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Selectivity of Trawl Bags with Different Mesh Size in Trawl Fishery for Greenland Halibut in the NAFO Regulatory Area

by

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Abstract

Data for selectivity of trawl bags with the mesh size of 120 mm and 130 mm in the Greenland halibut fishery in the NAFO Regulatory Area are presented.

Selectivity parameters derived by the authors in the first test for trawl bags with the mesh size 132 mm are as follows: 50% retention length ($L_{50\%}$) - 40.0 cm; selectivity coefficient (K_s) – 3.03; selectivity range (d_s) – 10.5 cm; 25% retention length ($L_{25\%}$) – 34.0 cm. For trawl bags with the mesh size 121 mm these parameters were 35.5 cm, 2.93, 6.5 cm and 33.0 cm, respectively.

In the second test performed in the same area in two weeks' time selectivity parameters were similar.

In the Greenland halibut fishery by trawls with the minimal mesh size of 130 mm a minimum landing size corresponding to 25% retention should be 32.0-34.0 cm. With this minimum landing size by-catch of juvenile halibut would not exceed 10% in number, as according to Conservation and Enforcement Measures.

Introduction

Over the last 20 years 342,6 thou.t of Greenland halibut were fished in NAFO Div.. 3LMNO, its annual harvest varied between 2,9 and 48,7 thou.t. According to Statlant 21A and 21B reporting formats the largest catch was taken in 1992-1994, it was 51,8-48,5 thou.t. Before 1995 the only regulatory measure in the fishery was a minimal mesh size in trawl (130 mm), from 1995 on a TAC has been established annually. It was 27,0-24,4 t. In 1996 in addition to these regulatory measures the Fisheries Commission adopted a minimal landing size for Greenland halibut of 30 cm, which was determined on the basis of selectivity experiments and corresponded to 25% retention for the bag with the mesh size of 130 mm. Maximum allowable by-catch of undersized halibut was 10%. These regulatory measures remain in force up to now (Anon, 2000).

At the same time the NAFO Scientific Council recommends that the fishing of immature halibut should be reduced as far as possible (Anon, 2001).

In this light a task of deriving new data on the selectivity of trawl bags with different mesh size and critical analysis of previously available data becomes central.

Material and Methods

Experiments to determine the selectivity in trawl fishery for Greenland halibut were conducted by the Russian commercial trawler "Mozdok" in Flemish Pass (3L) in March-April 2001. Overall length of the vessel was 58.9 m, width 13.0 m, deadweight capacity 1140 BRT, main engine power 1620 kW.

In experiments a bottom four-panel commercial trawl 36.5 m x 460 meshes was used, distance between wings was 30 m and opening height 6 m. The trawl was rigged with a rockhopper having rollers of 500 mm diameter in the center of the trawl and 400 mm diameter at the wings, "Kudrin" trawl boards with the area of 7 m^2 and weight of 2000 kg were used. Length of cables was 200 m each. Towing speed was 3 knots, haul duration 5 hours.

Four-panel trawl bags of PE having standard mesh size 120mm and 130 mm were tested. Length of cylindrical part of the bag was 10 m, perimeter 80 meshes. For bags with the mesh size of 120 mm twine of 6.0 mm in diameter was used, and for bags with the mesh size of 130 mm double-plaited it has 8.0 mm in diameter. Mesh size was measured by a wedge-shaped plate 2 mm thick under 5 kg load.

Selectivity was determined by using a bag-shaped cover, which was attached to the conical part of the trawl bag at a distance of 4-5 m from its joint with a cylindrical part. A perimeter of the cover was 30-40% larger than that of the trawl bag, its mesh size was 40-50 mm.

All fish from the trawl bag and cover were emptied into individual bins, measured into 1 cm size. Selectivity for each 2 cm size group was determined by the formula:

$$S_i = \frac{N_{ti}}{N_{ti} + N_{ci}}$$

where N_{ti} - number of fish from size group *i* in the trawl bag;
N_{ci} - number of fish from size group *i* in the cover.

For smoothing of selectivity data derived for each size group a 3-point moving average method was applied.

Besides, selectivity data for trawl bags with different mesh size derived by other researchers and authors of this paper previously were used in the analysis.

Results

The first test was done from 26 March to 14 April 2001. Table 1 shows details of hauls. Halibut with the length from 28 to 66 cm were fished, modal length 40-48 cm (Fig.1). Real mesh size in trawl bags was 132 mm and 121 mm. Catches taken with the trawl bag of 132 mm mesh size were 1.7-0.8 t and contained halibut of 28-66 cm, those from the cover were 0.18-0.36 t with halibut being 28-56 cm in length (Table 1,2). 50% retention length was 40.0 cm, selectivity coefficient 3.03, selectivity range 10.0 cm, 25% retention length 34.0 cm (Fig.3).

Trawl bags with the mesh size 121 mm fished similar in length Greenland halibut: 32-66 cm, modal length 39-48 cm. Catches in the bag were 0.88-0.58 t, in the cover 0.02 t (Table 1, Table 3, Fig. 1). 50% retention length was 35.5 cm, selectivity coefficient 2.93, selectivity range 6.5 cm, 25% retention length 33.0 cm (Fig.3). There was no by-catch of undersized halibut at all in the trawl bag of this mesh size nor was it in the bag of 132 mm mesh.

The second test was performed from 25 April to 5 May 2001, approximately in the same area as in the first test, however, in shallower depth. However, the size composition of aggregations fished was represented by smaller individuals. For example, although halibut of the same length 28-66 cm were fished, the modal length was 3-4 cm less than in the first test, 36.3-44.5 cm (Fig.2).

Catches by the trawl with the actual mesh size of 130 mm were 0.88-0.48 t in the bag and 0.31-0.09 t in the cover (Table 1). The length of halibut in the bag was between 30 and 66 cm and in the cover between 28 and 50 cm (Table

4). Selectivity parameters for this mesh size were: $L_{50\%}$ = 38.5 cm, K_s = 2.96, d_s = 7.1 cm, $L_{25\%}$ = 30.2 cm (Fig.4). There was no by-catch of undersized halibut in the trawl bag at all.

Catches by the trawl with the mesh of 121 mm were 0.72-0.51 t in the bag and 0.05-0.10 t in the cover (Table 1). Selectivity parameters for trawl bags with 121 mm mesh size were: $L_{50\%}$ = 33.5 cm, K_s = 2.77, d_s = 7.3 cm, $L_{25\%}$ = 30.2 cm (Fig. 4). There was minor by-catch (less than 0.1%) of undersized halibut, less than 30 cm, in the trawl bag.

Discussion

As our experiments and investigations by other researchers (Chumakov *et al*., 1981; de Cardenus *et al*., 1995; Walsh *et al*., 2000) have shown selectivity coefficient of trawl bags varies according to the mesh size from 2.8 to 3.3, and selectivity range from 6.5 to 11.8 cm (Table 6).

In experiments done by Chumakov *et al*. (Chumakov *et al*., 1981) it was not possible to determine the selectivity range. This was presumably due to the method applied to determine selectivity – the use of ICES cover, which has a significant impact on the escape of fish from the trawl bag. For this reason these researchers in many cases failed to determine not only the 25% retention length, but 50% retention length too. Assessment of selectivity by using the trouser codend and bag-shaped cover provides a more objective characteristics of the escape of Greenland halibut through trawl bag mesh.

The analysis of data available has shown that currently applied minimum landing size of 30 cm for Greenland halibut does not accord with 25% retention by the trawl bag with the mesh size of 130 mm. This size should be in the range of 32-34 cm depending on the length of fish in the aggregations harvested. By-catch of fish less than 32 cm by trawls with the mesh size of 130 mm is 0.4-0.7%, less than 34 cm – 3.3-5.2%, and less than 36 cm - 7.9-12.8%.

Provided that the length of Greenland halibut corresponding to 25% retention for the mesh size of 130 mm is 32-34, their by-catch in the trawl bag would not exceed 0.7% for individuals less than 32 cm and 5.2% less than 34 cm, i.e. by-catch of juvenile halibut would be less than that established by the regulatory measures.

So, reinforced are our suggestions that in the fishery for Greenland halibut with 130 mm mesh trawl bags in the NAFO Regulatory Area the minimum landing size should be in the range of 32-35 cm (Lisovsky, 1995).

With this minimal landing size the by-catch of juvenile halibut will be less than 10%, which would ensure compliance with the Conservation and Enforcement Measures.

Walsh and others (Walsh *et al*., 2000) examined the selectivity of trawl bags with the mesh size of 145 mm. According to their findings 50% retention length was 47.7 cm and 25% retention length 44.0 cm. Their paper does not give a size composition of Greenland halibut aggregations, which were fished. However, if we apply our data for the size composition of halibut aggregations fished it could be found out that fishery using trawls with this mesh size would be economically unprofitable since a considerable number of fish up to 44 cm which constitute a major part of aggregations would escape.

To a certain extent a reduction of by-catch of juvenile Greenland halibut could be achieved with sorting grids which selectivity range for Greenland halibut is 2-3 times less than for mesh (Lisovsky *et al*., 1996).

Conclusions

In the fishery for Greenland halibut in NAFO Div. 3LMNO with a minimal mesh size of 130 mm a minimum landing size corresponding to 25% retention should be in the range of 32-34 cm, therewith allowable by-catch of juvenile halibut would be maintained at up to 10% in number. Such an increase of the minimum landing size would reduce fishing pressure on juvenile fish.

An increase of the mesh size in trawl over130 mm, given a current size composition of catches, would result in the trawl fishery for Greenland halibut in NAFO Div. 3LMNO becoming economically unprofitable due to a considerable escape of individuals to 44 cm which constitute a major part of aggregations.

Some reduction of by-catch of juveniles could be achieved by using sorting grids, which assure a narrower selectivity range.

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Table 1. Details of hauls to determine selectivity of trawl bags in Greenland halibut fishery by trawler " Mozdok" in Div. 3L

Date	Haul, no.	Start position		Start Time, h:min	Haul duration, h:min	Depth, m	Catch, kg		Mesh size, mm
		N degree, min.	W Degree, min.				bag	cover	
26.03.01	1	48.09.1	47.37.1	04:00	04:51	1200	933	174	132
27.03.01	3	48.08.8	47.39.7	12:10	04:10	1200	1672	286	132
31.03.01	4	48.09.9	47.37.7	05:30	05:00	1200	789	189	132
31.03.01	5	48.09.9	47.37.7	14:40	05:00	1200	788	359	132
01.04.01	6	48.09.7	47.37.4	14:30	05:00	1200	644	252	132
01.04.01	7	48.09.9	47.37.7	18:20	05:00	1200	878	256	132
02.04.01	8	48.09.8	47.38.0	8:20	05:00	1200	895	313	132
02.04.01	9	48.09.9	47.37.7	22:20	04:30	1200	794	335	132
05.04.01	11	48.10.2	47.37.2	14:40	04:50	1200	583	17	121
05.04.01	12	48.10.3	47.37.7	04:30	04:50	1200	650	19	121
06.04.01	13	48.10.2	47.14.4	11:10	05:30	1200	680	23	121
07.04.01	14	48.10.0	47.36.7	16:20	05:00	1200	673	21	121
08.04.01	15	48.10.4	47.36.5	01:50	05:00	1200	702	16	121
08.04.01	17	48.08.6	47.38.3	16:00	04:30	1000	738	13	121
13.04.01	18	48.10.2	47.38.7	15:00	05:00	1200	879	16	121
25.04.01	21	48.00.5	46.39.9	12:00	05:00	1000	879	171	130
26.04.01	24	48.00.8	46.43.3	14:20	05:00	880	892	310	130
27.04.01	26	48.00.1	46.40.4	18:20	05:00	1020	595	95	130
28.04.01	27	48.00.4	46.46.0	07:30	05:00	1040	693	191	130
28.04.01	28	48.01.9	46.43.1	20:40	05:00	880	601	128	130
29.04.01	29	48.01.6	46.45.2	08:40	05:00	780	482	341	130
29.04.01	30	48.01.1	46.43.1	21:30	05:00	880	494	306	130
01.05.01	32	48.02.8	46.44.9	06:30	05:00	850	557	77	121
02.05.01	34	48.00.9	46.43.2	12:30	05:00	880	634	47	121
03.05.01	35	48.02.5	46.45.3	01:50	05:30	780	569	79	121
03.05.01	36	48.01.5	46.42.9	15:30	05:20	880	724	46	121
04.05.01	37	48.02.0	46.44.9	05:30	05:30	770	713	99	121
04.05.01	38	48.02.0	46.44.7	19:20	05:20	770	587	76	121
05.05.01	39	48.16.5	46.30.6	02:30	05:30	770	513	73	121

Table 2. The catches of Greenland Halibut in codend with 132 mm mesh size and in the cover , *sp*., - (I-st tested)

Length of fish,cm	Haul 1		haul 3		haul 4		haul 5		haul 6		haul 7		haul 8		haul 9		**summ**	
	codend	cover	codend	cover	codend	Cover	codend	cover	codend	Cover	codend	cover	codend	cover	codend	cover	**codend**	**cover**
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
28	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	**0**	**2**
30	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	**0**	**3**
32	1	1	2	7	0	4	1	2	0	4	0	3	0	1	0	5	**4**	**27**
34	1	3	9	12	1	11	0	6	2	8	4	10	4	9	6	17	**27**	**76**
36	7	17	18	33	5	18	6	11	17	28	7	25	6	22	19	27	**85**	**181**
38	27	26	69	84	14	57	21	51	41	66	41	52	15	45	69	59	**297**	**440**
40	49	49	144	108	45	84	43	97	76	116	63	84	69	88	116	96	**605**	**722**
42	107	60	270	86	87	64	81	121	99	81	121	85	101	96	128	102	**994**	**695**
44	137	54	353	69	155	35	134	103	131	55	167	63	160	75	166	77	**1403**	**531**
46	219	21	377	19	179	17	151	60	139	19	236	35	204	53	145	56	**1650**	**280**
48	171	11	289	13	164	3	170	25	103	6	164	7	175	21	156	22	**1392**	**108**
50	122	2	165	3	76	1	99	6	59	1	85	7	97	13	66	6	**769**	**39**
52	58	0	62	1	36	0	31	1	25	1	35	0	39	3	27	2	**313**	**8**
54	29	0	32	0	22	0	16	1	10	0	11	0	29	0	10	1	**159**	**2**
56	10	0	13	0	8	0	12	0	9	0	6	0	9	0	6	1	**73**	**1**
58	2	0	11	0	6	0	11	0	3	0	6	0	6	0	4	0	**49**	**0**
60	6	0	4	0	3	0	10	0	2	0	2	0	2	0	0	0	**29**	**0**
62	2	0	4	0	3	0	0	0	0	0	0	0	2	0	0	0	**11**	**0**
64	0	0	0	0	2	0	1	0	1	0	0	0	2	0	0	0	**6**	**0**
66	1	0	0	0	1	0	5	0	1	0	3	0	2	0	0	0	**13**	**0**
summ	**949**	**244**	**1822**	**437**	**807**	**295**	**792**	**484**	**718**	**387**	**951**	**371**	**922**	**426**	**918**	**471**	**7879**	**3115**

Table 3. The catches of Greenland Halibut in codend with 121 mm mesh size and in the cover, sp., - (I-st tested)

Length of fish,cm	haul 11		haul 12		haul 13		haul 14		haul 15		haul 17		haul 18		**summ**	
	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	**codend**	**cover**
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
32	2	4	0	2	0	2	0	1	0	2	0	0	0	0	**2**	**11**
34	3	3	0	4	4	5	0	0	1	7	4	2	0	0	**12**	**21**
36	15	4	7	12	15	15	11	2	6	7	7	4	0	7	**61**	**51**
38	33	5	10	11	33	12	12	3	18	6	17	9	8	14	**131**	**60**
40	65	4	70	5	100	9	49	12	80	9	69	3	49	5	**482**	**47**
42	103	3	97	3	116	1	146	9	115	2	77	2	91	1	**745**	**21**
44	112	3	140	1	143	1	127	2	139	0	135	1	128	2	**924**	**10**
46	140	2	151	0	149	1	151	2	151	0	151	2	143	0	**1036**	**7**
48	99	1	131	0	128	0	125	1	127	0	129	0	176	0	**915**	**2**
50	49	0	70	0	49	0	64	0	69	0	58	0	101	0	**460**	**0**
52	22	0	14	0	15	0	22	0	26	0	33	0	53	0	**185**	**0**
54	10	0	11	0	9	0	5	0	7	0	21	0	33	0	**96**	**0**
56	4	0	2	0	6	0	3	0	5	0	8	0	21	0	**49**	**0**
58	2	0	5	0	5	0	4	0	8	0	6	0	9	0	**39**	**0**
60	1	0	1	0	1	0	4	0	2	0	4	0	6	0	**19**	**0**
62	1	0	0	0	0	0	0	0	0	0	4	0	5	0	**10**	**0**
64	0	0	1	0	0	0	0	0	3	0	2	0	4	0	**10**	**0**
66	0	0	0	0	1	0	3	0	0	0	1	0	3	0	**8**	**0**
summ	**661**	**29**	**710**	**38**	**774**	**46**	**726**	**32**	**757**	**33**	**726**	**23**	**830**	**29**	**5184**	**230**

Table 4. The catches of Greenland Halibut in codend with 130 mm mesh size and in the cover , sp., - (II-st tested)

Length of fish,cm	haul 21		haul 24		haul 26		haul 27		haul 28		haul 29		haul 30		**summ**	
	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	**codend**	**cover**
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
26	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**0**	**1**
28	0	0	0	2	0	0	0	0	0	0	0	2	0	0	**0**	**4**
30	0	1	3	14	0	2	0	0	0	1	3	4	0	1	**6**	**23**
32	2	7	16	37	2	4	1	7	1	5	11	25	1	23	**34**	**108**
34	20	21	57	69	16	12	1	7	19	25	28	120	8	68	**149**	**322**
36	50	41	96	108	20	21	5	38	26	32	44	126	30	95	**271**	**461**
38	62	69	180	156	50	38	52	56	60	56	70	138	56	150	**530**	**663**
40	128	68	219	113	102	37	74	78	112	59	114	123	111	110	**860**	**588**
42	184	47	225	65	136	21	118	65	122	31	115	67	125	73	**1025**	**369**
44	157	21	168	21	116	14	128	41	142	12	116	37	94	34	**921**	**180**
46	161	13	138	9	92	5	110	9	117	3	61	6	60	7	**739**	**52**
48	108	1	90	0	79	6	102	4	94	3	59	1	88	0	**620**	**15**
50	68	1	39	0	28	0	56	0	57	0	25	0	32	0	**305**	**1**
52	38	0	12	0	26	0	26	0	17	0	10	0	14	0	**143**	**0**
54	10	0	6	0	12	0	15	0	9	0	0	0	5	0	**57**	**0**
56	16	0	0	0	3	0	12	0	1	0	0	0	1	0	**33**	**0**
58	10	0	0	0	6	0	6	0	2	0	0	0	0	0	**24**	**0**
60	3	0	0	0	2	0	8	0	0	0	1	0	0	0	**14**	**0**
62	0	0	0	0	1	0	3	0	0	0	0	0	0	0	**4**	**0**
64	1	0	0	0	1	0	2	0	0	0	0	0	0	0	**4**	**0**
66	1	0	0	0	3	0	1	0	0	0	0	0	0	0	**5**	**0**
summ	**1019**	**290**	**1249**	**594**	**695**	**160**	**720**	**305**	**779**	**227**	**657**	**649**	**625**	**562**	**5744**	**2787**

Table 5. The catches of Greenland Halibut in codend with 121 mm mesh size and in the cover , sp., - (II-st tested)

Length of fish,cm	haul 32		haul 34		haul 35		haul 36		haul 37		haul 38		haul 39		**summ**	
	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	codend	cover	**codend**	**cover**
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
26	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**0**	**1**
28	0	0	0	2	0	1	0	0	0	0	0	1	0	0	**0**	**4**
30	0	2	0	2	2	2	0	0	0	5	2	5	0	4	**4**	**20**
32	8	8	11	9	7	18	5	7	20	22	17	19	13	12	**81**	**95**
34	43	30	26	15	38	27	14	30	40	51	37	42	23	33	**221**	**228**
36	64	27	85	30	59	30	66	19	59	57	59	42	46	25	**438**	**230**
38	109	34	91	14	94	40	127	23	134	48	90	36	106	36	**751**	**231**
40	151	25	144	12	150	19	146	12	163	21	158	10	151	23	**1063**	**122**
42	151	8	141	6	127	6	190	3	153	10	162	8	108	12	**1032**	**53**
44	122	12	144	3	118	9	140	1	131	1	106	3	123	3	**884**	**32**
46	56	3	95	2	80	5	123	1	106	1	94	2	62	1	**616**	**15**
48	61	0	94	1	61	1	84	1	78	0	76	0	48	0	**502**	**3**
50	21	0	18	0	30	0	40	0	56	0	16	0	30	0	**211**	**0**
52	7	0	5	0	14	0	10	0	20	0	3	0	3	0	**62**	**0**
54	0	0	3	0	1	0	8	0	3	0	2	0	4	0	**21**	**0**
56	0	0	1	0	2	0	2	0	1	0	0	0	0	0	**6**	**0**
58	1	0	0	0	0	0	1	0	0	0	0	0	0	0	**2**	**0**
60	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**	**0**
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
summ	**794**	**149**	**859**	**96**	**783**	**158**	**956**	**97**	**964**	**217**	**822**	**168**	**717**	**149**	**5895**	**1034**

Table 6. Selectivity Parameters of trawl bags with different mesh size in Greenland halibut fishery in NAFO RA as provided by various researchers

Mesh size, mm	Number of hauls	Duration of tow, h	L_{50}, cm	K_S	d_S, cm	L_{25}, cm	
121[1]	7	5	33,5	2,77	7,3	30,2	This paper
121[1]	7	5	35,5	2,93	6,5	33,0	This paper
130[1]	7	5	38,5	2,96	7,1	31,8	This paper
132[1]	9	5	40,0	3,03	10,5	34,0	This paper
127[2]	7	1,5	37,0	2,91	?	?	Chumakov *et al*., 1981 Nikeshin *et al*., 1983
130[1]	4	1	38,7	2,99	7,5	34,5	de Cardenas *et al*., 1995
130[1]	2	4	37,7	2,91	11,8	30,5	de Cardenas *et al*., 1995
133[3]	7	?	40,5	3,08	?	?	Chumakov *et al*., 1981 Nikeshin *et al*., 1983
135[3]	14	4	42,0	3,1	9,6	37,2	Huse *et al*., 1999
145[3]	14	4	47,7	3,29	7,4	44,0	Walsh *et al*., 2000

Method used to determine selectivity:
[1] – bag-shaped cover;
[2] - ICES type cover;
[3] – throuser bag.

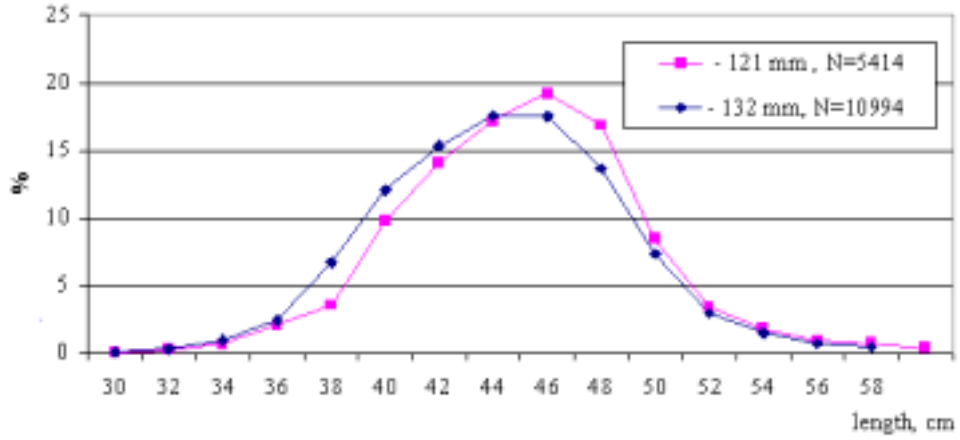

Figure 1. Size composition of Greenland halibut fished with trawl of different mesh size in the I test.

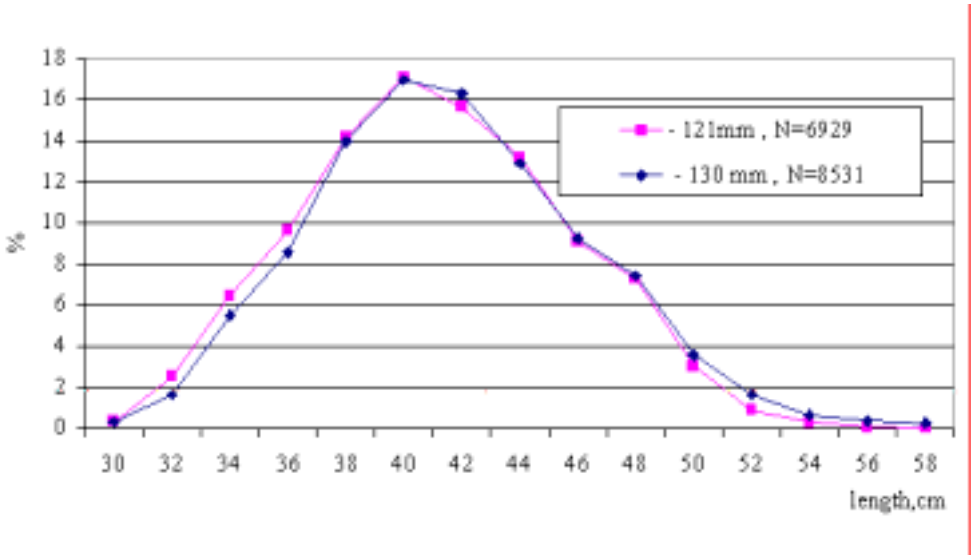

Figure 2. Size composition of Greenland halibut fished with trawl of different mesh size in the II test.

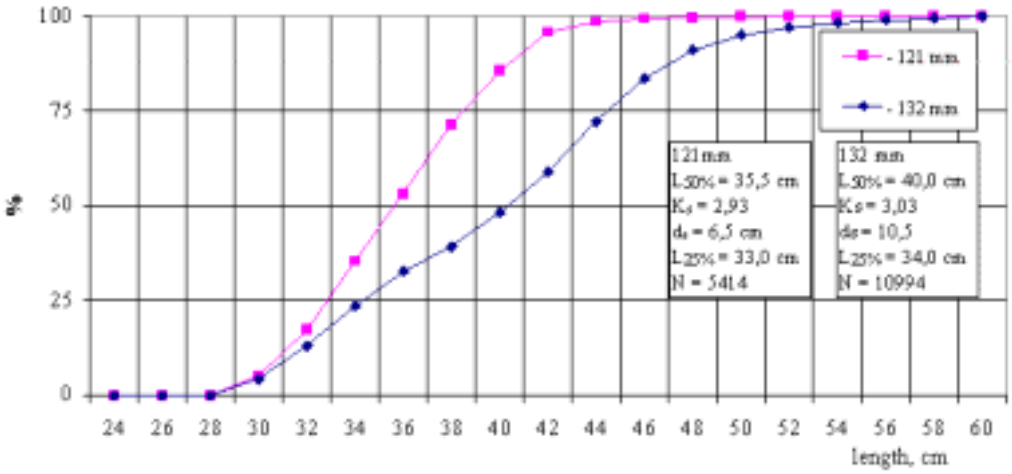

Figure 3. Selectivity of trawl bag with the mesh size 121 mm and 132 mm in Greenland halibut fishery (I test).

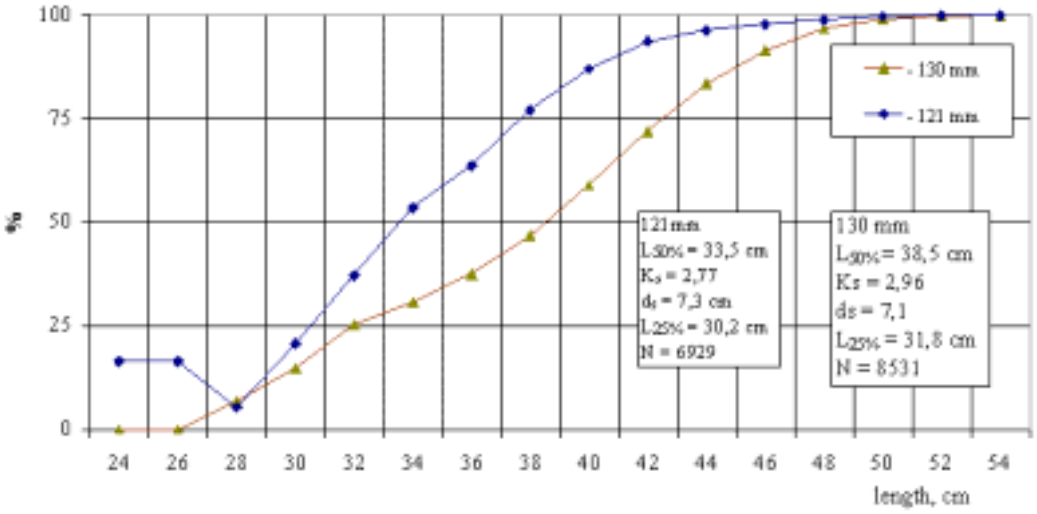

Figure 4. Selectivity of trawl bag with the mesh size 121 mm and 130 mm in Greenland halibut fishery (II test).