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Length of Split (Salted) Cod to Length of Round Fresh

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Comparative measurements of length of split (salted) cod to length of round, fresh cod were reported by Spain from researches carried out in Newfoundland waters. The individual data on length measurements were reported (cfr. Spanish research report for 1953 Appendix, Ann. Meet. 1954, Document No. 8).

The Norwegian research report for West Greenland waters for 1954 (Ann. Meet. 1955 Document No. 13) includes measurements, reported by 5 cm. groups of round fresh cod and of split, salted (1½-2 months salting) cod from experiments in 1953 and 1954.

In May 1956 similar measurements were reported by Canada (from Subarea 4 ?) in the form of two figures reproduced here (Fig. 1A and B). Original data were not reported.

The results of these series of measurements are shown in Fig. 1 A-D. The ordinate gives the length of the split cod, the abscisse the length of round fresh cod.

For all series it appears that the dots (crosses) indicating the separate measurements fall along a straight line, and fairly close to it. This means that by using a co-ordinate system and this straight line, conversion from one set of measurements to another can easily be done. The deviations of the dots from the line are rather small, amounting to only around 2-3 cm. in both directions, when only results of more than 5 specimens for each length unit are considered.

Thus, it is well possible through measurements of the landed salted cod to get an approximate picture of the length of the corresponding round fresh cod.

However, before such a converting line, or corresponding tables or conversion factors are elaborated for use a larger quantity of data should be collected.

It is therefore suggested that each country for its next fishing compaign plan such experiments. If the results in original data are reported to the Secretariat, they can be compiled and final figures for the conversion can be elaborated.

Canada has reported two sets of measurements of the split cod, to the fork of the tail fin and to the base of the fin. The figures indicate that the spreading of the observations along the straight line is a little wider for the fork measurements than for the fin base measurements. However, the difference in the degree of spreading is so small that it does not give sufficient reason for deviating from the common rule of measuring to the hind margin of the tail fin (fork).

Norway (Fig. 1 C) has reported two series of measurements, one from 1953 and one from 1954. There is a very small difference between the two series to the effect that the 1954 figures give ca. 1 cm. shorter total length for round fresh cod

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than the 1953 figures. The 1952 figures refer to cod salted in 1½ months, the 1954 figures to cod salted in two months.

Spain has measured the same split cod twice, first when placed in the hold for salting and again five months later, when landed. Figure 1D shows that there is a considerable difference between the two sets of measurements. The lengths after five months salting are from 4-5 cm. lower than the corresponding lengths just before salting. This means that the split cod during the salting period loses in length just as it - according to the conversion experiment - loses in weight. The loss in length during the salting period is around 7%.

Spain has reported the individual data from their experiment in 1953. In Figure 2 these individual measurements are plotted in a diagram with salted landed lengths on the ordinate and the corresponding round fresh lengths in the abscisse. It is apparent that for a certain landed length the corresponding round fresh length can vary considerably, e.g. 70 cm. salted length is measured for individuals having the initial fresh round lengths of 91, 91, 93 and 98 cm. The two dotted lines in the figure show the approximate range of these deviations.

A comparison of the results from the three countries is difficult as there are certain differences in the technique of measuring.

Thus, Canada has measured the split cod from the nape of the neck to the fork of the tail fin, whereas Spain has measured from the line uniting the two fore-corners ("ears") of the split cod; this latter method might give a slightly longer length. The difference arising from measurement to the fork or to the hind margin of the caudal fin might well be considered negligible.

In the Norwegian experiments the split cod were measured in the same way as in the Spanish experiments.

The following table based on the use of the straight lines in Fig. 1 A-D gives total length of the round fresh cod and the corresponding lengths of the split cod, in the fresh stage (when placed in the hold), and when landed after a varying duration of the salting period. The number of days salted are stated in the reports from Norway and Spain, but not in the Canadian. For Canada is noted a 20 day salting period, a figure estimated as being close to the mean length of a salt cod trip.

From this table it appears that there is, as is already mentioned, a considerable loss in length during the salting period.

When considering the length in the columns corresponding to the different durations of the salting period, it seems that there is hardly any decrease in length between the 20th and the 150th day of salting. When comparing the Canadian 20 days salting with the Spanish 150 days salting a slight irregularity is observed. The larger split salted cod of the 150 days salting are longer than those of only 20 days salting, whereas the smaller split cod of the 150 days salting are shorter than those of the 20 days salting. This means that the shrinkage of these smaller split cod has continued after the first 20 days salting. However, the difference is only small and might well be accidental. More experiments are needed for checking this.

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TOTAL LENGTH IN CM. OF COD

Round Fresh	Fresh, split Spain 1953	Salted cod Canada 1947	Salted cod Norway 1953		Spain 1953	Mean salted	Conver. Fact. salt. to Round
		20 days s.	45 days s.	60 days s.	150 days s.	length	Fresh length
120		92					
115		88.5					
110		85					
105	88	81			82	81.5	1.29
100	84	77	77.5	76.5	78	77.3	1.29
95	80	73.5	74	73	74	73.6	1.28
90	75.5	69.5	70	69	70	69.6	1.29
85	71	66	66	65	66	65.8	1.29
80	67	62	62	61	62	61.8	1.29
75	63	58.5	58	57	57.5	57.8	1.30
70	58	55	54	53	53.5	53.9	1.30
65	54.5		50	49.5	49.5	49.7	1.30
60	50		46.5	45.5	45.5	45.8	1.31
55	46		42.5	42	41	41.8	1.32
50	42				37		
45	37.5				33		
40	33				29		

However, in evaluating the results of these experiments it must be remembered that they have been carried out in various fishing fleets. The way of measuring may vary, and so may the salting itself and the pressure to which the salted cod have been exposed in the holds of the vessels. In fact these measurements are hardly fully comparable. When we consider the two experiments carried out by Norway with a salting period of 45 and 60 days, there is a slight but clear difference - cod of the same lengths which have been salted for 60 days are 1 cm. shorter than those which have been salted for only 45 days. This might well indicate a shrinkage over a later part of the salting period also, a shrinkage which, when comparing from country to country might be accidentally obscured by various ways of measuring or by the varying treatment of the salted cod.

From the above experiments it seems as if a back calculating from length measurements of landed salted cod to length of round fresh cod is possible - which of course is obvious - and that the back calculation will give fairly accurate figures. However, the fairly wide range of salted lengths to one and the same round fresh length shown by the Spanish experiment, with the individual data reported, shows that rather large numbers of salted cod should be measured. The possible shrinkage over a larger part of the salting period, indicated by the two Norwegian experiments, makes it possible that the conversion factors used may have to vary with the varying duration of the salting period. Further, when we consider the column in the table giving the conversion factors for each 5 cm. group it is seen that there is a very small but steady decrease of the conversion factor from smaller to larger specimens.

These observations stress the need for further experiments and for experiments where each individual is considered separately - as is the case with the Spanish experiment. It is proposed that such experiments be carried out by the various countries fishing for salt cod, and that a common method for measuring the salted cod be agreed to.

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Another question is however, can such back calculations to total lengths be of any use to us?

They can of course answer that, from an economic point of view, perhaps important questions, to what a degree a split cod shrinks during salting and they can tell us the original mean live length of the cod landed by a certain vessel. Owing to possible discarding of certain sizes they do not tell the mean live length of the cod fished by that vessel.

Another great disadvantage of the method is that we do not know for certain where the cod landed are caught. The same vessel often moves during its trip from one subdivision, even from one subarea, to another. The way in which the salted cod are piled in the different sections of the hold make it impossible to say with sufficient certainty from which region the lot to be measured originated.

The method <u>can</u> give a rough, and more or less inaccurate, picture of the size distribution of cod caught over a considerable range of area. The method will, however, only in a few cases be reliable enough to give us the size distribution for a more restricted area (a subdivision), or for a more restricted part of the year (say a certain month).

The method does not offer a reliable substitute for the sampling at sea by means of observers. The sampling by observers, although more expensive (in money and time), must continue to be our main way of studying size-distributions. Our efforts to carry out and develop this kind of sampling should not in any way be lessened through the adoption of the method of measuring landed, salted cod.

- THE END -

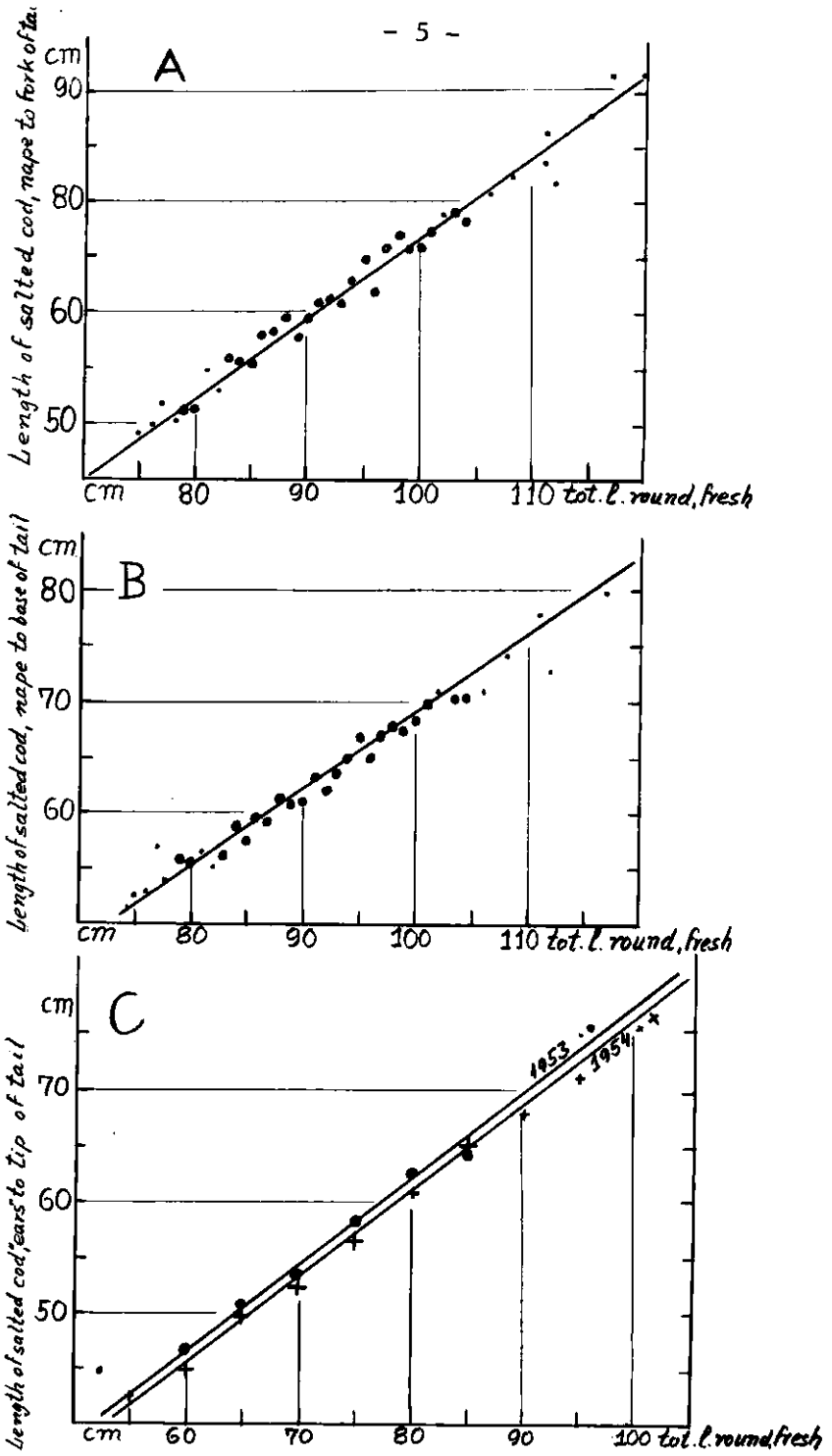

Figure 1. Comparisons of measurements of salted (landed) cod and of the same specimens as round fresh. A and B, Canada, fall 1947. C, Norway, Subarea 1, 1953 (after 45 days salting) and 1954 (after 60 days salting). D (next page) Spain, Subarea 3, 1953 fresh split cod (I) and after 5 months salting (II). Small dots and crosses 1-4 spec.; large dots and crosses 5-26 spec.

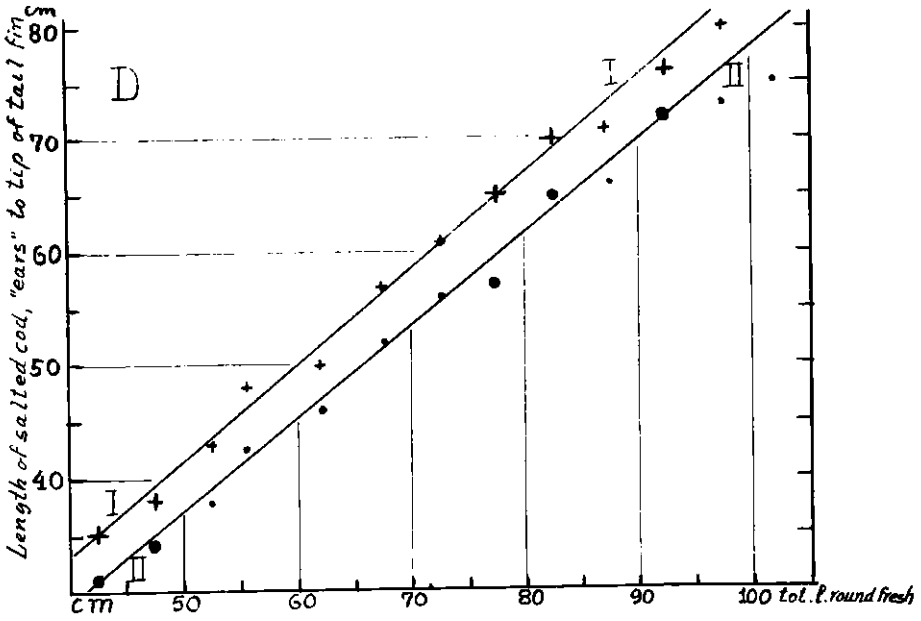

Figure 1 (continued).

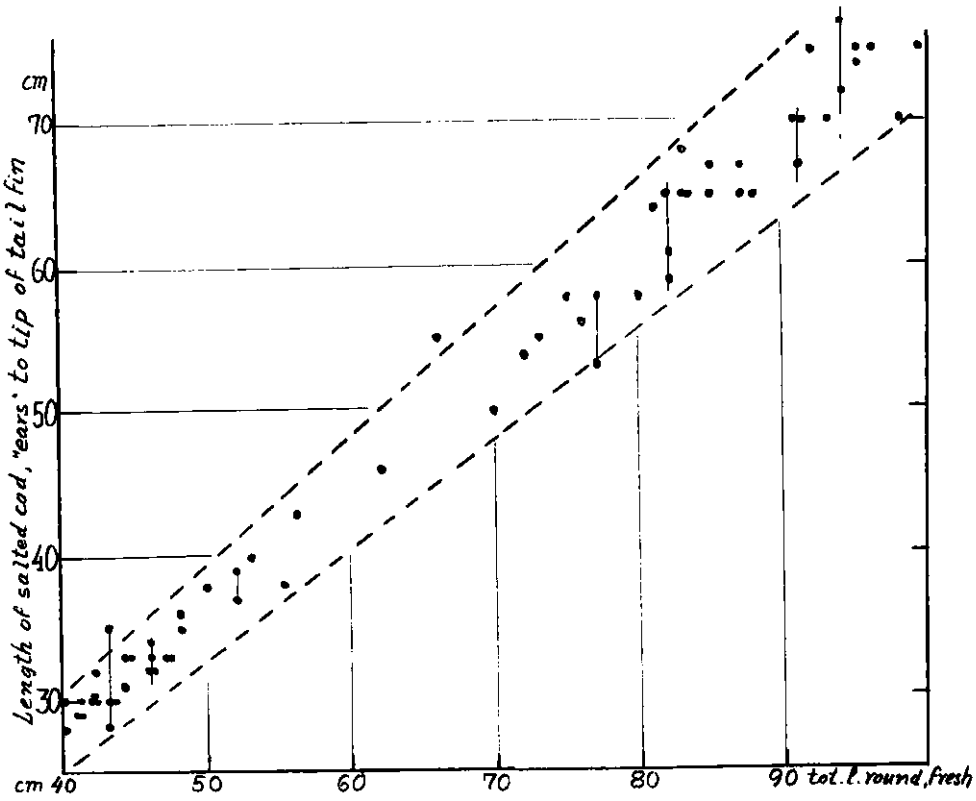

Figure 2. Cod, Spanish experiment, Subarea 3, 1953. Individual data; salted landed lengths of specimens of the same round fresh lengths. The two dotted lines indicate the supposed spreading of measurements of salted landed cod.