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ANNUAL MEETING - JUNE 1963Mesh Selection of Haddock in Divisions 3N and 3Oby V. M. Hodder  
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Considerable interest was shown by the Subcommittees for Assessments and for Gear and Selectivity at the 1962 Annual Meeting of ICNAF in recent investigations on redfish selectivity by Bohl (1962). From covered codend experiments carried out on East Greenland fishing grounds, he found that there was a clear negative relationship when the selection factors calculated for each catch were plotted against the quantity of redfish in the codend, and he states that from a biological point of view a sensible minimum mesh size for redfish can never be derived from selection data which are mainly based on small or medium catches, since redfish are often caught in large quantities. A similar phenomenon was demonstrated by von Brandt (1961) for redfish of Subarea 1. Consequently, member countries of ICNAF were urged to examine their selectivity data for all species of groundfish from this point of view. The main interest of this phenomenon to the Assessment Subcommittee lies in the effects that reduced selection factors resulting from large catches might have on the mesh assessments which have already been made (Assessment Report, 1962).

In 1959 and 1960 investigations on the selection of haddock were carried out by the research trawler A.T. Cameron on haddock concentrations in ICNAF Divisions 3N and 3O. The gear consisted basically of the No. 41-5 Yankee trawl, but nets of two different series of mesh sizes were tested against a standard small-meshed trawl. The method of alternate hauls was used and the procedure was to alternate most of the net (the codend, lengthening piece and after section of the belly) rather than just the codends. The nets used were manila throughout and for convenience are labelled B, C and D. Net B generally ranged from about 3 inches in the codend, lengthening piece and after section of the belly to about 5 inches in the wings and square; Net C ranged from about 4 inches or a little less to 5 inches in the forward parts, and Net D from about  $4\frac{1}{2}$  inches to 5 inches. For one series of drags with Net D a codend of about 5 inches was also tested.

The catches, consisting mostly of haddock with small quantities of cod, ranged from about 10 to 400 baskets (1 basket = 95 lb. = 43 kg.), but only 2 catches with over 200 baskets were recorded. The fork length measurements of the fish were made to the nearest centimeter. Due to the large quantities caught, it was not possible in many cases to take length measurements of the entire catches, but usually a random sample of about 1,000 haddock were measured from each catch. The mesh measurements were made with the ICNAF wedge-type gauge using a pressure of approximately 12 lb.

There was great variation in the size of the individual catches of the nets used, but the number of hauls with each net during a cruise were so few as not to make it feasible in this preliminary analysis to consider the data from the viewpoint of having more than two major catch size categories for each net comparison. Only the results of those series of hauls with sufficiently wide ranges of catch size have been selected for this analysis. These are given in Tables I and II. For the data of Table II all hauls were of 40 minutes duration, but of the 7 hauls involved in each comparison of Table I, 5 were 60 minutes and 2 were 40 minutes.

The results in all cases indicate that the selection factors for the large catches are slightly lower than those estimated for the smaller catches for an equal amount of fishing effort in the same area on the same concentrations. However, there is no indication that, as Bohl (1962)

suggests for redfish, the selection factor is reduced to the extent that escapement through the meshes of the net is drastically decreased. Even for the large catches the selection factors, which range between 3.1 and 3.4 for the overall results, are very similar to those by Clark (1957) for covered hauls on Georges Bank haddock. In the present data the 25-75% selection span, as estimated, varied between 7 and 10 cm., the average being about 8 cm.

The selection ogives used for the mesh assessments on haddock in Subareas 3, 4 and 5 (ICNAF Assessment Report, 1962) were based on the summary of selectivity data by Clark, McCracken and Templeman (1958). Their results were based largely on covered codend experiments and relatively small catches, and a selection factor of 3.2 with a 25-75% selection span of 8 cm were derived from them for use in the mesh assessments for haddock. This value for the selection factor is essentially the same as those summarized in Tables I to II of this paper. It would seem, therefore, that haddock escapement is not restricted by catch size to the same extent as has been indicated for redfish. The difference in escapement of the two species would seem to be due to the obvious differences in shape and other external characteristics such as the absence or presence of hard spines.

#### References

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Table I. Selection experiments on haddock by alternate hauls in ICMAF Division 30 during May 13-23, 1960.

NEP	B	C	D
Bunrage - codend - length, piece	60/1 double manila 60/1 single manila	50/1 double manila 60/1 single manila	50/1 double manila 60/1 single manila
Ave. mesh size - coxend - length, piece	2.65 in (67 mm) 2.33 in (61 mm)	3.65 in (93 mm) 3.32 in (85 mm)	4.22 in (108 mm) 4.20 in (107 mm)
Catch category	Small	Large	Total
No. of hauls	7	7	14
Total wt. haddock (baird.)	301	592	1,155
Range of catch size (baird.)	18-61	100-165	
Total no. haddock (calc.)	27,529	76,133	103,662
Est. 50% retention length (cm)	—	—	—
Selection factor (based on codend mesh size)	—	—	—
	Small	Large	Total
	7	7	14
	317	624	971
	27-70	71-107	
	29,536	52,600	82,136
	31.5	30.5	30.5
	3.39	3.28	3.28
	35.5	33.3	34.5
	3.23	3.05	3.24

Table II. Selection experiments on haddock by alternate hauls in ICNAF Division 3N during July 8-21, 1960.

NET	B			C		
Runnage - codend - length. piece	60/3 double manila 60/4 single manila			60/4 double manila 60/4 single manila		
Ave. mesh size - codend - length. piece	2.88 in ( 73 mm) 3.27 in ( 83 mm)			4.25 in (108 mm) 4.08 in (104 mm)		
Catch category	<u>Small</u>	<u>Large</u>	<u>Total</u>	<u>Small</u>	<u>Large</u>	<u>Total</u>
No. of hauls	10	10	20	10	10	20
Total wt. haddock (bask.)	745	2,042	2,787	486	1,176	1,662
Range of catch size (bask.)	50-90	107-396		12-72	77-180	
Total no. haddock (calc.)	63,451	172,225	235,676	36,980	90,509	127,489
Est. 50% retention length (cm)	—	—	—	36.0	34.5	35.0
Selection factor (based on codend mesh size)	—	—	—	3.33	3.19	3.24
NET	B			D <sub>1</sub>		
Runnage - codend - length. piece	{ same as above }			50/4 double manila 60/4 single manila		
Ave. mesh size - codend - length. piece	{ same as above }			4.31 in (109 mm) 4.46 in (113 mm)		
Catch category	<u>Small</u>	<u>Large</u>	<u>Total</u>	<u>Small</u>	<u>Large</u>	<u>Total</u>
No. of hauls	5	5	10	5	5	10
Total wt. haddock (bask.)	348	576	922	168	412	580
Range of catch size (bask.)	50-84	90-154		9-57	69-104	
Total no. haddock (calc.)	29,773	47,664	77,437	12,447	30,096	42,543
Est. 50% retention length (cm)	—	—	—	37.5	36.5	37.0
Selection factor (based on codend mesh size)	—	—	—	3.44	3.35	3.39
NET	B			D <sub>2</sub>		
Runnage - codend - length. piece	{ same as above }			60/4 double manila 60/4 single manila		
Ave. mesh size - codend - length. piece	{ same as above }			4.93 in (125 mm) 4.67 in (119 mm)		
Catch category	<u>Small</u>	<u>Large</u>	<u>Total</u>	<u>Small</u>	<u>Large</u>	<u>Total</u>
No. of hauls	5	5	10	5	5	10
Total wt. haddock (bask.)	477	1,388	1,865	116	516	632
Range of catch size (bask.)	59-140	152-396		13-36	44-187	
Total no. haddock (calc.)	41,218	117,007	158,225	7,523	34,180	41,703
Est. 50% retention length (cm)	—	—	—	43.5	40.5	41.5
Selection factor (based on codend mesh size)	—	—	—	3.48	3.24	3.32