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MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Fisheries Division

THE RELATIONSHIP OF SIZE AND AGE OF MATURITY IN ADULT MALE RAINBOW TROUT

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SUMMARY

Observations by fish culturists at Harrietta Brood Stock Hatchery indicated greater sperm production from smaller three year old males than from larger three year old males.

This study was initiated to test the hypothesis that the smaller males had matured as two year olds, and that growth had therefore been replaced by gonad development.

Results indicated that males which matured as two year olds were significantly smaller than ones which matured as three year olds.

A selection of three year old males on the basis of size would therefore also be a selection for age of maturation; and should be considered as such in a brood stock program.

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INTRODUCTION

Fish culturists at Harrietta Brood Stock Hatchery have noticed for several years that smaller male rainbows of a given year class produced better sperm than larger males. Because of this, smaller males were preferred when sperm was collected for use via the Australian method. Males are normally reared to three year olds before being used in Harrietta's egg production.

One hypothesis developed was that smaller males had matured at an earlier age than larger males. Their growth in size would therefore have been replaced by gonad development.

The selection of smaller males for use in fertilizing eggs could consequently have been an unintentional selection for earlier maturing fish. Due to the implications of an unintentional selection upon a brood stock program, this study was initiated to determine the credibility of the hypothesis.

METHODS AND RESULTS

The Harrietta strain of rainbows which were two years old in 1970 were sorted to separate males which were producing sperm. These males were then clipped for identification purposes and returned to the pond. The entire year class was retained until 1971.

In 1971, the same population was again sorted to separate mature males into groups of clipped (2 year maturing) and non-clipped (3 year maturing). One hundred males from each group were then measured to determine average length.

TABLE I

LENGTH COMPARISON 1971

Class	Length - Inches	Difference - Inches
Matured 1970	15.4	
Matured 1971	16.9	1.5

The difference in length recorded in Table I tended to support the hypothesis as applied to the Harrietta strain of rainbow. The study was therefore duplicated in 1971-1972 to determine if the hypothesis held true for other strains of rainbow.

In 1971, three strains of two year old rainbow males, one being the Harrietta strain, were sorted for maturity and clipped. In 1972, each strain was sorted into clipped and non-clipped lots and measured by the same methods used the previous year.

TABLE II

LENGTH COMPARISON 1972

Strain	Length - Inches Matured 1971	Length - Inches Matured 1972	Length - Inches Difference
Harrietta	14.9	16.6	1.7
Wisconsin	15.1	16.9	1.8
Manchester	15.4	17.0	1.6

The average length difference was 1.7 inches, and compared favorably with the 1.5 inch difference found in 1971.

DISCUSSION

The study indicates a close correlation between the size of adult male rainbows and their age at first maturation. It further indicates that the relationship holds true for more than one strain of the species.

A selection for size of mature male rainbows is therefore a selection for age of maturation and must be considered as such when applied to a brood stock program.