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AGE AND GROWTH RATE OF BLUEGILL IN SELECTED FARM PONDS IN OBION COUNTY, TENNESSEE

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INTRODUCTION

Bluegill populations of three farm ponds in Obion County, Tennessee were sampled. Age, weight and length measurements were compiled from 500 bluegills from each pond. Data from these populations were compared with one another and with published data from Reelfoot Lake (Schoffman 1966). The ponds sampled in this study are located approximately three miles southwest of Union City and one mile west of Old Troy highway (Tenn. 21) on farms of Mssrs. Tom Latimer, Morris Latimer, and Bill Gregory. The ponds, designated as Pond A, B, and C, are approximately 16 miles east of Reelfoot Lake. Pond A is 8 years old, covers 1.1 acres, and is 12 feet deep at its greatest depth. It was stocked seven years ago with bluegill and crappie and has not been fertilized or managed. The pond is located on a knoll and receives little drainage from the surrounding fields of fescue pasture. Pond B is 26 years old, covers 4.6 acres, and is 18 feet deep at its greatest depth. It was stocked with bass, bluegill, and crappie 25 years ago and has been fertilized by the owner according to USDA recommendations. Pond B is bordered by fescue pasture on three sides and a road levee on the fourth side. It receives considerable drainage from the surrounding pastures. Pond C is 15 years old, covers 2.2 acres, and is 12 feet deep at its greatest depth. It was stocked with bass and bluegill about 14 years ago but has not been fertilized or managed. Pond C is surrounded by fescue pasture and receives considerable drainage.

METHODS

Five hundred specimens were collected from each pond between August 25, 1966 and November 23, 1966. The fish were captured with a wire basket, mesh 1½ inches, baited with cottonseed meal. Sample specimens were taken at random.

Total length measurements were made from the tip of the snout to the tip of the caudal fin. Measurements were made on a flat measuring board and were recorded to the nearest millimeter. Specimens were weighed on a platform balance and weights were recorded to the nearest 0.1g. Weight and length determinations were made at pondside on fresh specimens. All metric measurements were subsequently converted to English units to make possible direct comparisons with data from Reelfoot Lake (Schoffman 1938, 1966).

Scales were taken from above and below the lateral line in the midbody region, cleaned in warm water, mounted between two glass slides and examined with the aid of a model 100 Micro-View microprojector. Age determinations were made according to the criteria of Schoffman (1938), and each specimen was assigned to an age group according to the number of annular scale markings, e.g. one annulus-age group 2, two annuli age group 3, etc.

RESULTS AND CONCLUSIONS

Age, weight and length measurements for the three ponds and Reelfoot Lake (Schoffman 1966) are given in Tables 1 and 2.

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TABLE I

SAMPLE SIZE, MEAN LENGTH AND STANDARD DEVIATIONS OF BLUEGILL FROM PONDS A, B, AND C AND REELFOOT LAKE.

	Pond A			Pond B			Pond C			Reelfoot	
Age Group	Sample Size	Mean	S.D.	Sample Size	Mean	S.D.	Sample Size	Mean	S.D.	Sample Size	Mean
2	207	12.47cm (4.90in.)	± 1.09	29	15.20 (5.89)	± .51	100	14.95 (5.08)	± .93	54	6.13 in.
3	167	14.72 (5.80)	± 1.21	87	16.49 (6.49)	± 2.02	132	16.79 (6.61)	± 1.69	148	6.65
4	67	15.76 (6.20)	± 1.34	198	17.27 (6.80)	± .36	187	18.17 (7.15)	± .26	229	7.28
5	35	17.45 (6.87)	± .28	132	19.04 (7.49)	± 1.08	53	18.39 (7.24)	± .53	93	7.53
6	24	19.24 (7.57)	± .38	54	21.30 (8.38)	± 1.53	28	20.21 (7.95)	± .79	26	7.90

TABLE II

SAMPLE SIZE, MEAN WEIGHT AND STANDARD DEVIATIONS OF BLUEGILL FROM PONDS A, B, C, AND REELFOOT LAKE.

	Pond A			Pond B			Pond C			Reelfoot	
Age Group	Sample Size	Mean	S.D.	Sample Size	Mean	S.D.	Sample Size	Mean	S.D.	Sample Size	Mean
2	207	36.94g (1.32oz)	± 8.90	29	75.34 ± (2.69)	3.38	100	73.28 ± (2.62)	8.48	54	2.78 oz
3	167	64.33 (2.30)	± 9.61	87	98.07 ± (3.50)	8.32	132	102.93 ± (3.68)	3.34	148	3.74
4	67	81.60 (2.89)	± 7.98	198	139.01 ± (4.97)	3.26	187	138.30 ± (4.94)	6.48	229	5.48
5	35	104.82 (3.74)	± 4.11	132	175.72 ± (6.27)	10.68	53	167.82 ± (5.99)	4.95	93	6.69
6	24	118.93 (4.25)	± 5.34	54	216.21 ± (7.72)	8.11	28	224.84 ± (8.03)	5.73	26	7.85

TABLE III

COEFFICIENTS OF CONDITION OF BLUEGILL FROM PONDS A, B, C, AND REELFOOT LAKE.

	Age Group 2	3	4	5	6	Avg. of all Age Groups
Pond A	70.12	73.68	75.79	72.09	61.23	73.54
Pond B	76.93	80.02	98.79	93.26	82.00	92.64
Pond C	83.93	79.64	84.47	98.65	99.88	94.05
Reelfoot	75.43	79.48	88.77	97.93	99.50	92.30

Length and weight measurements for the ponds were compared by an analysis of variance technique using a completely random design. This analysis indicated that there were significant differences among the ponds for both characteristics. Age group means were then compared by means of Duncan's New Multiple Range Test (Steel and Torrie 1960). These comparisons clearly indicated that the bluegill of Pond A were significantly shorted in length and weighed less than the specimens from Ponds B and C.

It was not possible to carry out a statistical comparison of the pond data with the data from Reelfoot Lake; however, an inspection of the means of the Reelfoot Lake samples suggest that the bluegill of Ponds B and C were similar in length and weight to those of Reelfoot Lake for the various age groups. Similarly, comparisons of population structure by age groups show that age group 2 was the predominant group in Pond A while age group 4 was the prevalent group in Ponds B and C and Reelfoot Lake.

Coefficients of Condition, which are index values that take into account both length and weight measures, were computed for the various age groups of the three ponds and Reelfoot Lake and are presented in Table 3. The overall average coefficients clearly show that the bluegills from Pond A were in much poorer condition than those of the other ponds or Reelfoot Lake.

Ponds B and C had large populations of turtles and bass. On several occasions, drowned turtles, along with the remains of partially devoured bluegill, were removed from the basket. Owners and fishermen reported excellent bass fishing in these two ponds though no bass were captured in this study. In addition, Pond B had large crappie which may prey upon the very young bluegill. Pond A was originally stocked with crappie, but apparently none exist in the pond now. No turtles were capture or observed in Pond A. Ponds B and C receive considerable drainage from the surrounding pastures which are regularly fertilized and Pond B is also fertilized by the owner.

Differences in size, depth and age of the ponds show no significant relationship to the growth of bluegill in these ponds. Predation and nutrient enrichment appear to be most significant in regulating populations in these ponds. In the case of these particular farm ponds it appears that nutrient supply and predation determine the size and age distribution of bluegill. Also, it appears that Ponds B and C produce bluegill that are comparable in size and weight to those of Reelfoot Lake.

LITERATURE CITED

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