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FEEDING HABITS OF THE ATLANTIC CUTLASSFISH, *Trichiurus lepturus*, IN THE GULF OF MEXICO

The Atlantic cutlassfish, *Trichiurus lepturus*, is an important component of the industrial bottomfish stocks of the northern Gulf of Mexico, (Guthertz *et al.*, 1975) and supports limited food fisheries in other parts of the world, particularly in the Orient. Aspects of its life history, emphasizing length frequency, growth, and distribution in the Gulf of Mexico, have been discussed by Dawson (1967). The feeding habits of *T. lepturus* from the northern Gulf of Mexico have not been reported except for some limited information on Texas *T. lepturus* by Diener *et al.* (1974). Feeding habits of stocks in the East China Sea, Yellow Sea, and Indian Ocean have been reported by Hiroshi (1964) and Narasmham (1972).

Stomach analyses of *T. lepturus* from the industrial bottomfish industry in the northern Gulf of Mexico are presented. This information is important in understanding the dynamics of the fishery and in formulating stock management decisions.

METHODS

Specimens were obtained from industrial bottomfish boats as they off-loaded in Biloxi and Pascagoula, MS. Because *T. lepturus* are delicate, most were badly battered and eviscerated. Whenever possible, samples were taken in lots of 20 fish, ranging from 38 to 100 cm, smaller samples were taken when fewer than 20 fish were available. Sampling extended from April 24 to September 21, 1978, with most samples taken between June 27 and September 21, 1978.

Each fish was measured in total length (TL) and sexed. The stomach was cut free at the esophagus and the pylorus, placed

on absorbent paper, sliced longitudinally and laid open. Contents were examined and all macroscopic material sorted and identified. Type of food was often determined by identifying hard parts of remains that were partially digested.

Percent frequency of occurrence for each food item was used as the basis for final evaluation. Three groupings — small (36-50 cm), medium (51-70 cm), and large (71-100 cm) — were established to represent fishes in the length distribution. Ingested food was compared among size groups to determine changes in feeding preferences with growth.

RESULTS AND DISCUSSION

Two hundred fifty *T. lepturus* from 38 to 100 cm TL were examined. Of the total, males comprised 38.8%, females comprised 58.4%, and 2.8% were sexually unidentifiable. Their length frequency distributions are shown in Figure 1. Most specimens were collected at depths less than 15 fms with some from depths up to 25 fms. Two hundred ten fish (84%) came from 23 samples taken east of the Mississippi River Delta.

No dietary differences were noted from fish east or west of the Delta nor from inshore or offshore samples. However, a larger sample may have produced some discernible differences. Differences were noted between sexes because more of the smaller fish were males; however, between sexes within size groups, dietary preferences remained the same.

Macroscopic food was found in 52.4% of the stomachs. Fishes were the most common food in the three size groupings with anchovies, *Anchoa* sp., the dominant identifiable food organism. The second most frequently occurring item was detritus (Fig. 2), a term assigned to a non-descript pasty material typically encountered in clumps. These clumps had a gritty texture and scales were often em-

Figure 1. Length-frequency distribution of specimens of *Trichiurus lepturus* examined.

bedded in it. The origin of this "detrital" material was not determined but is undoubtedly organic. Most of the detrital clumps were associated with other food types in the stomach. Mysid shrimp were the third most common food items and the second in the largest size group. Mysids were usually found in smaller numbers but sometimes as many as 50 were noted in a single stomach. Other food items included penaeid shrimp, larval crustaceans, and squid (Fig. 2).

Incidence of multiple food types varied among size groups; however, 75-90% of the fish stomachs examined contained only one identifiable food type. All size groups showed a high percentage of unidentifiable fish remains. These remains may well represent predation on sciaenid species as they were very abundant during the time of this study.

Parasitic infestation ranged from scattered individuals to dense aggregations with parasites found in virtually every stomach examined. All parasites were identified as *Lecithochirium microstomum*, a flat worm commonly found in *T. lepturus*. Other parasitic animals are known to occur in stomachs of *T. lepturus* although none was observed in this study. (Dr. R. Overstreet, Gulf Coast Research Laboratory, pers. comm.).

Food preferences of *T. lepturus* within size groups were fairly consistent. This

species has the morphological characteristics of a voracious predator, bearing large fang-like canine teeth, well-developed eyes and a typically pisciferous digestive tract (Lagler *et al.*, 1977). Major food items in Gulf of Mexico *T. lepturus* included unidentified fishes, *Anchoa* sp., and shrimp (Fig. 2) similar to adult *T. lepturus* in the western Pacific (Hiroshi, 1964). Variety of food types increased with growth in *T. lepturus* with the penaeid shrimp and squid becoming more important. The greatest variety of food types was noted in the medium (51-70 cm) group. Increasing variety was associated with a corresponding decrease in minute food items such as crustacean larvae. Large fish were not found in any of the specimens, although adult *T. lepturus* are physically capable of preying upon them. *Trichiurus* appears to be a selective feeder, favoring *Anchoa* sp. and mysids over other available prey. This may reflect abundance and availability of these two food items rather than a specific preference for them. Other fish were also preyed upon as evidenced by the variety of scale types and other identifiable fish parts found in the stomachs.

During this study period, productivity in the north central Gulf of Mexico was extremely high as many species of finfish and crustaceans moved offshore from the estuarine nursery areas. These species are subjected to considerable predation during their migration periods. Engraulids and sciaenids were the most abundant fish found in the sounds, bays, and nearshore environs. Many of the unidentified fish remains were postulated to be sciaenids or engraulids. During this time, penaeid shrimp were also moving through the estuary to the offshore grounds in large numbers. The availability of these species is undoubtedly a factor in their importance as food items for *T. lepturus*. Future studies should be conducted throughout

Figure 2. Occurrence of food items in three size classes of *Trichiurus lepturus*.

the year and should include the estuarine, nearshore, and offshore stocks to determine changes in food preferences.

Detrital material was a major item in terms of occurrence and volume. This material was often found in conjunction with fish or mysid remains and may be ingested incidentally during feeding. Several species of benthic crustaceans were noted in the stomachs examined. Some feeding activity apparently occurred on or near the bottom as evidenced by the frequency of benthic crustacean remains and the amount of detritus.

A high percentage of empty stomachs

was encountered from these commercial catches as trawl caught finfish frequently regurgitate while in the trawl. In the codend fishes are subjected to considerable pressure which increases as additional fishes are caught. Fishes were held onboard in a refrigerated, recirculating brine solution. Once in the brine solution, fishes are subject to pressures from the action of the brine solution and the weight of the catch. Evidence for this was indirect, as I found a large number of empty stomachs which were flaccid and thin walled, a condition typical of full stomachs.

ACKNOWLEDGMENTS

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