

MESH SELECTION DATA OF ARCTIC COD AND HADDOCK.

Report of G. O. SARS' cruise Sept. -Nov. 1957.

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During a cruise with the R/V G. O. SARS to the Barents Sea in the autumn of 1957 some mesh selection experiments were carried out on the East Finnmark Grounds. An account of the experiments is given in this report and the results are briefly discussed.

The gear. The material comprises 11 successful hauls with a manilla trawl equipped with a nylon cod end. The headline of the trawl was 60 feet. The cod end was 40 meshes long and made of double nylon twine, tarred. The nylon fiber was specified as being of high tenacity with a breaking strength of 7.5-8 gr/denier. The twine was made of a combination of plies of 840 denier yarns and had a runnage of abt. 260 meters per kilo. - A finemeshed nylon net was used as a cover over the entire upper side of the cod end and a small part of the after belly.

Mesh measurements. 16 hauls had been made with the cod end before the selectivity experiments were started and the knots were accordingly well set. Mesh measurements were made with the Aberdeen spring gauge. As the size of the catches were comparatively small the mean mesh size for these experiments have been referred to measurements of the ten last rows of meshes only. The mean size of three longitudinal rows of the ten after meshes were:

Date	Number of meshes	Mean	Standard Dev.
Oct. 11th	30	139.9 mm	2.82 mm
Oct. 13th	30	140.3 mm	2.07 mm

Girth measurements.

Cod. Two different girth measurements were taken viz. the head girth over the posterior edge of the 1st operculum and the stomach girth in a position over the middle of the 1st dorsal fin. The following table gives the relation between the mean total length and the mean values of the girth measurements in some samples from the East Finnmark Grounds:

			$\frac{t. \text{ length}}{h. \text{ girth}}$	$\frac{t. \text{ length}}{s. \text{ girth}}$	stomach
st. 15	3 Apr. 1957	N: 48	2.41	2.17	full of capelin
st. 23	5 Apr. "	N: 43	2.51	2.23	full of capelin
st. 24	9 Apr. "	N: 26	2.36	1.97	very full of capelin
st. 51	11 Oct. "	N: 45	2.44	2.43	empty

The major part of these fish were of sizes within the selection ranges. The stomach girth is clearly influenced by the feeding condition which is also obvious from an inspection of full and empty fish.

Haddock. Similar girth measurements of haddock from the East Finnmark Grounds gave the following results:

			$\frac{t. \text{ length}}{h. \text{ girth}}$	$\frac{t. \text{ length}}{s. \text{ girth}}$	stomach
st. 24	9 Apr. 1957	N: 47	2.24	1.96	full of capelin
st. 58	13 Oct. "	N: 24	2.15	2.11	nearly empty

The data indicate that when feeding is not very heavy, the relationship between total length and maximum girth of the arctic haddock is lower than that of the arctic cod. This may serve to explain the difference usually found between the selection factors of the two species.

Discussion of the results. The results are presented in table 1 and figure 1. The number of fish in each haul were unfortunately too small to permit an analysis of the haul to haul variation. The fish measured as belonging to the cod end include a small number of sizes between 35 and 40 cm (not shown in figure 1). It is believed, however, that the occurrence of at least part of such small fish in the cod end catch is caused by an accidental return of small fish from the cover to the cod end while taking in the trawl. Some observations to that effect were made.

Previous covered net experiments with double manilla cod ends in these waters (Beverton 1956, Sætersdal 1957) have given selection factors of from 3.4 to 3.8 for cod, and 3.3 to 3.4 for haddock. The value 3.4 for cod was obtained in experiments (in April 1957) on fish which were feeding heavily on capelin cfr. the girth measurements mentioned above. It is probable that a selection factor of 3.7 is a more normal one for double manilla covered net experiments. Thus the selection factors of 4.2 for cod and 3.8 for haddock obtained with our double nylon cod end are probably 0.4 to 0.5 units higher than the values which would have been obtained under similar circumstances with a double heavy manilla cod end.

In some experiments with cod ends of double perlon and nylon in the Spitsbergen waters, von Brandt (1957) obtained considerably lower values of selection factors than those shown here, viz. 3.7 to 3.8 for cod and 2.9 to 3.3 for haddock. von Brandt's data from other materials and areas show, however, that his values are in general considerably lower than those obtained by other workers, and he ascribes this to differences in the mesh measurement technique.

References:

- BEVERTON, R. J. H. 1956. Mesh selection of cod and haddock. Contribution no. 74 to the ICES meeting, Copenhagen 1956.
- BRANDT, A. v. 1957. Selectivity Data for Synthetic Fibers. Contribution no. S.20 to the ICNAF, ICES & FAO meeting, Lisboa 1957.
- LÆTERS DAL, G. 1957. Mesh selection of cod, haddock and redfish. Contribution no. S.37 to the ICNAF, ICES & FAO meeting, Lisboa 1957.

Table 1. Mesh selection data for arctic cod and haddock.

Codend: Double medium nylon.

	COD	HADDOCK
Method & ship	Cover, G.O.SARS 168 ft.	do.
Locality	East Finnmark Gr.	do.
Date	10 - 13 Oct. 1957	do.
Number of hauls	11	do.
Duration of hauls	1½ hr.	do.
Total catch all species (baskets)	20 (av.)	do.
Mean mesh size of codend	14.0 cm.	do.
Number of fish in selection range (Cover/c. e.)	1110/941	427/358
25 per cent length	53.5 cm.	49.5 cm.
50 " " "	59.0 "	54.0 "
75 " " "	62.5 "	57.0 "
Corrected x) 50 per cent length	58.5 "	53.5 "
Selection factor	4.2	3.8
Stomach	Empty	Nearly empty

x) Corrected 50 per cent length:  $\frac{50 \text{ per cent}-1}{2} + \frac{25 \text{ per cent}-1 + 75 \text{ per cent}-1}{4}$

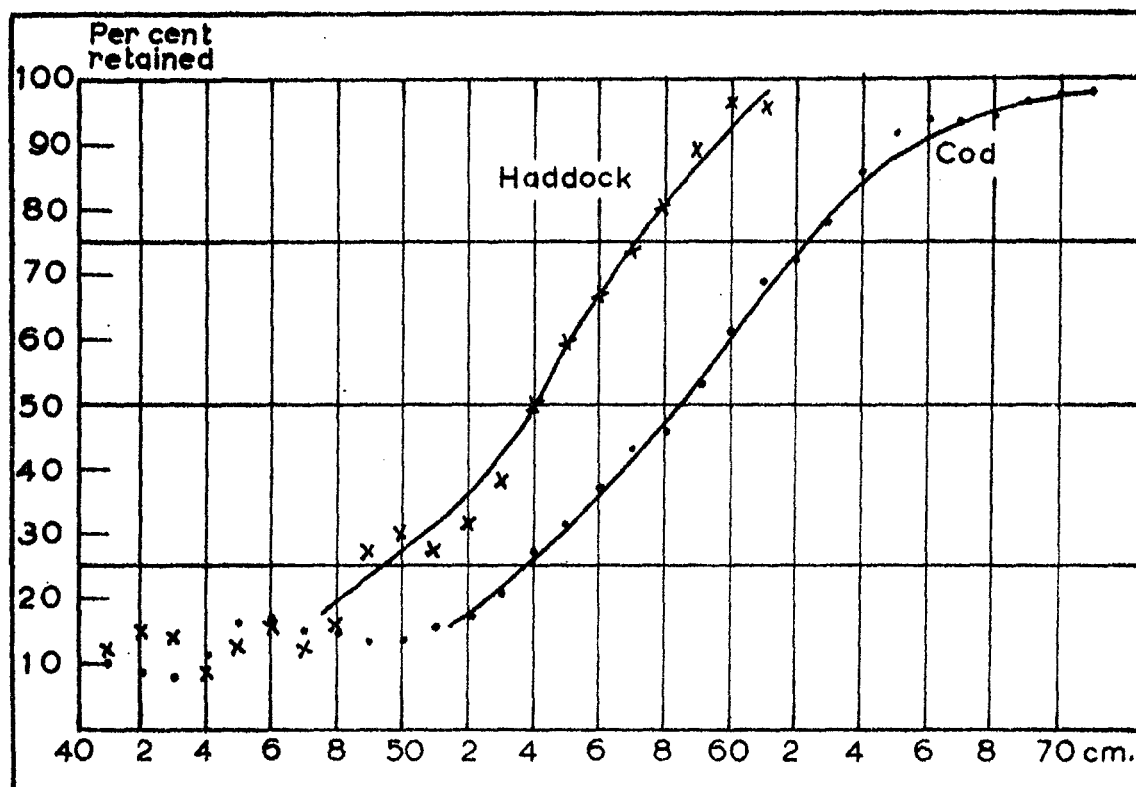


Fig. 1. Selection curves for double nylon codend of meshsize 14.0 cm. Points are calculated from smoothed data ( $1/4(a+2b+c)$ ).