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GROWTH OF CHANNEL CATFISH, Ictalurus punctatus, AND BLUE CATFISH, Ictalurus furcatus, IN THE KENTUCKY LAKE PORTION OF THE TENNESSEE RIVER IN TENNESSEE

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ABSTRACT

The age and rate of growth of channel and blue catfish were determined by the pectoral spine section aging technique. At the end of their first year's growth, channel catfish weighed 0.10 pound and were 4.3 inches in length (total length), and blue catfish weighed 0.12 pound and were 5.3 inches in length. At the end of ten years, channel catfish weighed 9.2 pounds and were 25.2 inches long, and blue catfish weighed 24.26 and were 33.3 inches long.

INTRODUCTION

The channel and blue catfish data in this paper have been collected and compiled because of the need for more complete knowledge of the age and rate of growth of these fish in Kentucky Reservoir. Also, there is considerable concern on the part of Kentucky Reservoir fishermen who are catching predominately small catfish and accurate scientific information is needed to combat the many and varied opinions held by the fishermen.

Kentucky Lake is the largest of the Tennessee Valley Authority's reservoirs and is managed primarily for flood control and navigation. It contains approximately 150,409 surface acres, of which 110,898 are within Tennessee. Its average water level normally fluctuates from two to five feet and occasionally during flood stage, it will fluctuate ten plus feet.

Both sport and commercial fishing for channel and blue catfish are permitted in the reservoir, however, because of the large mesh size (3 inch bar measure) of the legal nets in the lake, the harvest of small catfish is virtually limited to hand, bait and snag line fishing.

MATERIALS AND METHODS

From March 1 through June of 1961, pectoral spines and length weight data were collected from 95 channel catfish and from 134 blue catfish. All but a few fish were caught by commercial fishermen using trot and snag lines and gill and trammel nets. Some small fish not present in the commercial catches were collected with rotenone and one inch bar mesh hoop nets by Game and Fish Commission personnel.

The pectoral spines were sectioned in the manner described by Sneed (1951). The sections were placed in a Syracuse dish containing alcohol for reading and measuring with a binocular microscope. The alcohol was used in place of water since it accentuated the annual rings for a short time and made the sections easier to read.

AGE AND GROWTH

The calculated length and increments of growth for channel catfish (Table I) and blue catfish (Table II) were computed according to the Carlander method (1943). Channel catfish rates of growth and growth increments were slightly less than those of the blue catfish for each year of growth. The growth increments of both channel and blue catfish were 4.3 inches and 5.3 inches respec-

TABLE I

CALCULATED LENGTHS AND INCREMENTS OF GROWTH IN INCHES AND 0.1 OF 95 CHANNEL CATFISH FROM KENTUCKY LAKE IN TENNESSEE

Age Group	*No. of Fish*	*Mean Lgth. at Capture*	*Average Calculated Length at Annulus*									
			1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
I	0	. . .	*4.5									
II	8	10.2	5.0	8.1								
III	10	11.2	4.4	7.4	10.4							
IV	13	12.5	4.2	6.5	8.9	11.3						
V	12	14.2	4.6	6.5	8.7	10.8	12.7					
VI	5	15.8	3.8	5.9	8.0	10.7	13.0	15.4				
VII	11	17.2	3.9	6.1	7.8	9.6	11.5	13.5	16.0			
VIII	14	19.9	3.7	6.5	8.1	9.5	12.0	14.4	16.8	19.5		
IX	12	23.1	4.2	6.2	8.3	9.8	11.6	14.0	16.9	19.3	22.3	
X	10	25.9	5.2	7.4	9.4	11.0	12.6	15.0	17.3	19.8	22.3	25.2
Weighted Mean Length			4.3	6.7	8.7	10.3	12.1	14.3	16.7	19.5	22.3	25.2
Increments of Growth			4.3	2.4	2.0	1.8	2.0	2.3	2.5	2.5	2.8	2.9

TABLE II

CALCULATED LENGTHS AND INCREMENTS OF GROWTH IN INCHES AND 0.1 OF 134 BLUE CATFISH FROM KENTUCKY LAKE IN TENNESSEE

Age Group	*No. of Fish*	*Mean Lgth. at Capture*	*Average Calculated Length at Annulus*									
			1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
I	0	. . .	*4.7									
II	4	9.0	5.0	8.3								
III	16	10.6	4.8	7.2	10.0							
IV	14	12.2	5.0	7.2	9.6	11.7						
V	17	14.4	4.8	7.1	9.3	10.9	13.3					
VI	9	17.1	4.2	7.5	9.8	11.7	13.8	16.7				
VII	22	19.6	4.8	7.5	9.2	10.9	13.0	15.9	18.9			
VIII	29	24.3	5.9	8.3	10.1	12.0	14.3	17.2	20.9	23.0		
IX	19	27.5	5.8	8.7	10.2	12.3	14.6	16.8	19.6	22.2	26.9	
X	4	33.9	7.8	10.4	13.3	15.4	17.2	20.3	22.7	26.1	30.2	33.3
Weighted Mean Length			5.3	7.8	9.9	11.7	14.0	16.9	20.2	22.9	27.5	33.3
Increments of Growth			5.3	2.5	2.1	1.8	2.3	2.8	3.3	2.1	4.6	3.1

* Length of annulus calculated from two-year-old fish.

tively the first year, but dropped sharply to 1.8 inches for both species the fourth year of life. From the fourth year through the ninth year, increments for growth for both species increased annually.

BODY PECTORAL SPINE RELATIONSHIP

The pectoral spines were collected from 85 channel catfish and 134 blue catfish. The fish were arranged in one-inch intervals and the average determined for each interval and corresponding averages were also determined for spine sections. The empirical data were plotted (Figures 1 and 2) and a linear regression calculated to describe the relationship:

$$L = -4.28 + 2.70\ R \text{ for channel catfish, and}$$
$$L = -10.62 + 3.37\ R \text{ for blue catfish}$$

where L is the total length in inches and R is the length of the spine radius X .011.

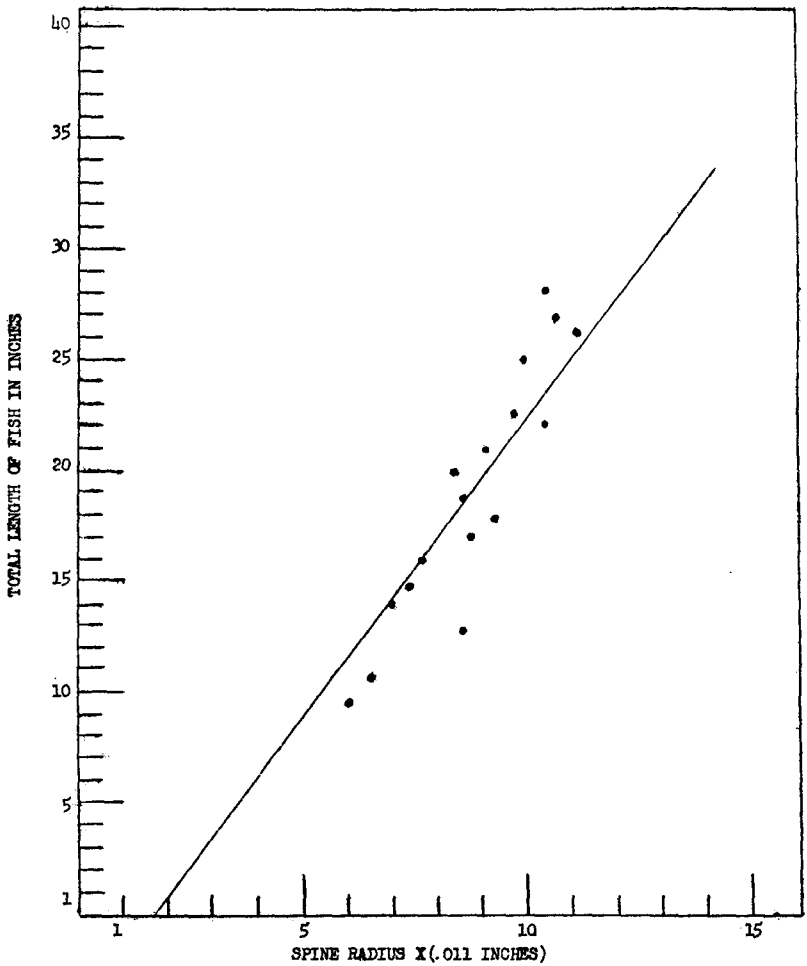

Figure 1. Relationship Between Total Length of Fish and Pectoral Spine Radius of Channel Catfish in the Kentucky Lake Portion of the Tennessee River in Tennessee.

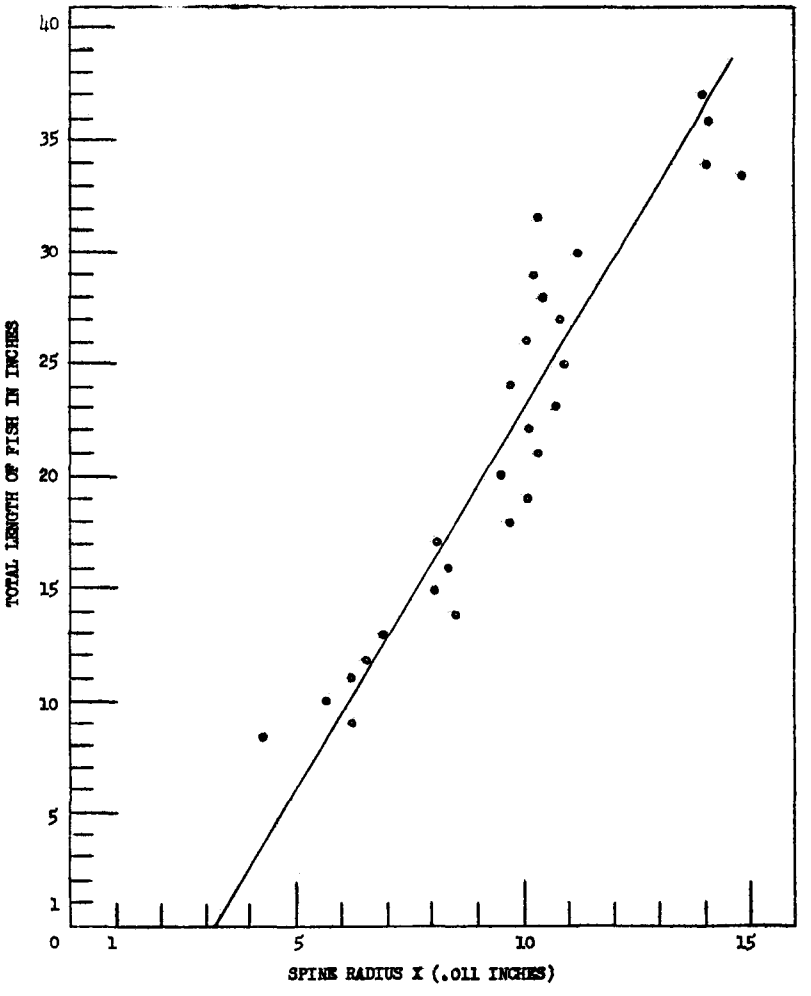

Figure 2. Relationship Between Total Length of Fish and Pectoral Spine Radius of Blue Catfish in the Kentucky Lake Portion of the Tennessee River in Tennessee.

LENGTH AND WEIGHT

The length-weight relationships (as shown in Figures 3 and 4) were calculated from 85 channel catfish and 134 blue catfish. The calculated length and weight range for each species was:

Channel Catfish—4.3 to 25.2 inches, and .28 to 10.42 pounds
Blue catfish—5.3 to 33.3 inches, and .18 to 24.36 pounds

The length-weight relationship for both species of fish can be expressed by the equation:

$\log W = -5.58695 + 3.51622 \log L$, channel catfish
$\log W = -4.82261 + 3.19584 \log L$, blue catfish

where W equals weight in pounds, and I equals total length in inches.

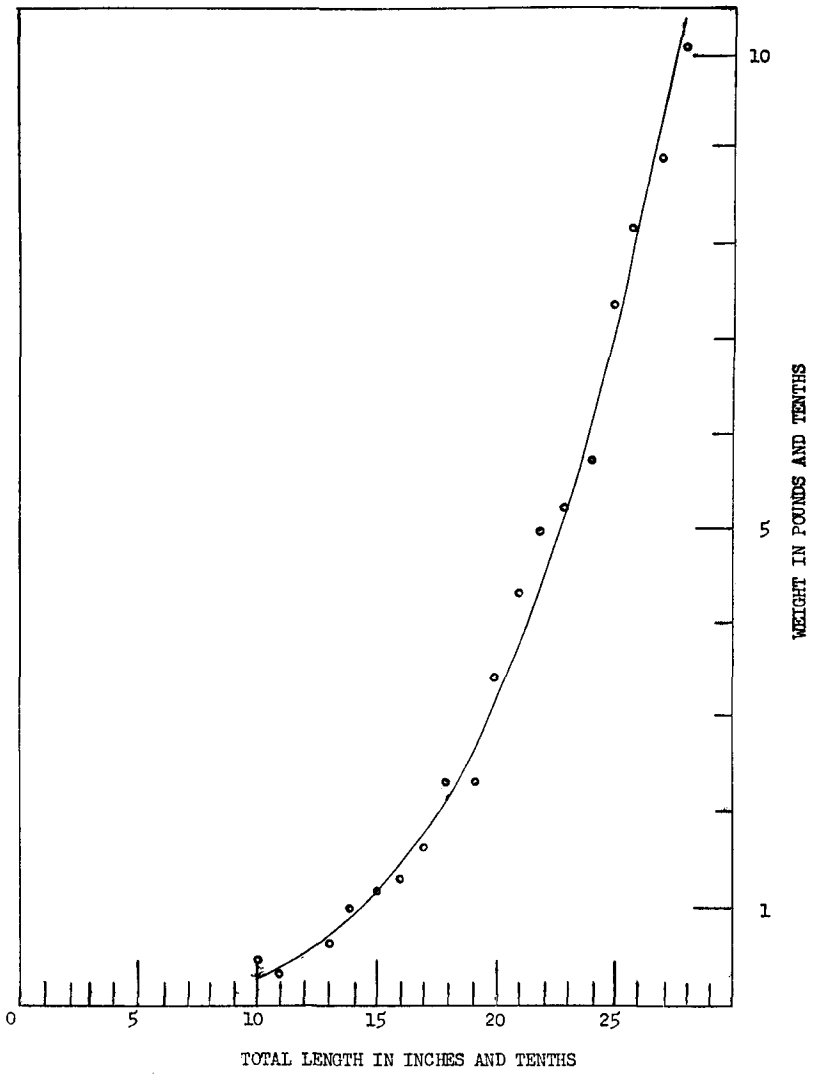

Figure 3. Length-Weight Relationship for Channel Catfish from the Kentucky Lake Portion of the Tennessee River in Tennessee.

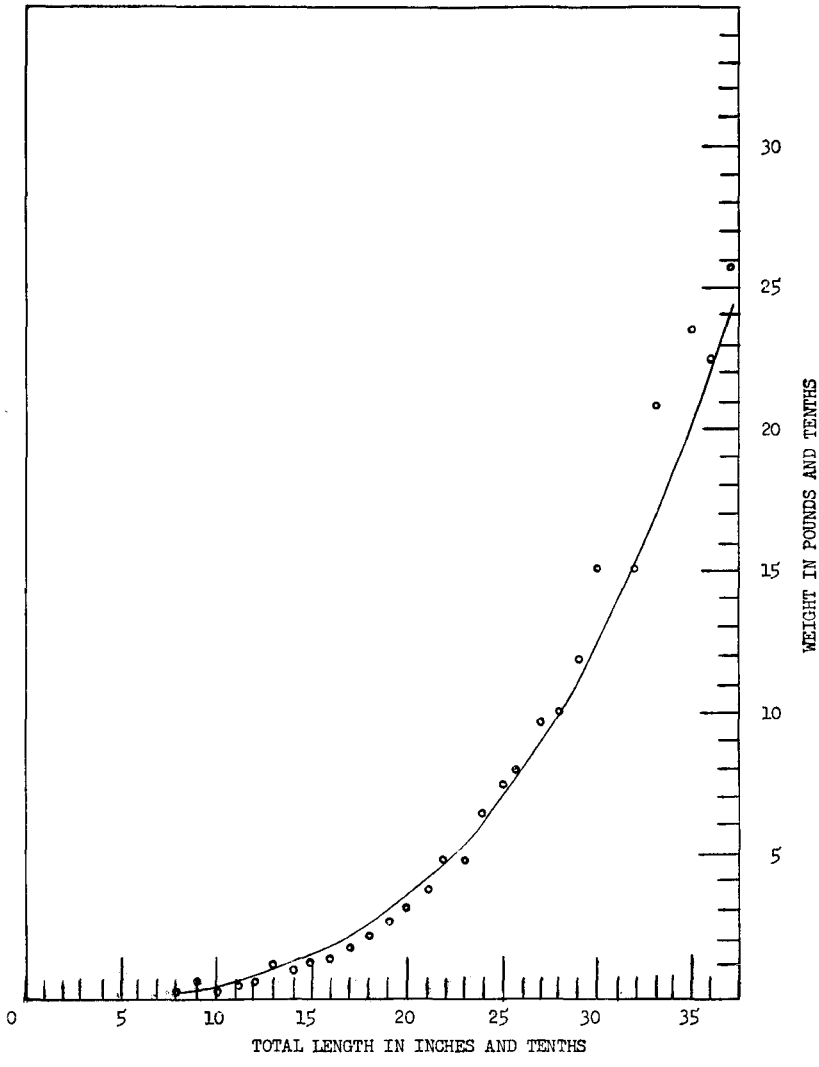

Figure 4. Length-Weight Relationship for Blue Catfish from the Kentucky Lake Portion of the Tennessee River in Tennessee.

DISCUSSION

The retardation in growth of the channel and blue catfish between the third to seventh year indicates that some fish management measures should be put into effect that would bring about faster growth during this period. In comparing the growth of fish with the channel and blue catfish of Lake Texoma, Sneed and Leonard (1956), Jenkins (1956), and Santee-Cooper Reservoir, Stevens (1959), Kentucky Reservoir blue and channel catfish drop behind the growth of catfish in the above reservoirs. Overpopulation of these species of fish may be one of the factors causing retardation. Consequently, fishing gear capable of catching the small fish in this age group should be introduced in the reservoir to see if this condition can be improved.

At present there is a recent influx of Asiatic clam *Corbicula sp.* Sinclair and Isom, 1961. Catfish of all sizes are feeding extensively on these clams which may influence their growth in the future.

ACKNOWLEDGMENTS

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TRANSPORTATION OF CHANNEL CATFISH FRY IN PLASTIC BAGS

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1962

ABSTRACT

Channel catfish fry, ranging in age from one day old to about two weeks old, are routinely transported in polyethylene plastic bags with an oxygen atmosphere between fish hatcheries in Arkansas. Approximately 10,000 fry are transported per 18" × 32" bag in 1½ gallons of well-oxygenated spring water of moderate hardness. These fish are transported by both airplanes and station wagons.

INTRODUCTION

Several years ago it became obvious that channel catfish, *Ictalurus punctatus,*[1] were more easily propagated at the Centerton State Fish Hatchery, Centerton, Arkansas, than at the Lake Hamilton State Fish Hatchery, Lake Hamilton (Hot Springs), Arkansas, or the Joe Hogan State Fish Hatchery, Lonoke,

1 Names of fish used are the accepted common and scientific names as listed in American Fisheries Society, Special Publication No. 2, 1960.