STOMACH ANALYSIS OF CHAIN PICKEREL
(*Esox niger*) OF SOUTH CENTRAL FLORIDA

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ABSTRACT

Alabama surveys indicate that the chain pickerel is undesirable because it preyed on harvestable species (1954, Annual Report Farm Ponds Project, Auburn University, unpublished). An examination of pickerel stomach contents was conducted in South Central Florida to explore possibilities of using pickerel as a desirable predator. Specimens were collected from anglers, trammel nets, and electro-shocking. One hundred fifteen adult pickerel collected from seven lakes, Pierce, Francis, June in Winter, Henry, Kissimmee, Hatchineha, and Walk 'n Water, were examined. The data collected indicate the chain pickerel feed almost entirely on fish and quite heavily on centracrhids, such as bluegills. These data also show that although pickerel will consume harvestable game species, 79.55% of all organisms consumed were not harvestable game fish. Variety of prey, mode of specie consumed, and length frequency of prey to predator are discussed.

INTRODUCTION

This study was undertaken to analyze the food habits of the chain pickerel in South Central Florida, and to determine if this fish could be used in managed waters as a possible predator for forage fish control. The need for additional desirable predators is a problem in Florida. It is probable that pickerel cannot control over-population of forage but it could complement the accepted freshwater predator, the largemouth bass. Even though the pickerel is extremely bony and not fully accepted by the angler, it is a fighting sport fish, has tasty meat, is piscivorous, and rates high in catchability.

This paper presents the findings of 115 stomach analysis and compares the pickerel prey in terms of harvestable game fish and forage fish.

MATERIALS AND METHODS

All specimens were collected by methods which allowed the pickerel stomach contents to remain as natural as possible. The methods included electro-shocking, trammel nets, and angling. Rotenone collecting was not used because the pickerel would move into the affected area and prey on the struggling fish, producing biased data.

The electro-shocking rig consisted of a portable generator (capable of producing 230 volts) connected to two copper cable electrodes suspended on booms in front of the boat. A cluster of lights mounted on the bow of the boat was used for night collecting. The boat was powered slowly along the shoreline and the pickerel were collected with dip nets. Night shocking was found to be much more effective than day shocking. Thirty percent of all fish collected were by night shocking and 10% by day.

Two trammel nets, an inner stretch mesh of three inches and an outer stretch mesh of 12 inches, each 125 yards long, were used by setting them in the evening and collecting the fish the following morning. This proved to be the most effective means of collecting specimens and well over 50% of the pickerel were obtained in this manner.

About 10% of the pickerel were obtained from fishermen who were using artificial lures and live bait.

All specimens were weighed, measured and analyzed immediately after collection. Each stomach was examined and the contents were identified as accurately as their condition allowed. Some of the consumed fish could be identified only by the depth of their bodies. These

were classified as panfish (unidentifiable centracrhids). Other stomachs contained only fins and vertebral columns. These were classified as measurable fish remains. Still other stomachs contained only scales and bones, which were classified as non-measurable fish remains.

South Central Florida was chosen as the area of study since it was most available to the author. The lakes used were located south of Lakeland, Florida, and north of Lake Placid, Florida, an area about 70 miles wide. Specific lakes yielding the pickerel were Pierce, Francis, June in Winter, Henry, Kissimmee, and Walk 'n Water.

RESULTS AND DISCUSSION

The mean lengths for the chain pickerel collected was 19.5 inches and the mode was 18 inches. The largest percentage (61.7%) of the specimens had empty stomachs, but all were in excellent physical condition. The fish had few obvious parasites and all had large quantities of fat in the body cavity. All specimens were taken from well-established waters having natural fish populations. Experiments in Alabama were all conducted in managed ponds.

A total of 47 organisms were consumed by 44 pickerel and only two stomachs contained more than one food item. One held two fish and the other three.

The data indicates that pickerel feed more actively in cooler weather, similar feeding habits were observed in the northern pike (Seaburg, 1964). Collections made in January show more than 75% of those fish recovered contained food. July collections revealed stomach contents in as few as three per cent to five per cent of the fish examined. To further check for evidence of "low feeding during high temperatures" trammel nets and electro-shocking were used to collect specimens during a three-day temperature drop in August. The results showed that more than 40% of the pickerel collected had food in their stomachs.

Table 1 shows that the chain pickerel collected were almost entirely piscivorous. (Only one exception is shown with the consumption of a *Siren lacertina,* or greater siren). The mean length of prey consumed was 5.9 inches with the modes being four and seven inches. Also shown in Table 1 is a comparison between the lengths of consumed prey and the predators. Auburn indicates that large pickerel prefer harvestable size bluegills (1954, Annual Report Farm Ponds Project, Auburn University, unpublished). As is indicated by these specimens taken from large natural bodies of water, pickerel will eat smaller prey also. As shown in Table 1, relatively large pickerel (15 to 23 inches) consumed prey ranging from two to five inches in length.

Fifty percent by number of the game fish consumed were of harvestable size. Harvestable size refers to the standards established by Swingle (1965). Of the recognizable fish consumed only nine out of 34 (26%) could be considered harvestable game fish.

An abundance of soft rayed forage fishes existed in the seven study lakes, including species such as lake chubsuckers and golden shiners. Although soft rayed fishes were present, 49.9% of all recognizable fishes consumed were centrarchids, or spiney rayed fish. Ostensibly, if this group of forage is available, pickerel will utilize them extensively.

As shown in Table 2, bluegills were the most abundant species consumed. Largemouth bass were the second largest recognizable food item consumed. Of the largemouth bass consumed, 80% were eaten in August. Why more bass were consumed at this time is not understood.

TABLE 1. INCH GROUP COMPARISONS OF PREY TO PREDATOR

Chain pickerel lengths	Micropterus salmoides (largemouth bass)	Lepomis macrochirus (bluegill)	Pomoxis nigromaculatus (black crappie)	Chaenobryttus gulosus (warmouth)	Unidentifiable Centrarchids (panfish)	Enneacanthus gloriosus (bluespotted sunfish)	Notemigonus crysoleucas (golden shiner)	Labidesthes sicculus (brook silverside)	Measurable fish remains	Non-measurable fish remains	Siren lacertina (greater siren)	Chain pickerel with stomach contents (38.26%)	Empty stomachs (61.73%)
8"													1
9"													
10"													
11"													
12"					3"							1	
13"													
14"					4"	2", 2"			4"			2	
15"				5"								1	
16"		5"											
17"	5"								4"			3	9
18"	4", 6"						7"	3"	6", 6"	2		7	20
19"	8"				6"				3", 4", 5"	1		7	17
20"	7"		8"						4"	4		7	9
21"	8"									2		7	6
22"	9"	3", 7", 7"					11", 11"			1		5	3
23"		7", 8"							7"	1	17"	3	4
24"		9"					5"			1		1	1
25"													1
Total	5	10	1	1	3	2	4	1	9	10	1	44	71

TABLE 2. PERCENTAGES OF TOTAL FOOD ITEMS
CONSUMED BY CHAIN PICKEREL.

Percentage occurrence in stomachs	Organisms eaten
10.63%	Largemouth bass
21.28%	Bluegill
2.13%	Black crappie
2.13%	Warmouth
4.26%	Bluespotted sunfish
6.38%	Unidentifiable centrarchids (panfish)
8.51%	Golden shiner
2.13%	Brook silverside
40.42%	Unidentifiable fish remains
2.13%	Greater siren
100.00%	

Alabama surveys indicate that the pickerel is undesirable because it preys on harvestable species. As shown in Table 3, only 20.4% of all food items consumed were harvestable game fish. However, all harvestable game fish eaten were bluegill except for one 10-inch largemouth bass.

TABLE 3. PERCENTAGES OF TOTAL NUMBER OF FOOD ITEMS CONSUMED BY THE 44 CHAIN PICKEREL WITH STOMACH CONTENTS.

Percentages	Types of Food Eaten
97.73%	Fish
2.27%	Organisms other than fish
45.45%	Game fish
20.45%	Harvestable game fish
15.91%	Non-game fish
43.18%	Unidentifiable fish remains
49.99%	Centrarchids
34.09%	Centrarchids that were panfish (bluegill, black crappie, warmouth, and unidentifiable panfish)
88.88%	Harvestable game fish were bluegills
11.11%	Harvestable game fish was a largemouth bass

CONCLUSIONS

The data collected during this study indicates that the South Central Florida chain pickerel feed almost entirely on fish, and will feed quite heavily on centrarchids, such as bluegills.

These data also show that, although pickerel will consume harvestable game species, 79.5% of all organisms consumed were not harvestable game fish.

The results of this study indicate that the pickerel has a potential as a desirable predator in South Central Florida.

ACKNOWLEDGMENTS

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GEOGRAPHICAL DISTRIBUTION AND HABITAT REQUIREMENTS OF THE REDBREAST SUNFISH *Lepomis auritus* IN NORTH CAROLINA [1]
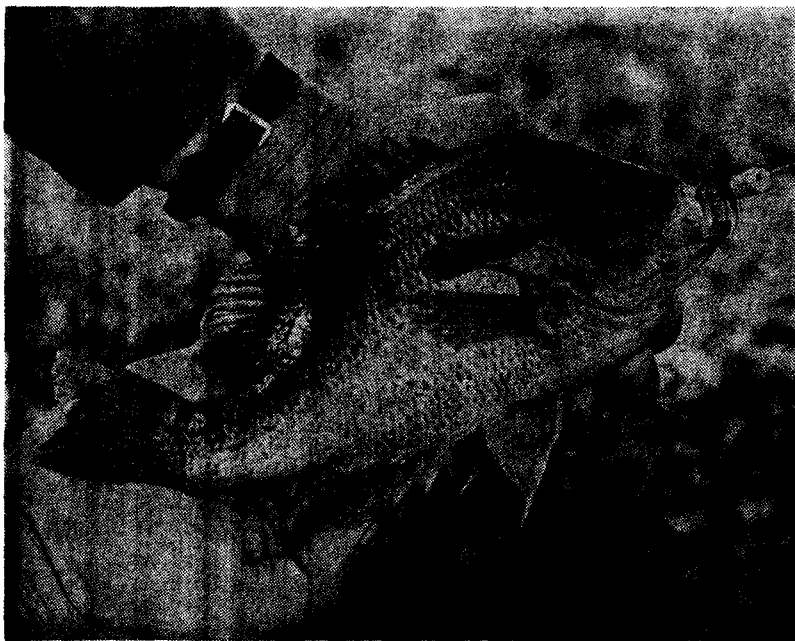
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ABSTRACT

In order to determine the distribution and habitat requirements of the redbreast sunfish *Lepomis auritus* (Linnaeus) in the streams and reservoirs of North Carolina, a more detailed analysis of the data were extrapolated from previous watershed and reservoir survey reports made by personnel of the Wildlife Resources Commission from 1956 to 1966.

It was concluded from the study that: (1) Redbreast sunfish inhabit 23 of the 26 major watersheds within the State; (2) Redbreast sunfish inhabit (a) waters reaching elevations up to 3,500 feet, (b) waters having up to eight percent sea-water equivalency, and (c) a pH range between 4.8 and 8.4; and (3) The game-fish species most frequently associated with the redbreast sunfish in the Mountain, Piedmont, and Northeastern watersheds was the bluegill, whereas warmouth, redfin pickerel and/or largemouth bass were most frequently associated in the Southeastern Coastal watersheds.

INTRODUCTION

From information obtained through State-wide lentic and lotic water surveys made between 1956 and 1965 it became apparent that the red-