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AGE AND RATE OF GROWTH OF THE WHITE CRAPPIE IN REELFOOT LAKE, TENNESSEE, FOR 1959 AND 1964[1]

ROBERT J. SCHOFFMAN, C.S.V.
Griffin High School, Springfield, Illinois

INTRODUCTION

In 1937 an investigation was undertaken to determine the age and rate of growth of game and rough fish in Reelfoot Lake. Since the original investigation of the white crappie *Pomoxis annularis* (Schoffman, 1940), fishing regulations pertaining to the white crappie have undergone various changes, some of which will be considered in the succeeding paragraphs.

In this and previous studies, age determination was made by the method of Schoffman (1939) on each specimen and the specimens arranged into age groups, i.e., a fish in the first age group would show one annulus and be in its second year of life; one in the second age group would be in its third year of life and so on. In this study seven age groups are considered for each of the years 1959 and 1964.

RATE OF GROWTH

The histogram (Fig. 1) shows the distribution of 500 white crappie for 1959 and 500 for 1964 arranged according to age groups. In 1959 age groups 3, 4, and 5 represent the largest numbers caught, while in 1964 age groups 2 and 3 represent the largest numbers caught with age group 2 being much larger than age group 3. This seems to indicate that the population of small fish is increasing.

The average rate of growth in length of 500 white crappie for each age group in 1959 and 1964 is shown in Table 1 and Fig. 2. If the average length for age group 8 in 1959 (13.72 in.) is taken as 100 per cent, then 53 per cent of the total growth in length is completed by the fish in age group 2, 59 per cent by those in age group 3, 66 per cent by age group 4, 73 per cent by age group 5, 76 per cent by age group 6, and 92 per cent by age group 7. In 1964 the average length for age group 8 was 13.77 in. and if taken as 100 per cent, then 52 per cent of the total growth in length is completed by the fish of age group 2, 55 per cent by those in age group 3, 59 per cent by age group 4, 68 per cent by age group 5, 77 per cent by age group 6, and 80 per cent by age group 7.

The growth in weight for all age groups of 500 white crappie for 1959 and for 1964 is shown also in Table 1 and Fig. 2. Fig. 2 shows a progressive increase in weight for all ages. If the average weight for age group 8 in 1959 (20.06 ounces) is taken as 100 per cent, then 14 per cent of the total weight is acquired by fish of age group 2, 24 per cent by those of age group 3, 27 per cent by age group 4, 38 per cent by age group 5, 50 per cent by age group 6, and 71 per cent by age group 7. For 1964 corresponding data show 14 per cent of the total weight is acquired by fish of age group 2, 19 per cent by those age group 3, 25 per cent by age group 4, 35 per cent by age group 5, 38 per cent by age group 6, and 66 per cent by age group 7.

The increment in length between successive age groups for 1959 was steady except for age groups 6 and 7: age group 6 showed a decrease and age group 7, a relatively large increase. In 1964 the length increment was steady except for age group 7 which showed a decrease. There was a steady increase in the weight increment for both years except for age group 4 in 1959 and for age group 6 in 1964. Fig. 3 shows a steady increase in length for both 1959 and 1964. In both years the oldest fish were in age group 8 and no fish was over nine years old. The increase in length is slower after the second year of life while the increase in weight is greater in the oldest groups. This information indicates that the life history of white crappie covers a nine year period.

In 1948 there was an increase in both length and weight over 1938 (Schoffman, 1951). During this period (and until 1955), commercial fishing of white crappie was legal with no limit on the number of fish taken. However, in 1941 wire set nets were outlawed. The legal length from 1938 through 1946 was 9 in.

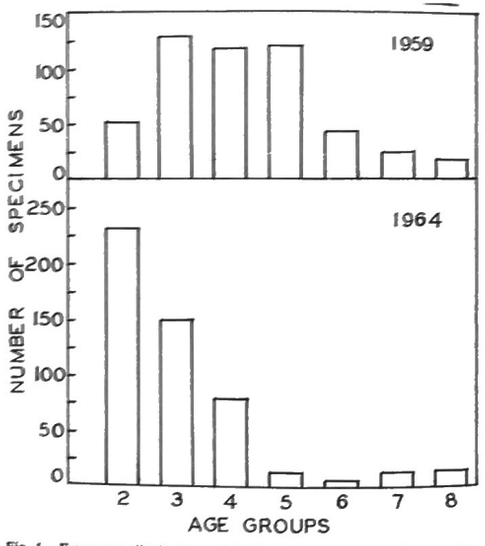

Fig. 1. Frequency distribution of 1000 Reelfoot Lake white crappie: 500 for 1959 and 500 for 1964.

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Table 1

Average Total Length and Weight for Each Age Group of 500 White Crappie from Reelfoot Lake for 1959 and 500 for 1964.

Age Group 1959	Number of Fish	Average Length (inches)	Average Weight (ounces)	Age Group 1964	Number of Fish	Average Length (inches)	Average Weight (ounces)
2	50	7.30	2.80	2	230	7.20	2.57
3	128	8.11	4.85	3	147	7.60	3.52
4	118	9.01	5.46	4	77	8.07	4.62
5	119	10.04	7.62	5	14	9.30	6.57
6	43	10.41	9.95	6	5	10.55	7.20
7	24	12.63	14.29	7	13	10.96	12.38
8	18	13.72	20.06	8	14	13.77	18.71

while in 1947 the legal length was reduced to 8 in. In 1949 this restriction was removed and commercial fishermen were limited to 25 fish per day. In 1955 commercial fishing of game fish was abolished; and in 1963 the sale of white crappie in eating places in Tennessee was made illegal.

It has been noted that from 1938 to 1948 there was an increase in both length and weight of corresponding age groups of white crappie. From 1948 to 1950 there was a decrease in length and weight in age groups 3, 4, 5, and 6 although the 12-year period from 1938 to 1950 showed an increase. In 1959 there was a decrease in length and weight in all age groups (Schoffman, 1960). Abolishing of commercial fishing in 1955 gave the 1959 age groups 2, 3, and 4 complete protection; age group 5, one year of protection; age group 6, two years of protection; age group 7, three years; and age group 8, four years. All age groups in 1964 had complete protection from commercial fishing. From 1959 to 1964 there was a decrease in weight in all age groups and in length in all groups except 6 and 8.

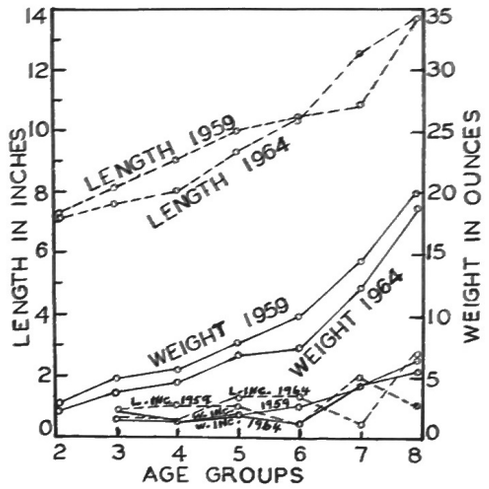

Fig. 2. Growth, weight and increment curves of 1000 Reelfoot Lake white crappie: 500 for 1959 and 500 for 1964. The increment curves represent the annual increase in length and weight.

CONCLUSION

The study of age and growth of white crappie in Reelfoot Lake, Tennessee, has extended over a period of twenty-five years. The maximum growth rate was reached in 1948 followed by a slow decrease to the time of the present study. During this period changes in fishing regulations resulted in a decrease in the growth rate and an increase in the population. At the

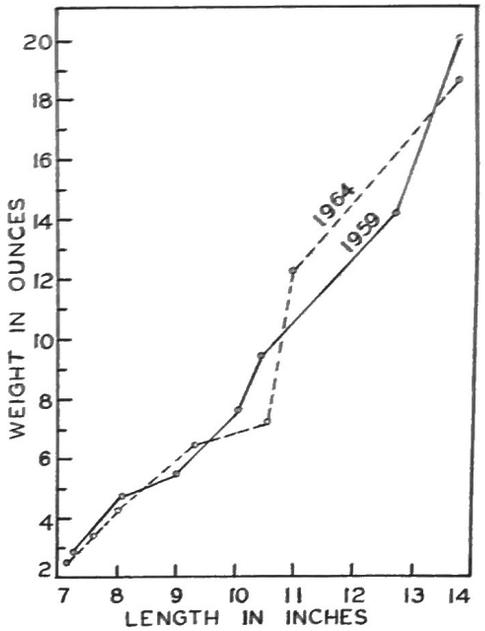

Fig. 3. Length and weight relationship of 1000 Reelfoot Lake white crappie: 500 for 1959 and 500 for 1964.

present time Reelfoot Lake is over populated with white crappie. Since the prohibition of commercial fishing, sportsmen have been catching more small white crappie each year. The appearance of age group 2 in 1959 with its increase to 46 per cent of the specimens taken in 1964 shows that an overpopulation exists.

The restriction of white crappie fishing to sport fishing is of no value unless there is a depletion of fish due to biological causes. Since there is no such depletion, the restriction is unnecessary. In 1950 Schoffman stated that, because of overpopulation, sport fishing would not exist within six years if commercial fishing were stopped. This prediction of 1950 has become a reality in 1964.

Reelfoot Lake is growing old, and if fishing is to be improved, rejuvenation of the Lake is necessary. The Lake is shallow with run-off water as its only source of fresh water. Cutting of timber, straightening Reelfoot Creek making it into a drainage ditch, and allowing farm drainage ditches to empty into the Lake are causing sediment to fill the Lake.

To improve fishing, measures must be taken to reduce the population of small fish, to keep the Lake in balance, and to keep the sediment from filling the Lake. To divert the sediment, a soil and water conservation program is now in progress. It involves the building of lakes and ponds to slow the run-off water and allow the sediment to settle before the water reaches the Lake. It will take several years to complete the conservation program, thus its success is yet to be known.

ACKNOWLEDGMENTS

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NEWS OF TENNESSEE SCIENCE

Tennessee institutions announcing NSF-sponsored summer institutes for secondary school teachers are: Austin Peay State College (mathematics), Fisk University (biology, chemistry, and physics), Peabody College (biology, chemistry, mathematics, and physics), Memphis State University (mathematics), Middle Tennessee State College (science and mathematics), ORINS (chemistry and physics), and the University of Tennessee (mathematics).

The University of Tennessee Department of Nuclear Engineering has received a $6,900 grant from the Atomic Energy Commission to increase the use of nuclear reactors at Oak Ridge in U.T. study programs. Dr. P. F. Pasqua, head of the Nuclear Engineering Department, said the funds will be used to pay the Oak Ridge National Laboratory for "teaching time" on the reactors. Research of a similar nature was carried out last spring by the U.T. department.

Professor Ray Kinslow, chairman of the Engineering Science Department at Tennessee Polytechnic Institute addressed the Middle Tennessee Astronomical Society December 14 at Arnold Engineering Development Center, Tullahoma. Professor Kinslow discussed meteorite cratering studies at AEDC and significant findings from similar work at other laboratories. Kinslow is studying for AEDC the types of craters produced in various materials by projectiles traveling as much as 25,000 feet per second and by shaped-charged explosives.

Establishment of three new major staff offices of the Oak Ridge Institute of Nuclear Studies and appointments to head these offices have been announced by William G. Pollard, Executive Director of ORINS. At the same time, Dr. Pollard announced incorporation of the activities of the University Relations Division of ORINS in the new offices. The changes, announced following the annual meeting of the ORINS Board of Directors and Council in Oak Ridge, became effective November 1, 1964. W. W. Grigorieff, chairman of the former University Relations Division, has been named assistant to the Executive Director for Special Projects. Kenneth Fry will head the new Fellowship Office, and Louis A. Rayburn will be in charge of the University

(Continued on page 17)