

# CENTRAL FILE

Length, weight, age, and fecundity of the  
Atlantic herring, Clupea harengus harengus L.,  
in the western Gulf of Maine, 1980

by

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## INTRODUCTION

The fecundity of Atlantic herring, Clupea harengus harengus L., occurring in the Gulf of Maine was studied by Yudanov (1966) and Perkins and Anthony (1969). This study was made to determine the present reproductive potential of Atlantic herring in the western Gulf of Maine and to indicate possible changes in fecundity compared to earlier studies.

## METHODS

Atlantic herring were sampled from inshore commercial catches during August-October 1980 from Penobscot Bay, Maine to Cape Cod, Massachusetts. Routine sampling of each fish included total length (mm), weight (g), otoliths for age determination, and exsection and preservation in 10% formalin of ovaries in stages 4 and 5. Egg counts followed the method outlined in Morse (1980).

## RESULTS

Fecundity estimates ranged from 43,000 to 250,000 eggs for fish between 260 and 368 mm TL. Table 1 lists the least squares regression coefficients, correlation coefficients ( $r$ ), and variance about the line ( $S^2_{y \cdot x}$ ) for the relationships of length versus fecundity, weight versus fecundity, and age versus fecundity. Scatter plots and the fitted regression lines are shown in Figures 1-3.

A comparison of the expected mean fecundity for a given length calculated from regression analysis between this study and data presented by Perkins and Anthony (1969) indicated mean fecundity was lower for

comparable lengths (26-33 cm) in 1963-64. Data are not presented by Perkins and Anthony to permit a statistical analysis of the observed differences in the length-fecundity relationships, but an examination of the scatter plots indicated a statistical difference is unlikely due to the extreme variability in their data (e.g. at 29 cm a variation of 150,000 eggs can be seen in their scatter plot). Additional studies are needed to determine the causes of such high variability and their relationship to the detection of possible changes over time in fecundity of Atlantic herring.

#### LITERATURE CITED

Morse, W. W.

1980. Spawning and fecundity of Atlantic mackerel, Scomber scombrus, in the Middle Atlantic Bight. Fish. Bull., U. S. 78: 103-108.

Perkins, F. E. and V. C. Anthony.

1969. A note on the fecundity of herring (Clupea harengus harengus L.) from Georges Bank, the Gulf of Maine and Nova Scotia. ICNAF Redbook 1969 Pt. III: 33-38.

Yudanov, I. G.

1966. Fecundity and efficiency of spawning of Atlantic herring in the Gulf of Maine. Trudy PINRO 17: 249-262.

Table 1. Statistics of the fecundity relationship of Atlantic herring, 1980. The regression equation used was the power curve where  $Y = aX^b$ .

	n	a	b	r	$S^2_{y \cdot x}$
Length	131	$1.714 \times 10^{-7}$	4.756	0.92	0.0644
Weight	131	40.390	1.413	0.94	0.0209
Age	131	20877.465	1.121	0.84	0.0485

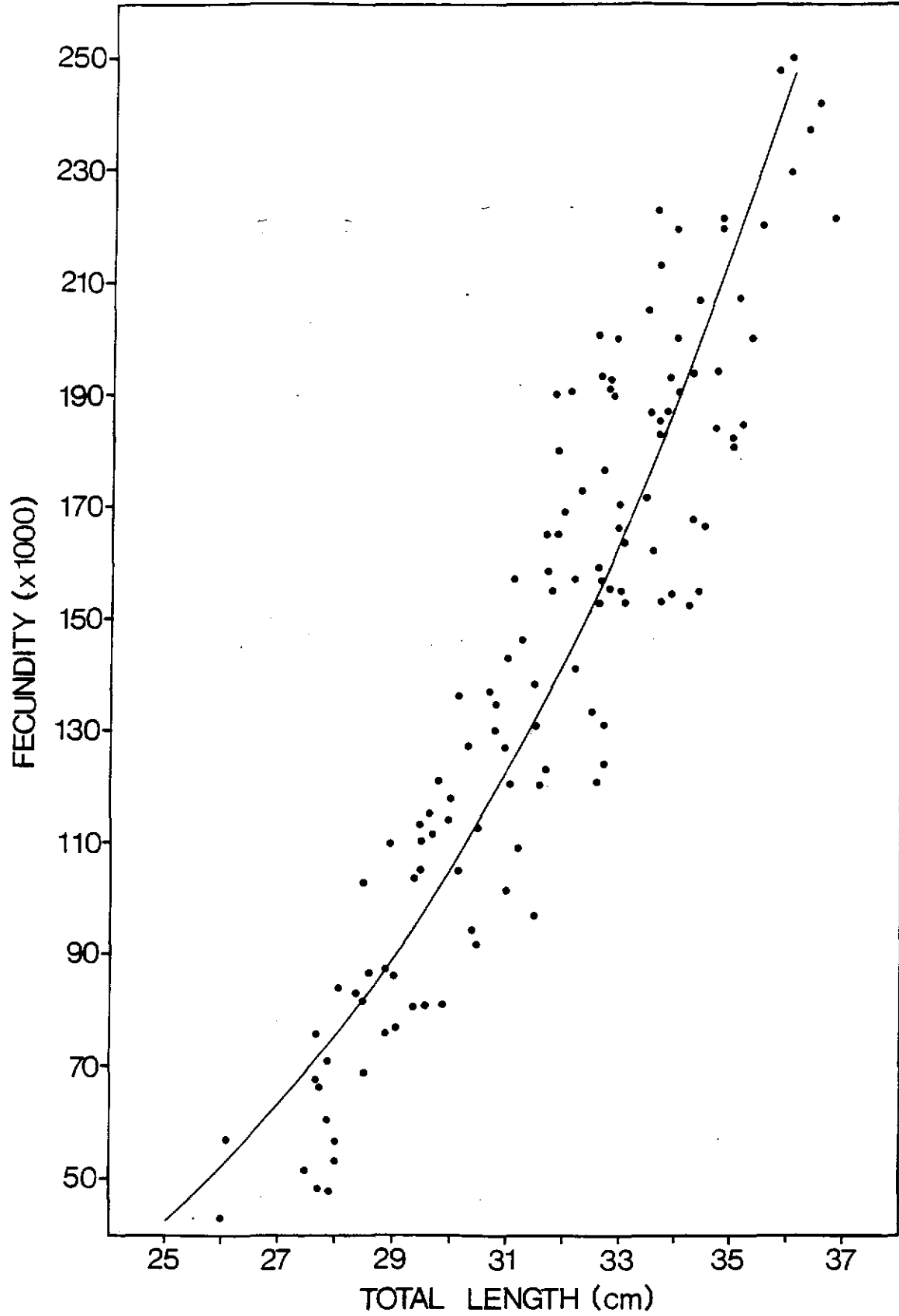


Figure 1. Length-fecundity relationship of Atlantic herring in the western Gulf of Maine, 1980.

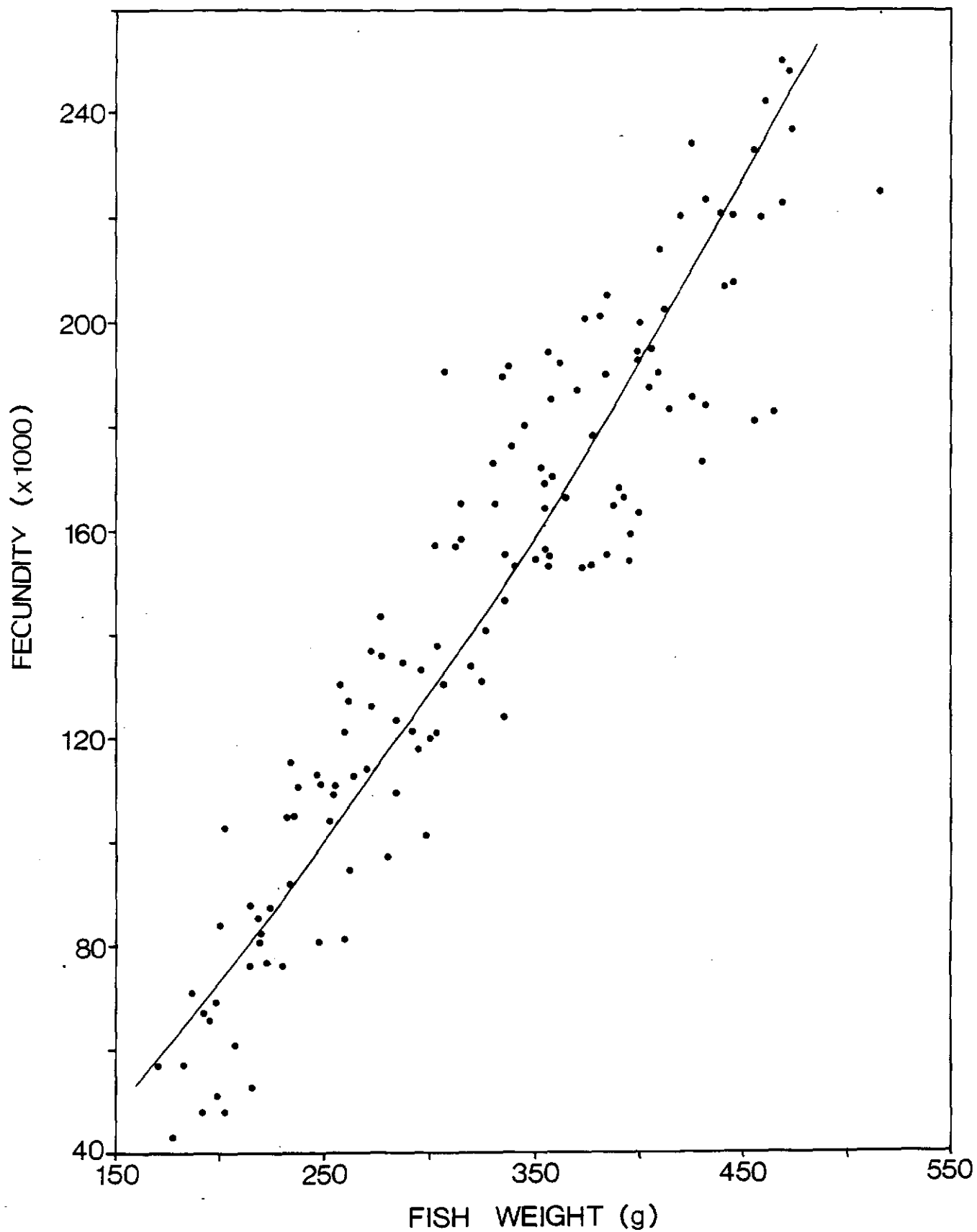


Figure 2. Weight-fecundity relationship of Atlantic herring in the western Gulf of Maine, 1980.

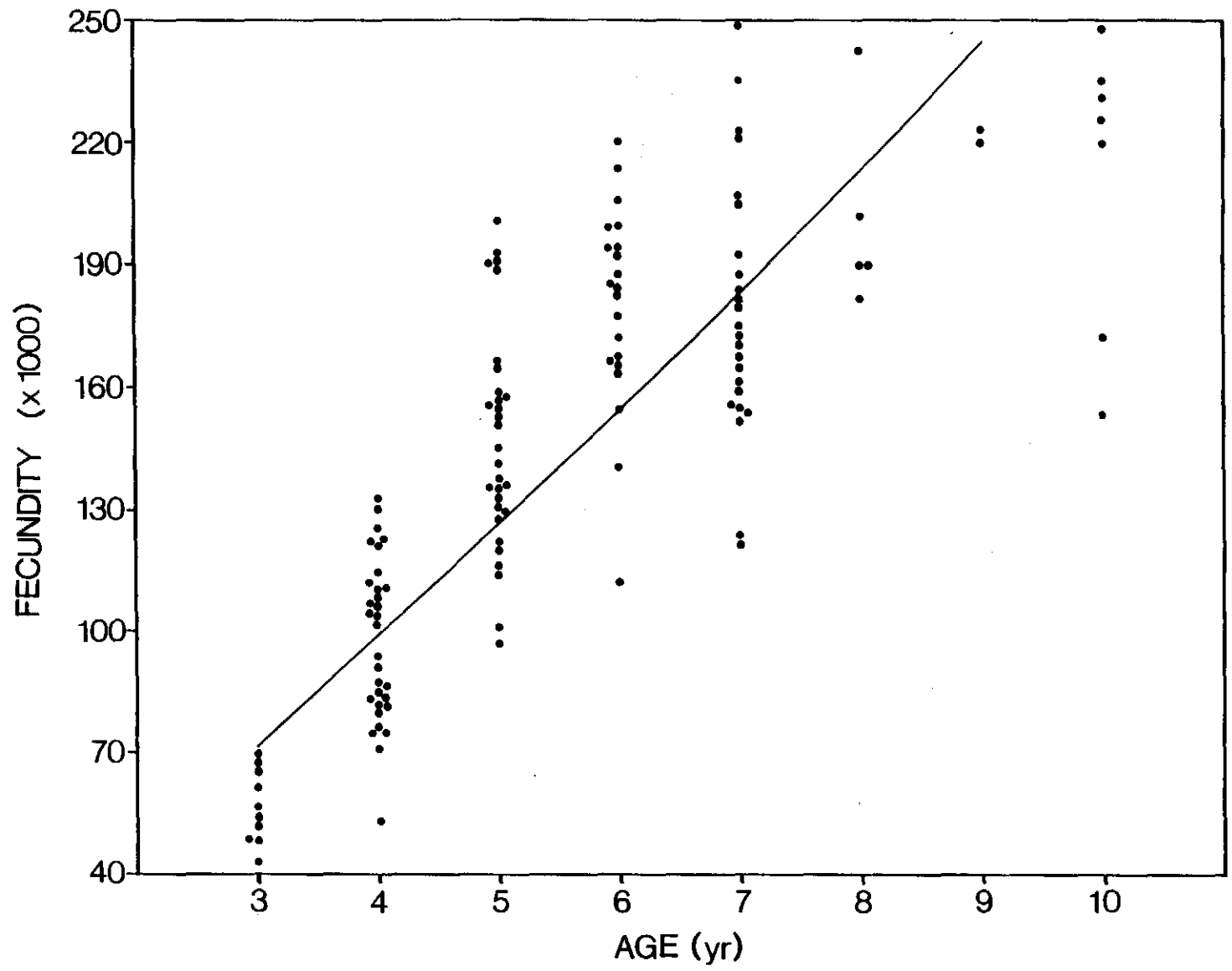


Figure 3. Age-fecundity relationship of Atlantic herring in the western Gulf of Maine, 1980.