INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

Serial No. 1368
(D. c. 8)

Document No. 72

ANNUAL MEETING - JUNE 1964

Minimum Mesh Sizes and Equivalents for Different Materials to meet ICNAF Regulations

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Following documentation of Canadian legal difficulties with spring-loaded gauge for enforcement (Doc. 38, 1962) and recommendations from the Ad Hoc Committee on ICNAF Trawl Regulations (Proceedings 14, App. I, 1963), we have re-examined some of the minimum mesh size regulation problems. Among these were selection equivalents for various materials; comparison of regulations for the NW Atlantic with those of the NE Atlantic and North Sea; equivalent measurements with different gauges; manufacturers' specifications to meet minimum mesh regulations; and codend mesh sizes currently in use by Canadian trawlers according to material.

Selection equivalents

Selection factors ($\frac{\text{50\% retention length}}{\text{mesh size}}$) for various species and materials in the ICNAF area have been compiled by Clark et al. (1958) and Parrish (1963). These show that the current ICNAF minimum mesh size of 4½ inches for manila trawls (as measured with an ICNAF gauge) should have a 50% retention length of about 40 cm for cod and 37 cm for haddock. Most data for synthetics show substantially higher escapement than manila for meshes of the same size, and this raises problems of equivalents, i.e., what mesh size in synthetics will produce the same selection as the specified manila mesh size. Estimates of mesh size in synthetics equivalent to the 4½ inch (114 mm) manila mesh are presented in Table I.

Table I. Mesh size equivalents* (ICNAF gauge) by material for cod and haddock (50% retention, cod = 40 cm; haddock = 37 cm).

Material	Mesh size Inches	mm
Manila (double)	4 1/2	114
Polyethylene (double)	4 1/2	114
Polyamides and esters (double)	4 1/8	105
Polyamides and esters (single)	4	102
Polypropylene (Ulstron)	?	?

*From Clark et al. (1958) and Parrish (1963)

Comparisons of regulations

ICNAF regulations for cod and haddock call for a minimum mesh size of 4½ inches (114 mm) for manila and equivalent selectivity for other materials throughout the whole region. This requires interpretation at a national level. In contrast, regulations for the NE Atlantic and North Sea state the internationally agreed equivalents. A comparison of these regulations with North American practice is presented in Table II.

Table II. Comparison of current mesh regulations.

	ICNAF (mm)		NE Atlantic (mm)	North Sea (mm)
Manila	114		120	80
	Canada	USA*		
Polyamides and Polyesters (dbl)	111	108	110	75
Polyethylene (dbl)	111	108	120	75
Ulstron (dbl)	111	108	120	?
Synthetics (single)	102	108	...	70
Seine nets	Same as OT		100	70

*The USA commonly uses a system of measuring nets before use and certifying the new codends.

The comparison points out: (a) the somewhat different interpretation of equivalents by Canada and USA for the ICNAF regulation; (b) that North American countries have grouped synthetics while European countries have separated some of these; and (c) that the two areas differ in treatment of minimum mesh sizes for newly introduced materials. North Americans group with synthetics, Europeans group with manila until selectivities are determined. In addition, the table shows differences by country and area in treatment of single synthetics and seine nets.

Comparison of mesh measuring methods

The literature about mesh measuring shows a general lack of precision but suggests that greater precision is reached using a "spring-loaded" gauge rather than a "simple" gauge. Measurements (recorded in the literature) obtained with the ICES gauge (8 lb pressure) were generally lower than those with an ICNAF gauge (12-15 lb pressure). Measurements with a simple non-pressure gauge depended on interpretation of amount of pressure.

Our comparisons between "spring-loaded" gauges and the "simple" gauge were carried out by officers who might normally be concerned with regulations. We obtained used codends of manila, polypropylene, terylene (polyester) and polyethylene, wetted, and then used for measurements. Simple gauges, 3/32 inch thick, of 100, 105, 110, 114 and 120 mm width, were tried in meshes that they would "pass easily through" (suggested for possible regulation and interpreted by us to mean slight pressure) and the same meshes subsequently measured in sequence with the ICES gauge at 8 lb pressure and the ICNAF gauge at 12-15 lb pressure. The results are shown in Fig. 1.

With our interpretation of "pass easily through", the simple gauge was close to the measurements obtained with the ICES gauge but 2-5 mm less than those obtained with the ICNAF gauge.

ICNAF regulations were drawn up for measurements with the ICNAF gauge, which is still used in the USA and may be used by other countries. Canada is obliged by law to drop the spring-loaded gauge and use a simple gauge for regulation. From the comparisons described above it is apparent that insistence on conformity with these regulations based on measurements with simple gauges would require that Canada use larger meshes than those possible for other countries. Thus, to ensure uniformity in meshes used, there would need to be two versions of the regulation schedule--one for those countries in which the spring-loaded gauge is legal, and one for countries where simple gauges only are legal. The equivalents shown in Table I should be revised to provide for both measuring systems as shown in Table III.

Table III. Mesh size equivalents for ICNAF and simple "pass through" gauges.

Material	Mesh size		
	ICNAF gauge		Simple gauge
	Inches	mm	mm
Manila (dbl)	4 1/2	114	110
Polyethylene (dbl)	4 1/2	114	110
Polyamides and esters (dbl)	4 1/8	105	103
Polyamides and esters (single)	4	102	100
Polypropylene (Ulstron)		?	?

Net manufacturers' specifications

By contacting several net manufacturers who provide trawl nets for both Canadian and NE Atlantic vessels, we were able to obtain information about sizes of newly knit codend meshes which apparently satisfy the regulations specified for codend meshes measured wet after use. These are presented in Table IV and show between knot centre measurements of new nets related to after use regulations.

Table IV. Net makers' specifications to meet mesh size regulations.

Material	Can. regulations		NE.Atl. regulations	
	New netting Knot centres	Minimum Used netting	New netting Knot centres	Minimum Used netting
	inches	mm	inches	mm
Manila 50/4	5 5/8	114		
75/4	5 3/8	114		
50/4			6	120
75/4			5 1/2	120
Polyamides and esters	5	111	5	110
Polypropylene (Ulstron)	4 3/4	111	5 1/4	120

It is obvious from Table IV that net manufacturers allow for the difference in mesh size for manila but they consider that the difference between polyamides and esters for the different regions is negligible, even though they are measured with different gauges.

Mesh sizes in codends used by Canadian trawlers

Records of inspections by Canadian Department of Fisheries officers have been used to show mean mesh sizes of codends used by Canadian mainland trawlers in 1963 and Newfoundland trawlers in 1962 and 1963 (Jan.-June, main haddock fishing period), Fig. 2 and 3. The results have been presented according to material used and the

relation between the ICNAF gauge and a simple gauge measurement has been approximated along the horizontal axis.

On the Canadian mainland larger trawlers used double synthetic codends with average mesh sizes of 4 3/8 inches or greater (4 1/4 inches, 108 mm, simple gauge). Smaller trawlers used single twine synthetics with mesh sizes between 4 and 4 1/4 inches, ICNAF gauge (about 3 15/16 to 4 1/8 inches, simple gauge).

In Newfoundland, larger trawlers were using mainly manila codends with average mesh size ranging from 4 1/8 to 4 1/2 inches, ICNAF gauge (4 to 4 3/8 inches, simple gauge).

Summary

Current data for selectivity in the ICNAF area from recent compilations referred to in the text show large differentials between manila and some synthetics (polyamides and polyesters) but not for others (polyethylenes).

National interpretation of equivalents for the ICNAF minimum mesh size regulation by North American countries has led to grouping of all synthetics under one mesh size; differentials that are too great for some materials; and differences in equivalents provided by different countries. International agreement on equivalents seems desirable.

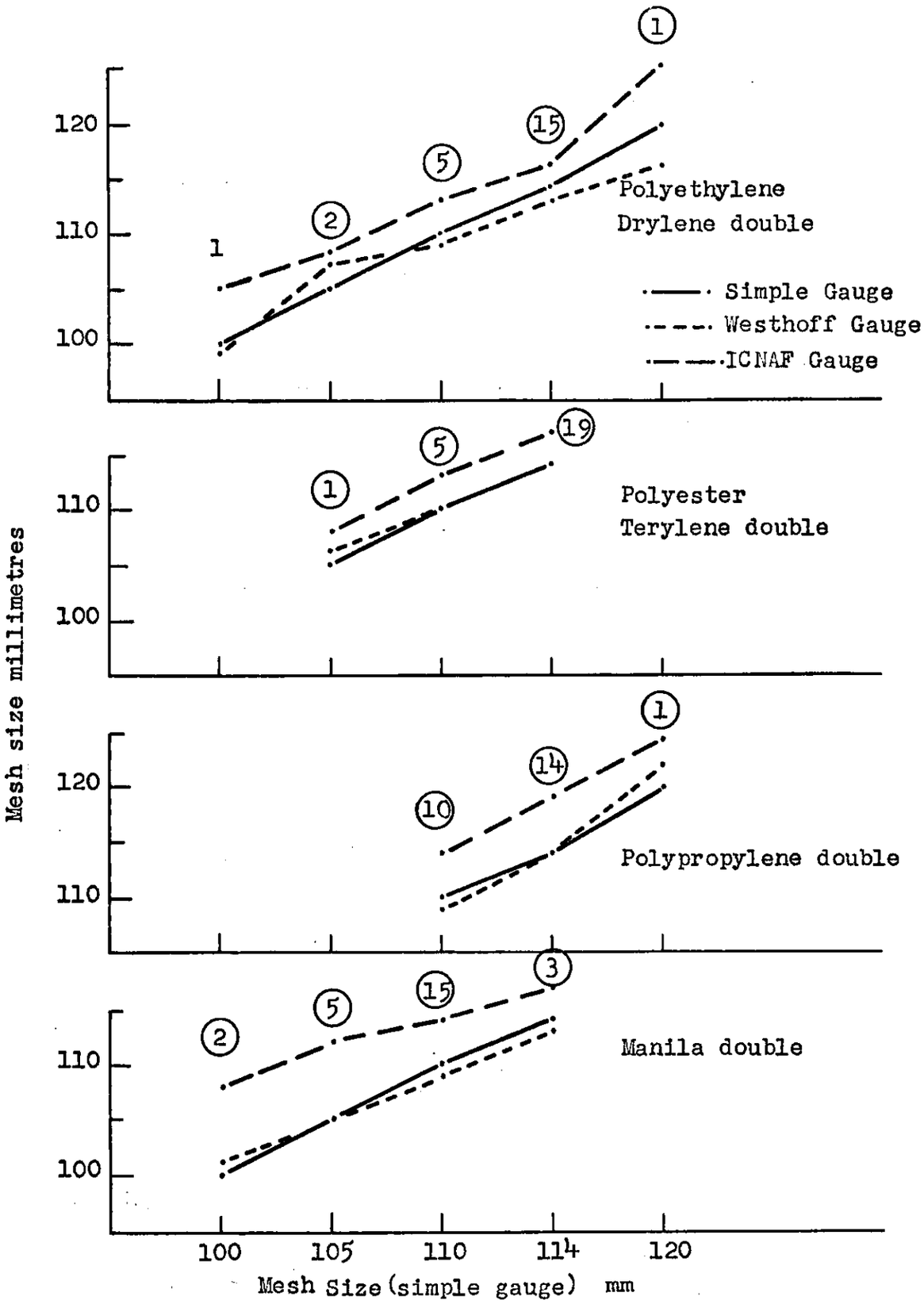
Mesh measuring comparisons and net manufacturers' specifications suggest that ICNAF regulations should be written in two forms (1) for countries using spring-loaded ICNAF gauges, and (2) those using simple gauges, the latter being about 4 mm less than the former (for manila).

Provision of more reliably estimated equivalents for synthetics would make little difference in present Canadian practice, except for one group of mainland trawlers (mostly large) which are currently using meshes in synthetic materials larger than those which would be required.

References

Clark, J. R., F. D. McCracken, and W. Templeman. 1958. Summary of gear selection information for the Commission Area. ICNAF Ann. Proc., Vol. 8, pp. 83-98.

Parrish, B. B. 1963. Selectivity differences between codends made of natural and synthetic fibres in the ICNAF Area. ICNAF, Redbook, Pt. III. Selected papers from the 1963 Annual Meeting.



Numbers in circles are number of meshes measured.

Fig. 1. Comparison of mesh sizes with different gauges.

COMMERCIAL CODENDS MEASURED BY DEPT. OF FISHERIES
1963, N.B.-P.E.I.-N.S.

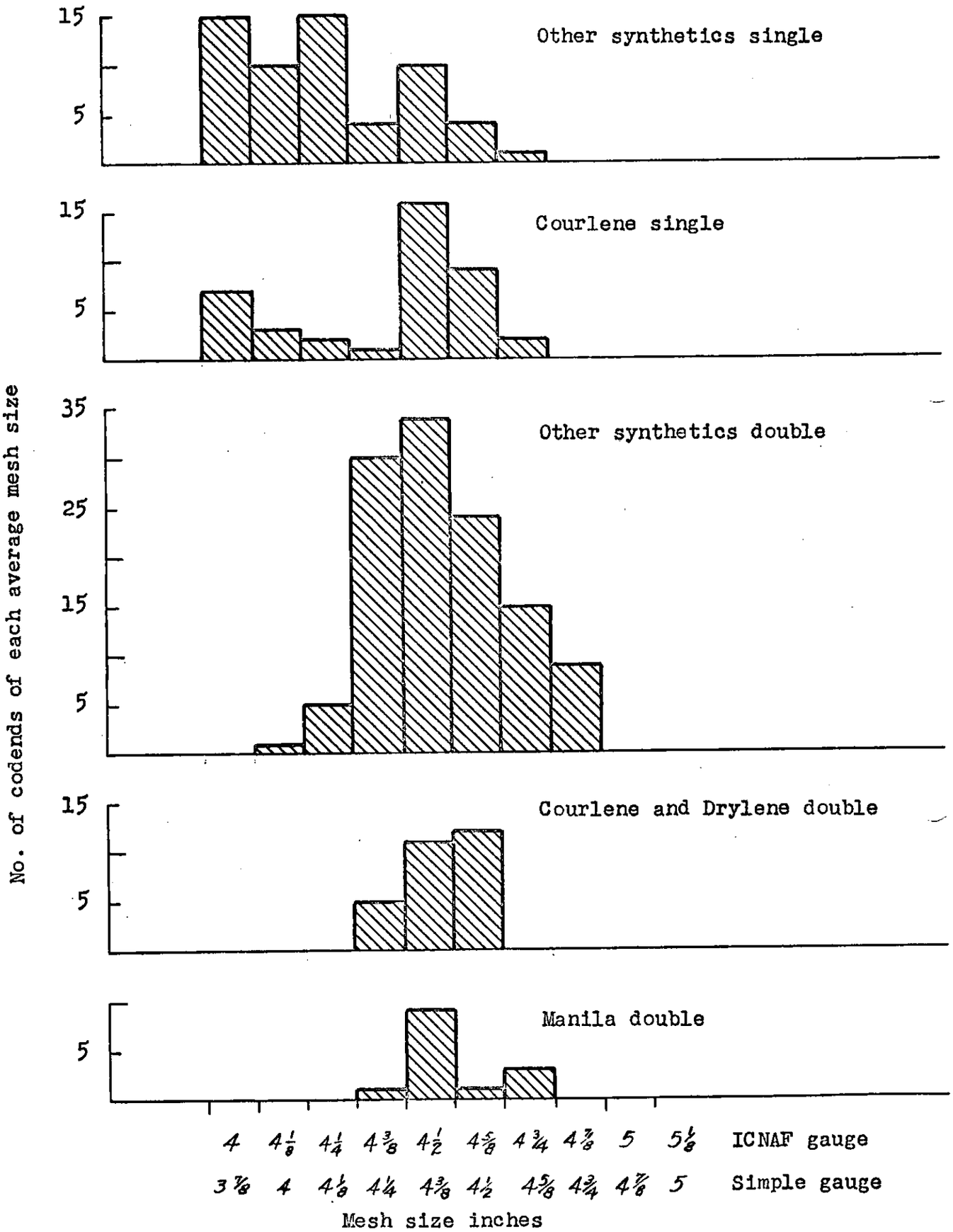


Fig. 2. Mesh sizes in Canadian mainland codends.

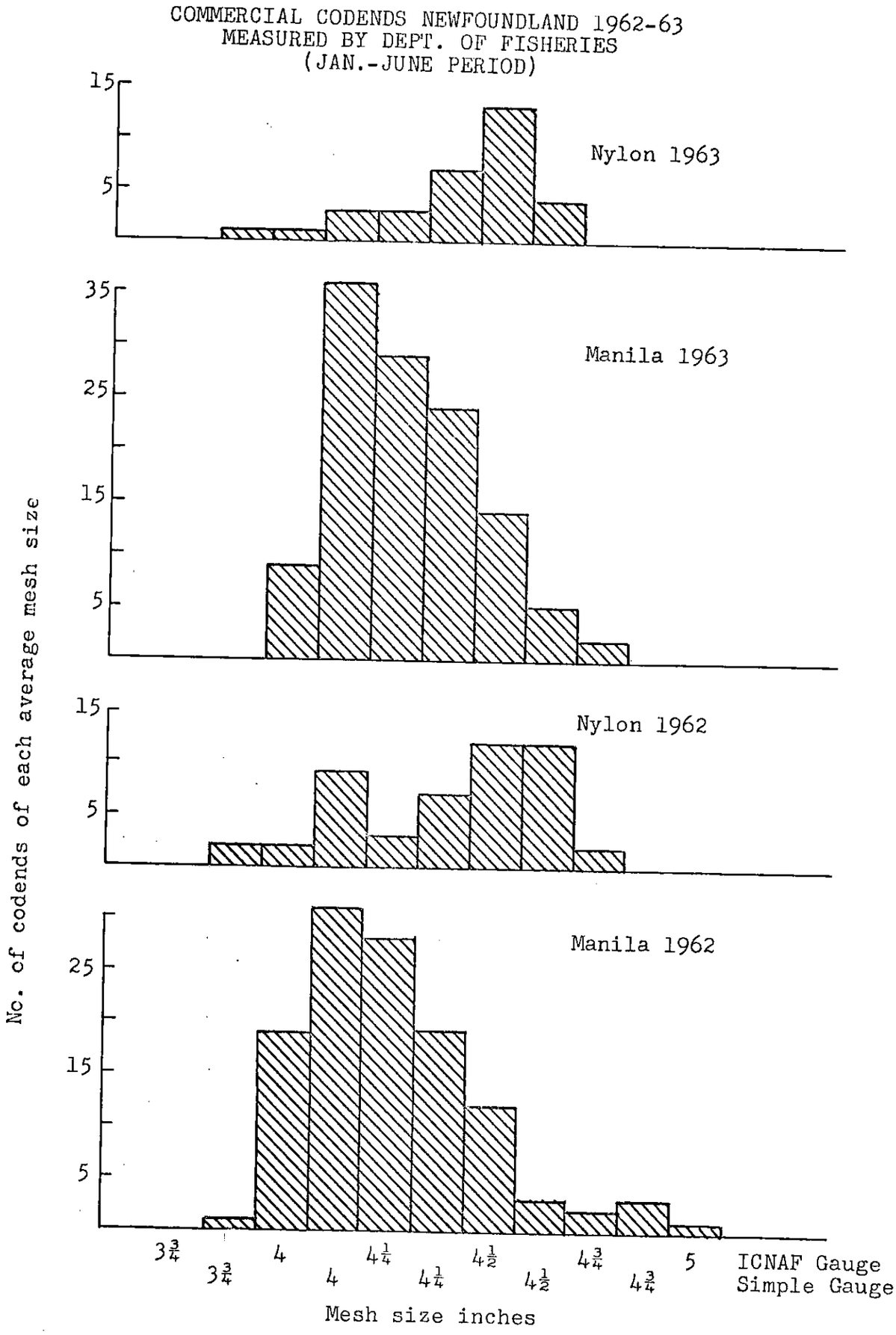


Fig. 3. Mesh sizes in Newfoundland codends.