

AGE AND RATE OF GROWTH OF THE BLUEGILLS IN REELFOOT LAKE, TENNESSEE, FOR 1950 AND 1958¹

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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. Since the original investigation of bluegills, *Lepomis macrochirus macrochirus* Rafinesque (Schoffman, 1938), changes have taken place that have caused a re-check to be made from time to time. In 1937 commercial fishing was legal, allowing the use of hoop nets with an inch and a half mesh (square measure), trammel nets, gill nets, and wire set nets. In 1941 the use of wire set nets was prohibited. In 1937 the legal length was 6 inches and in 1949 this legal length was removed and commercial fishermen limited to 25 per day. In 1955 commercial fishing of game fish was abolished. Thus a re-check in 1947 and 1950 (Schoffman, 1948 and 1952) and the present re-check. Scale collections for the 1937, 1947, and 1950 studies were obtained from both commercial and sportmen's catches. In 1958 only sportmen's catches were used. Age determinations were made for all studies for each specimen and arranged according to age groups, *i.e.*, a fish in age group 2 would show one annulus and be in its second year of life. Age determinations were made for all studies by the method of Schoffman (1939).

Rate of Growth

The histogram (Fig. 1) shows the distribution of 177 bluegills for 1950, and 550 for 1958, arranged according to age groups. In 1950 age group 2 represents 1 per cent, age group 3, 13 per cent, age group 4, 42 per cent, age group 5, 36 per cent, and age group 6, 8 per cent of all the specimens. In 1958 age group 2 represents 7 per cent, age group 3, 18 per cent, age group 4, 37 per cent, age group 5, 26 per cent, and age group 6, 12 per cent. In 1950 and 1958 age groups 4 and 5 represent the largest numbers caught.

The average rate of growth in length and weight of 177 bluegills for each summer of life in 1950, and 550 bluegills in 1958, is shown in table 1 and figure 2. If the length for age group 6 in 1950 (8.84 inches) is taken as 100 per cent, it may be stated that 61 per cent of the total growth in length is completed by specimens of age group 2, 73 per cent by age group 3, 82 per cent by age group 4, and 84 per cent by age group 5. In

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1958 the length of age group 6 was 8.20 inches and if taken as 100 per cent, it may be stated that 74 per cent of the total group in length is completed by specimens of age group 2, 82 per cent by age group 3, 87 per cent by age group 4, and 95 per cent by age group 5.

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 for all age groups. If the average weight in the sixth summer of life in 1950 (8.46 ounces) is taken as 100 per cent it may be said that 33 per cent of the total weight is acquired by specimens of age group 2. In 1958 the same data

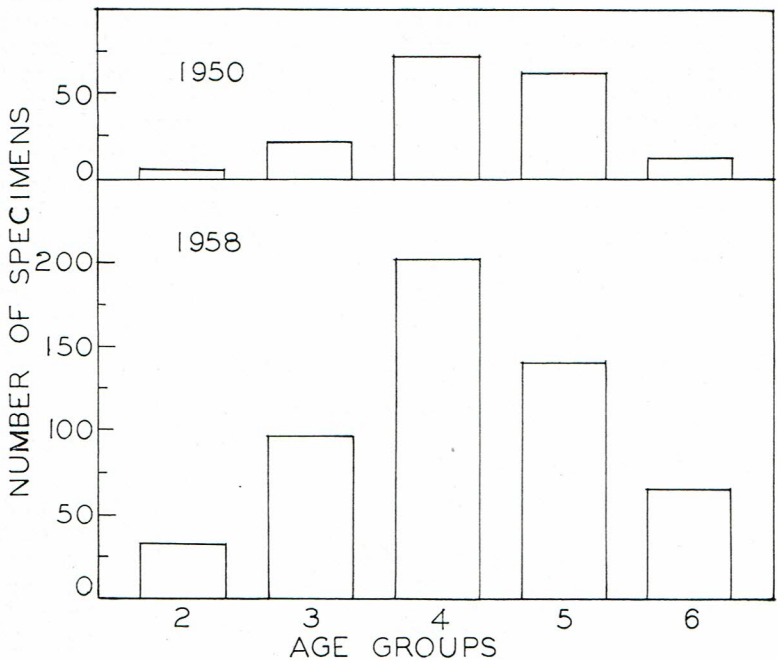


Fig. 1. Frequency distribution of 727 Reelfoot Lake bluegills; 177 for 1950 and 550 of 1958, grouped into age groups.

TABLE 1. Average Total Length and Weights for Each Age Group for 177 Bluegills from Reelfoot Lake for 1950 and 550 Bluegills for 1958.

Group Age 1950	Number of Fish	Average Length inches	Average Weight ounces	1958 Age Group	Number of Fish	Average Length inches	Average Weight ounces
2	5	5.40	2.80	2	38	6.90	2.74
3	22	6.47	3.95	3	97	6.73	3.67
4	73	7.25	5.53	4	206	7.14	5.13
5	64	7.65	6.41	5	142	7.71	6.36
6	13	8.84	8.46	6	67	8.20	8.05

shows 34 per cent of the total weight is acquired by specimens of age group 2. The total weights acquired for the third, fourth, and fifth age groups of 1950 are: 47 per cent, 65 per cent, and 76 per cent. For 1958 the same data shows 46 per cent of the total weight is acquired for age group 3, 64 per cent for age group 4, and 79 per cent for age group 5. In 1947 there was an increase in length and weight over 1950 (Schoffman 1952). In 1950 there is an increase in length in age groups 4, 5, and 6 over 1958. Age groups 2 and 3 in 1958 show an increase over 1950. In 1950 there was an increase of weight over 1958 in all age groups.

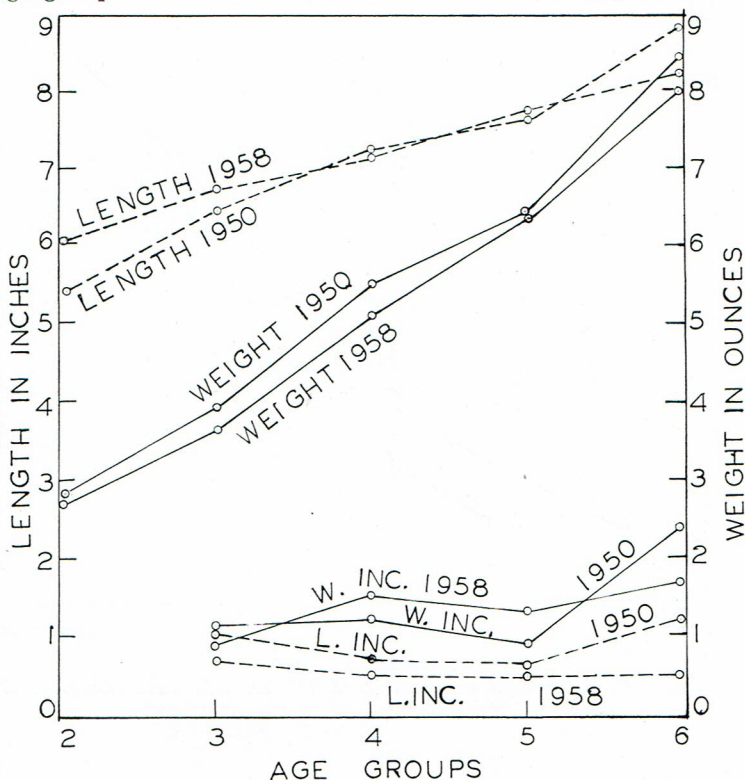


Fig. 2. Growth, weight and increment curves of 727 Reelfoot Lake bluegills; 177 for 1950 and 550 for 1958. The increment curves represent the annual increase in length and weight.

The increment in length in 1950 showed a decrease in age group 5 with an increase in age group 6. In 1958 the increment was constant. Figure 3 shows a steady increase in length and weight for both 1950 and 1958. In both years the oldest fish were in age group 6 and no fish were 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 older age groups. This information indicates that 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 over-lapping of age groups. The majority belonging to three age groups.

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 set nets was prohibited.

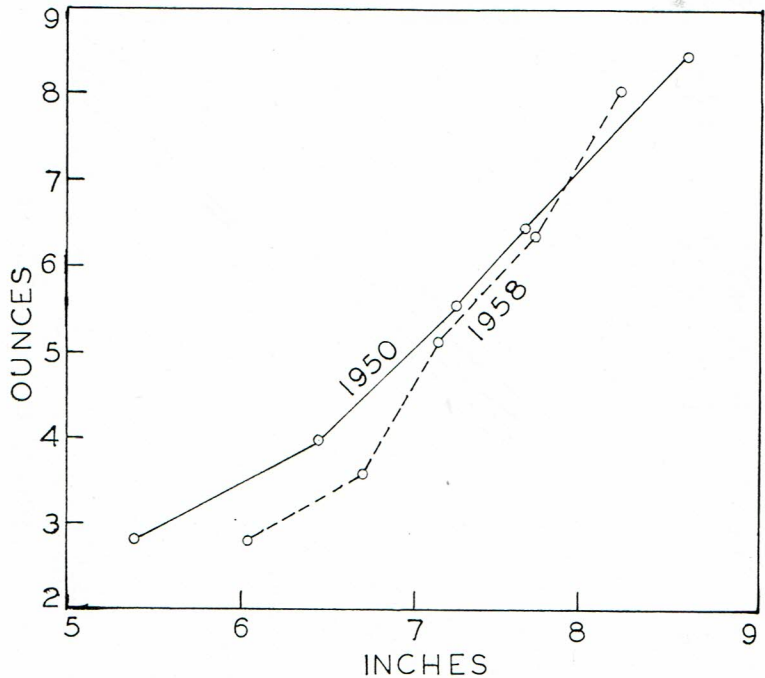


Fig. 3. Length and weight relationship of 727 Reelfoot Lake bluegills; 177 for 1950 and 550 for 1958.

In 1949 the removal of the six inch size legal limit and limiting commercial fishermen to 25 bluegills per day, the then existing creel limit. In 1950 there was a decrease in both length and weight under 1947. During this period no changes in fishing regulations were made. In 1958 there was a decrease in weight under 1947 with an increase in length in age groups 2 and 3 in 1958 over 1950. The length of age groups 4, 5, and 6 being greater in 1947 than in 1950. During this period commercial fishing was permitted during the first year of age group 4, two years of age group 5, and three years of age group 6. Age groups

TABLE 2. Size and Age Groups for 177 Bluegills from Reelfoot Lake for 1950 and 550 Bluegills for 1958.

Length Intervals inches	Number of Fish		Age Groups									
			2		3		4		5		6	
	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958	1950	1958
4.6-5.0	1	1	1	1								
5.1-5.5	2	3	2	3								
5.6-6.0	6	27	2	18	4	9						
6.1-6.5	10	78		15	10	47		16				
6.6-7.0	35	110		1	9	38	24	71	2			
7.1-7.5	66	179				3	41	107	25	67		2
7.6-8.0	44	99					7	12	37	61		26
8.1-8.5	9	43								13	9	30
8.6-9.0	4	10								1	4	9
	177	550	5	38	23	97	72	206	64	142	13	67

2 and 3 were protected since their growth occurred after commercial fishing of game fish was prohibited.

Conclusions

The study of age and growth of bluegills in Reelfoot Lake, Tennessee, has extended over a period of twenty-one years and during this period a change in growth rate has slowly been taking place. The length and weight of each age group has slowly decreased since 1947. Between each check changes in fishing regulations have been made. Each change has reduced the number of fish caught thus increasing the population. Studies should be continued to determine if the increase in population will reach such proportions that an undesirable bluegill will appear. Studies should also be made on other species of game fish to determine if the prohibition of commercial fishing should be continued or restored.

Acknowledgments

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LITERATURE CITED

- Baker, C. L. 1937. The commercial game and rough fish of Reelfoot Lake. *Report Reelfoot Lake Biological Station*, 1:9-54 (Reprinted in *Jour. Tenn. Acad. Sci.*, 12:9-54).
- Hubbs, Carl L., and Karl F. Lagler. 1941. Guide to the fishes of the Great Lakes and tributary waters. *Cranbrook Institute of Science*, Bull. No. 18.
- Schoffman, Robert J. 1938. Age and growth of the blue-gills and the 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).
1952. Growth of the bluegills and crappies in Reelfoot Lake, Tennessee. *Report Reelfoot Lake Biological Station*, 16:15-26 (Reprinted in *Jour. Tenn. Acad. Sci.*, 27:15-26).