

Northwest Atlantic



Fisheries Organization

Serial No. N2674

NAFO SCR Doc. 96/8

SCIENTIFIC COUNCIL MEETING - JUNE 1996

Distribution and Biological Characteristic of Greenland Halibut in the  
Flemish-Pass Area and on the Flemish-Cape Bank in May 1995

by

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**ABSTRACT**

Greenland halibut catches did not exceed 850 kg per 3-4 trawling hours. Greenland halibut made up insignificant by-catch to redfish at depth to 700m. At 700-900m depth Greenland halibut constituted 86.5% in catches, an essential by-catch of roughhead grenadier was registered deeper. Immature Greenland halibut 35-45cm long at age 4-5 made up the bulk of catches. Mean length of males and females grew with an increase in a fishing depth. Feeding intensity was poor. The main components in Greenland halibut feeding were squid, shrimp, Themisto and roughhead grenadier.

**MATERIAL AND METHODS**

A set of hauls was performed by RV "Olenitsa" (MI-0708) with a fishing bottom trawl from 600 to 1100m depth in the Flemish-Pass area (Divs. 3L and 3M) from 1 to 19 May 1995. These operations were done to study distribution and obtain biological characteristic of Greenland halibut.

Sampling trawl survey of bottom fish, including Greenland halibut, was carried out on the Flemish-Cape Bank (Div.3M) from 20 to 29 May. As in the previous years, bottom trawl (1625-A) with a small-meshed insertion in codend (10-12mm mesh-size) was used as a sampling fishing gear. The survey was carried out according to stratified random method developed by Canadian investigators. In total, 58 sampling hauls of 30-minute duration have been done to 730m depth in the Flemish-Cape Bank area during the period surveyed.

Length from tip of snout to a line joining tips of tail was separately measured by sex. In total, 904 males and 1248 females have been measured. Samples for age were taken by Canadian methods with choosing not less than 15 specimens from each 2-cm size group (14-15, 16-17cm, etc.). Greenland halibut were aged by scales under transmitted light. Results from age reading with length-age keys in use were calculated to length composition of catches and thus age composition of Greenland halibut catch was obtained.

Food composition was visually determined. Main components of feeding were determined by frequency of food items occurrence.

**RESULTS**

During the investigations in the Flemish-Pass area Greenland halibut were scattered at low fish densities in 850-1100m. Catches varied from 300 to 850 kg per 3-4 trawling hours. Maximum catch was taken on the eastern slope in 850m depth (Div.3L), with a catch composition being different in different depth. Sebastes mentella (69.5%) and cod (23.8%) constituted the bulk of catches

in depth to 700m. Sebastes marinus (2.3%) and Greenland halibut (4.4%) made up the rest portion of catch. At 701-900m depth Greenland halibut (86.5%) and Sebastes mentella (9.7%), scates (2.2%), Sebastes marinus (1.6%) as by-catch made up the bulk of catches. At 901-1100m depth the bulk of catches consisted of two species, i.e. of Greenland halibut (53.7%) and roughhead grenadier (44.4%), and scates (1.9%) - as by-catch.

When conducting the trawl survey on the Flemish-Cape Bank Greenland halibut occurred in small quantities (single specimens) in catches from over the whole area studied. Those were small immature specimens. The abundance and biomass made up 2.5 mill.indiv. and 1.1 thou.t, respectively. These estimates should consider to be incomplete as far as the hauls were performed only to 730m depth and the main area of halibut distribution was not covered.

In catches taken in the Flemish-Pass area and on the Flemish-Cape Bank Greenland halibut were from 12 to 110cm long, with specimens 35-45cm long constituting the bulk of catches (Fig.1). Length of males varied from 14 to 66cm (43.5cm mean length) and that of females - from 12 to 110cm (44.4cm mean length). Mean length of both males and females grew with an increase in fishing depth (Table 1).

Using Greenland halibut age samples the length-age keys (Tables 2 and 3) were developed, by which length-age composition of catches was calculated (Tables 4 and 5). Greenland halibut age composition is given in Fig.2. Age of halibut in catches was from 1 to 13 yr. Fish at age 4-5 made up the bulk of catches.

Females (58.1) were preponderant in catches. Most of Greenland halibut specimens caught during the investigations were immature and only 7 males and 3 females had gonads at post-spawning stages of development.

Squid, shrimp, Themisto and roughhead grenadier were the main components in Greenland halibut feeding. Feeding intensity was poor, mean degree of stomach fullness made up 0.47 by 5-point scale.

TABLE 1. Mean length of males and females of Greenland halibut in Flemish-Pass area. May, 1995.

Depth, m	Mean length : males, cm	No. :	Mean length females, cm	No. :
601 - 700	35.16+1.35	74	36.20+1.26	392
701 - 900	41.98+0.32	392	41.94+0.27	547
901 - 1100	45.30+0.32	422	45.40+0.35	613

Table 2. Age-length key of Greenland halibut males in the Flemish-Pass area. May, 1995.

L0a	1	2	3	4	5	6	7	8	9	10	11	NN	weig. #
14	2	0	0	0	0	0	0	0	0	0	0	2	15.0
16	0	1	0	0	0	0	0	0	0	0	0	1	30.0
18	0	1	0	0	0	0	0	0	0	0	0	1	50.0
20	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22	0	0	0	0	0	0	0	0	0	0	0	0	0.0
24	0	5	1	0	0	0	0	0	0	0	0	6	101.7
26	0	1	1	0	0	0	0	0	0	0	0	2	148.0
28	0	0	0	0	0	0	0	0	0	0	0	0	0.0
30	0	0	1	0	0	0	0	0	0	0	0	1	180.0
32	0	0	4	1	0	0	0	0	0	0	0	5	244.0
34	0	0	1	10	0	0	0	0	0	0	0	11	321.0
36	0	0	1	6	2	0	0	0	0	0	0	9	384.4
38	0	0	0	6	6	0	0	0	0	0	0	12	461.7
40	0	0	0	0	10	2	0	0	0	0	0	12	519.2
42	0	0	0	1	7	0	0	0	0	0	0	8	625.0
44	0	0	0	0	5	7	0	0	0	0	0	12	733.3
46	0	0	0	0	2	6	1	0	0	0	0	9	833.3
48	0	0	0	0	0	4	3	0	0	0	0	7	971.4
50	0	0	0	0	0	0	9	0	0	0	0	9	1151.1
52	0	0	0	0	0	0	11	1	1	0	0	13	1223.1
54	0	0	0	0	0	0	3	2	2	0	0	7	1350.0
56	0	0	0	0	0	0	0	3	1	0	0	4	1600.0
58	0	0	0	0	0	0	0	2	4	1	0	7	1838.6
60	0	0	0	0	0	0	0	2	4	0	0	6	1981.7
62	0	0	0	0	0	0	0	0	2	1	1	4	2192.5
64	0	0	0	0	0	0	0	0	0	0	0	0	0.0
66	0	0	0	0	0	0	0	0	0	2	0	2	2570.0
NN	2	0	9	24	32	19	27	10	14	4	1	150	
w. #	15.0	88.1	228.3	372.9	574.4	801.6	1155.6	1567.0	1891.4	2365.0	2210.0	150	869.1
L.m	14.50	23.00	31.44	36.21	41.31	45.42	51.41	56.70	58.79	63.75	62.00	150	44.3

Table 3. Age-length key of Greenland halibut females in the Flemish-Pass area. May, 1995.

L0a	1	2	3	4	5	6	7	8	9	10	11	12	13	NN	weig. g
14	3	0	0	0	0	0	0	0	0	0	0	0	0	3	17.7
16	4	0	0	0	0	0	0	0	0	0	0	0	0	4	26.3
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22	0	1	1	0	0	0	0	0	0	0	0	0	0	2	85.0
24	0	0	2	0	0	0	0	0	0	0	0	0	0	2	125.0
26	0	1	2	0	0	0	0	0	0	0	0	0	0	3	123.3
28	0	0	1	0	0	0	0	0	0	0	0	0	0	1	160.0
30	0	0	2	1	0	0	0	0	0	0	0	0	0	3	226.7
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	252.5
34	0	0	4	11	0	0	0	0	0	0	0	0	0	15	328.0
36	0	0	0	16	2	0	0	0	0	0	0	0	0	18	384.4
38	0	0	0	11	2	0	0	0	0	0	0	0	0	13	465.4
40	0	0	0	3	11	0	0	0	0	0	0	0	0	14	568.6
42	0	0	0	0	7	4	0	0	0	0	0	0	0	11	625.0
44	0	0	0	0	2	0	0	0	0	0	0	0	0	10	781.0
46	0	0	0	0	2	5	3	0	0	0	0	0	0	10	824.5
48	0	0	0	0	1	0	0	0	0	0	0	0	0	17	959.4
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1115.0
52	0	0	0	0	0	2	7	3	0	0	0	0	0	12	1232.1
54	0	0	0	0	0	0	3	6	1	0	0	0	0	10	1397.0
56	0	0	0	0	0	0	0	2	6	0	0	0	0	0	1598.0
58	0	0	0	0	0	0	0	2	4	0	0	0	0	6	1751.7
60	0	0	0	0	0	0	0	1	4	0	0	0	0	5	1868.0
62	0	0	0	0	0	0	0	1	1	0	0	0	0	2	2340.0
64	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2750.0
66	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2435.0
68	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3100.0
70	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3680.0
72	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3740.0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
78	0	0	0	0	0	0	0	0	0	0	0	1	2	3	5343.3
80	0	0	0	0	0	0	0	0	0	0	0	1	0	1	5430.0
NN	7	2	20	42	27	27	29	15	16	1	4	2	3	195	
w. g	22.6	95.0	224.0	393.1	614.3	850.4	1089.7	1551.3	1750.8	2350.0	3007.5	5215.0	4923.3	195	940.9
L. g	15.57	24.00	30.45	36.50	41.78	46.26	50.59	55.07	58.30	66.00	67.25	79.50	76.33	195	44.3

Table 4. Length frequency converted to age-length key of Greenland halibut males in the Flemish-Pass area. May, 1995.

L0a	1	2	3	4	5	6	7	8	9	10	11	NN	weig. n
14	2	0	0	0	0	0	0	0	0	0	0	2	15.0
16	0	6	0	0	0	0	0	0	0	0	0	6	30.0
18	0	4	0	0	0	0	0	0	0	0	0	4	50.0
20	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22	0	0	0	0	0	0	0	0	0	0	0	0	0.0
24	0	7	1	0	0	0	0	0	0	0	0	8	101.7
26	0	2	2	0	0	0	0	0	0	0	0	3	140.0
28	0	0	0	0	0	0	0	0	0	0	0	0	0.0
30	0	0	4	0	0	0	0	0	0	0	0	4	100.0
32	0	0	16	4	0	0	0	0	0	0	0	20	244.0
34	0	0	5	45	0	0	0	0	0	0	0	50	321.0
36	0	0	0	51	17	0	0	0	0	0	0	76	384.4
38	0	0	0	42	42	0	0	0	0	0	0	84	461.7
40	0	0	0	0	98	20	0	0	0	0	0	117	519.2
42	0	0	0	13	89	0	0	0	0	0	0	102	625.0
44	0	0	0	0	37	51	0	0	0	0	0	88	733.3
46	0	0	0	0	17	51	0	0	0	0	0	76	833.3
48	0	0	0	0	0	34	26	0	0	0	0	60	971.4
50	0	0	0	0	0	0	65	0	0	0	0	65	1151.1
52	0	0	0	0	0	0	42	4	4	0	0	50	1223.1
54	0	0	0	0	0	0	18	12	12	0	0	41	1350.0
56	0	0	0	0	0	0	0	13	4	0	0	17	1600.0
58	0	0	0	0	0	0	0	5	9	2	0	16	1838.6
60	0	0	0	0	0	0	0	3	5	0	0	8	1981.7
62	0	0	0	0	0	0	0	0	2	1	1	4	2192.5
64	0	0	0	0	0	0	0	0	0	0	0	0	0.0
66	0	0	0	0	0	0	0	0	0	3	0	3	2570.0
NN	2	10	36	155	299	156	159	36	36	6	1	904	
ZZ	0.2	2.0	4.0	17.1	33.1	17.2	17.6	3.9	4.0	0.7	0.1	100.0	

Table 5. Length frequency converted to age-length key of Greenland halibut females in the Flemish-Pass area. May, 1995.

L8a	1	2	3	4	5	6	7	8	9	10	11	12	13	NN	weig. a
14	4	0	0	0	0	0	0	0	0	0	0	0	0	4	17.7
16	7	0	0	0	0	0	0	0	0	0	0	0	0	7	26.3
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
22	0	1	1	0	0	0	0	0	0	0	0	0	0	2	85.0
24	0	0	3	0	0	0	0	0	0	0	0	0	0	3	125.0
26	0	3	5	0	0	0	0	0	0	0	0	0	0	8	123.3
28	0	0	2	0	0	0	0	0	0	0	0	0	0	2	160.0
30	0	0	4	2	0	0	0	0	0	0	0	0	0	6	226.7
32	0	0	14	0	0	0	0	0	0	0	0	0	0	14	252.5
34	0	0	18	48	0	0	0	0	0	0	0	0	0	66	328.0
36	0	0	0	103	13	0	0	0	0	0	0	0	0	116	384.4
38	0	0	0	114	21	0	0	0	0	0	0	0	0	135	465.4
40	0	0	0	33	122	0	0	0	0	0	0	0	0	155	568.6
42	0	0	0	0	90	52	0	0	0	0	0	0	0	142	625.0
44	0	0	0	0	22	89	0	0	0	0	0	0	0	111	781.0
46	0	0	0	0	16	41	24	0	0	0	0	0	0	81	824.5
48	0	0	0	0	6	48	48	0	0	0	0	0	0	101	959.4
50	0	0	0	0	0	0	76	0	0	0	0	0	0	76	1115.0
52	0	0	0	0	0	12	41	18	0	0	0	0	0	71	1232.1
54	0	0	0	0	0	0	16	31	5	0	0	0	0	52	1397.0
56	0	0	0	0	0	0	0	0	23	0	0	0	0	30	1598.0
58	0	0	0	0	0	0	0	9	17	0	0	0	0	26	1751.7
60	0	0	0	0	0	0	0	3	10	0	0	0	0	13	1868.0
62	0	0	0	0	0	0	0	5	5	0	0	0	0	9	2340.0
64	0	0	0	0	0	0	0	0	0	0	3	0	0	3	2730.0
66	0	0	0	0	0	0	0	0	0	2	2	0	0	4	2435.0
68	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3100.0
70	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3680.0
72	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3740.0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
78	0	0	0	0	0	0	0	0	0	0	0	1	2	3	5343.3
80	0	0	0	0	0	0	0	0	0	0	0	2	0	2	5430.0
NN	11	4	47	301	290	240	205	72	60	2	0	3	5	1248	
ZZ	0.9	0.3	3.0	24.1	23.2	19.3	16.4	5.8	4.8	0.2	0.6	0.2	0.4	100.0	

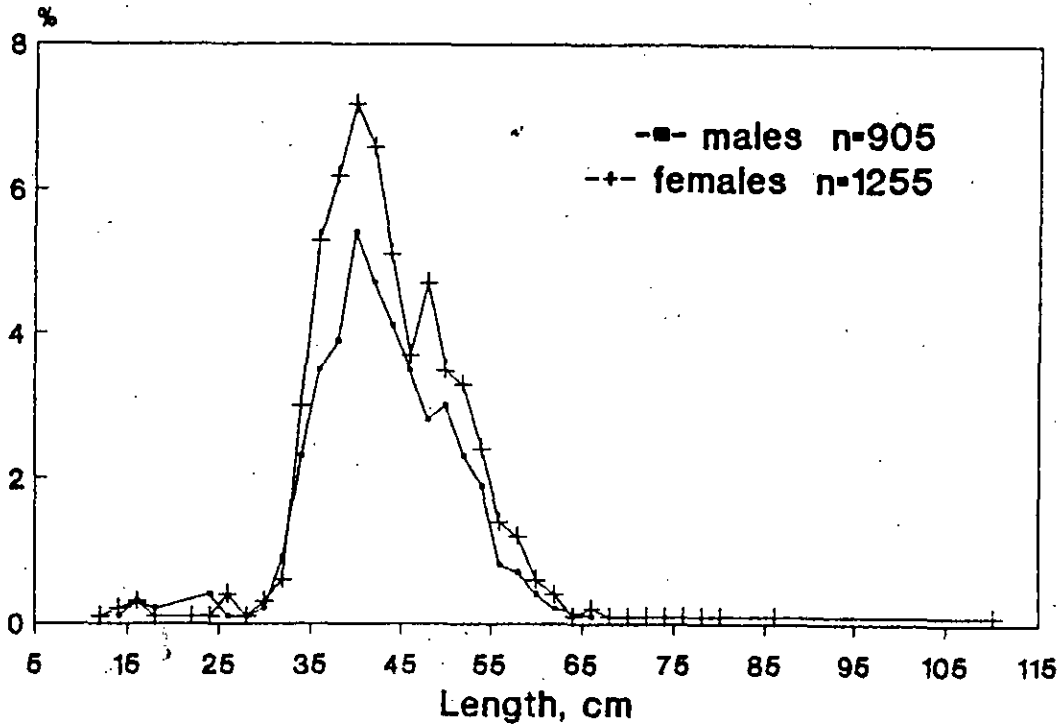


Fig. 1. Length composition of Greenland halibut in the Flemish-Pass area. May, 1995.

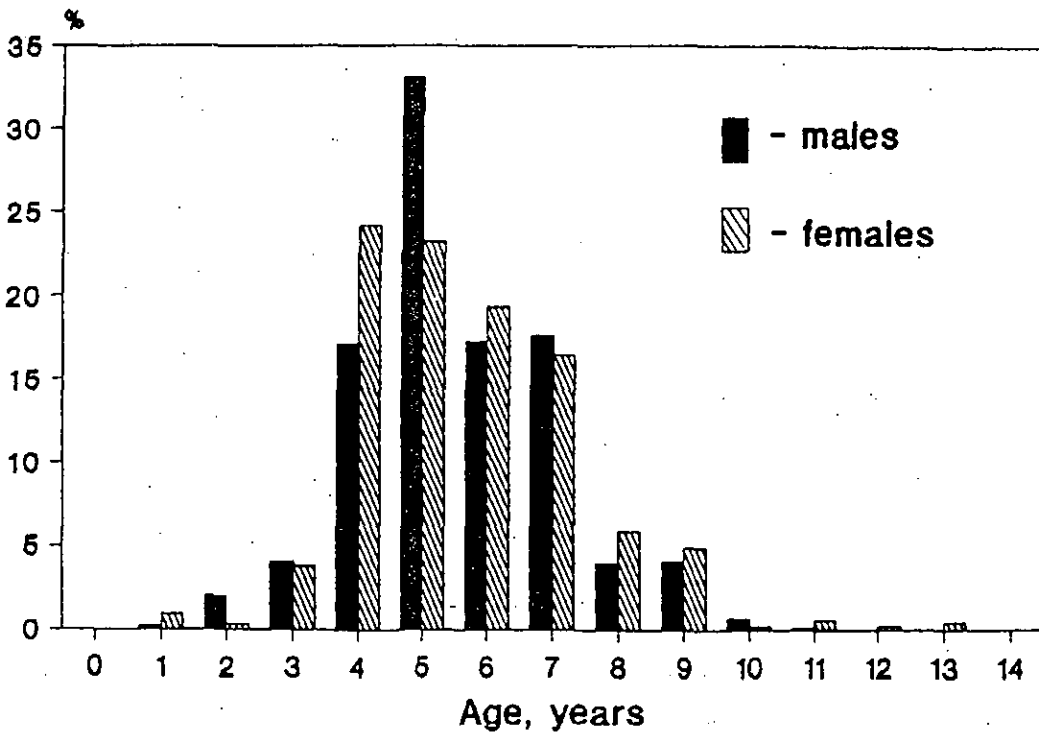


Fig. 2. Age composition of Greenland halibut in the Flemish-Pass area. May, 1995.