens from Div. 3NO. Maturity at age data were taken during 1981-85 from Div. 2J3KL (approx. 12000 specimens) and 1978-85 (excluding 1983) from Div. 3NO (approx. 7000 specimens). Age samples were taken in a stratified manner from each division during a survey year.

RESULTS

Tables 1 and 2 give percentages mature at length and age respectively for cod from Div. 2J3KL and Tables 3 and 4 give the same information for cod from Div. 3NO. Length and age at 50% maturity are also included in these tables. For Div. 2J3KL cod the length and age at 50% maturity increases slightly from north to south with averages for the entire stock area of length and age being 50.47 cm and 4.55 years respectively. Estimates from Div. 3NO are somewhat higher than those from the more northern areas with the stock area averages for length and age at 50% maturity being 60.30 cm and 5.69 years respectively. The age at 50% maturity for Div. 3NO cod is similar to that for Subdiv. 3Ps cod (5.8 years) as reported by Bishop in 1984. Probit analysis was used to calculate length and age at 50% maturity.

Because Div. 2J+3KL cruises were conducted during fall, maturing specimens aged from these cruises were judged to be maturing to spawn early in the following year, and then ages were advanced one age group. Lengths were not adjusted for growth for the period between the times of examination and spawning. Thus the percentage of mature fish at length and the length at 50% maturity in Table 1 are indicative of maturing fish, some of which would have previously been immature in the year of observation. These values are underestimates of corresponding values which would have been obtained if observations had been taken in the early part of the year.

REFERENCE

Bishop, C. A. 1984. Estimates of age at maturity for cod in Subdivision 3Ps. NAFO SCR Doc. 84/122. Serial No. N921. 3 p.

Table 1. Percentages of mature fish at length along with length at 50% maturity for cod in Divisions 2J3KL.

Length group (cm)	2J	3K	3L	Ave.
31	0	0	0	0
34	1	0	0	0
37	2	1	3	2
40	9	7	4	7
43	21	14	4	13
46	36	28	17	27
49	43	42	28	38
52	67	56	44	56
55	88	76	60	75
58	96	91	81	89
61	98	96	92	95
64	99	99	97	98
67	100	100	98	99
70	100	100	99	100
73	100	100	99	100
76	100	100	100	100
N	12314	8715	4338	
L50	48.49	50.24	52.68	50.47

Table 2. Percentages of mature fish at age along with age at 50% maturity for cod in Divisions 2J3KL.

Age	2J	3K	3L	Ave.
3	0	0	0	0
4	7	5	3	5
5	39	32	18	30
6	76	74	61	70
7	95	97	85	92
8	99	100	99	99
9	100	100	100	100
N	4257	3711	3990	
A50	5.36	5.44	5.86	4.55

Table 3. Percentages of mature fish at length along with length at 50% maturity for cod in Divisions 3N0.

Length group (cm)	3N	3Ø	Ave.
34	0	0	0
37	0	1	1
40	1	6	4
43	1	7	4
46	3	14	9
49	6	15	11
52	14	25	20
55	24	23	24
58	35	45	40
61	44	62	53
64	59	67	63
67	79	82	81
70	91	85	88
73	94	96	95
76	95	94	95
79	92	98	95
82	93	100	97
85	97	100	99
88	100	100	100
N	8136	6013	
L50	61.63	58.97	60.30

Table 4. Percentages of mature fish at age along with age at 50% maturity for cod in Divisions 3N0.

Age	3N	3Ø	Ave.
3	0	0	0
4	5	2	4
5	23	20	22
6	67	61	64
7	94	93	94
8	99	99	99
9	100	99	100
10	100	100	100
N	3503	3367	
A50	5.62	5.76	5.69