Northwest Atlantic Fisheries Organization

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CORRIGENDUM

SCIENTIFIC COUNCIL MEETING - JUNE 1995

Preliminary Length Selection Curves of Trawl Fishing for Greenland Halibut (*Reinhardtius hippoglossoides*)

by

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Please correct the following errors:

Page 3, lines 1 and 2. "thus the l_{50} can come out larger than it actually is,"

SHOULD READ

"thus the L_{50} can come out lower than it actually is,"

Page 5, Table 2. the title at the last column in Table 2 should say 100 mm codend, not 135 mm.

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Abstract

A selection curve for Greenland halibut (*Reinhardtius hippoglossides*, Walbaum) is drawn, based on alternating trawlhauls with 100 and 135 mm meshes in extension and codend, used in the Norwegian research fishery in June 1993. The SELECT model made by R.B. Millar is used to fit the selection curve and calculate the essential parameters. The results indicate a l_{50} at 36 cm. The selectivity curve made is based on very few points in the lower end of the size-range, probably because of overlapping selectivity curves for the meshsizes used. A selection experiment will be done in August 1995 to complete the curve. To establish the upper part of the curve a comparison to longline-catches and gillnetcatches from different meshsizes will be done.

Introduction

In 1992 strict regulations were introduced in the fisheries for Greenland halibut in the north east Atlantic (ICES subarea I and II) due to very low stock levels and several signs of recruitment failure. Since then the direct fishing for Greenland halibut with trawlers and conventional vessels larger than 27.5 m has been forbidden. The latest calculations estimated the total stock in 1992 and 1993 to be approximately 60.000 tons. During the years after the fishing stop a research fishery has taken place each spring and fall. These fisheries have been conducted with the use of commercial trawlers, longliners and gillnetters. For a report on the to maintain a data series which can be employed, along with results from other surveys, to yield a stock size index. In order to refine this index it is necessary to estimate the selectivity properties of the gears used in the surveys.

Materials and methods

Data from three paris of trawl hauls were retroactively chosen for selectivity analysis from sampling stations occupied during the last few days of the spring 1993 multi-gear test fishery. The approach was intended to opportunistically approximate an alternate-haul selectivity experiment, comparing catches made with one trawl with a codend and extension made from 100 mm netting versus catches obtained with 135 mm netting in the same sections of an otherwise identical trawl. Three pair-hauls were selected. Both tows in each reconstructed pair were made within one hour and 10 nautical miles of each other.

The trawler used for the trials was the factory-trawler 'Kongsfjord', (1662 GRT 3300 Bhp Loa 56.90). The trawls used were two standard two-seam 'Alfredo 5' commercial cod trawls, spread by slotted oval doors (2500 kg). All hauls were carried out in Norwegian statistical areas 4 and 12 within ICES subarea IIa (Table 1). The analyzing was done using the SELECT- method, described by A.D. Millar. (Millar 1991, 1993, Millar and Walsh 1992). The programs used were made available in a draft 'Methodology manual, Measurement of fishing gears selectivity', that was presented by J.J. Foster in the FTFB meeting i Aberdeen 19-21 April 1995.

Results

The length distributions from the experimental hauls (Table 2) show quite similar size compositions taken by the two different codends. The selectivity curve (Figure 1) made from the combined datasets of all three hauls has a l_{50} at 36 cm and a narrow selection range (35.9-36.1 cm) (Table 3). The selection curve presented here is not finite.

Discussion

The slope of the 'curve' and the very short 'selection-range' from this analysis, suggest that the data are inappropriate to fulfill the model, and a followup experiment should be done. This selection curve shows a l_{50} at 36 cm. This is 7 cm smaller than previously reported by Nedreaas (1991). The difference could be explained by the fact that the shrimptrawl catches and fishtrawl catches the Nedreaas study of 1991 were taken in different areas. This can give an unrealistically high l_{50} if undersized Greenland halibut is over-represented in the areas where the shrimp trawl was used. In the present study the areas and time are essentially the

same, but here the meshes can have overlapping selection curves, thus the l_{50} can come out larger than it actually is. Jørgensen and Boje (1991) show that large Greenland halibut are under-represented in trawl catches compared to longline catches. This may suggest that the actual selectivitycurve for Greenland halibut in trawls are bell-shaped. To evaluate the degree of 'bell-shaping' in the selection curve the trawl catch data will be compared to the existing data from longline and gillnet catches and from data to be collected in August. Planned selection trials for the 135 mm codend will be performed in August 1995 with 65 mm and 135 mm mesh sizes in each of the two codends in a single trawl.

Acknowledgements

Sincere thanks are due to Charles W. West for critizing this working note and correcting the English.

References

Hovgård, H. og F.F. Ridget, 1992 'Comparison of longline and trawl selectivity in cod surveys off West Greenland' *Fish. Res.*, 13:pp. 323-333.

Millar, R.B. and Walsh, S.J., 1992. Analysis of trawl selectivity studies with an application to trouser trawls. Fish. Res., 13:105-220.

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Nedreaas, K. 1991. 'Minimum legal length of Greenland halibut (*Reinhardtius hippoglossoides)* in ICES Sub-areas I and II, and suggested criteria for legal bycatch of shorter specimens.' *Working Document, ICES Artic Fisheries Working Group*, 10-19 Sept, 1991.

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Table 1. Trawlstations used in the selection calculations

OBS	Statistical area nr.	Towing speed	Start time	Stop time	Distance, nm	Date
1	04	4.0	1:50	5:50	16.0	04/06/93
2	04	4.0	6:55	11:55	20.0	04/06/93
3	12	4.0	7:05	12:00	19.7	05/06/93
4	12	4.0	12:55	19:00	24.3	05/06/93
5	12	4.0	7:05	10:05	12.0	06/06/93
6	12	4.0	11:45	16:00	17.0	06/06/93

OBS	Degrees latitude	Minutes latitude	Degrees longitude	Minutes longitude	Meshsize, mm
1	70	54	17	07	100
2	70	46	17	06	135
3	72	22	15	04	135
4	72	22	15	02	100
5	71	35	15	50	100
6	71	34	16	13	135

Table 2. Length frequency distribution of Greenland halibut

OBS	Length	135 mm codend, pair 1	100 mm codend, pair 1	135 mm codend, pair 2	100 mm codend, pair 2	135 mm codend, pair 3	135 mm codend, pair 3
1	35	0	0	0	1	0	0
2	36	1	0	0	1	0	1
3	37	1	0	1	2	0	0
4	38	5	1	5	4	1	2
5	39	1	2	4	1	1	1
6	40	4	2	10	7	1	3
7	41	5	0	11	8	3	1
8	42	3	4	11	9	5	1
9	43	11	11	15	21	4	5
10	44	7	16	13	16	7	3
11	45	11	17	20	22	7	1
12	46	5	10	17	17	11	5
13	47	12	13	19	23	6	0
14	48	13	14	23	14	10	5
15	49	10	9	11	15	17	6
16	50	15	18	18	16	8	7
17	51	10	9	9	9	10	3
18	52	15	17	13	9	5	10
19	53	15	23	11	4	12	8
20	54	10	14	6	7	7	5
21	55	10	11	9	8	13	3
22	56	11	13	6	10	10	5
23	57	4	8	2	6	6	7
24	58	9	7	6	3	3	4
25	59	6	4	5	3	7	6
26	60	2	7	4	4	9	2
27	61	4	3	7	3	4	3
28	62	1	1	0	1	2	4
29	63	4	3	3	3	4	3
30	64	3	3	0	3	3	4
31	65	1	3	2	2	3	6
32	66	2	2	3	1	2	3
33	67	3	0	1	4	4	5
34	68	0	1	1	2	1	3
35	69	0	0	0	0	1	2
36	70	2	0	0	1	1	1
37	71	1	0	0	0	2	0
38	72	0	0	0	0	0	3
39	73	1	0	0	0	1	2
40	74	1	0	1	1	0	0
41	75	0	0	0	0	1	0
42	79	0	0	1	0	0	1
43	81	0	0	0	0	1	1
44	85	0	0	0	1	0	0

Table 3. Calculated parameter estimates for the combined set of data.

Parameter Estimates and Asymptotic Standard Errors

Sets Combined

A	-456.2897	stderr_a	20894.013	for the curve given by $P(\text{length}) = \frac{1}{1+ e^{-a-b \times \text{length}}}$
B	12.671519	stderr_b	580.38949	
P	0.5147839	stderr_p	0.01421	→ relative fishing efficiency

Goodness of Fit Statistics

Deviance		36.725343	
df		41	
prob		0.6609934	← no apparent reason to suspect the log.relation to be inappropriate

L25	35.922377	stderr_L25	3.5593318
L50	36.009076	stderr_L50	0.4548738 ← L_{50}
L75	36.095775	stderr_L75	4.3913146
S.R.	0.1733987		

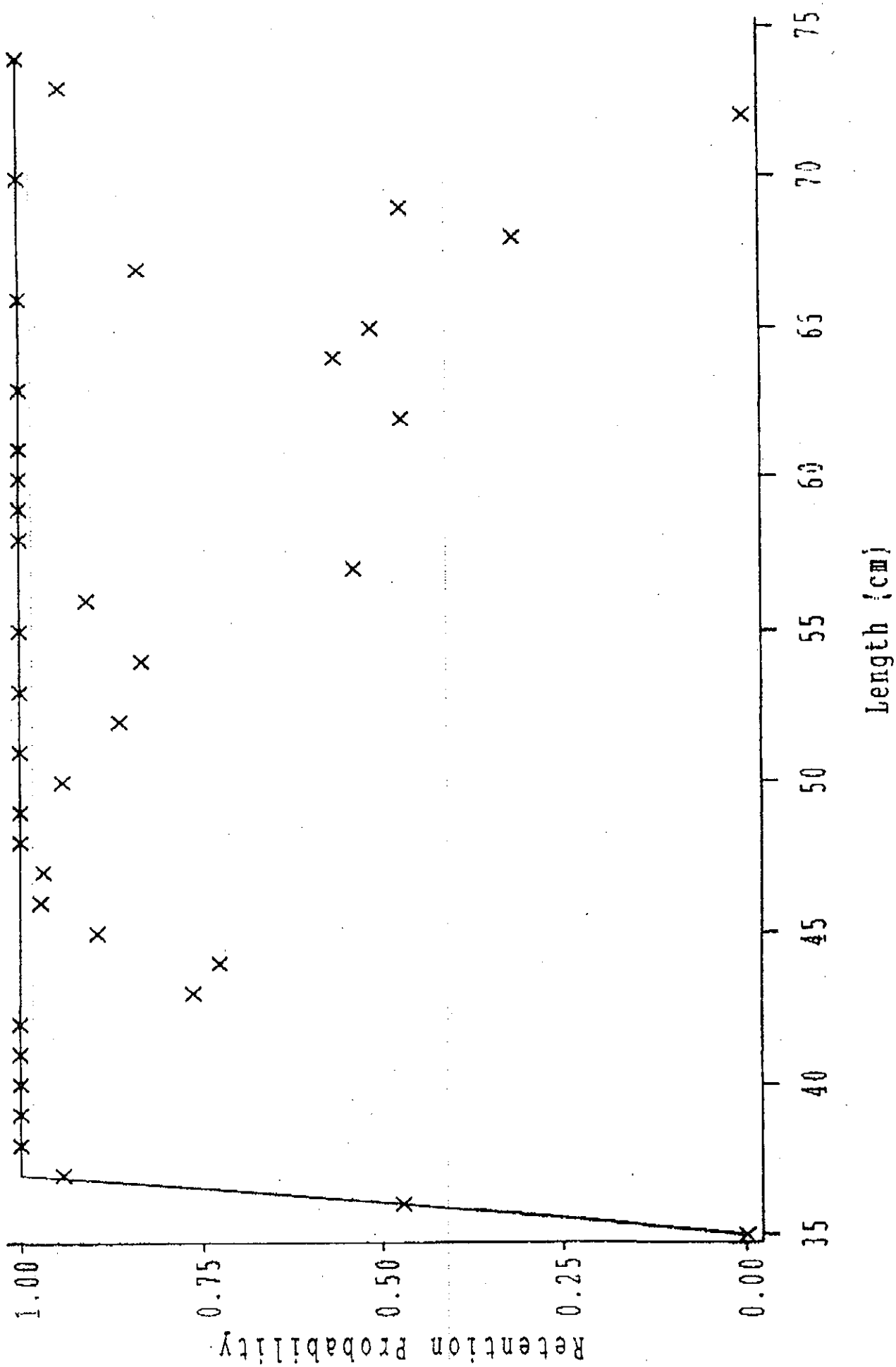
Combined Selectivity Curve and Points, p removed
Retention Probability
1.00
0.75
0.50
0.25
0.00
35
40
45
50
55
60
65
70
75
Length (cm)

Figure 1.