Length-weight relationship of commercial-size
Greenland halibut, Reinhardtius hippoglossoides (Walbaum)

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Abstract

The length-weight equations using $W = cL^b$ are given for round and gutted Greenland halibut from commercial catches from Trinity Bay, Nfld. in 1966-67. The conversion factors - round to gutted weight and gutted to round weight - were calculated using length-weight equations.

Introduction

To be able to say definitely that one conversion factor can be used for the whole length range of commercially exploited fish, one must compute length-weight equations using round and gutted weights. If the slopes of both gutted and round weight curves are not significantly different, then it is reasonable to assume that one conversion factor can be used in conversion of commercial landings.

Materials and Methods

The length-weight equations were computed using 573 Greenland halibut lengths and weights from catches of commercial fishermen in Trinity Bay, Nfld. (ICNAF Division 3L).

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The fish were measured to the nearest centimetre and lengths ranged from 41-97 cm with a mean length of 64.2 cm (Fig. 1). Weights were expressed in pounds to the nearest ounce. The length-weight curves were obtained by using the equation $W = cL^b$ in which W = weight, L = length and c and b are constants. The least squares regression of the logarithmic transformation

$$Y = a + bX$$

in which $Y = \log_{10} W$, $a = \log_{10} c$ and $X = \log_{10} L$ was used for estimating values of c and b. (Hile 1936; Lux 1966; Snedecor 1956)

The conversion factors were obtained by using four methods as follows:

1. Since the same fish were used to calculate both the round and gutted weight curves, the round and gutted weight totals were divided to give appropriate conversion factors.

2. The condition factor c of each length-weight curve was obtained by using perfect cube or $b = 3$ in the equation $W = cL^b$. The condition factors were then divided to give appropriate conversion factors. (Hile 1936).

3. The slope (b) of the round weight curve was substituted into gutted weight curve so that two curves again had the same slope. The condition factors were then divided to give appropriate conversion factors.

4. The slope (b) of the gutted weight curve was substituted into the round weight curve and appropriate conversion factors calculated as before.

Results

The equation of the length-round weight curve is $0.000008702 \ L^{3.2303}$ and for the length-gutted weight curve is $0.000008712 \ L^{3.2114}$ (Fig. 2). The conversion factors from four methods are all very similar (Table 1).

Table 1. Conversion factors from round to gutted weight and gutted to round weight by four different methods.

Method	Conversion factor (Round wt. to gutted wt.)	Conversion factor (Gutted wt. to round wt.)
1	0.9256	1.0804
2	0.9217	1.0844
3	0.9244	1.0818
4	0.9245	1.0816

For the purpose of converting commercial landings from round to gutted weight, it would be quite feasible to use conversion factor of 0.9. For converting gutted weight to round weight, a conversion factor of 1.1 would be a good approximation.

References

Hile, Ralph. 1936. Age and growth of the cisco, *Leucichthys artedi* (Le Sueur), in the Lakes of the Northeastern Highlands, Wisconsin. U.S. Dept. of Comm. Bureau of Fisheries, Bull. 19, 317 p.

Lux, Fred E. and L.R. Porter, Jr. 1966. Length-weight relation of the summer flounder *Paralichthys dentatus* (Linnaeus). U.S. Fish and Wildlife Serv. Spec. Sci. Rept. Fisheries, No. 531, 5 p.

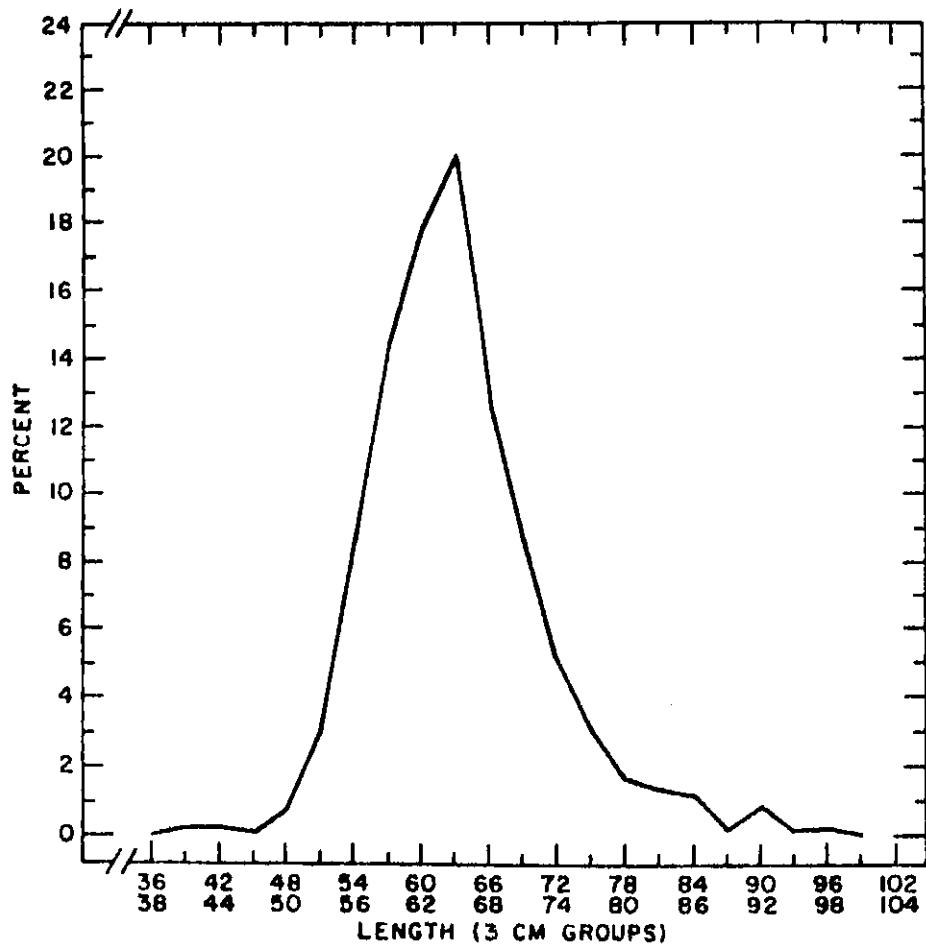Snedecor, George W. 1956. Statistical Methods, 5th ed. Iowa State Univ. Press, Ames, Iowa, 534 p.

Fig. 1. Length distribution of commercial-size Greenland halibut
(573 fish) used in computing length-weight curves.

ROUND WEIGHT = 0·000008702 $L^{3·2303}$
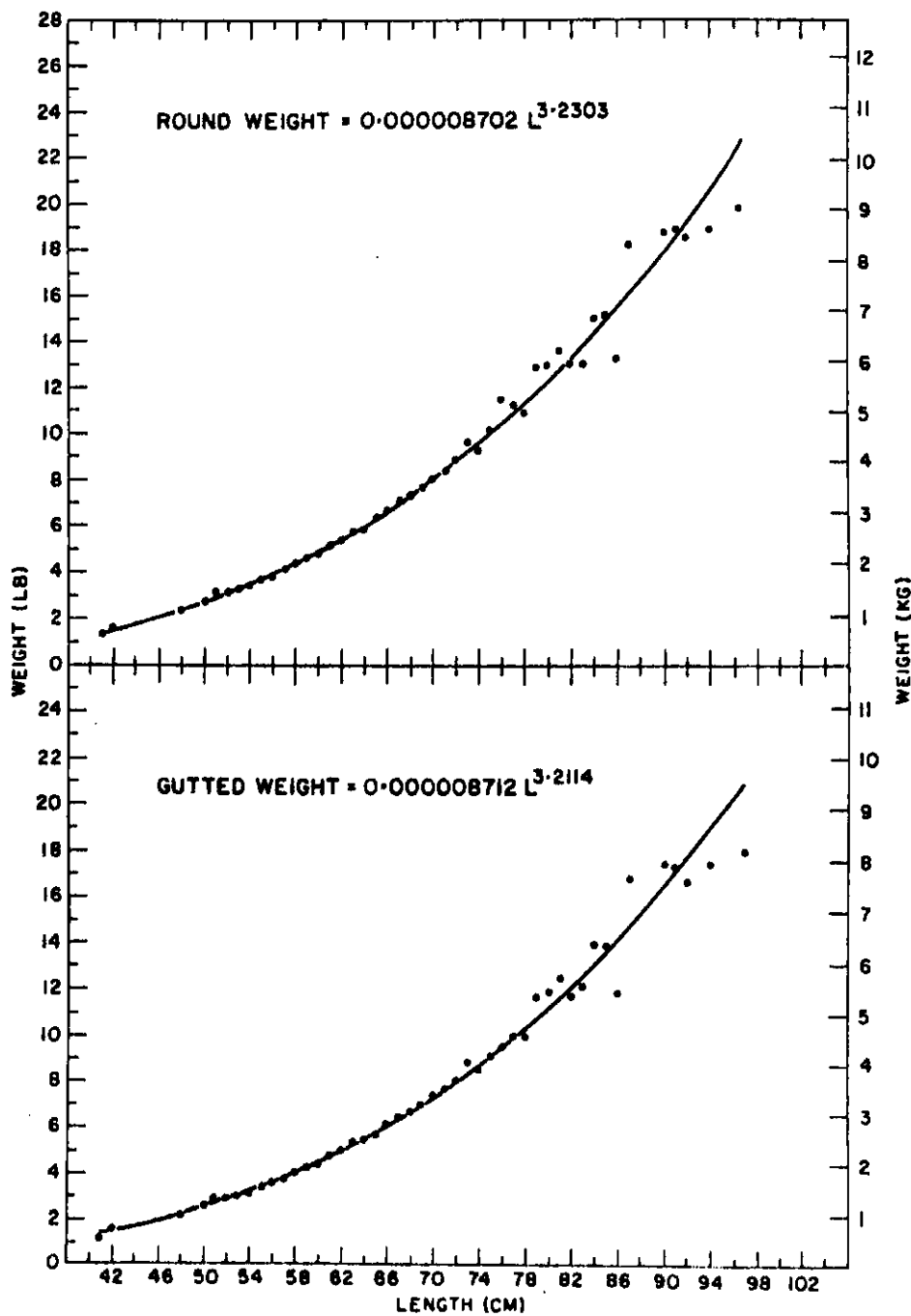
GUTTED WEIGHT = 0·000008712 $L^{3·2114}$

Fig. 2. Length-weight curves of commercial-size Greenland halibut. Above: Length-round weight curve. Below: Length-gutted weight curve.