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ESTIMATED LENGTHS OF VARIOUS FORAGE FISHES SPOTTED BASS CAN SWALLOW

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ABSTRACT

The estimated total length of several species of forage fishes that spotted bass, *Micropterus punctulatus*, of given total lengths can swallow are given.

INTRODUCTION

The spotted bass, *Micropterus punctulatus*, is believed to be almost as voracious a feeder on other fish as its relative the largemouth bass, *Micropterus salmoides*. In the evaluation of fish populations where spotted bass are present, it is necessary to know the sizes of various forage fishes that this species can swallow. Without such information, it is impossible to determine accurately such population values as If, Sf, and the Yc ratio [Swingle[1]]. This paper presents, in tabular form, preliminary estimates of the sizes of gizzard shad, *Dorosoma cepedianum*, bluegill, *Lepomis macrochirus*, golden shiner, *Notemigonus crysoleucas*, green sunfish, *Lepomis cyanellus*, and threadfin shad, *Dorosoma petenense*, that various sizes of spotted bass can swallow.

The procedure for determining a tabulated estimate of sizes of forage fish a given piscivorous species can swallow was given by Lawrence[2].

The length-depth relationships of bluegill, golden shiner, green sunfish, and gizzard shad from Lawrence[2], and calculations on the body depth-total length relationships of threadfin shad are included in this report. The equation for the depth-length relationship of threadfin shad was as follows:

$$L=10.20+3.6256\ D$$

Exactly how the spotted bass catches and orients its prey for swallowing is unknown. Since spotted bass possess a semirigid pair of cleithrum bones that surround the anterior portion of the esophagus as do largemouth bass, it was assumed that the same relationships exist between body depth of forage fishes and mouth width in both species of bass.

Thus, in calculating the mouth width-total length relationship of spotted bass, the same measurement techniques used by Lawrence[2] on largemouth bass were employed. The equations for these mouth width-total length relationships for different intervals of total length of this species were as follows:

Total length intervals mm	Equation
Less than 100	$M= -1.615+0.117\ L$
100-199	$M= -1.923+0.121\ L$
200-299	$M= 3.875+0.085\ L$
300-399	$M= -28.495+0.198\ L$

Since it is assumed that a spotted bass can swallow a forage fish whose depth of body is equal to its mouth width, the relationship may be expressed as follows:

Body depth (forage) = mouth width (spotted bass).

Based upon the above assumed relationship, and using the various equations for length-depth relationships mentioned previously, the esti-

[1] Swingle, H. S., Relationships and dynamics of balanced and unbalanced fish populations. Agricultural Experiment Station of Auburn University (A.P.I.) Bul. 274, 1960.
[2] Lawrence, J. M., Estimated sizes of various forage fishes largemouth bass can swallow. Proc. S. E. Assoc. Game and Fish Comm., 11:220-225, 1957.

mated length of certain forage species of fish a spotted bass can swallow were computed. These estimates are summarized in Table 1.

TABLE 1.
ESTIMATED LENGTH OF VARIOUS FORAGE FISH SPOTTED BASS CAN SWALLOW.

Spotted bass		*Total length of forage fish in inches*				
Total length inches	*Mouth width mm*	*Bluegill*	*Green sunfish*	*Golden shiner*	*Gizzard shad*	*Threadfin shad*
4.5	11.84	1.87	1.71	2.53	2.20	2.09
5.5	14.98	2.16	2.04	3.01	2.62	2.54
6.5	17.99	2.44	2.36	3.47	3.03	2.97
7.5	21.01	2.73	2.68	3.94	3.43	3.40
8.5	22.15	2.84	2.80	4.11	3.59	3.56
9.5	24.26	3.04	3.03	4.43	3.87	3.87
10.5	26.46	3.25	3.26	4.77	4.16	4.18
11.5	28.58	3.44	3.48	5.09	4.44	4.48
12.5	34.30	3.98	4.09	5.97	5.21	5.30
13.5	39.45	4.47	4.63	6.76	5.91	6.03

RESULTS OF A SIX YEAR INVESTIGATION OF CHEMICAL SOIL AND WATER ANALYSIS AND LIME TREATMENT IN GEORGIA FISH PONDS

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ABSTRACT

In some Georgia farm ponds a satisfactory phytoplankton growth is not produced following the application of normal amounts of fertilizer. Chemical investigations indicated a slightly acid condition and a low total hardness in these problem ponds. This condition was corrected by the addition of one ton per acre of agricultural lime or with varying amounts of hydrated lime added periodically.

Phytoplankton production was definitely improved in over 100 Georgia farm ponds after the addition of lime. The average total hardness increase in these ponds, using agricultural lime at the rate of one ton per acre, was 15 ppm. Results lasted from 2-4 years. Hydrogen ion alone is not a satisfactory measure of the need for lime. Total hardness of the water was found to be the best and most reliable measure for lime supplements.

For optimum fertilization results, the total hardness range should be 20 ppm or above. From 10-20 ppm results were varied, and below 10 ppm fertilization results were unsatisfactory.

Ponds with a calcium oxide content in the bottom soils of 1500 lbs. per acre or above produced good fertilization results. With calcium oxide in the range of 1000-1500 lbs. per acre, results were varied, and below 1000 lbs. per acre of calcium oxide, fertilization results were invariably poor.

INTRODUCTION

In Georgia a satisfactory phytoplankton growth cannot be produced in some farm ponds with the amount of fertilizer as recommended by Swingle and Smith (1947). The normal pond fertilizer requirement is 6-12 applications per year of 8-8-2 or its equivalent. This varies with the section of the state, soil series, construction of the pond, and other related factors. In some ponds 4 to 6 applications of fertilizer at one bag per acre, produces a good phytoplankton growth. In others, amounts up to one ton per acre would not produce a significant amount of plankton. Figure one graphically shows nutrient concentrations in regard to fertilization results. Upon investigation it was immediately determined that ponds with reduced phytoplankton growth were slightly acid and