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THE FOOD HABITS OF CHANNEL CATFISH IN SOUTH FLORIDA

By FORREST J. WARE
Florida Game and Fresh Water Fish Commission
Lakeland, Florida

ABSTRACT

Since channel catfish, *Ictalurus punctatus*, were being considered as a possible predator for the control of forage fish in Florida lakes, a study of their food habits was conducted. An examination was made of the stomachs of 195 channel catfish collected in Lake Okeechobee, Lake Blue Cypress, and Lake Agnes, with trammel nets. The size range of fish examined was eight to 30 inches in total length. The

major food items were insects, crustaceans, and fish. Data is presented according to the frequency of occurrence and number of food items contained in the stomachs. The lengths of channel catfish and the foods eaten are discussed.

INTRODUCTION

In recent years, the use of channel catfish, *Ictalurus punctatus*, has become an important tool for fisheries workers in Florida. Incorporating the results of workers from other states, this fish has been artificially propagated and is now used in restocking programs. Wide public acceptance of the channel catfish as a sport fish has insured the future of this specie in the fisheries management of Florida's waters.

Numerous food habit studies of the channel catfish have been conducted. However, the results of some of these studies tend to be inconsistent, especially in regard to piscivorous habits. Clemens (1952), reporting on channel catfish in Oklahoma, found invertebrates to be the main type of food. In one reservoir they fed exclusively on invertebrates. In another reservoir 77.6% of the stomachs contained invertebrates as compared to 67.5% in which fish were found. In the Mississippi River, Iowa, Hoopes (1960) observed that mayflies comprised over 50% by volume of the food of channel catfish. Conversely, Stevens (1959) reported fish life occurring in 75.7% of the channel catfish he examined from Santee-Cooper Reservoir, South Carolina. The only other major food item was mayfly nymphs which occurred 14.4% of the time. Additional work conducted in Alabama by Swingle (1954) suggested that channel catfish are piscivorous in the 16-inch group and larger.

Based on information reported by authors such as Swingle (1954), and Stevens (1959), Florida workers considered the possible usefulness of the channel catfish as a predator for the control of forage fish, especially the gizzard shad, *Dorosoma cepedianum*. Since little information was available on channel catfish in Florida this study was conducted to determine its food habits from natural populations.

MATERIALS AND METHODS

During the spring and summer of 1966, a total of 195 channel catfish was collected from Lakes Okeechobee, Blue Cypress, and Agnes, in South Florida. Selection of the study lakes was based on location, in order to represent a cross section of South Florida, and the presence of a natural population of channel catfish. Each lake was natural in origin and saucer shaped with a sand bottom. The average depths ranged between 10 and 12 feet. The surface areas of the lakes were 448,000 acres for Lake Okeechobee, 6,528 acres in Blue Cypress, and 396 acres in Lake Agnes.

The channel catfish were collected with trammel nets. Two nets were employed and were usually fished for a period of twelve hours beginning at sunset until the following day. The net specifications were: 250 yards in length, six feet in depth, and inter mesh of a three-inch stretch, and the outer meshes with a twelve-inch stretch. The size range of catfish in the study was from eight to 30 inches. The largest specimen weighing 14.5 pounds. This method of collection was unsuccessful for capturing channel catfish smaller than eight inches.

The stomach of each fish was extracted in the field and placed in a plastic bag of 10% formalin solution. Analyses were made at the Lakeland Laboratory, where each food item was sorted and counted. These data were recorded by frequency of occurrence, number of items, and the occurrence of each type of food within the inch groups of catfish collected.

RESULTS AND DISCUSSION

Stomach analysis data from each lake were combined and are presented in Table 1. The food items are listed according to frequency

of occurrence and total number. Of the 195 stomachs examined 127 (65.1%) contained food items.

TABLE 1. Food of the Channel Catfish from Lake Okeechobee, Lake Blue Cypress, and Lake Agnes, of South Florida, Spring and Summer, 1966.

Total number of stomachs examined — 195

Total number of stomachs containing food — 127 (65.1%)

Size range of fish examined — 8-inch - 30-inch

Organisms Eaten	Frequency of Occurrence		Number of Items
	Number of Stomachs	Percentage	
Crustacea	24	18.8	134
Isopoda	8	6.3	19
Amphipoda	3	2.3	88
Decapoda	14	11.0	27
freshwater shrimp	1	.8	6
crayfish	13	10.2	21
Insecta	97	76.3	2739
Ephemeroptera	61	48.0	584
Odonata	8	6.3	22
dragonfly	5	3.9	9
damselfly	3	2.3	13
Trichoptera	5	3.9	345
Diptera	71	55.9	1785
chironomid midge	62	48.8	1716
phantom midge	4	3.1	4
biting midge	28	22.0	65
Coleoptera	3	2.3	3
Unidentifiable remains	5	3.9	—
Gastropoda	2	1.5	10
Ctenobranchiata	2	1.5	10
Fish	21	16.5	29
Fish Remains	6	4.7	—
Fish Scales	15	11.8	—
Fish Eggs	2	1.5	—
Plant Debris	3	2.3	—

The major foods eaten by the channel catfish were insects, crustaceans, fish, and snails (Table 1). The insects occurred most frequently, and were found in 76.3% of the stomachs containing food. Crustaceans were present in 18.8% of the stomachs, fish in 16.5%, and snails in 1.5%.

As shown in Table 1 the insects most frequently utilized as food were chironomid larvae and mayfly nymphs. Their occurrence was 48.8% and 48.0%, respectively, in the stomachs containing food. Chironomid larvae also constituted the highest number of any organism found in a single stomach; a total of 335. The third most frequent insect eaten was the biting midge (*Ceratopogonidae*). It was found in 28 stomachs (22.0%). By volume, caddis fly larvae would have exceeded the biting midges, but their occurrence was only five stomachs (3.9%). Other insects utilized less frequently were: dragonfly nymphs (3.9%), damsel fly nymphs (2.3%), phantom midge larvae (3.1%), and beetles (2.3%).

Crayfish were the most abundant crustaceans eaten (Table 1). They were found in 13 stomachs (10.2%). Eight stomachs (6.3%) contained organisms of the Order Isopoda which could not be identified as a fresh water species. Since they were all recovered from the channel catfish collected in Lake Okeechobee, which has a history of supporting marine

organisms, these isopods were assumed to be marine. Scuds that were identified as *Hyalella azteca*, occurred in 2.3% of the stomachs. The remaining crustaceans were partially digested fresh water shrimp, which could not be specifically identified. Their occurrence was of minor importance as a food item, appearing in only one stomach.

Fish were not credited as a food item unless sufficient remains were found to indicate a whole fish had been eaten. The presence of scales or bone fragments were listed as separate categories. Table 1 shows that 21 stomachs contained fish (16.5%). In the majority of these stomachs only one fish was present. The highest number of fish in a single stomach was eight. Only two of the 29 fish utilized as food items were identifiable. One fish was a seven-inch sunfish (*Lepomis sp.*) and the other a 10-inch catfish (*Ictalurus sp.*). Both were recovered from the stomachs of 26-inch channel catfish. Other fish items found in the stomachs included: fish scales 11.8%, fish eggs 1.5%, and fish remains 4.7%.

Plant debris occurred in three of the stomachs containing food (2.3%). Two of these items were hyacinth root fragments (Table 1).

In order to gain some indication of the foods utilized by the different size classes of channel catfish, the frequency of occurrence of the major food items was recorded for each inch group. These data are presented in Table 2.

From this information it was apparent that invertebrates were the major food of the channel catfish. In those individuals between eight and 24 inches containing food items, invertebrates occurred at least 50% of the time (Table 2). Of these organisms, insects were the major components of the diet in the eight through 17-inch groups. Crustaceans were more frequently utilized by the larger fish, and were predominately crayfish. Only in the 30-inch group were invertebrates not found.

Fish were utilized as food by channel catfish ranging in size from 12 to 30 inches (Table 2). The occurrence of fish in 50% or more of the stomachs containing food was confined to specimens 22 to 30 inches in length. However, the presence of fish in the stomachs of the 15- and 16-inch groups was 28.5% and 33.3%, respectively, suggesting a trend to piscivorous habits at this size. Below this size, fish appeared in only three stomachs (3.8%).

The results of this study reveal that the principal food of channel catfish in South Florida is invertebrates. This is in accord with the findings by Clemens (1952) in Oklahoma. Only where a sizeable population of channel catfish 22 inches or larger exists, would any appreciable predation on other fishes be expected.

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TABLE 2. Frequency of Occurrence of Major Foods of 195 Channel Catfish Examined by Inch Group

Inch Group	Number of Fish Examined	Insects	Crustaceans	Fish	Fish Remains Scales, Eggs	Snails	Plant Debris	Empty
8	1	1	—	—	—	—	—	—
9	1	—	—	—	—	—	—	1
10	2	1	—	—	—	—	—	1
11	12	11	—	—	—	—	—	1
12	30	17	1	1	—	—	—	13
13	37	22	6	2	1	1	1	11
14	30	19	4	—	7	—	2	9
15	26	11	1	4	3	—	—	12
16	18	9	2	4	5	1	—	6
17	9	3	1	1	2	—	—	4
18	7	1	3	—	2	—	—	1
19	2	—	—	—	—	—	—	2
22	5	1	2	3	—	—	—	1
23	2	1	—	—	—	—	—	1
24	2	—	1	1	1	—	—	1
25	1	—	—	—	—	—	—	1
26	4	—	1	2	1	—	—	1
27	3	—	2	2	1	—	—	—
30	3	—	—	1	—	—	—	2
Total	195	97	24	21	23	2	3	68