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Review of Bottom Trawl Codend Mesh Selection Studies in the Northwest Atlantic

by

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Abstract

The literature was search for results of bottom trawl codend mesh selection studies for Atlantic cod, American plaice, yellowtail flounder and Greenland halibut. With one exception all studies were restricted to Northwest Atlantic. In some cases when data were available and no parameters estimated, the authors estimated them using a logistic model. Much of the data appears in the 'grey' area of the literature.

Introduction

In recent years there has been several requests from Fisheries Commission for information and advice on effect of changing mesh size regulations for various groundfish species in the NAFO area. Often this information is not readily available.

The purpose of this paper is to summarize the available information on codend mesh selection for cod, American plaice, yellowtail flounder and Greenland halibut.

Materials and Methods

The literature was search for results of bottom trawl codend mesh selection studies. With one exception all studies were restricted to Northwest Atlantic. In some cases when data were available and no parameters estimated, the authors estimated them using a logistic model. Much of the data appears in the 'grey' area of the literature.

Results

Tables 1 –4 presents listing of results of studies found. Minimum landing sizes by NAFO and Canada are also given.

Discussion

This may not be an exhaustive study and any studies omitted can be incorporated in an update by contacting the authors.

Table 1 Codend mesh selectivity studies of Cod						
SUMMARY CHART						
SPECIES: COD	NAFO MINIMUM LANDING SIZE: 41CM			CANADIAN MINIMUM LANDING SIZE: 43CM		
PARAMETER/MESH SIZE	130 mm Dia		140 mm Dia	145 mm Dia	155 mm Dia.	
Selectivity					*	
L25	38.5	43.9	53.1	55.8	59.5	
L50	43.2	49.5	58.7	60.8	64.6	
L75	48	55.1	64.3	65.9	69.7	
SF	3.3	3.8	4.2	4.1	4.2	
SR	9.5	11.2	11.2	10.2	10.2	
Method	Trouser	Trouser	Trouser	Trouser	Trouser	
Vessel Type	Research	Commercial	Research	Commercial	Research	
No. of hauls	9	26	49		15	
Tow Duration (hrs)	0.2 - 2.5	0.4 -3.7	0.2 -2.5		0.2 -2.5	
Location	Scotian S.	Scotian S.	Scotian S.	3KL	Scotian S.	
Model analysis	SELECT	SELECT	SELECT	SELECT	SELECT	
Country	Canada	Canada	Canada	Canada	Canada	
Reference	1	1	1	2	1	
Comments				*149mm		
Reference List						
1 R.G. Halliday, C.G. Cooper, P. Fanning, W.M. Hickey, P. Gagnon 1999 Size selection of Atlantic cod, haddock and pollock (saithe) by otter trawls with square and diamond mesh codends of 130-155 mm mesh size. Fisheries research 41 :255-271						
2 W.M. Hickey, G. Brothers and D.L. Boulos A study of selective fishing methods for the northern cod otter trawl fishery Canadian Technical Report of Fisheries and Aquatic Sciences No 1934						

Table 2 Codend mesh selection studies in American plaice.									
SUMMARY CHART									
SPECIES: AMERICAN PLAICE			NAFO MINIMUM LANDING SIZE: 25 CM						
PARAMETER/MESH SIZE	127 mm dia	130 mm Dia					134 mm dia	140 mm Dia	155 mm Dia.
Selectivity		*	*						
L25		27.5	26.5	28.1	28.05	24.75		33.6	34
L50	28	31.1	29.5	31.6	32.34	29.75	31.5	38.4	38.2
L75		34.8	32.5	35.1	34.89	32.72		43.2	42.4
SF	2.2	2.4	2.3	2.4	2.5	2.3	2.4	2.7	2.5
SR		7.3	6	7	6.8	8		9.6	8.5
Method	alternate	trouser	cover	uncovered	cover	cover	alternate	trouser	trouser
Vessel Type	research	research	research	research	commercial	commercial	research	research	research
No. of hauls		15			1	1		15	15
Tow Duration (hrs)	1-3hrs	0.5			1	4	1-3 hrs		0.5
Location	Grand Bank	Grand Bank			Grand Bank	Grand Bank	Grand Bank	Grand Bank	Grand Bank
Model analysis	by eye	SELECT	LOGISTIC	LOGISTIC	LOGISTIC	LOGISTIC	by eye	SELECT	SELECT
Country	USSR	Canada	StatesUnited States		Spain	Spain	USSR	Canada	Canada
Reference	5	1,	3	3	4	4	5	1,	1,
Comments			*131mm	*131mm					
Reference list									
1 Walsh, S.J. R.B. Millar, C.G. Copper and W.M. Hickey 1992 Codend selection in American plaice:diamond versus square mesh Fisheries Research , 13:235-254									
2 Douglas Clay Current mesh selection studies on the scotian shelf in relation to historical selectivity data. ICNAF Selected Papers 5:49-60									
3 Ronald Joel Smolowitz Mesh size and the New England groundfishery - Applications and implications july 1983. NOAA Technical Report. NAFS SSEF-771: 22p									
4 de Cardenas, E., A.A. de Melo, S. Iglesias and F. Saborido 1995 Selectivity of 130 mm mesh size in deep sea bottom trawl fishery in NAFO Regulatory Area. NAFO SCR Doc. 95/47									
5 Konstantinov, K.G, A.K. Chumakov, K.N. Nkeshin and V.G. Kovaleno 1982 On validity of trawl mesh size used in fishing area of the Norhwest Atlantic. NAFO SCR Doc. 82/VI/14									

Table 4 Codend Mesh selection studies in yellowtail flounder											
SUMMARY CHART											
SPECIES: yellowtail flounder											CANADIAN MINIMUM LANDING SIZE: 30CM
PARAMETER/MESH SIZE	127 mm Dia.	129 mm Dia.	133 mm Dia.			140 mm Dia.			145 mm Dia.	152 mm Dia.	155 mm Dia.
			133 mm	133 mm	134 mm	140 mm	140 mm	140 mm			155 mm
Selectivity											
L25		27.2	24.5	29.1		32.5	32.0	33.5	29.8	36.2	31.6
L50	27.0	30.2	28.5	30.5	28	34.6	34.0	34.7	34.0	38.1	36.9
L75		33.1	31	34.0		36.4	35.0	36.2	38.3	40.0	42.4
SF	2.1	5.9	2.2	2.3	2.1	3.9	2.4	2.6	8.5	3.9	8.4
SR		2.3	8.6	4.9		2.5	3.0	2.7	2.4	2.5	2.5
Method	alternate	parallel hauls	cover	alternate	alternate	alternate hauls			parallel hauls	parallel hauls	trouser
Vessel Type	research	commercial	commercial	commercial	research	commercial			commercial	commercial	research
No. of hauls		6							6		15
Tow Duration (hrs)	1-3hrs	1			1-3hrs				1		0.5
Location	Grand Bank	Nantuket shoals			Grand Bank				Nantuket shoals		Grand Bank
Model analysis	by eye	SELECT			by eye				By eye		SELECT
Country	USSR	United States			USSR	United States			United States	United States	Canada
Reference	5	1	2	2	5	4	2	2	1	4	3
Comments		Walsh estimation of data 129 mm mesh				Carr Unpublished			Carr unpublished	Walsh Unpublished	
1 Lux , F.E 1968 Codend mesh selection of yellowtail flounder Limanda ferruginea (Storer) ICNAF Res. Doc. 68/91											
2. Anon 1993 Report of the 15th Northeast regional Stock Assessment Workshop NOAA/NMFS Ref Doc 93-06											
3. Walsh., S.J. 1988 unpublished data collected during American plaice codend mesh selection study see Walsh 1992 study for details in plaice table											
4 Arnold Carr 1999 Massachussets Division of Marine Fisheries, USA: unpublished data											

Table 4 Codend mesh selection studies in Greenland Halibut						
SUMMARY CHART						
SPECIES: GREENLAND HALIBUT	NAFO MINIMUM LANDING SIZE: 30CM			CANADIAN MINIMUM LANDING SIZE:45CM		
PARAMETER/MESH SIZE	130 mm Dia			145 mm Dia		
	127 mm	133 mm	130 mm	130 mm	135 mm	
Selectivity						
L25			34.5	30.5	37.2	43.2
L50	36.5	40.5	38.9	37.6	42.0	47.2
L75			41.9	42.3	46.8	50.7
SF	2.9	3.1	3	2.9	3.1	3.3
SR			7.4	11.8	9.6	7
Method	cover	cover	cover	cover	trouser	trouser
Vessel Type	Research	research	commercial	commercial	commercial	Commercial
No. of hauls			1	1	4	15
Tow Duration (hrs)	1.5	1.5	1	1	1	4
Location	Labrador	Off Baffin			Barents Sea	NE Nfld shelf
Model analysis			LOGISTIC	LOGISTIC	SELECT	SELECT
Country	USSR	USSR	Spain	Spain	Norway	Canada
Reference	1	1	2	2	3	
Comments						DFO unpublished
1Chumakov, A.K., K.N. Nikeshin and A.S. Gorshkova 1981 Bottom trawl codend selectivity for Greenland halibut in NAFO Subarea), Div. 2H, 2J and 3K NAFO SCR Doc. 81/IX/89						
2 de Cardenas, E., A.A. de Milo, S. Iglesias and F. Saborido. 1995. Selectivity of 130 mm mesh size in deep sea bottom trawl fishery in NAFO Regulatory Ara. NAFO SCR Doc. 95/47.						
3 Huse, I., A.C. Gunderson and K.H. Nedreaas 1995. Relative selectivity of Greenland halibut (Reinhardtius hippoglossides, Walbaum) by trawls longlines and gillnets. Fisheries Research 44:75-93.						