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AGE AND RATE OF GROWTH OF BLUEGILLS IN REELFOOT LAKE, TENNESSEE, FOR 1958 AND 1965[1]

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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 bluegills, *Lepomis macrochrius macrochrius* Rafinesque, (Schoffman 1938), fishing regulations pertaining to bluegills 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 six age groups are considered for each of the years 1958 and 1965.

RATE OF GROWTH

The histogram (Fig. 1) shows the distribution of 550 bluegills for 1958 and 550 for 1965 arranged according to age groups. In 1958 age groups 4 and 5 represent the largest numbers caught, while in 1965 age groups 3 and 4 represent the largest numbers caught with age group 3 being larger in 1965. This seems to indicate that the proportion of young fish is increasing.

The average rate of growth in length of 550 bluegills for each age group in 1958 and 1965 is shown in Table 1 and Fig. 2. If the average length for age group 6 in 1958 (8.20 in.) is taken as 100 per cent, than approximately 74 per cent of the total growth in length is completed by the fish in age group 2, 82 per cent by those in age group 3, 87 per cent by age group 4, and 94 per cent by age group 5. In 1965 the average length for age group 6 was 7.90 in. and if taken as 100 per cent, than approximately 78 per cent of the total growth in length is completed by fish of age group 2, 84 per cent by age group 3, 92 per cent by age group 4, and 95 per cent by age group 5.

The growth in weight for all age groups for 550 bluegills for 1958 and 1965 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 6 in 1958 (8.05 ounces) is taken as 100 per cent, than approximately 34 per cent of the total weight is acquired by fish of age group 2, 46 per cent by those of age group 3, 64 per cent by age group 4, and 79 per cent by age group 5. For 1965 corresponding data show approximately 35 per cent of the total is acquired by fish of age group 2, 48 per cent by those of age group 3, 70 per cent by age group 4, and 85 per cent by age group 5.

[1] This contribution from the Reelfoot Lake Biological Station was made possible by a grant from the RLBS of the Tennessee Academy of Science.

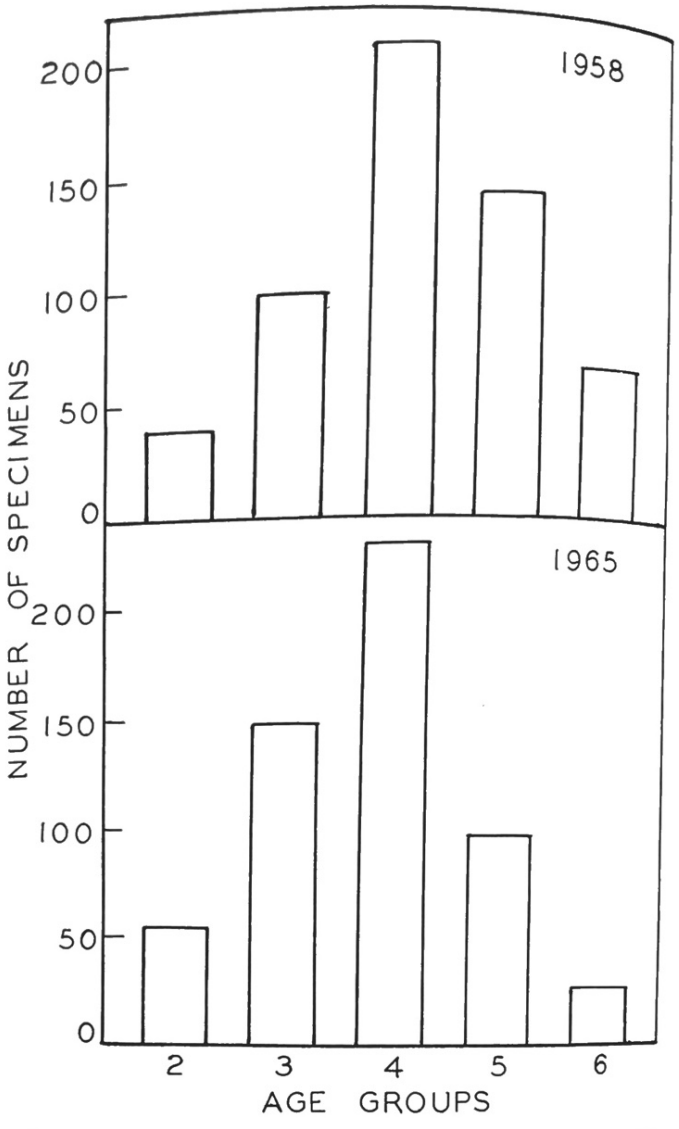

Fig. 1. Frequency distribution of 1100 Reelfoot Lake bluegills: 550 for 1958 and 550 for 1965.

The increment in length between the successive age groups for 1958 showed a decrease for age group 4 and 6. In 1965 the length increment was steady except for age groups 5 and 6. There was a steady increase in the weight increment for both years except for age group 5 in 1958. Fig. 3 shows a steady increase in length and weight for both 1958 and 1965. In both years the oldest fish were in age group 6 and no fish was over seven years old. The increase in length is slow after the second year of life while the increase in weight is greater in the oldest groups. This information indicates the life history of bluegills covers a seven year period.

Table 2 shows the size and age for each size group. In all size groups except the first two there is an overlapping of age groups.

Table 1

Average total length and weight for each age group of 550 bluegills from Reelfoot Lake for 1958 and 550 for 1965.

Age Group 1958	Number of Fish	Average Length (inches)	Average Weight (ounces)	Age Group 1965	Number of Fish	Average Length (inches)	Average Weight (ounces)
2	38	6.09	2.74	2	54	6.13	2.78
3	97	6.73	3.67	3	148	6.65	3.74
4	206	7.14	5.13	4	229	7.28	5.48
5	142	7.71	6.36	5	93	7.53	6.69
6	67	8.20	8.05	6	26	7.90	7.85

Table 2

Size and age group for 550 bluegills from Reelfoot Lake for 1958 and 550 for 1965.

Length Intervals inches	Number of Fish		Age Groups									
			2		3		4		5		6	
	1958	1965	1958	1965	1958	1965	1958	1965	1958	1965	1958	1965
4.6—5.0	1	1	1	1								
5.1—5.5	3	1	3	1								
5.6—6.0	27	31	18	25	9	6						
6.1—6.5	78	94	15	21	47	63	16	10				
6.6—7.0	110	185	1	4	38	77	71	95		9		
7.1—7.5	179	176			3	3	107	121	67	48	2	4
7.6—8.0	99	60					12	6	61	35	26	19
8.1—8.5	43	2							13		30	2
8.6—9.0	10								1		9	

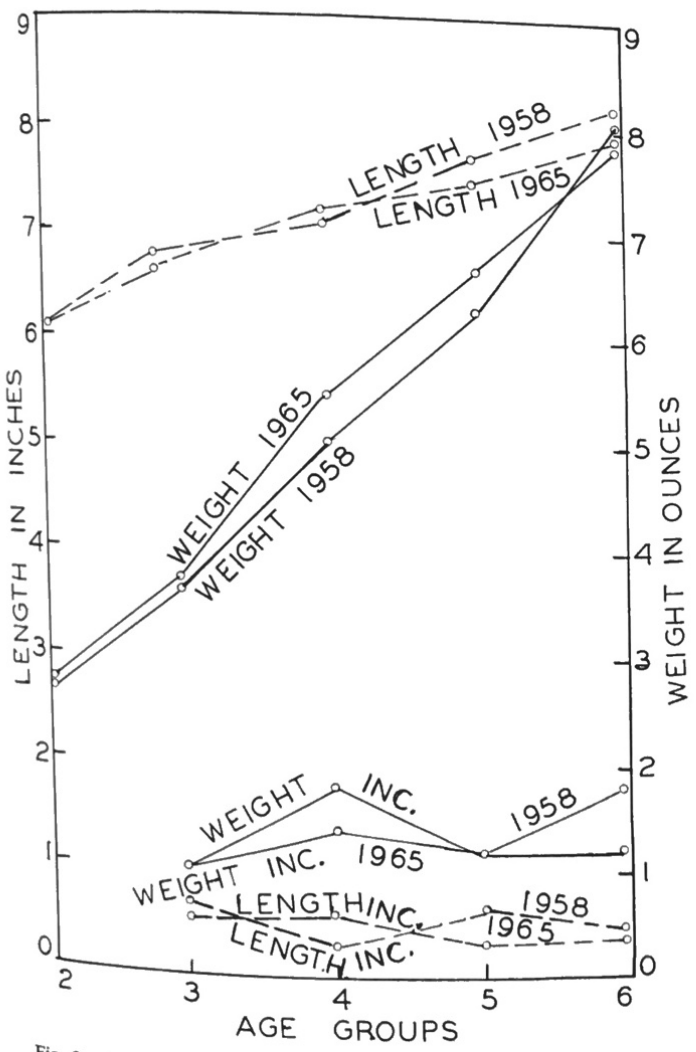

Fig. 2. Growth, weight and increment curves of 1100 Reelfoot Lake bluegills: 550 for 1958 and 550 for 1965. The increment curves represent the annual increase in length and weight.

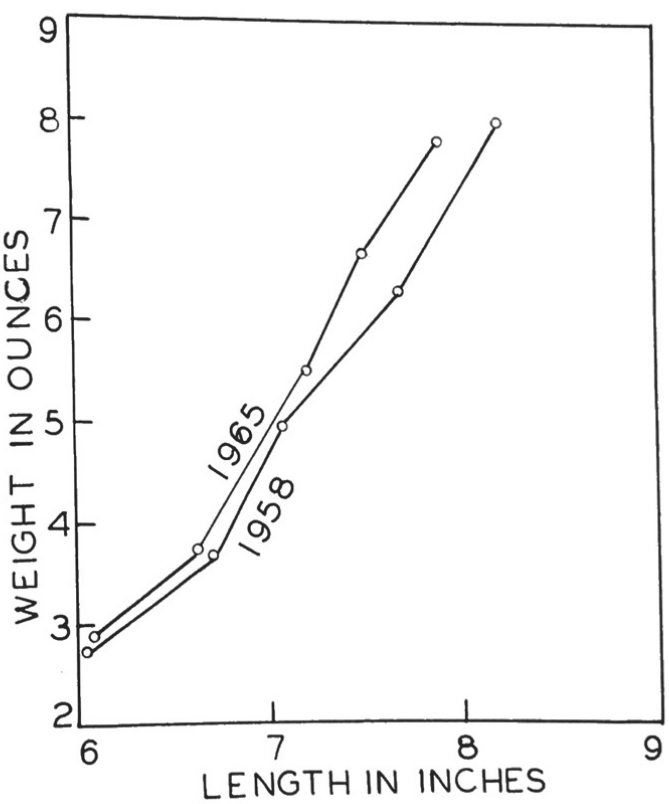

Fig. 3. Length and weight relationship of 1100 Reelfoot Lake bluegills: 550 for 1958 and 550 for 1959.

In 1947 there was an increase in both length and weight over 1937 (Schoffman 1948). During this period several changes were made. In 1941 the use of wire nets was prohibited. In 1949 the six-inch-size legal limit and the limiting of commercial fisherman to 25

bluegills per day (the then existing creel limit) were removed. In 1950 there was a decrease in both length and weight compared to those of 1947. During this period no changes in fishing regulations were made. In 1958 there was a decrease in weight under that of 1947 with an increase in length in age groups 2 and 3 in 1958 over 1950. The lengths of fish in age groups 4, 5, and 6 were greater in 1947 than in 1950. During this period commercial fishing was permitted during the first year of age group 4, two years for age group 5, and three years for age group 6. Age groups 2 and 3 were protected since their growth occurred after commercial fishing was prohibited in 1955. All age groups in 1965 were protected and in all but age group 4 there was a decrease in length. In weight all age groups increased except age group 6 which showed a decrease. This is the reverse of white crappies (Schoffman 1964) which decreased in both length and weight after commercial fishing was abolished.

Conclusions

The study of age and growth of bluegills in Reelfoot Lake, Tennessee, has extended over a period of twenty-nine years and during this period a change in growth rate has slowly been taking place. The length of each age group has slowly decreased since 1947. The weight of each age group has also slowly decreased since 1947 except for the present study which shows a notable increase in weight. Between each check from 1937 through 1958 changes in fishing regulations have been made. From 1958 to the present no changes in fishing regulations have been made for bluegills. Each check shows that more small fish are being caught which indicates an over population of bluegills is being built up.

The restriction of bluegill 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.

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 and preserve the Lake it will be necessary to divert the sediment and keep the Lake from filling up.

Acknowledgments

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LITERATURE CITED

Schoffman, Robert J. 1938. Age and growth of the blue-gills and large mouth black bass in Reelfoot Lake. *Report Reelfoot Lake Biological Station,* 2:81-103. (Reprinted in *Jour. Tenn. Acad. Sci.,* 13:81-103).

_____. 1939. Age and growth of the red-eared sunfish in Reelfoot Lake. *Report Reelfoot Lake Biological Station,* 3:61-71 (Reprinted in *Jour. Tenn. Acad. Sci.,* 14:61-71).

_____. 1948. Age growth and size distribution of bluegills in Reelfoot Lake for 1937 and 1947. *Report Reelfoot Lake Biological Station,* 12:12-19 (Reprinted in *Jour. Tenn. Acad. Sci.,* 23:12-19).

_____. 1959. Age and rate of growth of the bluegill in Reelfoot Lake, Tennessee, for 1950 and 1958. *Report Reelfoot Lake Biological Station,* 23:73-77 (Reprinted in *Jour. Tenn. Acad. Sci.,* 34:73-77).

_____. 1964. Summary of the age and rate of growth of game fish in Reelfoot Lake, Tennessee, from 1937 through 1961. *Jour. Tenn. Acad. Sci.,* 39:11-14.

NEWS OF TENNESSEE SCIENCE

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throughout the southeastern United States who are full-time staff members at some junior college, college or university which does not have a doctoral program in chemistry. Participants must have taught chemistry for at least three years and have at least a master's degree with training in chemistry.

The Collegiate Division will hold regional meetings this spring at which time students may present papers. More information can be obtained by contacting the sponsor in your region. The meeting place, date of meeting, and sponsor for each region are as follows: Southwestern at Memphis, April 23, Bro. George Carney, Christian Brothers College, Memphis, Tenn. 38104; George Peabody College, April 16, Dr. R. E. Martin, Box 52A, Tennessee Technological University, Cookeville, Tenn. 38501; Knoxville College, March 26, Dr. B. L. Stump, Carson-Newman College, Jefferson City, Tenn. 37760.

Two special conferences, one on "Bioengineering" and the other on "Principles of Radiation Protection", are planned by the Oak Ridge Associated Universities (formerly ORINS) in August 1966. The three-day conferences are to be supported by the U. S. Atomic Energy Commission. The conference on "Principles of Radiation Protection" is to be held in Oak Ridge August 24-26 in cooperation with Oak Ridge National Laboratory. The "Bioengineering" program, scheduled for August 29-31, is to be held in Gatlinburg in cooperation with Oak Ridge National Laboratory, the American Nuclear

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