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Relationship of Length to Girth of Cod and Haddock from
Georges Bank (5Z) and the Gulf of Maine (5Y)

by

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The relationship of length to weight and girth may be an important consideration in evaluating the escapement of fish from a particular size of mesh. This report presents the available length-girth measurements of cod and haddock from the Gulf of Maine and the Georges Bank area. Clark and Dietsch (1959), and Sherman and Wise (1961) have presented the relationship of length to gutted weight for haddock and cod, respectively. The factors for converting gutted weight to round-fresh weight are 1.17 and 1.20 for haddock and cod, respectively (ICNAF Statistical Bulletin for 1954, vol. 4 p. 19).

The measurement of fork length was taken to the nearest centimeter using a standard measuring board. The measurement of girth represents the maximum girth of the fish, and was taken either with a flexible steel measuring tape or by encircling the fish with a cord and then measuring the straightened cord. All measurements were made on round, fresh fish by trained personnel aboard research vessels.

Haddock:

A total of 435 measurements of length-girth of haddock were taken during three cruises of our research vessels: 196 from Georges Bank in August 1951; 44 from Georges Bank in May 1953; and 192 from the Gulf of Maine in September 1949. An analysis of covariance of these data indicated that the length-girth relationships obtained from these three samples are similar (table 1; analysis follows that of Snedecor, 1956). The equation for the common regression line was $Girth (cm) = -.573 + .535 Length (cm)$ (fig. 1.) The correlation coefficient of the combined samples was high ($r = .99$), indicating a nearly perfect linear relationship.

Cod:

Measurements of length-girth of twenty cod were taken from fish caught on Georges Bank during November 1961.

The regression of girth on length yielded the following equation: $Girth (cm) = -9.83 + .706 Length (cm)$ (Fig. 2). The linear correlation coefficient was high ($r = .97$) but data indicate a slight curvilinear tendency. Further measurements should be collected, however, to establish this relationship more certainly.

Table 1. Covariance analysis of the haddock length-girth regressions lines obtained from three research cruises.

Date of Cruise	Σx^2	Σxy	Σy^2	Regr. Coef.	d.f.	$\Sigma dy.x^2$	MS
Sept. 1949	29693	16055	8847	.541	191	166	.87
Aug. 1951	29898	15782	8717	.528	195	386	1.98
May 1953	4294	2334	1330	.544	43	61	1.42
Within					429	613	1.43
Regr. Coef.					2	4	2.00
Common	63885	34171	18894	.535	431	617	1.44
Adj. Means					2	2	1.00
Total	72361	38706	21323	.535	433	619	1.43

"F" test for slope = $\frac{2.0}{1.43} = 1.40$

"F" test for adj. means = $\frac{1.00}{1.44}$

Bibliography

- Clark, John R., and Eli L. Dietsch. 1959. Length-weight tables for Northwest Atlantic haddock. International Commission for the Northwest Atlantic Fisheries. Sampling Year-book, No. 2, p. 25-37.
- Sherman, K. and J.P. Wise, 1961. Incidence of the cod parasite Lernaeocera branchialis L. in the New England Area, and its possible use as an indicator of cod populations. Limnology and Ocean. 6(1): 61-67.
- Snedecor, George W. 1956. Statistical methods. Iowa State College Press. Ames, Iowa. 5th Edition.

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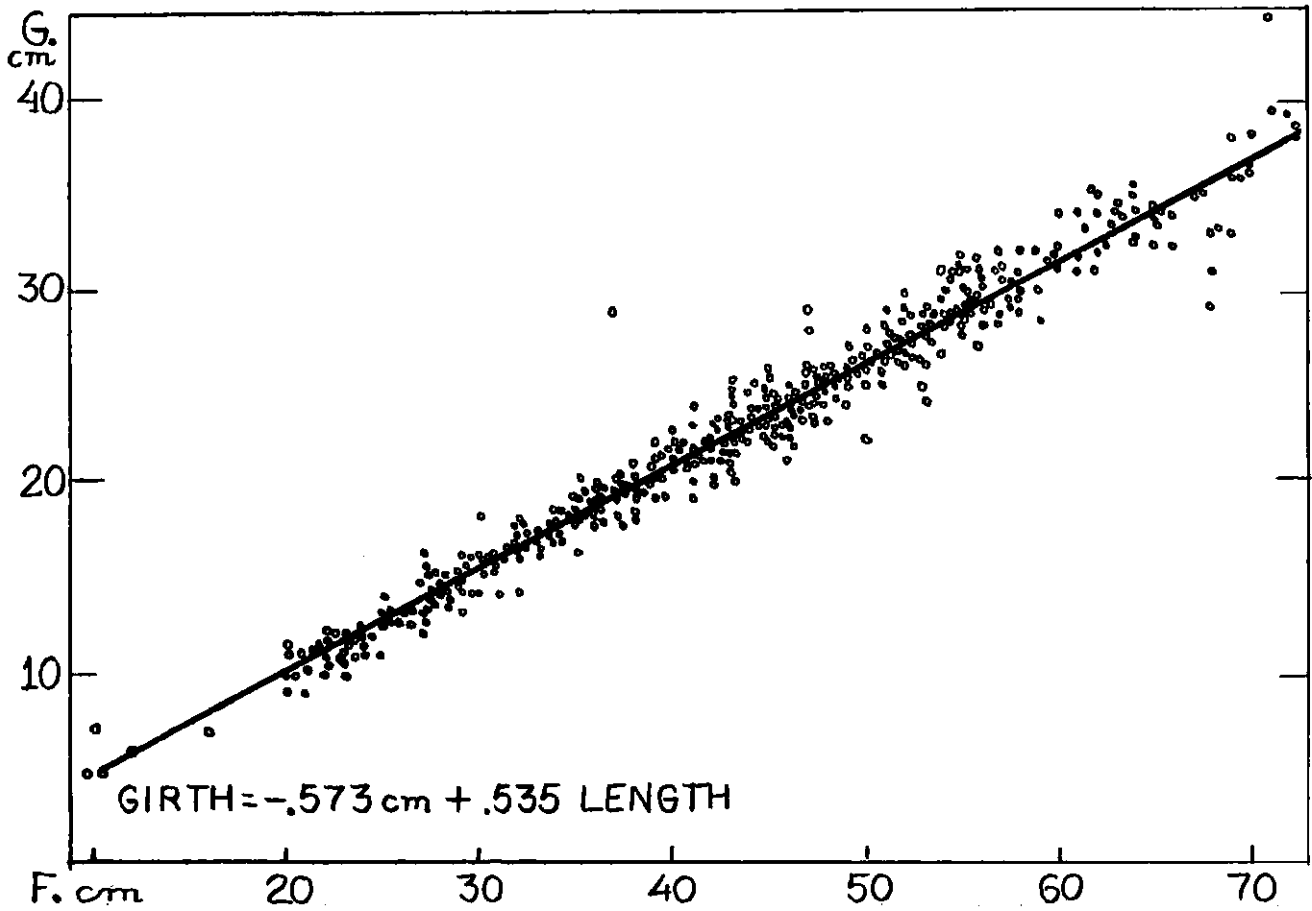


Fig. 1. Length-girth regression line for haddock taken from Georges Bank and the Gulf of Maine. G.(ordinate) = maximum girth in cm; F.(abscisse) = fork length in cm.

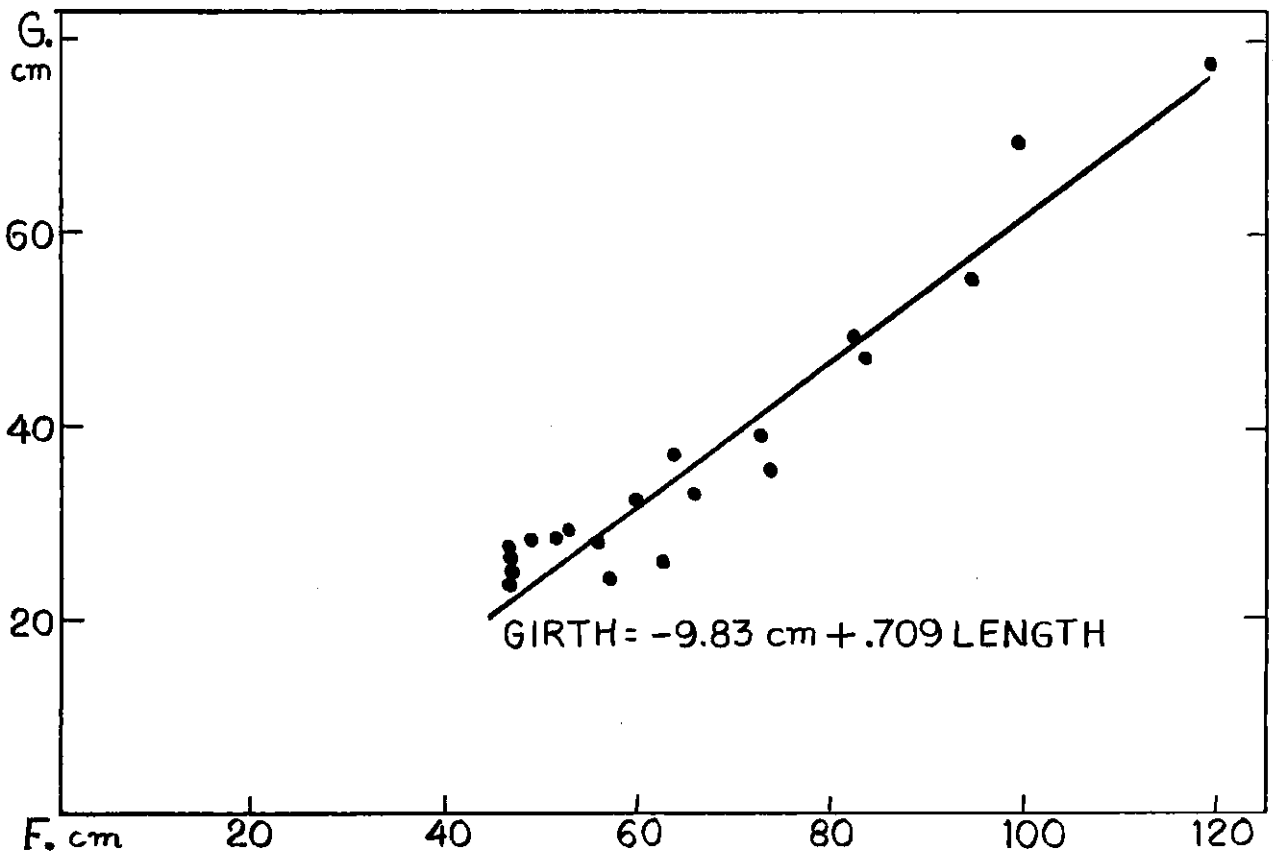


Fig. 2. Length-girth regression line for cod taken from Georges Bank. G.(ordinate) = maximum girth in cm.; F.(abscisse) = fork length in cm.