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AGE AND RATE OF GROWTH OF THE YELLOW BASS IN REELFOOT LAKE, TENNESSEE, FOR 1939 AND 1955[1]

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In 1937 an investigation was started to determine the age and rate of growth of game and rough fish in Reelfoot Lake. These investigations included both scale bearing fish and fish having skin without scales, *i. e.*, catfish. From the beginning of these investigations to May, 1955, commercial fishing of game fish was legal in Reelfoot Lake. Commercial fishing of game fish was abolished by the 1955 Tennessee Legislature. This act made one exception: it allows the yellow bass to be taken commercially. Since the yellow bass or striped jack, *Morone interrupta* Gill, is the only game fish taken commercially this study will serve as a comparison for future study of game fish to determine what effect this protection will have on their rate of growth.

Collections for the 1939 study were obtained from commercial catches with hoop nets and wire set nets. Collections for the 1955 study were also obtained from commercial catches with trout lines, no nets being used. Age determinations were made for both studies for each specimen and arranged according to age groups, *i. e.*, a fish in age group 2 would show 2 annuli and be in its third year of life. Age determinations were made for both studies by the method of Schoffman (1939).

TABLE 1. Average total lengths and weights for each group for 129 yellow bass from Reelfoot Lake for 1939 and 518 yellow bass in 1955

Age Group 1939	Number of Fish	Average Length inches	Average Weight ounces	Age Group 1955	Number of Fish	Average Length inches	Average Weight ounces
2	44	7.775	4.14	2	127	7.720	3.58
3	45	8.688	5.86	3	167	8.687	5.25
4	28	9.988	9.15	4	204	9.467	7.17
5	12	11.641	14.10	5	20	10.712	10.40

[1]Contribution from the Reelfoot Lake Biological Station No. 87. This study here reported on was made possible by a grant from the Reelfoot Lake Biological Station of the Tennessee Academy of Science, to whom the author wishes to express his appreciation.

Rate of Growth

The histogram (Fig. 1) shows the distribution of 129 yellow bass in 1939 and 518 in 1955 arranged according to age groups. In 1939 age group 2 represents 34 per cent, age group 3, 34 per cent, and age group 4, 22 per cent of all the specimens. In 1955 age group 2 represents 25 per cent, age group 3, 32 per cent, and age group 4, 39 per cent of all the specimens. In 1939 age group 2 and 3 show an equal distribution and represent the largest

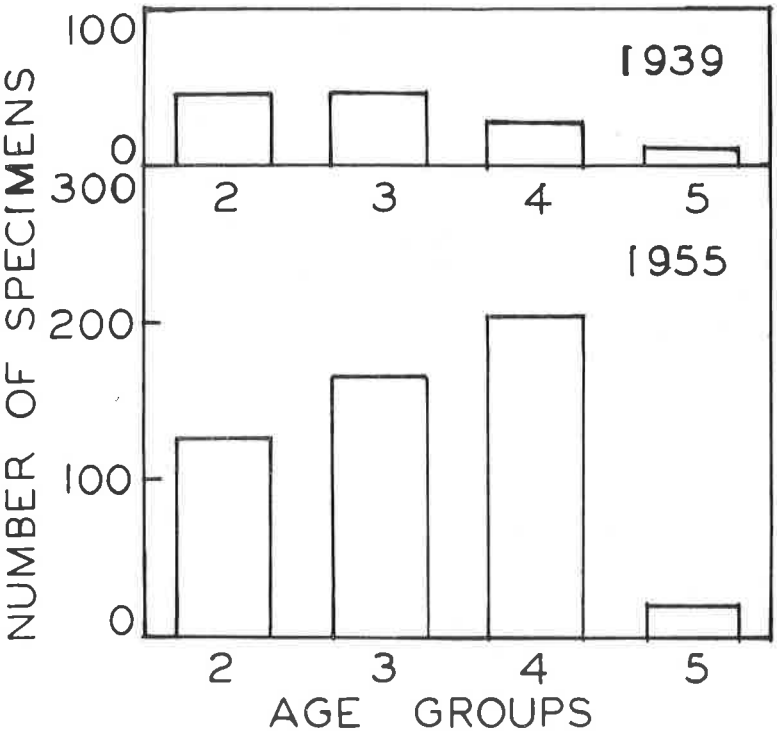

Fig. 1. Frequency distribution of 647 Reelfoot Lake yellow bass; 129 for 1939 and 518 for 1955, grouped into age groups.

number caught. In 1955 age group 3 and 4 represent the largest number caught, showing that in 1955 larger numbers of the older age groups were being caught.

The average rate of growth in length and weight of 129 yellow bass in 1939 and 518 in 1955 for each age group is shown in Table 1 and Figure 2. If the length of age group 5 (11.64 inches) is taken as 100 per cent, it may be stated that 67 per cent of the total growth in length is completed by specimens of age group 2, 75 per cent by age group 3, and 86 per cent by age group 4 in 1939. In 1955 the length of age group 5 was 10.71

inches and if taken as 100 per cent, it may be stated that 72 per cent of the total growth in length is completed by specimens of age group 2, 81 per cent by age group 3, and 88 per cent by age group 4.

The growth in weight based on the average weight of the age groups is shown in Table 1. Figure 2 shows a progressive increase in weight during all summers of life. This suggests

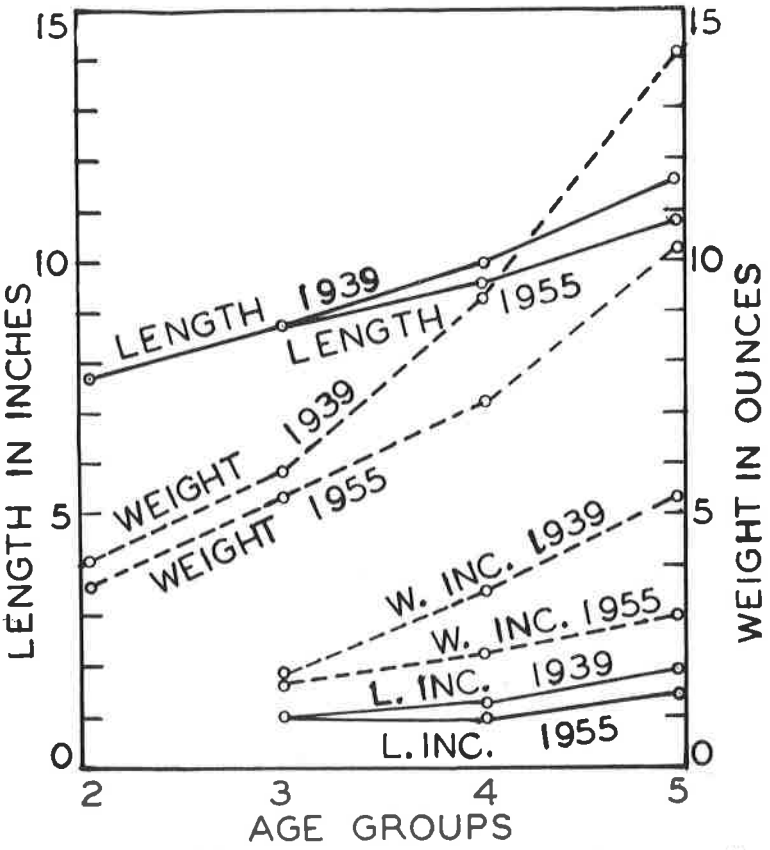

Fig. 2. Growth, weight, and increment curves of 647 Reelfoot Lake yellow bass; 129 for 1939, and 518 for 1955. The increment curves represent the annual increase in length and weight.

that yellow bass are a fast growing fish and the yearly increments are large in the upper age groups. If the average weight in the fifth summer of life in 1939 (14.10 ounces) is taken as 100 per cent it may be said that 29 per cent of the total weight is acquired by specimens of age group 2. In 1955 the same data shows that 34 per cent of the total weight is acquired by specimens of age group 2. The total weights acquired for the third

and fourth age groups for 1939 are: 42 per cent and 64 per cent. For 1955 the same data shows that 50 per cent of the total weight is acquired for age group 3 and 69 per cent for age group 4. Figure 2 shows a progressive increase in length and weight for all age groups both in 1939 and 1955. However both Table 1 and Figure 2 show that in 1939 and 1955 the length remained the same for age groups 2 and 3, decreasing in age groups 4 and 5 in 1955. In 1955 the weight was below that of the 1939 in all age groups.

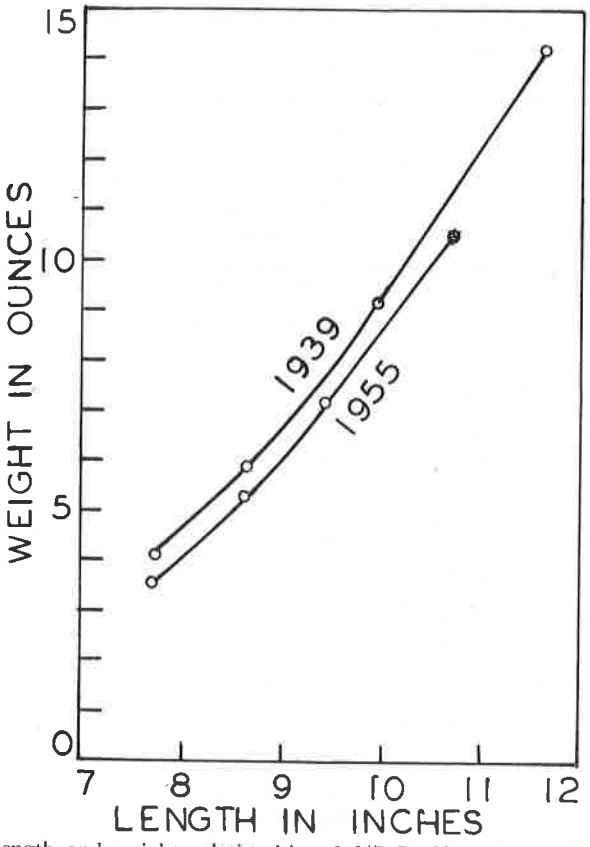

Fig. 3. Length and weight relationship of 647 Reelfoot Lake yellow bass; 129 for 1939, and 518 for 1955.

The increment in length for both 1939 and 1955 showed a slow but steady increase from age group 3 to age group 5. The increment for length was greatest for age group 5. The weight increment for both 1939 and 1955 shows an increase from age group 2 to age group 5. In 1939 the increase was much greater than in 1955. In both years the weight increment was greatest for age group 5. Table 1 and Figure 3 shows that no specimens

were longer than 12 inches or heavier than 15 ounces. Figure 3 shows a steady increase in length and weight for both 1939 and 1955. In both years the oldest fish were in age group 5. No fish were over six years old and the increase in length and weight was slow after the second year of life. This information indicates that the life history of the yellow bass covers a six year period. It also shows that intensive commercial fishing is successfully harvesting the crop of yellow bass and intensive fishing over a period of years has not decreased the size or number to any extent.

The difference in weight from 1939 to 1955 may be due to the larger number of fish used in the 1955 study and the method of catching the fish. In 1939 all specimens were obtained from set nets and in 1955 trout lines. Since commercial fishing of game fish was abolished in the spring of 1955, except yellow bass, the commercial fishermen concentrated on this species and methods that were still legal.

Table 2 shows the size groups and age for each size group. From 7.6 inches to 11 inches there is an overlapping of age groups. Fish over 7.6 inches in length may belong to two or three age groups. The majority belong to two age groups.

TABLE 2. Size and age groups for 519 yellow bass from Reelfoot Lake for 1955.

Length Intervals	Number of Fish	Age Groups 2	3	4	5
6.6– 7.0	5	5	—	—	—
7.1– 7.5	44	44	—	—	—
7.6– 8.0	74	60	14	—	—
8.1– 8.5	83	18	60	5	—
8.6– 9.0	109	—	68	41	—
9.1– 9.5	109	—	22	87	—
9.6–10.0	59	—	3	53	3
10.1–10.5	21	—	—	15	6
10.6–11.0	11	—	—	3	8
11.1–11.5	2	—	—	—	2
11.6–12.0	1	—	—	—	1
TOTAL	518	127	167	204	20

CONCLUSIONS

Yellow bass in Reelfoot Lake have a rapid and steady rate of growth and are being harvested during their life history. There is no size or creel limit for yellow bass and unlimited commercial fishing is successfully harvesting the crop, leaving few to die of old age or other natural causes. Since the yellow bass is the only game fish that can be taken commercially it will be important to follow up this study and to check the protected game fish to determine if commercial fishing reduces the hook and line catch to the extent claimed by sportsmen.

Acknowledgments

The author's gratitude is extended to Dr. C. L. Baker, Director of the Reelfoot Lake Biological Station, for many helpful suggestions. He also wishes to acknowledge his indebtedness to Marvin Hayes of Samburg, Tennessee, for aid in obtaining commercial catches.

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News of Tennessee Science

Newsworthy items suitable for this column should be addressed to the News Editor, Dr. Carl Tabb Bahner, Carson-Newman College, Jefferson City.

The Ninth Annual Research Conference sponsored by the Biology Division of the Oak Ridge National Laboratory will be held on April 12, 13, and 14, 1956, in Gatlinburg, Tennessee, at Mountain View Hotel. This conference, supported by the Atomic Energy Commission, will consist of invited papers and open discussions of a nonrestricted nature on the general topic of Biocolloids.

Dr. Guy Forman, Associate Professor of Physics at Vanderbilt University, has been granted leave from teaching during the winter term in order to be of service to high school science teachers in Tennessee. He will be available for consulation, for talks before science clubs and classes, and for rendering assistance in the promotion of science fairs.

Eastman Kodak and its subsidiaries, including Tennessee Eastman Company, have announced the addition to its aid-to-education program of a plan believed to be a new approach in educational assistance by an industrial company. The new plan is based largely on three facts: first, that the training and ability of college graduates who have come to the company have contributed greatly to Kodak's progress; second, that colleges and universities have incurred substantial deficits in the education of their students; and third, that the American system of higher education is increasingly in need of financial help—particularly privately supported institutions that do not receive public funds. Under the Kodak grant plan, which goes into effect this year, privately supported institutions will receive grants based upon the number of their graduates who joined the company during the fifth year preceding the year in which the grants are made and who are currently employed by the company. The cost of the company's over-all-aid-to-education program including the new plan, will total approximately $650,000 this year and will benefit over 100 educational institutions and organizations.

(*continued on page* 31)