FOOD HABITS OF LONGNOSE GAR *(LEPISOSTEUS OSSEUS)* AND FLORIDA GAR *(LEPISOSTEUS PLATYRHINCUS)* COLLECTED FROM FIVE CENTRAL FLORIDA LAKES

by

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ABSTRACT

Stomachs from 285 longnose *(Lepisosteus osseus)* and 603 Florida gar *(Lepisosteus platyrhincus)* were collected from five lakes in central Florida. Of all stomachs examined, 432 or 49 per cent contained food items.

Stomach data grouped from the two species and five lakes indicated that gar in central Florida lakes feed principally on nongame forage fish and do not extensively utilize game fish species. Nongame forage fish comprised 57 per cent of the total number of food items consumed, while only 11 per cent were game fish.

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INTRODUCTION

"Gars are the killers of game and food fish." "It is a wholly worthless and destructive nuisance in its relations to mankind." "Gars eat their weight in game fish every day." Such statements by fishermen and sportsman club pressure groups, calling for the eradication of gar, prompted an investigation of the food habits of the longnose *(Lepisosteus osseus)* and Florida gar *(Lepisosteus platyrhincus)* in several central Florida lakes.

METHODS AND MATERIALS

Gar were collected periodically from September 1967 to May 1969, and were collected by the following sampling methods:

1. A 1,600-yard haul seine with 3-inch stretch mesh.
2. A 100-yard trammel net with 8-inch outside mesh and 3-inch stretch inside mesh. Fish were removed every four hours.
3. An otter trawl with a 15-foot mouth diameter and 1-inch stretch mesh.
4. A 4-tined fishing spear.
5. An electrofishing apparatus consisting of a portable generator (115 to 215 volts) connected to two copper electrodes suspended from booms in front of the boat.

Information recorded for each gar collected included sex, weight in pounds and ounces, total length in inches and the habitat from which it was collected.

Stomachs of large gar (greater than 30 inches) were removed upon collection, while small, live gar were preserved whole in 10 per cent formalin subsequent to removing the stomachs (tin snips were found to greatly facilitate the opening of the body cavity). After removal stomachs were labeled and preserved in 10 per cent formalin.

Individual food items were measured in millimeters when possible, and weighed to the nearest tenth of a gram on a Mettler balance. Food items were identified, when possible, to species with the aid of an A. O. Spencer binocular microscope and taxonomic keys by Ward and Whipple (1959), Pennak (1953) and Eddy (1957).

DESCRIPTION OF STUDY AREAS

Gar were collected from five lakes. Four are eutrophic and include Lake Dora (3,600 acres), Lake Eustis (7,200 acres), Lake Harris (17,000 acres) and Lake Griffin (8,800 acres) in Lake County, Florida. Lake Weir (5,450 acres), the fifth lake, is a mesotrophic lake in Marion County, Florida. All five lakes are part of the Oklawaha River Basin.

Lakes Dora and Eustis had low density game fish populations. Lakes Harris and Griffin had high density game fish populations. All four eutrophic lakes had high density populations of longnose gar, Florida gar, threadfin shad, gizzard shad, and nongame forage fishes such as catfish and suckers. Invertebrates are abundant in each lake. Lake Weir had a low density threadfin shad population, no gizzard shad, no longnose gar, and a high density population of Florida gar, catfish, suckers and gamefish. Invertebrates are abundant also.

The four eutrophic lakes display typical blue-green algal blooms. Leaching of fertilizers from citrus groves, run-off from septic tanks and storm sewers and effluent from citrus and sewage processing plants attributed to conditions in the lakes. Lake Weir is clear but during spring and summer months exhibits a slight "bloom".

RESULTS AND DISCUSSION

Two hundred and eighty-five longnose gar (3,090 pounds) and 603 Florida gar (724 pounds) were collected during the study. Longnose gar averaged 34.9 inches in length and 8 pounds in weight. Florida gar averaged 21.5 inches in length and 1.6 pounds in weight.

Eight hundred and eighty-eight longnose and Florida gar stomachs contained 759 food items weighing 9,286.2 grams (20.4 pounds). Bluegill numbered 54 weighing 1,363.2 grams, bullheads numbered 48 weighing 1,969.8 grams, crayfish numbered 48 weighing 66.3 grams, golden shiners numbered 3 weighing 80.7 grams, killifish numbered 42 weighing 113.7 grams, largemouth bass numbered 6 weighing 28.8 grams, mosquito fish numbered 18 weighing 19.2 grams, shad numbered 315 weighing 2,385.0 grams, shellcracker numbered 6 weighing 1,521.0 grams, shrimp numbered 78 weighing 33.6 grams, crappie numbered 24 weighing 951.3 grams, shiners numbered 21 weighing 54.6 grams and unidentified fish numbered 96 weighing 169.8 grams.

Table 1 shows the number of gar collected from each study lake and the percentage of full and empty stomachs. Fifty-eight per cent of the Florida and 38 percent of the longnose gar stomachs contained no food. Published data on gar food studies elsewhere show that many of the fish were found with empty stomachs (Coker, 1930; Scott, 1938; Lagler et al., 1940; Hunt, 1953, 1960).

Past investigations have shown that the diet of gar is predominately nongame forage fish. Lagler and Hubbs (1940) studied the food habits of 204 longnose gar in southern Michigan and found that 13.8 per cent of the 297 food items were game fish, while nongame forage fish accounted for 74.4 per cent

of the food ingested. Hunt (1953) found that game fish comprised only 5.7 per cent of the food items, nongame forage fish 45.2 per cent and unidentified fish 49.1 per cent of the diet of Florida gar in the Tamiami Canal in south Florida. Netsch (1964) found 239 food items in 148 longnose gar in Missouri. He found that only 3.8 per cent were game fish, 53.6 per cent were nongame forage fish, 7.9 per cent invertebrates and 34.7 per cent were unidentified fish. Toole (1968) collected 1075 gar in east Texas. Of 922 food items found, only 7.2 per cent were game fish, 54.5 per cent were nongame forage fish, 4.2 per cent were invertebrates and 34.1 per cent were unidentified fish.

Sampling was not extensive enough to permit comparisons of gar food habits between the five lakes studied and the data from all five lakes was combined. However, Florida gar from Lake Weir had a tendency to consume more invertebrates (shrimp and crayfish) than did the Florida or longnose gar from the other study lakes.

Table 2 shows the combined per cent occurrence, weight and number of specific food items found in the stomachs of longnose gar from five study lakes. Results indicated by category are nongame forage fish 74 per cent by number and 50 per cent by weight, game fish 14 per cent by number and 45 per cent by weight, invertebrates 7 per cent by number and 1 per cent by weight, unidentified fish 5 per cent by number and 1 per cent by weight and unidentified material 3 per cent by weight.

Table 3 shows the combined per cent occurrence, weight and number of specific food items found in stomachs of Florida gar from five study lakes. Results indicated by category are nongame forage fish 47 per cent by number and 51 per cent by weight, game fish 11 per cent by number and 27 per cent by weight, invertebrates 24 per cent by number and 5 per cent by weight and unidentified material 12 per cent by weight.

TABLE 1

A PERCENTAGE COMPARISON OF NUMBERS OF EMPTY AND FOOD-CONTAINING STOMACHS IN LONGNOSE AND FLORIDA GAR FROM FIVE CENTRAL FLORIDA LAKES.

	Florida Gar		Longnose Gar	
		Percentage		Percentage
Lake	Total No. Stomachs Examined	Containing Food	Total No. Stomachs Examined	Containing Food
Dora	57	37	126	71
Eustis	27	67	57	63
Harris			99	48
Griffin	267	39	3	100
Weir	252	44		
Totals	603	42	285	62

Very few stomachs examined were filled to capacity. The largest food item found in longnose gar was a 235 millimeter bullhead. The most numerous items found were 5 shad ranging from 48 to 93 millimeters in length. The largest food item in Florida gar was a 155 millimeter golden shiner and the most food items found were 7 shad ranging from 59 to 92 millimeters in length. Hunt (1960) found food consumption of warmouth to be 1.6 times greater than gar, and that of largemouth bass, 2.5 times greater than gar.

Digestion of food items was slow in the large gar. On occasion there was 3 to 4 hours time lapse between longnose gar collection and stomach preservation due to location of the collection site. Although most gar remained alive, and food digestion continued, food items were easily identified. Hunt (1960) ran voluntary and force-feeding experiments on 131 Florida gar, 46 warmouth and 21 largemouth bass to determine rates of food consumption and digestion. He found the rate of digestion was slower in large gar than the digestion in small gar. The digestion rate of warmouth was 1.6 times greater than gar, and that of largemouth bass was 2.4 times greater than gar.

Gar feeding habits stray from the normal on occasion. A Florida gar stomach from Lake Weir contained a tab top from a can. Another contained a fishing hook. A longnose gar from Lake Harris contained a red and white fishing bobber. A longnose gar from Lake Eustis contained bones and feathers of a bird, probably a duck.

SUMMARY

Both longnose and Florida gar fed extensively on nongame forage fish and invertebrates. Data supports previous investigations that gar consume greater quantities of nongame forage fish than game fish. It was concluded that longnose and Florida gar are principally predators of nongame forage fish and do not utilize game fish populations in central Florida lakes extensively.

TABLE 2

PER CENT OCCURRENCE, WEIGHT AND NUMBER OF SPECIFIC FOOD ITEMS FOUND IN STOMACHS OF LONGNOSE GAR FROM FIVE STUDY LAKES.

Specific Food Items	Per Cent Occurrence	Per Cent Weight	Per Cent Number
Bluegill Sunfish *Lepomis macrochirus*	6	14	8
Bullhead Catfish *Ictalurus nebulosus*	12	25	10
Crappie *Pomoxis nigromaculatus*	3	11	4
Crayfish *Procambarus* sp.	1	t*	2
Redear Sunfish *Lepomis microlophus*	2	20	2
Shad *Dorsoma cepedianum*	31	25	60
Shiners *Notropis* sp.	3	t*	4
Shrimp *Palaemonetes paludosus*	1	t*	5
Unidentified Fish	6	1	5
Unidentified Material	34	4	
	422		

*t denotes trace of that specific food item.

TABLE 3

PER CENT OCCURRENCE, WEIGHT AND NUMBER OF SPECIFIC FOOD ITEMS FOUND IN STOMACHS OF FLORIDA GAR FROM FIVE STUDY LAKES.

Specific Food Item	Per Cent Occurrence	Per Cent Weight	Per Cent Number
Bluegill Sunfish *Lepomis macrochirus*	5	18	7
Bullhead Catfish *Ictalurus nebulosus*	3	6	3
Crappie *Pomoxis nigromaculatus*	2	7	3
Crayfish *Procambarus* sp.	5	3	10
Golden Shiner *Notemegonus crysoleucas*	1	5	t*
Killifish *Fundulus* sp.	6	7	10
Largemouth Bass *Micropterus salmoides*	1	2	1
Mosquitofish *Gambusia affinis*	2	1	4
Shad *Dorsoma cepedianum*	9	29	25
Shiners *Notropis* sp.	3	3	5
Shrimp *Palaemonetes paludosus*	5	2	14
Unidentified Fish	11	5	18
Unidentified Material	13	12	

*t denotes trace of that specific food item.

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PRELIMINARY STUDIES OF CERTAIN ASPECTS OF THE LIFE HISTORY OF THE HYBRID (STRIPED BASS X WHITE BASS) IN TWO SOUTH CAROLINA RESERVOIRS

by

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ABSTRACT

From 1967 through the spring of 1970 Lakes Hartwell and Clark Hill on the upper Savannah River between Georgia and South Carolina have been stocked with the striped bass *Roccus saxatilis* (Walbaum) X white bass, *Roccus chrysops* (RaFinesque) hybrids. A total of 30,000 fingerlings and 26,120,000 fry have thus far been introduced.

Approximately 130 hybrids were captured during a one year period (1969-70) of which 87 were examined for age, growth rate, food habits and meristic characters.

The average total lengths for three year classes were 12.6, 17.2 and 20.2 inches respectively and maximum weights were 3.7 pounds and 5.9 pounds for year class one and two respectively. These lengths and weights compare favorably with findings in Tennessee, Bishop (1967) and, as in Tennessee, were greater than reported in Virginia (1969) - (Howard Kerby, personal communication).

Stomach contents of specimens examined indicated a definite preference for threadfin shad. Meristic characters as described by Bayless (1967) held up in all cases and, of the 130 hybrids observed, all but one exhibited the chain-like broken line effect.

Spawning migration is apparent in the spring when the water temperature reaches 50° F. This is just prior to white bass migration with females apparently running earlier than males.

INTRODUCTION

The desire for a large game fish that might provide a fishery and act as a biological control for gizzard shad *Dorosoma cepedianum* (LeSueur) in our large reservoirs prompted the stockings of hybrid fry and fingerlings in South Carolina. This was instigated by the rather poor survival rate of striped bass fry. It was hoped that the hybrid fry might prove more hardy and have a better chance of survival and such has been the case.

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