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Report of the 1962 Iceland Trawl Mesh Selection Working Group

INTRODUCTION

Following a request from the Permanent Commission, the North-Western Working Group was set up in May, 1960 to investigate the state of the fish stocks in the northern part of the Convention Area outside the north-east Arctic. This Group was to analyse the effects on the fish stocks of further increases of mesh sizes above 110 mm.

During its work the Group felt the need for more selectivity data for some of the more important species and it therefore passed the following recommendation for the consideration of the Liaison Committee:-

"1. Selectivity data for cod, haddock, redfish and coalfish in Icelandic waters are needed. It is thought that these could most effectively be obtained by an international experiment along the lines of those carried out in the North Sea and the Arctic in 1959 and 1960. Accordingly, the Group recommends that the attention of the Chairman of the Comparative Fishing Committee be drawn to this proposition at an early date, with a view to planning an experiment of this kind at the 1961 meeting of the Council".

This recommendation was adopted by the Comparative Fishing Committee at its 1961 meeting and Mr. Jón Jónsson was asked to act as Organiser of the experiment.

During the detailed planning he was assisted by Mr. A.R. Margetts who also undertook to work out the first results for presentation at the 1962 ICES Meeting.

The experiments were carried out during the months April to September, 1962.

As an outcome of co-operation between ICES and ICNAF, Canada also took part in the experiment.

At the 1962 ICES Meeting, Mr. Margetts gave a summary of the results obtained so far, and at that meeting it was decided to have the results worked out in full detail by a Working Group. This Group was to be composed of representatives of the countries which took part in the experiment. Mr. Jón Jónsson was made Convenor of this Group with special assistance by Mr. Margetts.

The Group met at Charlottenlund, Copenhagen, 3 - 7 December, 1962.

Participants:- Jón Jónsson (Convenor, Iceland)
A.R. Margetts (England)
H. Bohl (German Federal Republic)
E. Bratberg (Norway)
J. Pope (Scotland)
A.I. Treschev (U. S. S. R.)
L.K. Bøerema (Liaison Committee)
E. Akyuz (by special agreement with FAO)

Unfortunately a representative for Canada was not able to attend the meeting but, although not a member of ICES, Canada has kindly reported her collected data and allowed this Working Group to interpret them in their own manner.

The Experiments

During the summer months of 1962 seven countries with eight ships took part in co-ordinated trawl mesh selection experiments in Icelandic waters.

The chief aim of the experiments was to establish the selectivity, on the principal commercial species, of double-braided manila trawl cod-ends. This was to be done by use of the covered cod-end technique. Further aims were: the comparison of selectivities measured by the alternate or paired haul techniques with those measured by the covered cod-end technique; measurement of the selectivity of cod-ends made from various other commonly used materials; and investigation of the effect on selectivity of forms of cod-end top-side chafers.

The ships were of three classes, the large stern-trawler 'Goncharov', the small cutter-type side trawler 'María Julía', and the others all side trawlers of similar size to each other (Table 1).

In July 'Ernest Holt', 'A. T. Cameron' and 'María Julía' fished simultaneously on the same grounds; otherwise ships worked individually.

'G. O. Sars', 'Johan Hjort', 'Explorer', 'Anton Dohrn' and 'Goncharov' made only covered hauls. 'María Julía' made mostly covered hauls with some alternate hauls, while 'Ernest Holt' and 'A. T. Cameron' each made some covered hauls but took advantage of their fishing together to make paired alternate hauls, one ship fishing a small mesh simultaneously with the other fishing a large mesh, and each ship changing from large to small mesh and vice versa after two hauls. 'Ernest Holt', 'A. T. Cameron', 'María Julía', 'G. O. Sars' and 'Johan Hjort' used only manila cod-ends. 'Anton Dohrn' used manila and Perlon, 'Explorer' manila and nylon, and 'Goncharov' manila and Kapron. 'Goncharov' was the only ship to employ top-side chafers; two forms of chafer were used and comparative hauls were made with and without chafers.

All covered cod-end hauls were made with top-side covers of 35-70 mm mesh made of polyethylene, hemp or polyamide, and all except the nylon cod-end used by 'Explorer' and the Norwegian cod-ends were with the bottom side of the cod-end blinded on the inside.

One of the Russian top-side chafers was a modification of the ICNAF type. Its specifications were that it was of the same mesh size as the cod-end, and of the same length, fixed at the forward end and open at the rear, and of a width such that the ratio of perimeter of chafer to perimeter of cod-end was as 5:4. The second Russian top-side chafer might more correctly be called a double cod-end. This was of the same mesh size as the cod-end and laced mesh for mesh along all four edges without an opening near the cod-line. Such a top-side chafer was used at times to cover the whole of the cod-end and at other times to cover only the after half of the cod-end, but always with the ratio of perimeters of chafers to underlying cod-end as 1:1.

The great majority of the hauls were of duration between one and two hours. Fish were measured to the nearest cm, the lengths being total except by Canada (fork length) and without the lobes of the tail fin smoothed down except by Scotland. Girth measurements were made of samples, either or both of the natural maximum

body girth or maximum head girth (around rear edge of operculum) being recorded.

Weather conditions during the course of the experiments were mostly very fine indeed.

In the absence of the official ICES gauge, meshes were measured with other spring-loaded gauges which were subsequently calibrated against the ICES gauge.

The Data

The data collected were on selection of cod, haddock and redfish (type marinus) by cod-ends made of double manila, double Kapron, double nylon and double Perlon. In nearly all cases the data collected were insufficient to derive selection curves for single hauls, and comparable hauls were therefore grouped together. In most cases this meant combining hauls made in the same area within a short period of days. Exceptions to this were some data from 'Anton Dohrn', 'María Julía' and 'G. O. Sars', which were combined from different localities. Where data were so combined, this was justified by the similarity of the length composition of the catches in the separate localities.

The selection curves were drawn for covered, alternate and paired hauls. The percentages retained in the cod-end at each centimetre length were plotted, and the curves were fitted to these points by eye. The 50% lengths, as well as the selection ranges, were read off the so-constructed curve. These figures are given in Tables 2-4 which also contain other items of information recommended as relevant in the report of the ICES Mesh Selection Working Group (ICES, 1964). In these tables, values followed by a question mark indicate the rather unreliable results which were obtained from meagre or variable data. The selection range values were rounded to the nearest centimetre and the number of fish in the selection range for cod-end and cover were rounded to the nearest ten fish. The 50% lengths for haddock caught by 'A. T. Cameron', measured fork length, were adjusted to total length.

The quantities caught in the cod-end and cover were weighed aboard 'A. T. Cameron', 'Explorer' and 'Goncharov', basketed on 'Anton Dohrn', 'Ernest Holt' and 'G. O. Sars' and counted on 'María Julía'.

The grouped data from which selection factors were calculated are given in Tables 5, 6 and 7.

During the course of experiments, girth measurements were made on board 'A. T. Cameron' (cod, haddock and redfish, head and maximum body girth), 'Explorer' (cod and haddock, head girth), 'Anton Dohrn' (redfish, types marinus and mentella, maximum body girth), and 'María Julía' (cod and haddock, maximum body girth). The average girths at lengths are given in Tables 8, 9 and 10.

Data were collected and recorded separately for redfish meshed in the cod-end (Table 7). These data were, however, included with the cod-end catches in calculating the selectivity values.

In general, although there were exceptions, the experiments were not conspicuously successful and the quality of data and results was not always as good as might be desired. The most obvious reason for this was that in the covered cod-end experiments the selection range of the mesh in use frequently did not match well with the length distribution of the fish available, and in the alternate haul experiments there were very marked differences between the length

distributions of the fish being caught on the same ground from haul to haul. Thus, with the numbers of hauls often being rather few, the selection curves and the 50% points were not always clearly defined. A notable exception to this was 'Anton Dohrn' redfish, and, amongst the other data, some such as 'Goncharov' cod, 'María Julía' and 'Ernest Holt' cod with large mesh, 'Explorer' and 'Ernest Holt' N. Iceland haddock, and 'María Julía' S. E. Iceland haddock yielded more definite results than the remainder. So, in considering all the results in Tables 2-4, it is reasonable to attribute a substantial amount of the variation in selection factors to experimental variation.

Conclusions

1. Cod. Nine sets of data gave selection factors for covered cod-ends of double manila, of which two are of doubtful validity. The ordinary unweighted average of these nine values is 3.2, which is unaltered if the two less reliable figures (2.8 and 3.3) are omitted. The range of selection factors is 2.8 to 3.4. The summary tables do not point to any relationship between size of catch and selection factor, but the grouping of the data in the summary tables could mask any such effect. However, in the cases where it was possible to examine smaller groupings, there was no apparent effect of catch size on selectivity.

The average value of 3.2 for the selection factor is close to the average (3.3) of results previously available for the Icelandic region. (ICES, 1964). The present figure is lower than those available for any other region.

Selection ranges varied from 8 to 18 cm with an average value of 13 cm. The selection ranges show a tendency to increase with the extreme range of mesh sizes in the cod-end. The relationship between selection range and average mesh size is somewhat more marked. No correlation was evident between mesh size and extreme mesh range.

Selection factors from paired and alternate hauls are less reliable, due to the marked variation between hauls (both in length composition and in quantity caught), to the small number of hauls, and also, in the case of 'A. T. Cameron' at Skjálfandi, to accumulations of Laminaria in the cod-end. Such figures as were obtained, however, show that in this experiment the selection factors from paired hauls are somewhat lower than those from covered hauls, while that from the alternate hauls is considerably higher.

Selection factors were also obtained for the polyamide materials Kapron and nylon. These were higher than the average for double manila, and the differential calculated within ships is close to, but lower than, 10%.

The Kapron cod-ends were fished from 'Goncharov' both with and without top-side chafer. From the limited experimental data it appeared that the modified ICNAF-type chafer did not appreciably affect selectivity, neither did the mesh-for-mesh chafer over only the after half of the cod-end, but the selection factor obtained when the mesh-for-mesh chafer covered the whole top-side of the cod-end was the lowest of the group for Kapron.

The selection ranges for the synthetic cod-ends also show an increase with both range of mesh size and average mesh size, although for these cod-ends mesh size and mesh range are positively related.

Girth measurements of cod at Iceland were taken on 'A. T. Cameron', 'María Julía' and 'Explorer' (Table 8). It appears that N. Iceland cod is, in shape, intermediate between North Sea (Margetts, 1957) and Arctic cod (1959 International Arctic trawl mesh experiments; ICES, 1964). There appear to be

no substantial cod shape differences between N. Iceland fishing grounds such as to affect selection. The regressions of girth on length are similar, so a comparison of girths can conveniently be made at an arbitrarily chosen length, in this case 50 cm as being near the 50% lengths in Arctic and Iceland experiments. There were differences between the girth measurements from various ships, both at Iceland and in the Arctic, but it is seen that the two independent measurements at Iceland both give a head girth measurement at length 50 cm (23.7 and 24.0 cm) appreciably greater than the biggest Arctic measurements (21.8, 21.2 and 23.1 cm) and about 2 cm greater than the mean of the Arctic measurements. The maximum body girth at length 50 cm measured at Iceland (24.0 and 26.2 cm) was similar to, or rather bigger than, the comparable Arctic measurements (22.6, 23.8 and 25.0 cm). The maximum body girth measurement is affected by such as feeding and "blown" condition, but it is the only one available for comparison of North Sea and Iceland cod, and, as such, shows North Sea cod measured on an English ship to have about the same girth as Iceland cod measured on 'A. T. Cameron' and 'María Julia'.

The foregoing results are all from hauls made off the north coast of Iceland in the summer. Differences in shape and condition of cod between north and south Iceland are known to exist, the fish in the south generally being thicker, length for length, than those in the north. It would accordingly be expected that selectivity in the south would be lower than in the north. Seasonal differences within the northern area are unlikely to affect selectivity appreciably.

The mean of all the Arctic cod covered double manila trawl cod-end mesh selection factors from the ICES Mesh Selection Working Group report was 3.5. (Note: that report considers that, allowing for cover effects and catch size, the true factor might be 3.7.) The comparable factors for North Sea and Iceland cod, both from limited experimental evidence, were both 3.4; the new evidence from 1962 indicates a selection factor for Iceland of 3.2, which is 8.5% below the Arctic factor, while the head girth at Iceland was 9% greater than in the Arctic. Body girth measurements suggest that the North Sea cod selection factor should be about the same as the Iceland factor; such limited experimental evidence as exists indicates it to be rather higher, but the difference could well be due to experimental variation.

2. Haddock. The data yielded sixteen estimates of the selection factor for covered cod-ends of double manila, ranging from 3.0 to 3.6, with an unweighted average of 3.35. These results came from hauls taken both off the north and off the south coast of Iceland and no significant differences were found between these two areas. The data were not sufficient to analyse the relationship between catch size and selection factor. The average selection factor is higher than that of 3.2 calculated from previously available data for the Icelandic area and also higher than those for all other ICES areas for which data are available, although not very different from that for the Arctic (ICES, 1964). The reasons for this difference are not known, but the range of results suggests that at least not all of the difference is due to experimental variation in 1962.

The selection ranges from the covered double manila hauls vary from 4 to 13 cm with an average value of 9 cm, of which most of the lower values are considered doubtful. There is a clear relation between selection range and mesh size, the selection range increasing with the mesh size. On the other hand there is no relationship between selection range and the extreme range of mesh sizes in the cod-end.

Selection factors for double Kapron again do not show any real evidence of an effect on selection factor of the top-side chafer used by 'Goncharov'.

'Explorer' data show the selectivity on haddock of double nylon to be about 10% higher than that of double manila, but 'Goncharov' data indicate no selectivity difference between these two materials on haddock.

The polyamide materials show a relationship between selection range and mesh size similar to that for double manila. For these materials a relationship is also found between selection range and extreme range of mesh sizes, the latter being directly related to average mesh size for nylon and Kapron.

Girth measurements of haddock at Iceland were taken on three of the ships (Table 9); on two of the ships the maximum body girths were measured, and those at total length 50 cm (25.6 and 27.7 cm) were of the same order as for North Sea haddock (27.2 cm, Margetts, 1954). Comparable Arctic haddock girth measurements are not available.

3. Redfish. The calculated selection factors for covered double manila hauls range from 2.2 to 3.2. In respect of this wide variation the present experiment is in agreement with previous experiments elsewhere.

The results obtained by 'Anton Dohrn', when hauls are grouped according to total cod-end catch sizes above and below 500 kg, indicate lower selectivity with higher catches. The data tend to support the earlier observations (ICES, 1964) that there is an increase in selection factor with mesh size.

The selection ranges were difficult to derive in most cases, but reliable estimates indicate a selection range of about 16 cm.

Selection factors obtained for cod-ends of polyamide materials lie within the upper part of the range of selection factors for double manila. However, within-ship comparisons indicate no difference between polyamide and manila. It is noted that the selection factors greater than 3.0 were all obtained from the area SW. Iceland while the values lower than this were obtained from W. and N. Iceland, but this could well be an experimental effect.

Redfish meshed in the cod-end were recorded separately on 'Anton Dohrn' and 'Goncharov'. In 'Anton Dohrn' hauls, appreciable meshing (more than 5% meshed at any centimetre length) was confined to a length range extending over 12-15 cm. On plotting smoothed percentage meshed against length it was seen that, in the two manila cod-ends, at any centimetre length, the meshed proportion of the fish held by the cod-end rose to about 26% and 15% respectively, being above 10% over length ranges of 6 and 11 cm. In the two Perlon cod-ends, the proportion meshed reached 20% and 30% respectively, and the length range of more than 10% meshed was 9 cm. In the case of 'Goncharov', the meshing size range also extended over about 12 cm, but the meshed proportion of the fish held in the cod-end, at any centimetre length, reached as high as 70% and was above 30% over a length range of 8 cm. 'Goncharov' catches of redfish were small, and few other fish were caught at the same time; 'Anton Dohrn', per haul, caught more fish in the selection range than did 'Goncharov'. The length range where most fish were meshed was, for both 'Anton Dohrn' and 'Goncharov', in the upper part of the cod-end selection range. In the lower part of the selection range there was little meshing in 'Anton Dohrn' but more in 'Goncharov'. In the three 'Goncharov' hauls, while 165 fish were meshed in the cod-end which, including those meshed, held 641 fish, 217 were meshed in parts of the trawl other than the cod-end; these were mostly rather bigger fish than were meshed in the cod-end. The pattern of meshing in the cod-end was similar to that of gill-net selection.

Girth measurements of redfish are shown in Table 10.

Comment

In these experiments a considerable amount of fishing time was devoted by 'A. T. Cameron' and 'Ernest Holt', and rather less by 'María Julia', to measuring selectivity by the alternate and paired haul technique. By considering hauls within ships the data from all three ships could be treated as for alternate hauls; by considering hauls of 'A. T. Cameron' and 'Ernest Holt' together they could be treated as for paired hauls, since it was arranged that while one ship was using big mesh the other was using small mesh. Yet the results achieved were some of the least satisfactory in a series of experiments which yielded quite a lot of rather uncertain results. The fundamental reason for this was that the length distribution and quantities of fish from place to place at quite short distances, and even on one ground between different times, varied very markedly. This meant that the alternate hauls were almost useless, while the paired hauls, though rather better, yet to give clear results needed many more hauls than were possible. Plotting of selection curves and interpretation of even approximate 50% points was so unsure that it was thought best not to include suggested results from alternate hauls in the report table.

A feature of the selection curves plotted for the Iceland mesh experiments, and one also of the Barents Sea selection curves earlier (ICES, 1964), was that very frequently they did not smoothly approach the zero retained level, but rather there was a band of cm lengths where the percentage retained would have been expected to be near zero but where it was in fact around the 25% retained level. This may be a masking effect, but due not so much to the cover as to other fish in the catch. It would therefore be expected to be a real occurrence rather than an experimental artefact.

References

- MARGETTS, A. R. (1954) "The length-girth relationships in haddock and whiting and their application to mesh selection". J. Cons. int., Explor. Mer, 20 (1): 56 - 61.
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- ICES, 1964. "Report on the Mesh Selection Working Group, 1959-1960". Coop. Res. Rep. No. 2, 156pp.

Table 1. The types of ships that took part in the experiments, their gear and their working time at Iceland

Country	Ship				Trawl		Working dates	Working areas	No. of hauls
	Name	Tons	Length overall (m)	Horse-power	Type	Headline length (m)			
Iceland	'María Julía'	138	27.8	470	Granton	17	28 Mar. - 1 Apr.	SW. Iceland	13
"	" "						20-28 July	N. Iceland	43
							6-8 Aug.	S. & W. Iceland	32
Norway	'G. O. Sars'	600	52	1,200	"	20	10-13 May	SW. Iceland	16
"	'Johan Hjort'	697	52.3	1,300	"	20	13-16 Sept.	SW. Iceland	8
Scotland	'Explorer'	862	61	1,200	"	24	16-25 June	N. Iceland	26
Fed. Rep. Germany	'Anton Dohrn'	999	62.3	850	"	32	9-26 July	N., NW. & W. Iceland	62
U. S. S. R.	'Goncharov'	3,000	80	2,000	"	35	27 July-28 Aug.	N. & NW. Iceland	26
England	'Ernest Holt'	604	59	900	"	25	20-28 July	N. Iceland	51
Canada	'A. T. Cameron'	753	54	1,000	41 Yankee	24	20-28 July	N. Iceland	51

TABLE 2 : COD

Ship	Date	Locality	Material	Runnage (m/kg)	Method	Mesh size (mm)		50% length (cm)	Selection factor	Selection range (cm)	No. of hauls	Av. duration of tow (min)	Towing speed (knots)	Av. total weight of catch per haul (kg)		No. of fish in selection range (total of all hauls)	
						mean	range							Cod-end	Cover	Cod-end	Cover
'A. T. Cameron'	24-25 July 1962	N. Iceland	D. manila	100	Cover	120 ⁺		35.0	2.9	11	9	60	3.5	2447	268	2880	1860
'Anton Dohrn'	9-14 July 1962	N.+NW. Iceland	D. manila	163	Cover	138	129-146	40.2	2.9	12	17	84	4.0	555	160	500	380
'Explorer'	16-20 June 1962	N. Iceland	D. manila	151	Cover	112	99-123	37.6	3.4	8	7	60	4.0	366	132	180	170
	22-25 June 1962	N. Iceland	D. manila	151	Cover	127	113-163	40.1	3.2	16	8	60	4.0	674	177	330	370
	21-22 June 1962	N. Iceland	D. manila	151	Cover	132	119-149	42.9 ?	3.3 ?	18	3	60	4.0	552	309	60	90
'Goncharov'	28 July 1962	N. Iceland	D. manila	100	Cover	141 ⁺	122-155	49.0	3.4	12	5	90	3.5	1451	844	340	370
'Ernest Holt'	24-25 July 1962	N. Iceland	D. manila	151	Cover	132	113-143	37.5 ?	2.8 ?	16 ?	6	60	3.5	2640	310	3240	2000
'María Julia'	26-27 July 1962	N. Iceland	D. manila	150	Cover	117	104-134	39.0	3.3	12	6	60	3.5	-	-	110	110
	25 July and 12-13 Aug. 1962	N.+NW. Iceland	D. manila	150	Cover	138	117-153	47.0	3.4	16	12	60	3.5	-	-	660	920
'A. T. Cameron'	20-21 July 1962	NW. Iceland	D. manila	100	Paired	120 ⁺		32.0 ?	2.7 ?	12 ?	8	60	3.5	628	-	380	-
'Ernest Holt'	26-27 July 1962	N. Iceland	D. manila	151	Paired	132	113-143	42.0 ?	3.2 ?	8 ?	4	60	3.5	755	-	340	-
'María Julia'	23-27 July 1962	N. Iceland	D. manila	150	Alternate	97	82-113	39.8 ?	4.1 ?	8 ?	10	54	3.5	-	-	95	-
'Explorer'	18-21 June 1962	N. Iceland	D. nylon	302	Cover	89	80-95	31.0 ?	3.5 ?	8 ?	5	60	4.0	475	56	20	40
'Goncharov'	27 July 1962	N. Iceland	D. Kapron	182	Cover	125 ⁺	111-141	44.7 ?	3.6	13	5	80	3.5	1144	119	440	320
	29-30 July 1962	N. Iceland	D. Kapron [*]	182	Cover	108 ⁺	102-118	44.0	4.1	7	3	80	3.5	1364	489	330	390
	28-29 July 1962	N. Iceland	D. Kapron ^x	182	Cover	126 ⁺	113-150	39.3	3.2	9	2	85	3.5	1675	378	340	210
	28-29 July 1962	N. Iceland	D. Kapron ^{xx}	182	Cover	126 ⁺	113-150	45.5	3.7	11	3	85	3.5	1427	573	251	286

+ 1959 Westhoff gauge

* with topside chafers (modified ICNAF type)

x with topside chafer (double cod-end) full-length

xx with topside chafer (double cod-end) half-length

TABLE 3 : HADDOCK

Ship	Date	Locality	Material	Runnage (m/kg)	Method	Mesh size (mm)		50% length (cm)	Selection factor	Selection range (cm)	No. of hauls	Av. duration of tow (min)	Towing speed (knots)	Av. total weight of catch per haul (kg)		No. of fish in selection range (total of all hauls)	
						mean	range							Cod-end	Cover	Cod-end	Cover
'A. T. Cameron'	24-25 July 1962	N. Iceland	D. manila	100	Cover	120 ⁺		35.5	3.0	10 ?	9	60	3.5	2447	268	390	830
'Anton Dohrn'	9-14 July 1962	N. & NW. Iceland	D. manila	163	Cover	138	129-146	42.2	3.1	12	16	83	4.0	520	150	380	340
'Explorer'	16-20 June 1962	N. Iceland	D. manila	151	Cover	112	99-123	35.6	3.2	9	7	60	4.0	366	132	300	390
	22-25 June 1962	N. Iceland	D. manila	151	Cover	127	113-143	41.6	3.3	11	8	60	4.0	674	177	160	180
'Goncharov'	28 July 1962	N. Iceland	D. manila	100	Cover	141 ⁺	122-155	50.0	3.5	13	5	97	3.5	1451	844	3360	2930
'Ernest Holt'	24-25 July 1962	N. Iceland	D. manila	151	Cover	132	113-143	46.0	3.5	10	11	60	3.5	2640	310	330	350
'María Julia'	24-25 July 1962	N. Iceland	D. manila	150	Cover	117	104-134	39.0	3.3	9	6	60	3.5	-	-	270	170
	28 Mar. to 1 Apl. 1962	SW. Iceland	D. manila	150	Cover	126		42.4	3.4	11	13	56	3.5	-	-	940	880
	6-17 Aug. 1962	S. & SW. Iceland	D. manila	150	Cover	138	119-153	48.0	3.5	13	14	60	3.5	-	-	840	810
	25 July and 12-13 Aug. 1962	N. & NW. Iceland	D. manila	150	Cover	138	117-153	49.6	3.6	12	12	60	3.5	-	-	270	320
'G. O. Sars'	10-11 May 1962	SW. Iceland	D. manila	151	Cover	98	87-112	31.0	3.2	4 ?	4	48	4.0	2455	85	50	50
	10-13 May 1962	S. & SW. Iceland	D. manila	151	Cover	99	92-109	35.4 ?	3.6 ?	5 ?	2	45	3.0	1100	110	40	60
	12 May 1962	SW. Iceland	D. manila	151	Cover	103	99-119	34.0 ?	3.3 ?	6 ?	3	25	4.0	825	192	30	40
	10-13 May 1962	S. & SW. Iceland	D. manila	151	Cover	104	91-124	36.2	3.5	5	2	45	4.0	1818	238	90	50
	10-11 May 1962	SW. Iceland	D. manila	151	Cover	120	102-134	38.8	3.2	9	3	41	4.0	1750	493	440	360
	12-13 May 1962	SW. Iceland	D. manila	151	Cover	122	107-138	41.2	3.4	9 ?	2	45	3.5	1575	363	180	120
'Explorer'	18-21 June 1962	N. Iceland	D. nylon	302	Cover	89	80-95	32.1	3.6	5	5	60	4.0	475	56	200	360
'Goncharov'	27 July 1962	N. Iceland	D. Kapron	182	Cover	125 ⁺	111-145	43.3	3.5	11	5	80	3.5	1144	119	100	80
	29-30 July 1962	N. Iceland	D. Kapron [*]	182	Cover	108 ⁺	102-118	36.7 ?	3.4 ?	9 ?	3	80	3.5	1364	489	300	200
	28-29 July 1962	N. Iceland	D. Kapron ^x	182	Cover	126 ⁺	113-150	42.0	3.3	10 ?	2	85	3.5	1675	378	130	110
	28-29 July 1962	N. Iceland	D. Kapron ^{xx}	182	Cover	126 ⁺	113-150	44.0 ?	3.5 ?	8	3	85	3.5	1427	573	95	88

+ not corrected to ICES gauge

* with topside chafers (modified ICNAF type)

x with topside chafer (double cod-end) full-length

xx with topside chafer (double cod-end) half-length

TABLE 4 : REDFISH (of type marinus, except for 'Goncharov' which included a small percentage of mentella)

Ship	Date	Locality	Material	Runnage (m/kg)	Method	Mesh size (mm)		50% length (cm)	Selection factor	Selection range (cm)	No. of hauls	Av. duration of tow (min)	Towing speed (knots)	Av. total weight of catch per haul (kg)		No. of fish in selection range (total of all hauls)	
						mean	range							Cod-end	Cover	Cod-end	Cover
'Anton Dohrn'	14-17 July 1962	W. Iceland	D. manila	163	Cover	139	129-146	39.6	2.9	16	11	108	4.0	435	292	2680	3670
	24-26 July 1962	SW. Iceland	D. manila	120	Cover	149	140-164	46.9	3.1	15 ?	10	174	4.0	661	665	2000	2700
'Explorer'	16-20 June 1962	N. Iceland	D. manila	151	Cover	112	99-123	24.8 ?	2.2 ?	7 ?	6	60	4.0	366	132	50	40
	22-25 June 1962	N. Iceland	D. manila	151	Cover	127	113-143	27.5	2.2	16	8	60	4.0	674	177	2280	2000
	21-22 June 1962	N. Iceland	D. manila	151	Cover	132	119-149	36.9	2.8	15 ?	3	60	4.0	552	309	500	830
'Johan Hjort'	13 Sept 1962	SW. Iceland	D. manila	151	Cover	108	86-125	35.0 ?	3.2 ?	5 ?	2	75	3.0	595	185	20	20
'Anton Dohrn'	17-20 July 1962	W. Iceland	D. Perlon	210	Cover	132	124-139	38.5	2.9	16	17	100	4.0	659	493	8080	12490
	21-23 July 1962	SW. Iceland	D. Perlon	200	Cover	142	135-150	43.9	3.1	15 ?	7	137	4.0	558	481	1220	1740
'Explorer'	18-21 June 1962	N. Iceland	D. nylon	302	Cover	89	80-95	24.1 ?	2.7 ?	6 ?	3	60	4.0	475	56	70	60
'Goncharov'	5 Aug. 1962	W. Iceland	D. Kapron ⁺	182	Cover	118 [*]	107-125	37.2	3.2	10	3	60	3.5	258	240	510	430

+ with topside chafers (modified ICNAF type)

* not corrected to ICES gauge.

TABLE : 5 COD

Ship	'Anton Dohrn'			'A. T. Cameron'			'Ernest Holt'			'A. T. Cameron'				'Ernest Holt'		
Area	N. & NW. Iceland			N. Iceland			N. Iceland			N. Iceland				N. Iceland		
Date	9-14 July 1962			24-25 July 1962			24-25 July 1962			23-27 July 1962				26-27 July 1962		
Cod-end	Double manila			Double manila			Double manila			Double manila				Double manila		
Mean mesh size (mm)	138			120			132			120				132		
Method	Cover			Cover			Cover			Paired haul				Paired haul		
No. of hauls	17			9			6			8				4		
Haul duration (min)	84			60			60			60				60		
Average total cod-end catch (kg)	555			2447			2640			628				755		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	'A. T. Cameron' 120 mm (Column 1)	'Ernest Holt' 75 mm (Column 2)	Col. 1 Col. 2 (%)	Length (cm)	'Ernest Holt' 132 mm (Column 1)	'A. T. Cameron' 50 mm (Column 2)	Col. 1 Col. 2 x 2 (%)
≤ 20					2											
21					2						1					
22					6											
23		1	0		13					1	1	100				
24	1	4	20	4	24	14		1	0		1					
25	3	13	19	3	47	6	2		100	1	10	10				
26	5	10	33	13	91	12	2	1	67	4	9	44				
27	6	18	25	23	138	14	4	5	44	12	26	46				
28	15	34	31	30	138	18	16	11	59	13	27	48				
29	8	36	18	29	154	16	2	28	7	19	52	37				
30	5	33	13	48	127	27	12	33	27	38	77	49	≤ 30		61	
31	4	19	17	64	134	32	18	45	29	25	85	29			16	
32	11	12	48	59	109	35	20	45	31	31	62	50			14	
33	3	14	18	74	103	42	34	52	40	28	62	45			13	
34	6	18	25	88	122	42	42	47	47	36	61	59			14	
35	8	22	27	137	130	51	32	54	37	52	55	95		1	24	8
36	13	30	30	194	166	54	38	61	38	55	73	75		3	32	19
37	17	29	37	326	206	61	94	92	51	68	92	74		7	47	30
38	28	42	40	464	219	68	180	139	56	93	103	90		17	74	46
39	34	39	47	622	264	70	216	179	55	132	130	102		12	99	24
40	40	47	46	803	278	74	316	172	65	175	163	107		21	143	29
41	48	39	55	891	315	74	384	224	63	197	173	114		32	177	36

continued on next two pages

TABLE 5: GOD (Continued)

Ship	'Anton Dohrn'			'A. T. Cameron'			'Ernest Holt'			'A. T. Cameron'			'Ernest Holt'		
Area	N. & NW. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	9-14 July 1962			24-25 July 1962			24-25 July 1962			23-27 July 1962			26-27 July 1962		
Cod-end	Double manila			Double manila			Double manila			Double manila			Double manila		
Mean mesh size (mm)	138			120			132			120			132		
Method	Cover			Cover			Cover			Paired haul			Paired haul		
No. of hauls	17			9			6			8			4		
Haul duration (min)	84			60			60			60			60		
Average total cod-end catch (kg)	555			2447			2640			628			755		
Length (cm)	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	'A. T. Cameron' 120 mm (Column 1)	'Ernest Holt' 75 mm (Column 2)	Col. 1 Col. 2 (%)	'Ernest Holt' 132 mm (Column 1)	'A. T. Cameron' 50 mm (Column 2)	Col. 1 Col. 2 x 2 (%)
42	55	47	54	949	250	79	458	268	63	185	194	95	41	185	44
43	76	30	72	917	226	80	474	223	68	197	204	97	66	183	72
44	75	30	71	854	165	84	520	180	74	187	188	99	70	206	68
45	62	29	68	700	101	87	468	170	73	161	167	96	84	173	97
46	45	11	80	666	66	91	448	145	76	149	144	103	82	179	92
47	57	13	81	644	45	93	432	110	80	118	122	97	72	167	86
48	57	10	85	466	43	92	386	82	82	91	107	85	45	136	66
49	65	11	86	457	18	96	302	77	80	85	80	106	62	127	98
50	66	12	85	321	6	98	292	52	85	65	71	92	49	140	70
51	79	5	94	297	15	95	262	47	85	63	57	111	47	112	84
52	79	7	92	294	14	95	302	23	93	57	50	114	65	99	131
53	70	7	91	250	4	98	292	35	89	56	43	130	54	113	96
54	108	8	93	233	3	99	322	14	96	69	40	172	46	90	102
55	90	13	87	212	4	98	330	10	97	41	42	98	44	95	93
56	120	7	95	205	2	99	296	10	97	37	43	86	53	94	113
57	100	6	94	199	2	99	266	7	97	44	33	133	31	87	71
58	117	7	94	190	3	98	242	10	96	39	35	111	42	106	79
59	115	4	97	149	1	99	268	4	98	34	40	85	44	94	94
60	84	3	97	132		100	198	5	98	40	38		45	76	118
61	76	4	95	125		100	298	3	99	31	31		24	95	51
62	66		100	171	2	99	272	1	100	29	22		20	74	54
63	55	2	96	133		100	246	2	99	30	21		32	65	98

continued on next page

TABLE 5 : COD (Continued)

Ship	'Anton Dohrn'			'A. T. Cameron'			'Ernest Holt'			'A. T. Cameron'			'Ernest Holt'		
Area	N. & NW. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	9-14 July 1962			24-25 July 1962			24-25 July 1962			23-27 July 1962			26-27 July 1962		
Cod-end	Double manila			Double manila			Double manila			Double manila			Double manila		
Mean mesh size (mm)	138			120			132			120			132		
Method	Cover			Cover			Cover			Paired haul			Paired haul		
No. of hauls	17			9			6			8			4		
Haul duration (min)	84			60			60			60			60		
Average total cod-end catch (kg)	555			2447			2640			628			755		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	'A. T. Cameron' 120 mm (Column 1)	'Ernest Holt' 75 mm (Column 2)	Col. 1 Col. 2 (%)	'Ernest Holt' 132 mm (Column 1)	'A. T. Cameron' 50 mm (Column 2)	Col. 1 Col. 2 x 2 (%)
64	48	2	96	109		100	180	2	99	19	15		29	47	123
65	38		100	85			142	3	98	22	14		8	49	33
66	36			93			104		100	18	9		9	49	37
67	39			76			126	1	99	12	9		12	33	73
68	32			28			60		100	14	8		7	21	67
69	32			52			66			11	9		10	24	83
≥70	573			339			482			137	91		79	131	121
TOTAL	2770	728		13218	3758		9946	2673		3021	3190		1365	3764	
50% length (cm)	40.2			35			37.5			32?			42?		
Selection range (cm)	12			11			16?			12?			8?		
Selection factor	2.9			2.9			2.8			2.7?			3.2?		

TABLE 5 : (Continued)

Ship	'Explorer'			'Explorer'			'Explorer'			'Explorer'		
Area	Iceland			Iceland			Iceland			Iceland		
Date	16-20 June 1962			22-25 June 1962			21-22 June 1962			18-21 June 1962		
Cod-end	Double manila			Double manila			Double manila			Double nylon		
Mean mesh size (mm)	112.2			127			132			89		
Method	Cover			Cover			Cover			Cover		
No. of hauls	7			8			3			5		
Haul duration (min)	60			60			60			60		
Average total cod-end catch (kg)	366			674			552			475		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤20					1							
21		3			1	0		1			1	
22		4		2	11	15		1			3	
23		16	0	4	7	36		7			1	
24	3	41	7	2	16	11		4	0		6	0
25	3	34	8	12	22	35	2	3	40	2	4	33
26	6	66	8	10	25	29	3	10	23	3	6	33
27	7	52	12	6	26	19	2	4	33	1	11	8
28	5	43	10	7	31	18	2	5	29	4	4	50
29	6	33	15	7	21	25	1	7	12	5	8	38
30	3	35	8	7	27	21	4	6	40	3	2	60
31	8	21	28	6	20	23	2	5	29	3	6	33
32	3	21	12	3	6	33	-	4	0	4	4	50
33	4	14	22	9	7	56	1	3	25	3	-	100
34	16	18	47	8	18	31	2	5	29	-	2	0
35	12	15	44	13	28	32	3	4	43	3	3	50
36	14	25	36	15	25	38	2	4	33	14	1	93
37	21	27	44	14	37	27	-	7	0	8	4	67
38	28	31	47	27	35	44	7	7	50	10	1	91
39	27	16	63	21	31	40	-	4	0	7	1	88
40	34	15	69	42	41	51	5	11	31	7	1	88
41	27	10	73	32	34	48	2	9	18	13	-	100
42	28	6	82	33	21	61	5	9	36	6		
43	31	3	91	30	16	65	2	4	33	1		

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TABLE 5 : COD (Continued)

Ship	'Explorer'			'Explorer'			'Explorer'			'Explorer'		
Area	Iceland			Iceland			Iceland			Iceland		
Date	16-20 June 1962			22-25 June 1962			21-22 June 1962			18-21 June 1962		
Cod-end	Double manila			Double manila			Double manila			Double nylon		
Mean mesh size (mm)	112.2			127			132			89		
Method	Cover			Cover			Cover			Cover		
No. of hauls	7			8			3			5		
Haul duration (min)	60			60			60			60		
Average total cod-end catch (kg)	366			674			552			475		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
44	19	-	100	36	9	80	6	3	67	4		
45	14	2	88	30	12	71	4	4	50	1		
46	7	-	100	14	12	54	5	2	71	4		
47	7	1	88	17	4	81	4	2	67	1		
48	9	-	100	27	3	90	6	3	67	4		
49	12			28	2	93	6	2	75	1		
50	10			32	9	78	9	2	82	2		
51	6			36	2	95	13	1	93	3		
52	8			37	1	97	15	2	88	7		
53	7			32	-	100	5	1	83	1		
54	1			38	3	93	10	1	91	3		
55	5			33	1	97	17	2	89	3		
56	4			31	-	100	15	-	100	6		
57	5			31	-	100	17			5		
58	6			31	1	97	8			7		
59	3			20	-	100	12			5		
≥60	63			371			204			150		
TOTAL	472	552		1154	566		401	150		304	69	
50% length (cm)	37.6			40.1			42.9?			31.0?		
Selection range (cm)	8			16			18			8?		
Selection factor	3.4			3.2			3.3?			3.5?		

TABLE 5 : COD (Continued)

Ship	'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'		
Area	N. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	28 July 1962			27 July 1962			29-30 July 1962			28-29 July 1962			28-29 July 1962		
Cod-end	Double manila			Double Kapron			D. Kapron with modified ICNAF chafer			D. Kapron, $\frac{1}{2}$ length d. cod-end chafer			D. Kapron, full length d. cod-end chafer		
Mean mesh size (mm)	141			125			108			126			126		
Method	Cover			Cover			Cover			Cover			Cover		
No. of hauls	5			5			3			3			2		
Haul duration (min)	97			80			80			85			85		
Average total cod-end catch (kg)	1451			1144			1364			1427			1675		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤ 30	27	604	4	2	51	4	23	509	4	31	501		110	171	
31	2	54	4		1		2	39	5	1	20	5	3	20	
32	5	55	8	1	3	25	3	41	7	2	26	7		17	
33	2	29	6		6		2	29	4	6	13	32	1	7	12
34	3	46	6	1	4	20	1	21	5	1	17	6	8	13	38
35	18	52	26		4		15	31	33	7	34	17	6	16	27
36	1	49	2		4		10	27	27	14	16	47	5	19	21
37		41		2	8	20	5	32	14	4	15	21	13	30	30
38	6	46	12	4	10	29	7	25	22	9	26	26	9	16	36
39	10	65	13	6	11	35	26	50	34	3	11	21	28	13	68
40	38	80	32	14	29	33	53	107	33	35	48	42	52	42	55
41	11	57	16	9	22	29	23	53	30	6	38	14	40	28	59
42	23	58	28	20	28	42	36	55	40	16	28	36	47	20	70
43	12	40	23	26	30	46	46	48	49	18	24	43	38	17	69
44	27	47	36	27	26	51	29	37	44	17	21	45	49	21	70
45	39	55	41	40	35	53	78	31	72	39	40	49	61	25	71
46	26	50	34	38	36	51	38	12	76	39	26	60	47	13	78
47	58	14	81	48	22	69	54	5	92	18	27	40	28	4	88
48	13	21	38	33	22	61	27	6	82	27	12	69	23	8	74
49	13	14	48	32	18	64	45	1	98	33	11	75	44	6	88
50	35	21	62	64	22	74	91	4	96	44	15	75	32	6	84
51	26	9	74	33	13	72	28	3	90	38	7	84	30	2	94
52	22	21	52	47	7	87	30		100	23	7	77	24	3	89

continued on next page

TABLE 5 : COD (Continued)

Ship	'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'		
Area	N. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	28 July 1962			27 July 1962			29-30 July 1962			28-29 July 1962			28-29 July 1962		
Cod-end	Double manila			Double Kapron			D. Kapron with modified ICNAF chafer			D. Kapron, $\frac{1}{2}$ length d. cod-end chafer			D. Kapron, full length d. cod-end chafer		
Mean mesh size (mm)	141			125			108			126			126		
Method	Cover			Cover			Cover			Cover			Cover		
No. of hauls	5			5			3			3			2		
Haul duration (min)	97			80			80			85			85		
Average total cod-end catch (kg)	1451			1144			1364			1427			1675		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
53	22	7	76	41	7	86	18		100	31	4	89	40		100
54	31	14	69	43	12	78	23		100	46	2	96	34	2	94
55	61	15	80	83	10	89	69	1	99	35	7	83	31	5	86
56	58	10	85	62	10	86	55		100	39	2	95	27	2	93
57	71	8	90	81	8	91	48	1	98	39	1	97	30	2	94
58	56	6	90	60	10	86	51		100	34	4	89	29	1	97
59	52	2	96	46	3	94	22			43	1	98	27		
60	100	4	96	157	10	94	81			96	3	97	38		
61	87	6	94	87	4	96	51			47		100	43		
62	68	2	97	115	7	94	57			57	1	98	29		
63	53		100	80	3	96	34			58			35		
64	61	3	95	88	2	98	35			55			38		
65	95	3	97	139	3	98	74			54			32		
66	43		100	83		100	32			53	1		26		
67	79	1	99	85	2	98	27			44			18		
68	59	2	97	73	1	99	34			41			21		
69	39		100	60	2	97	12			37			33		
≥ 70	536	2	100	589	3	99	201			369			160		
TOTAL	1988	1613		2419	509		1613	1068		1609	1009		1389	529	
50% length (cm)	49.0			44.7			44.0			45.5			39.3		
Selection range (cm)	12			13			7			11			9		
Selection factor	3.4			3.6			4.1			3.7			3.2		

TABLE 5 : COD (continued)

Ship	'María Julia'			'María Julia'			'María Julia'		
Area	N. Iceland			N. & NW. Iceland			N. Iceland		
Date	24-27 July 1962			25 July & 12-13 Aug. 1962			23-27 July 1962		
Cod-end	D. manila			D. manila			D. manila		
Mean mesh size (mm)	117			138			97		
Method	Cover			Cover			Alternate haul		
No. of hauls	12			12			10		
Haul duration (min)	60			60			54		
Average total cod-end catch (kg)									
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	97mm Cod- end	61mm Cod- end	$\frac{97\text{mm}}{61\text{mm}} \times 1.4\%$
<20	1	1	50					7	
21									
22		1							
23		1			1	0		1	
24		2			1	0	1		
25		1		1	1	50		5	
26					3	0	1	3	24
27	1	5	17		6	0		10	
28	3	7	30	2	9	18	1	12	6
29	1	11	8	2	2	50	2	6	24
30	5	10	33	2	15	12	1	7	10
31	2	10	17	3	19	14	2	7	20
32	2	5	29	6	17	26		8	
33	2	7	22	2	29	6		3	
34	2	13	13	4	23	15	1	6	12
35	4	9	31	10	18	36	3	7	31
36	4	3	57	2	36	5	5	9	40
37	5	7	42	14	33	30	5	9	40
38	9	8	53	18	61	23	7	11	45
39	8	11	42	36	69	34	8	13	44
40	17	20	46	48	108	31	12	11	78
41	15	11	58	48	109	31	26	25	74
42	22	5	81	54	136	28	30	23	93
43	11	8	58	54	104	34	27	16	121
44	11	7	61	54	79	41	31	15	148
45	13	5	72	45	62	42	28	22	91
46	15	6	71	43	45	49	17	15	81
47	17	2	89	45	44	51	25	17	105
48	9	5	64	48	36	57	25	15	119
49	10	1	91	42	34	55	6	10	43
50	6	1	86	34	29	54	18	17	76
51	10			27	12	69	11	17	46
52	7	1	88	36	17	68	17	14	87
53	7		100	20	13	61	17	14	87
54	7			21	14	60	10	11	65
55	9			27	8	77	20	7	204
56	4			24	3	89	14	12	83
57	4			32	6	84	10	14	51
58	3			27	10	73	16	8	143
59	7			27	6	82	22	10	157
60	7			33	4	89	13	7	133
61	1			32	3	91	17	4	304
62	4			26	3	90	9	12	54
63	1			27		100	5	9	40

continued on next page

TABLE 5 : COD (continued)

Ship	'María Julia'			'María Julia'			'María Julia'		
Area	N. Iceland			N. & NW. Iceland			N. Iceland		
Date	24-27 July 1962			25 July & 12-13 Aug. 1962			23-27 July 1962		
Cod-end	D. manila			D. manila			D. manila		
Mean mesh size (mm)	117			138			97		
Method	Cover			Cover			Alternate haul		
No. of hauls	12			12			10		
Haul duration (min)	60			60			54		
Average total cod-end catch (kg)									
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	97mm Cod- end	61mm Cod- end	$\frac{97\text{mm}}{61\text{mm}} \times 1.4\%$
64	6			26	1	96	13	7	133
65	6			24	1	96	20	10	143
66	2			24		100	13	8	116
67	1			25			7	2	250
68				15			8	4	143
69	2			13			4	3	95
≥70				161			45	20	161
TOTAL	287	184		1264	1230		573	503	
50% Length (cm)	39.0			47.0			39.8 ?		
Selection range (cm)	12			16			8 ?		
Selection factor	3.3			3.4			4.1 ?		

TABLE 6 : HADDOCK

Ship	'Anton Dohrn'			'A. T. Cameron'			'Ernest Holt'		
Area	N. & NW. Iceland			N. Iceland			N. Iceland		
Date	9-14 July 1962			24-25 July 1962			24-25 July 1962		
Cod-end	D. manila			D. manila			D. manila		
Mean mesh size (mm)	138			120			132		
Method	Cover			Cover			Cover		
No. of hauls	16			9			11		
Haul duration (min)	83			60			60		
Average total cod-end catch (kg)	520			2447			2640		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤20				2	99	2			
21				1	8	11			
22				1	3	25			
23		3	0						
24		5	0	3	7	30			
25	1	37	3	12	35	26			
26	6	52	10	31	89	26			
27	11	109	9	37	157	19		5	0
28	23	138	14	69	212	25	1	4	20
29	19	154	11	90	226	28	1	14	7
30	20	145	12	76	154	33	1	22	4
31	8	103	7	53	101	34	3	19	14
32	13	87	13	32	62	34	1	14	7
33	12	58	17	20	28	42		7	0
34	6	40	13	8	21	28		9	0
35	3	25	11	4	10	29		4	0
36	6	10	38	9	9	50		1	0
37	6	14	30	25	7	78	1	3	25
38	7	11	39	42	17	71	1	11	8
39	14	21	40	65	18	78	3	16	16
40	18	43	30	112	20	85	9	36	20
41	30	39	44	137	24	85	13	26	33
42	53	53	50	122	22	85	29	41	41
43	67	39	63	157	19	89	32	68	32
44	57	49	54	125	18	87	39	52	43
45	52	36	59	96	10	91	38	58	40
46	22	16	58	86	3	97	34	31	52
47	36	9	80	75	1	99	28	20	58
48	27	8	77	82	4	95	26	24	52
49	32	12	73	94	4	96	30	12	71
50	51	8	86	127		100	29	13	69
51	54	8	87	154	2	99	37	10	79
52	62	9	87	176	1	99	45	11	80
53	71	11	87	190		100	47	10	82
54	93	9	91	219	2	99	72	9	89
55	93	8	92	212	1	100	126	4	97
56	96	2	98	181	1	99	111	7	94
57	129	4	97	142		100	127	4	97
58	90	4	96	124			110	5	96
59	90		100	94			93	2	98
60	60	1	98	69			68	2	97
61	51	1	98	42			62	1	98
62	53		100	31			48	1	98
63	32			30			28		100
64	24			16			26		100

continued on next page

TABLE 6 : HADDOCK (continued)

Ship	'Anton Dohrn'			'A. T. Cameron'			'Ernest Holt'		
Area	N. & NW, Iceland			N. Iceland			N. Iceland		
Date	9-14 July 1962			24-25 July 1962			24-25 July 1962		
Cod-end	D. manila			D. manila			D. manila		
Mean mesh size (mm)	138			120			132		
Method	Cover			Cover			Cover		
No. of hauls	16			9			11		
Haul duration (min)	83			60			60		
Average total cod-end catch (kg)	520			2447			2640		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
65	14		100	16		100	15		100
66	21			8			12	1	92
67	11			10			11		100
68	4			8			14		
69	11			6			7		
≥70	15			17			25		
TOTAL	1674	1381		3538	1395		1403	577	
50% length (cm)	42.2			35.5			46		
Selection range (cm)	12			10 ?			10		
Selection factor	3.1			3.0			3.5		

TABLE 6 : HADDOCK (continued)

Ship	'Explorer'			'Explorer'			'Explorer'		
Area	Iceland			Iceland			Iceland		
Date	22-25 June 1962			18-21 June 1962			16-20 June 1962		
Cod-end	D. manila			D. nylon			D. manila		
Mean mesh size (mm)	127			89			112		
Method	Cover			Cover			Cover		
No. of hauls	8			5			7		
Haul duration (min)	60			60			60		
Average total cod-end catch (kg)	674			475			366		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
<20	4	85	4	2	0		2	8	20
21	-	1	0	1	2	33	-	20	0
22	2		22	1	9	10	2	68	3
23	3	17	15	4	24	14	11	183	6
24	12	53	18	7	39	15	29	328	8
25	24	108	18	9	96	9	34	409	8
26	42	169	20	28	150	16	59	488	11
27	59	264	18	29	175	14	71	500	12
28	56	261	18	43	156	22	85	455	16
29	48	246	16	52	163	24	92	312	23
30	52	161	24	36	103	26	69	231	23
31	31	108	22	38	48	44	72	150	32
32	13	65	17	39	24	62	38	98	28
33	6	19	24	18	13	58	36	48	43
34	2	13	13	12	6	67	8	10	44
35	5	15	25	9	-	100	16	14	53
36	5	11	31	12	-	100	11	13	46
37	8	9	47	21	2	91	20	14	59
38	11	35	24	19	-	100	32	22	59
39	15	25	38	25			59	19	76
40	23	26	47	19			56	15	79
41	17	17	50	24			41	6	87
42	20	19	51	15			42	3	93
43	22	7	76	12			47	-	100
44	12	8	60	8			29	2	94
45	7	7	50	3			19	-	100
46	13	4	76	7			19		
47	10	3	77	1			26		
48	13	2	87	2			21		
49	8	-	100	2			31		
50	14	-	100	3			32		
51	27	1	96	4			29		
52	35	-	100	2			27		
53	35	-	100	3			29		
54	51	1	98	4			43		
55	63	-	100	3			37		
56	81			1			59		
57	86			3			46		
58	95			3			61		
59	86			7			41		
>60	376			8			266		
TOTAL	1492	1767		537	1012		1747	3416	
50% length (cm)	41.6			32.1			35.6		
Selection range (cm)	11			5			9		
Selection factor	3.3			3.6			3.2		

TABLE 6 : HADDOCK (continued)

Ship	'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'		
Area	S. & SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			S. & SW. Iceland		
Date	10-13 May 1962			10-11 May 1962			10-11 May 1962			12-13 May 1962			12 May 1962			12-13 May 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	104			120			98			122			103			99		
Method	Cover			Cover			Cover			Cover			Cover			Cover		
No. of hauls	2			3			4			2			3			2		
Haul duration (min)	45			41			45			45			25			45		
Average total cod-end catch (kg)	1818			1750			2455			1575			825			1100		
Length (cm)	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained
≤20		7	0	1	15	6	2	14	12	15	345	4	1	104	1	1	367	0.3
21		3	0		2	0		1	0	3	11	21		21	0		49	0
22		5	0					1	0		6	0		5	0		17	0
23		4	0					1	0		11	0		2	0		8	0
24											4	0					7	0
25																	1	0
26							1	6	14				1	1	50			
27					5	0		6	0		2	0					2	0
28		3	0		17	0	3	14	18		5	0		3	0		3	0
29	1	6	14		13	0	3	12	20		9	0	2	7	22	1	10	9
30	1	7	12	2	18	10	11	19	37	2	7	22	1	17	6	3	12	20
31	2	10	17	6	14	30	19	12	61	3	19	14	8	21	28	10	24	29
32		13	0	2	9	18	9	7	56	4	12	25	12	27	31	8	27	23
33	1	10	9	1	10	9	8	3	73	1	15	6	9	21	30	10	28	26
34	2	9	18	3	2	60	12	2	86	1	8	11	8	13	38	10	15	40
35	4	7	36	4	8	33	18	2	90	3	5	38	4	1	80	5	3	62
36	7	4	64	9	23	28	35	3	92		2	0	5	1	83	5		100
37	13	8	62	27	33	45	54	3	95	2	8	20	3	1	75	1	1	50
38	24	14	63	37	31	54	75	2	97	1	4	20	2		100	13		100
39	40	15	73	49	50	49	124		100	3	11	21	4	1	80	18	1	95
40	67	15	82	80	71	53	193	2	99	12	10	55	14	4	78	27		100
41	95	10	90	81	64	56	251		100	10	8	56	14	2	88	30		
42	116	15	89	119	57	68	277			20	23	47	12	2	86	46		

continued on next two pages

TABLE 6 : HADDOCK (continued)

Ship	'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'		
Area	S. & SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			S. & SW. Iceland		
Date	10-13 May 1962			10-11 May 1962			10-11 May 1962			12-13 May 1962			12 May 1962			12-13 May 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	104			120			98			122			103			99		
Method	Cover			Cover			Cover			Cover			Cover			Cover		
No. of hauls	2			3			4			2			3			2		
Haul duration (min)	45			41			45			45			25			45		
Average total cod-end catch (kg)	1818			1750			2455			1575			825			1100		
Length (cm)	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained	Cod-end	Cover	% Ret-ained
43	134	8	94	129	57	69	261		100	25	16	61	19	2	90	64		100
44	103	5	95	108	26	81	233			30	12	71	19		100	47		
45	103	3	97	88	23	79	163			36	16	69	32		100	50		
46	90	3	97	63	17	79	135			43	12	78	38	1	97	38		
47	58		100	51	2	96	109			35	14	71	37	1	97	32		
48	43			36	2	95	85			43	3	93	34		100	28		
49	28			23	2	92	50			46	3	94	40			21		
50	32			23	1	96	58			55	3	95	49			20		
51	19			14		100	33			54	3	95	33			14		
52	17			20			36			62	2	97	41			15		
53	14			8			23			60	2	97	40			19		
54	16			6			25			53	1	98	34			13		
55	12			5			16			46	1	98	33			14		
56	8			5			18			40		100	29			15		
57	8			1			9			27		100	23			11		
58	4			1			10			42	1	98	13			10		
59	4			1			10			17		100	11			7		
60	6			2			7			19			20			10		
61	2			1			4			13			13			5		
62	5			1			4			12			5			7		
63	2			2			1			10			9			7		
64	1						1			8			10			5		

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TABLE 6 : HADDOCK (continued)

Ship	'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'			'G. O. Sars'		
Area	S. & SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			SW. Iceland			S. & SW. Iceland		
Date	10-13 May 1962			10-11 May 1962			10-11 May 1962			12-13 May 1962			12 May 1962			12-13 May 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	104			120			98			122			103			99		
Method	Cover			Cover			Cover			Cover			Cover			Cover		
No. of hauls	2			3			4			2			3			2		
Haul duration (min)	45			41			45			45			25			45		
Average total cod-end catch (kg)	1818			1750			2455			1575			825			1100		
Length (cm)	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained	Cod-end	Cover	%Ret-ained
65							2			9			4			3		
66							1			8			2			1		
67							1			2			3			2		
68	1									4			5			1		
69										4			2			2		
70							2			3			4			1		
TOTAL	1083	184		1009	572		2392	110		885	616		702	258		650	575	
50% length (cm)	36.2			38.8			31.0			41.2			34.0 ?			35.4 ?		
Selection range (cm)	5			9			4 ?			9 ?			6 ?			5 ?		
Selection factor	3.5			3.2			3.2			3.4			3.3 ?			3.6 ?		

TABLE 6 : HADDOCK (Continued)

Ship	'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'		
Area	N. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	28-29 July 1962			28-29 July 1962			27 July 1962			28-30 July 1962			28 July 1962		
Cod-end	D. Kapron, full length d. cod-end chafer			D. Kapron, $\frac{1}{2}$ length d. cod-end chafer			Double Kapron			D. Kapron with modified ICNAF chafer			Double manila		
Mean mesh size (mm)	126			126			125			108			141		
Method	Cover			Cover			Cover			Cover			Cover		
No. of hauls	2			3			5			3			5		
Haul duration (min)	85			85			80			80			97		
Average total cod-end catch (kg)	1675			1427			1144			1364			1451		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤30	142	177		6	371		3	69	4	10	665	1	42	1260	4
31		7			11		1	22	4	2	26	7	1	69	1
32		8		1	8			4		1	11	8	7	68	9
33	1	2	33		4		1	12	8	6	6	50	1	21	5
34		1	0		4			13		3	4	43	4	51	7
35	3	2	60		5			4		12	12	50	2	62	3
36	3	2	60		3		1	1	50	5	15	25		68	
37	3	8	27		12	0	1	4	20	21	19	52	20	79	20
38	4	7	36	2	9	18	4	8	33	32	30	52	16	112	12
39	6	12	33	4	7	36	6	3	67	53	19	74	31	160	16
40	10	14	42	4	15	21	5	10	33	72	57	56	73	356	17
41	11	19	37	15	11	58	4	6	40	51	26	66	47	210	18
42	23	17	57	14	15	48	5	6	46	52	28	65	87	215	29
43	10	15	40	5	8	38	7	5	58	46	11	81	44	169	21
44	22	8	73	2	8	20	4	3	57	100	9	92	69	147	32
45	19	11	63	18	10	64	16	10	62	129	11	92	80	167	23
46	22	4	85	19	10	66	11	10	52	81	11	88	103	173	37
47	16	6	73	18	11	62	20	5	80	105	8	93	96	180	35
48	19	4	83	37	9	80	14	4	78	78	5	94	141	176	44
49	19	4	83	20	2	91	8	5	62	124		100	146	161	48
50	60	2	97	59	8	88	52	5	91	207	3	99	312	316	50
51	63	2	97	38	2	95	23		100	108		100	288	179	62
52	67	3	96	62	3	95	56	3	95	133		100	369	212	54

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TABLE 6 : HADDOCK (Continued)

Ship	'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'			'Goncharov'		
Area	N. Iceland			N. Iceland			N. Iceland			N. Iceland			N. Iceland		
Date	28-29 July 1962			28-29 July 1962			27 July 1962			28-30 July 1962			28 July 1962		
Cod-end	D. Kapron, full length d. cod-end chafer			D. Kapron, $\frac{1}{2}$ length d. cod-end chafer			Double Kapron			D. Kapron with modified ICNAF chafer			Double manila		
Mean mesh size (mm)	126			126			125			108			141		
Method	Cover			Cover			Cover			Cover			Cover		
No. of hauls	2			3			5			3			5		
Haul duration (min)	85			85			80			80			97		
Average total cod-end catch (kg)	1675			1427			1144			1364			1451		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
53	75		100	94	1	99	48	1	98	173	1	99	438	168	72
54	104	1	99	92	5	95	72		100	198	1	99	427	20	68
55	110	1	99	150	1	99	132	4	97	281	1	100	852	276	76
56	110		100	132	1	99	57		100	152	1	99	562	137	80
57	120		100	102		100	85		100	139	2	99	510	91	85
58	74	1	99	76			42	1	98	96		100	328	60	85
59	87		100	43			24	1	96	59			195	42	82
60	16			49			51	1	98	34			255	36	88
61	16			12			17		100	18			118	7	94
62	24			10			10		100	23			81	6	93
63	11			8			4		100	14			58	5	92
64	5			10			7	1	88	7			32	4	89
65	5			15			14		100	8			34	6	85
66	2			8			5			4			14		100
67	1			4			2			9			15		
68	1			2			5			2			12		
69	1						3			2			19		
≥70	9						3			6			28		
TOTAL	1294	338		1131	554		823	221		2656	982		5967	5751	
50% length (cm)	42.0			44.0 ?			43.3			36.7 ?			50.0		
Selection range (cm)	10.0			8.0			11.0			9.0 ?			13.0		
Selection factor	3.3			3.5 ?			3.5			3.4 ?			3.5		

TABLE 6 : HADDOCK (continued)

Ship	'María Julia'			'María Julia'			'María Julia'			'María Julia'		
Area	SW. Iceland			N. Iceland			N. & NW. Iceland			S. & SW. Iceland		
Date	28 Mar - 1 Apl 1962			24-27 July 1962			25 July & 12-13 Aug 1962			6-17 Aug 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	126			117			138			138		
Method	Cover			Cover			Cover			Cover		
No. of hauls	13			6			12			14		
Haul duration (min)	56			60			60			60		
Average total cod-end catch (kg)	-			-			-			-		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤20				1	2	33					1	
21										2		
22								2	0	3	13	19
23					1			1	0	6	37	14
24				1						16	88	15
25				2	7	22		7	0	9	77	10
26				3	21	13	1	12	8	15	73	17
27				5	49	9	2	40	5	3	52	5
28		1		9	81	10	2	60	3	2	28	7
29	1			8	102	7	10	66	13	5	10	33
30	1	6	14	9	120	7	10	108	8		18	0
31		7	0	17	82	17	4	87	4	3	40	7
32		10	0	11	72	13	3	69	4	6	83	7
33		12	0	6	54	10	3	32	9	9	94	9
34	1	7	13	10	26	28	1	25	4	17	143	11
35	2	7	22	2	16	11	1	20	5	22	150	13
36	4	9	31	5	8	38		18	0	25	131	16
37	7	17	29	6	6	50	2	7	22	21	122	15
38	18	43	30	5	11	31	2	11	15	22	79	22
39	31	76	29	10	16	38	1	10	9	14	45	24
40	56	127	31	29	21	58	8	34	19	10	37	21
41	87	125	41	43	29	60	11	38	22	16	33	33
42	134	116	54	54	32	63	15	46	25	19	43	31
43	120	125	49	79	26	75	21	49	30	31	59	34

continued on next two pages

TABLE 6 : HADDOCK (continued)

Ship	'María Julia'			'María Julia'			'María Julia'			'María Julia'		
Area	SW. Iceland			N. Iceland			N. & NW. Iceland			S. & SW. Iceland		
Date	28 Mar - 1 Apl 1962			24-27 July 1962			25 July & 12-13 Aug 1962			6-17 Aug 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	126			117			138			138		
Method	Cover			Cover			Cover			Cover		
No. of hauls	16			6			12			14		
Haul duration (min)	56			60			60			60		
Average total cod-end catch (kg)	-			-			-			-		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
44	139	90	61	77	22	78	18	47	28	42	85	33
45	123	66	65	70	19	79	24	44	35	59	87	40
46	125	69	64	70	19	79	20	38	34	77	89	46
47	90	24	79	78	4	92	16	24	40	72	95	43
48	101	31	77	44	4	92	13	22	37	79	71	53
49	74	24	76	16	2	89	16	11	59	80	69	54
50	98	20	83	25	3	89	11	15	42	106	86	55
51	97	12	89	33	1	97	22	11	67	108	60	64
52	112	12	90	35			32	11	74	114	46	71
53	82	6	93	54	3	95	33	22	60	106	44	71
54	109	5	96	55	4	93	57	10	85	109	32	77
55	103	3	97	71	1	99	51	19	73	103	22	82
56	76	3	96	61	1	98	62	17	78	108	19	85
57	81	2	98	81		100	46	15	75	89	20	82
58	45	3	94	65			75	4	95	91	13	88
59	2	2	96	45			61	6	91	85	10	89
60	60		100	36			62	6	91	66	4	94
61	32			18			19	1	97	63	1	98
62	42			18			30	2	94	54		100
63	16			12			22	1	96	53	2	96
64	24			13			18		100	26	1	96
65	12			4			10			33		100
66	13	2	87	5			10			20		
67	12		100	6			6			12		

continued on next page

TABLE 6 : HADDOCK (continued)

Ship	'María Julia'			'María Julia'			'María Julia'			'María Julia'		
Area	SW. Iceland			N. Iceland			N. & NW. Iceland			S. & SW. Iceland		
Date	28 Mar - 1 Apr 1962			24-27 July 1962			25 July & 12-13 Aug 1962			6-17 Aug 1962		
Cod-end	D. manila			D. manila			D. manila			D. manila		
Mean mesh size (mm)	126			117			138			138		
Method	Cover			Cover			Cover			Cover		
No. of hauls	16			6			12			14		
Haul duration (min)	56			60			60			60		
Average total cod-end catch (kg)	-			-			-			-		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
68	9			5			5	1	83	7		
69	7			1			1		100	7		
≥70	20			7			14			28		
TOTAL	2216	1062		1290	865		861	1069		2073	2312	
50% length (cm)	42.4			39.0			49.6			48.0		
Selection range (cm)	11			9			12			13		
Selection factor	3.4			3.3			3.6			3.5		

TABLE 7 : REDFISH

Ship	'Anton Dohrn'				'Anton Dohrn'				'Anton Dohrn'				'Anton Dohrn'			
Area	W. Iceland				SW. Iceland				W. Iceland				SW. Iceland			
Date	14-17 July 1962				24-26 July 1962				17-20 July 1962				21-23 July 1962			
Cod-end	D. manila				D. manila				D. Perlon				D. Perlon			
Mean mesh size (mm)	139				149				132				142			
Method	Cover				Cover				Cover				Cover			
No. of hauls	11				10				17				7			
Haul duration (min)	108				174				100				137			
Average total cod-end catch (kg)	435				661				659				558			
Length (cm)	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed
≤20	11	44	20						37	60	38					
21	1	4	20						1	11	8					
22	1	7	12						4	14	22					
23	5	9	36						10	21	32					
24	2	24	8						12	49	20					
25	10	42	19						32	71	31					
26	28	61	32						48	147	25					
27	45	95	32						86	267	24					
28	69	147	32						151	408	27					
29	65	179	27						196	599	25					
30	79	212	27	1	2	1	67		338	904	27	2	4	1	80	
31	115	269	30		2	1	67		455	1049	30	2	2	6	25	
32	134	333	29	1	2	3	40		592	1288	32	9	2	4	33	
33	195	379	34	2	6	6	50		704	1406	33	15	4	14	22	
34	216	361	37	2	8	16	33		734	1288	36	17	11	21	34	1
35	201	349	36	5	21	43	33		724	1319	35	23	26	39	40	2
36	183	295	38	4	27	64	30	2	645	1034	38	22	32	58	36	2
37	200	273	42	6	51	123	29	4	728	929	44	43	58	110	34	2
38	206	258	44	10	69	212	25	5	653	714	48	57	97	200	33	3
39	190	190	50	11	98	216	31	5	541	492	52	42	98	214	31	7
40	186	198	48	10	149	290	34	5	477	416	53	55	132	252	34	11
41	187	148	56	11	139	286	33	5	465	246	65	69	142	215	40	10
42	171	116	60	15	158	278	36	9	434	201	68	67	182	211	46	12
43	162	93	64	8	142	262	35	14	391	135	74	72	124	170	42	15

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TABLE 7 : REDFISH (Continued)

Ship	Anton Dohrn'				'Anton Dohrn'				'Anton Dohrn'				'Anton Dohrn'			
Area	W. Iceland				SW. Iceland				W. Iceland				SW. Iceland			
Date	14-17 July 1962				24-26 July 1962				17-20 July 1962				21-23 July 1962			
Cod-end	D. manila				D. manila				D. Perlon				D. Perlon			
Mean mesh size (mm)	139				149				132				142			
Method	Cover				Cover				Cover				Cover			
No. of hauls	11				10				17				7			
Haul duration (min)	108				174				100				137			
Average total cod-end catch (kg)	435				661				659				558			
Length (cm)	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed	Cod-end	Cover	% Retained	Meshed
44	131	71	65	12	125	199	39	13	354	83	81	69	105	92	53	16
45	134	49	73	10	88	138	39	9	296	38	89	51	74	73	50	16
46	135	32	81	24	89	117	43	10	297	23	93	58	75	46	62	12
47	123	30	80	19	148	131	53	23	301	17	95	47	85	34	71	22
48	146	29	83	19	179	137	57	38	314	9	97	47	88	20	82	38
49	150	13	92	12	190	138	58	49	266	4	98	19	104	9	92	23
50	138	6	96	18	199	106	65	54	236	4	98	13	106	7	94	21
51	93	1	99	9	226	88	72	52	197	6	97	1	95	2	98	11
52	84	3	97	5	172	46	79	45	157	2	99	3	78		100	7
53	42		100		133	25	84	23	81		100		42			
54	24			1	77	6	93	14	46				24			
55	7				54	3	95	7	15				22			1
56	8			1	13	1	93	1	10				11			
57	5				11	1	92		2				7			
58	1				4		100	1					4			
59	1				3				3				1			
≥60	17				107				29				77			
TOTAL	3901	4320		216	2692	2936		388	11062	13254		803	1912	1798		232
50% length (cm)	39.6				46.9				38.5				43.9			
Selection range (cm)	16				15?				16				15?			
Selection factor	2.9				3.1				2.9				3.1			

TABLE 7 : REDFISH (continued)

Ship	'Explorer'			'Explorer'			'Explorer'			'Explorer'		
Area	Iceland			Iceland			Iceland			Iceland		
Date	16-20 June 1962			22-25 June 1962			21-22 June 1962			18-21 June 1962		
Cod-end	D. manila			D. manila			D. manila			D. Nylon		
Mean mesh size (mm)	112.2			126.8			131.6			89.1		
Method	Cover			Cover			Cover			Cover		
No. of hauls	6			8			3			3		
Haul duration (min)	60			60			60			60		
Average total cod-end catch (kg)	366			674			552			475		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
≤20	2	10	17	31	114	21		10		2	3	40
21	2	3	40	17	33	34		6	0	3	1	75
22	2	3	40	40	79	34	3	7	30	3	5	38
23	4	4	50	55	103	35	-	4	0	-	8	0
24	8	4	67	81	144	36	9	22	29	9	12	43
25	6	7	46	121	178	40	7	17	29	25	13	66
26	8	6	67	176	180	49	15	27	36	33	21	61
27	8	3	73	254	228	53	21	56	27	51	20	72
28	10	6	62	243	204	54	26	59	31	164	17	91
29	7	5	58	239	215	53	39	90	30	72	11	87
30	4	3	57	267	169	61	33	109	23	135	3	98
31	7	1	88	238	172	58	36	108	25	140	4	97
32	3	-	100	196	104	65	60	93	39	119	1	99
33	4	-	100	152	70	68	56	95	37	115	-	100
34	-	-	-	122	45	73	51	75	40	142		
35	1	1	50	67	30	69	40	42	49	78		
36	5	-	100	65	18	78	39	34	53	61		
37	-			43	14	75	28	27	51	27		
38	-			28	7	80	24	23	51	16		
39	-			18	3	86	21	8	72	31		
40	-			13	1	93	14	6	70	30		
41	-			7	-	100	12	4	75	27		
42	-			6	6	86	8	4	67	21		
43	-			-	-	-	4	1	80	-		

TABLE 7 : REDFISH (Continued)

Ship	'Explorer'			'Explorer'			'Explorer'			'Explorer'		
Area	Iceland			Iceland			Iceland			Iceland		
Date	16-20 June 1962			22-25 June 1962			21-22 June 1962			18-21 June 1962		
Cod-end	D. manila			D. manila			D. manila			D. Nylon		
Mean mesh size (mm)	112.2			126.8			131.6			89.1		
Method	Cover			Cover			Cover			Cover		
No. of hauls	6			8			3			3		
Haul duration (min)	60			60			60			60		
Average total cod-end catch (kg)	366			674			552			475		
Length (cm)	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained	Cod-end	Cover	% Retained
44	-			3	1	75	12	-	100	-		100
45	-			-	-	-	6	-	100	10		
46	-			1	-	100	3	1	75	21		
47	-			-			1	-	100	-		
48	-			1			4			10		
49	-						1			-		
50	-						2			-		
51	-									-		
52	-									-		
53	-									-		
54	-									-		
55	-									-		
56	-									-		
57	-									-		
58	-									-		
59	-									1		
≥ 60	1									-		
TOTAL	82	56		2484	2113		575	928		1346	119	
50% length (cm)	24.8?			27.5			36.9			24.1?		
Selection range (cm)	7?			16			15?			6?		
Selection factor	2.2?			2.2			2.8			2.7?		

TABLE 7 ; REDFISH (Continued)

Ship	'Johan Hjort'			'Goncharov'					
Area	SW, Iceland			N. Iceland					
Date	13 Sept. 1962			5 Aug. 1962					
Cod-end	D. manila			D. Kapron					
Mean mesh size (mm)	108			118					
Method	Cover			Cover					
No. of hauls	2			3					
Haul duration (min)	75			60					
Average total cod-end catch (kg)	595			258					
Length (cm)	Cod-end	Cover	% Retained	Length (cm)	Cod-* end	Cover	% Retained	Meshed in cod-end	Meshed forward
≤20	4	830	0.5						
21	1	80	1						
22		38	0						
23	1	34	3						
24		29	0						
25	1	40	2						
26	2	34	6						
27		17	0						
28	1	10	9						
29	2	11	15						
30	1	9	10	≤30	24	314	7	5	1
31	1	5	17		14	39	26	3	1
32	2	2	50		21	66	24	13	3
33	5	10	33		24	42	36	13	
34	1	1	50		43	75	36	9	8
35	5	6	45		40	87	32	21	25
36	3	1	75		37	47	44	24	14
37	3	3	50		47	53	47	43	29
38		2	0		46	22	68	6	24
39	3	1	75		41	25	62	19	23
40	8		100		40	16	71	3	28
41	5				33	2	94	1	13
42	12				35	6	85	2	14
43	5				27		100	1	5
44	3				16	8	67		6
45	2				24	4	86	1	7
46					21		100		1
47					18	4	82	1	4
48					22	2	92		1
49					3	1	75		1
50	1		100		13	4	77		5
51					11	1	92		1
52					10	2	83		
53					6		100		1
54					5		100		
55					7	2	78		2
56									
57					1		100		
58					2				
59					1				
60					1				
61					1				
62					1				
63									
64					2				

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TABLE 7 ; REDFISH (Continued)

Ship	'Johan Hjort'			'Goncharov'					
Area	SW. Iceland			N. Iceland					
Date	13 Sept. 1962			5 Aug. 1962					
Cod-end	D. manila			D. Kapron					
Mean mesh size (mm)	108			118					
Method	Cover			Cover					
No. of hauls	2			3					
Haul duration (min)	75			60					
Average total cod-end catch (kg)	595			258					
Length (cm)	Cod-end	Cover	% Retained	Length (cm)	Cod-* end	Cover	% Retained	Meshed in cod-end	Meshed forward
65					2				
66									
67									
68									
69									
≥70					2		100		
TOTAL	72	1163			641	822		165	217
50% length (cm)	35?			37.2					
Selection range (cm)	5?			10					
Selection factor	3.2?			3.2					
* Includes fish meshed in cod-end									

TABLE 8 COD: Mean girth at length

Ship	'María Julia'		'A. T. Cameron'			'Explorer'	
Locality	N. & NW. Iceland		N. Iceland			N. Iceland	
Date	July 1962		July 1962			June 1962	
Length (cm)	Max. body girth (cm)	No. of Obs.	Head girth (cm)	Max. body girth (cm)	No. of Obs.	Head girth (cm)	No. of Obs.
15	10.0	1					
20	-						
21	-						
22	-						
23	14.0	1				10.4	1
24	-					10.4	3
25	-					11.2	5
26	14.0	2				11.6	6
27	15.0	1				11.8	5
28	14.2	4				12.5	6
29	16.0	1				12.8	2
30	14.3	3	14.0	13.8	1	12.9	4
31	15.5	2	14.1	14.0	3	13.6	2
32	16.0	4	15.4	15.7	3	14.2	2
33	25.0	1	15.5	15.6	7	15.2	3
34	17.5	4	15.8	16.2	5	-	
35	19.0	2	16.0	16.0	6	15.3	1
36	18.4	5	16.4	16.6	12	17.0	1
37	19.0	3	17.7	17.8	12	16.0	1
38	18.0	4	17.8	18.0	10	17.8	3
39	20.2	5	18.2	18.2	18	19.2	2
40	20.5	6	19.1	19.3	12	19.2	2
41	20.2	22	19.2	19.4	12	-	
42	21.5	16	20.3	20.4	19	-	
43	22.2	12	20.4	20.5	15	19.9	2
44	23.1	17	20.9	21.1	25	-	
45	23.7	18	21.6	21.8	15	22.2	1
46	23.8	9	22.0	22.2	16	22.0	1
47	24.2	10	23.0	23.2	15	-	
48	25.4	13	23.1	23.3	15	-	
49	25.8	6	23.6	24.0	19	-	
50	25.2	15	23.1	23.3	13	23.8	2
51	27.9	8	24.0	24.2	14		
52	27.4	10	24.8	25.0	19		
53	27.2	12	25.8	26.0	10		
54	27.7	3	25.0	25.3	13		
55	28.7	9	26.1	26.4	9		
56	30.9	13	26.3	26.4	13		
57	29.0	8	26.9	27.2	18		
58	30.9	12	27.7	28.0	12		
59	31.1	12	27.7	28.1	11		
60	33.2	14	28.7	28.9	10		
61	33.4	11	29.3	29.7	5		
62	35.6	10	29.2	29.4	12		
63	35.5	10	30.4	30.6	14		
64	36.0	6	30.8	31.3	5		
65	34.3	4	31.4	31.8	5		
66	35.7	9	31.9	32.4	5		
67	36.5	6	32.1	32.5	8		

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TABLE 8 COD: Mean girth at length

Ship	'María Julia'		'A. T. Cameron'			'Explorer'	
Locality	N. & NW. Iceland		N. Iceland			N. Iceland	
Date	July 1962		July 1962			June 1962	
Length (cm)	Max. body girth (cm)	No. of Obs.	Head girth (cm)	Max. body girth (cm)	No. of Obs.	Head girth (cm)	No. of Obs.
68	38.2	9	32.4	33.0	5		
69	37.2	5	34.2	34.6	6		
70	38.6	9	34.5	34.7	4		
71	38.3	11	34.4	35.1	1		
72	40.3	4	34.8	35.5	4		
73	40.1	10	-	-			
74	41.2	6	36.1	36.6	4		
75	42.3	6	-	-			
76	41.9	8	37.7	38.3	2		
77	43.7	6	37.0	37.4	2		
78	41.4	7	37.4	37.4	1		
79	46.5	2	-	-			
80	39.0	1	-	-			
81	44.0	1	-	-			
82	44.3	3	39.6	40.3	2		
83	46.0	1	-	-			
84	43.0	1	44.4	46.9	1		
85	46.0	2	-	-			
86	46.5	2	45.6	46.2	1		
87	43.5	2	-	-			
88	-		40.6	40.7	1		
89	45.0	1	45.2	46.4	1		
90	-		-	-			
95	56.0	1	-	-			
97	50.0	1	-	-			
99	-		50.5	53.6	1		
102	51.0	1					
105	63.0	1					
Regression							
Girth (G) on	BG = 0.564L - 2.0 cm		HG = 0.496L - 1.1 cm BG = 0.511L - 1.5 cm			HG* = 0.529L - 2.4 cm	
Length (L)							
Regression from curve fitted by eye, except* which indicates a calculated fit.							

TABLE 9 HADDOCK. Mean girth at length

Ship	'Explorer'		'A. T. Cameron'				'María Julía'	
Locality	N. Iceland		N. Iceland				N. & NW, Iceland	
Date	June 1962		July 1962				July 1962	
Length (cm)	Head girth (cm)	No. of obs.	Mean head girth (cm)	No. of obs.	Mean body girth (cm)	No. of obs.	Max. body girth (cm)	No. of obs.
22	10.0	1						
23	11.1	3					13.0	1
24	-						-	
25	11.9	3	13.4	2	13.6	1		
26	12.0	2	13.2	2	13.5	1	-	
27	12.8	1	-	-	-	-	-	
28	13.4	3	14.4	8	14.8	3	-	
29	13.6	2	14.8	8	15.1	7	15.3	3
30	14.1	2	15.5	8	15.8	8	16.0	2
31	14.6	3	16.1	11	16.6	10	17.0	2
32	-		16.7	10	16.9	10	18.0	5
33	15.6	2	16.5	10	16.9	8	18.5	2
34	16.0	2	17.5	5	18.0	4	-	
35	16.4	2	17.6	3	18.0	3	21.0	3
36	17.0	2	18.8	2	19.0	2	19.0	1
37	17.3	1	19.4	7	19.7	5	21.0	1
38	-		19.7	5	20.2	5	-	
39	18.7	3	21.1	7	21.5	7	21.5	8
40	19.4	3	20.8	12	21.3	12	22.9	7
41	19.6	5	21.5	12	22.0	12	23.3	12
42	19.3	2	22.1	12	22.7	12	23.2	19
43	20.7	1	22.5	9	23.1	9	24.3	33
44	21.2	1	22.6	6	23.5	6	24.7	34
45	21.3	2	23.1	6	23.7	6	25.2	34
46	21.6	2	24.2	3	25.0	3	26.1	16
47	-		24.7	8	25.2	8	26.5	12
48	22.6	1	25.5	5	26.5	5	26.5	11
49	22.6	1	26.1	4	26.9	4	27.7	9
50			26.8	8	27.3	7	31.3	3
51			27.6	4	28.5	4	29.6	5
52			28.1	3	29.4	3	28.8	8
53			26.9	6	27.7	3	29.1	12
54			28.4	9	29.5	7	30.1	17
55			29.2	6	30.5	5	30.4	10
56			28.8	7	29.9	7	30.7	24
57			29.7	3	30.3	2	30.9	15
58			30.1	3	31.5	3	35.6	20
59			30.8	3	31.8	3	31.7	14
60			30.7	4	32.0	4	32.3	18
61			32.7	1	-	-	33.7	10
62			31.3	3	32.3	3	33.8	6

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TABLE 9 HADDOCK. Mean girth at length

Ship	'Explorer'		'A. T. Cameron'				'María Julia'	
Locality	N. Iceland		N. Iceland				N. & NW, Iceland	
Date	June 1962		July 1962				July 1962	
Length (cm)	Head girth (cm)	No. of obs.	Mean head girth (cm)	No. of obs.	Mean body girth (cm)	No. of obs.	Max. body girth (cm)	No. of obs.
63			31.8	1	32.5	1	34.0	6
64			31.5	1	33.3	1	32.0	2
65			-	-	-		37.5	2
66			-	-	-		36.0	3
67			29.9	1	31.0	1	36.5	2
70			35.2	1	37.8	1	-	
74							39.0	1
Regression Girth (G) on Length (L)	G* = 0.475L + 0.01 cm		*HG = 0.495L + 1.0 cm *BG = 0.523L + 0.4 cm				G = 0.552L	
Regression from curve fitted by eye, except* which indicates a calculated fit.								

TABLE 10 : REDFISH. Mean girth at length

Ship	'A. T. Cameron'			'Anton Dohrn'			
Locality	N. Iceland			W. Iceland		SW. Iceland	
Date	July 1962			July 1962		July 1962	
Sebastes type	Not separated, probably <u>marinus</u>			<u>marinus</u>		<u>mentalla</u>	
Length (cm)	Head girth (cm)	Body girth (cm)	No. of obs.	Body girth (cm)	No.of obs.	Body girth (cm)	No.of obs.
19	13.6	13.5	1				
23	15.6	15.3	1				
24	17.3	17.4	2				
25	17.9	18.1	6				
26	18.4	18.6	9				
27	19.1	19.3	19	18.1	33		
28	20.1	20.2	16	18.9	42		
29	20.8	21.0	17	19.9	40		
30	21.8	22.0	22	20.9	50		
31	22.3	22.6	18	21.3	64		
32	22.8	23.0	13	22.0	78		
33	23.7	24.0	12	23.1	68		
34	24.2	24.7	14	23.6	79		
35	25.2	25.4	8	24.3	93		
36	26.3	26.8	10	24.8	73		
37	26.4	27.1	5	25.6	98		
38	26.9	27.1	4	26.6	109		
39	27.3	27.3	1	27.3	114		
40	29.6	30.5	1	28.1	114		
41	29.0	29.0	1	28.9	108	29.5	37
42	31.5	32.9	1	29.6	99	30.4	70
43	29.8	30.2	2	30.2	75	31.2	60
44				31.0	74	31.7	83
45				32.1	64	32.8	63
46				32.5	52	32.9	36
47				33.2	63		
48				34.0	54		
49				34.5	47		
50				35.5	44		
51				35.9	20		
52				36.6	32		
53				37.8	27		
Regression							
Girth (G) on	*HG = 0.73L - 0.5 cm BG = 0.75L - 0.8 cm			*G = 0.742L - 1.7 cm		*G = 0.711L + 0.5 cm	
Length (L)							
Regression from curve fitted by eye, except* which indicates a calculated fit							