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# DIET OF TRIPLETAIL, *LOBOTES SURINAMENSIS*, FROM MISSISSIPPI COASTAL WATERS

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*ABSTRACT* The diet of tripletail, *Lobotes surinamensis*, collected from the Mississippi Sound and Mississippi's offshore waters of the Gulf of Mexico between April and September 1995–1997, was investigated through analysis of stomach contents. Of 178 tripletail stomachs examined, 136 (76%) contained prey items, and 42 (24%) were empty. Tripletail with prey in their stomachs ranged from 183 to 787 mm total length (mean 522.6 mm) and 0.14 to 10.5 kg total weight (mean 3.64 kg). The diet consisted of 32 different prey types and was comprised of shrimp, crabs, and teleost fishes which were represented by about equal number and volume of prey but differed in relative importance to the diet, with fishes having greater importance. Principal contributors to the diet were *Farfantepenaeus aztecus*, *Callinectes sapidus*, *Brevoortia patronus*, and *Chloroscombrus chrysurus*. The variety of prey in the diet suggested that tripletail fed opportunistically.

## Introduction

The tripletail, *Lobotes surinamensis,* is a pelagic fish that occurs in tropical and subtropical oceans, with the exception of the eastern Pacific (Fischer 1978). In the western Atlantic, *L. surinamensis* is distributed from Massachusetts southward to Argentina, including the Gulf of Mexico (Gulf) and the Caribbean Sea (Robins and Ray 1986). *Lobotes surinamensis* is the only member of the percoid family Lobotidae in the Gulf and is a highly esteemed food fish throughout its range (Hoese and Moore 1998).

This species occurs from April through October in offshore Gulf waters, sounds, and estuaries, where it supports a recreational fishery (Benson 1982) and appears in greatest concentration along the Mississippi coast in summer (Baughman 1941). Tripletail often associate with channel markers, wrecks, flotsam, and *Sargassum* algae (Gudger 1931, Hughes 1937, Dooley 1972) and often float aimlessly on their side in surface waters, mimicking drifting debris (Baughman 1943, Breder 1949). Although the biology and life history aspects of *L. surinamensis* from the northern Gulf were studied by Modde and Ross (1981), Ditty and Shaw (1994), Franks et al. (2001), and Brown-Peterson and Franks (2001), the ecology of this species in the Gulf is not well known.

Other than studies by Baughman (1941, 1944), who observed that *L. surinamensis* in Texas waters fed on *Callinectes* spp., there are no published accounts of diet and feeding habits of *L. surinamensis* from Gulf waters. The objective of this study was to describe the diet of *L. surinamensis* from Mississippi coastal waters.

## Materials and Methods

### Field procedures

Tripletail used in this study were caught in the recreational hook-and-line fishery from the Mississippi Sound and waters near the offshore barrier islands (Figure 1) between April and September 1995–1997. All fish were caught during daylight hours, and anglers packed their catch in ice immediately following capture. Specimens were sampled opportunistically at dockside and during sport fishing tournaments. The date, time, location of catch, total length (TL, mm), total weight (TW, kg), and sex were recorded for all specimens. Stomachs were removed, placed in labeled plastic bags, and immediately covered with ice for transport to the laboratory, where they were frozen for later examination.

### Laboratory procedures

Stomachs were thawed and opened, and contents were placed onto a 0.840-mm mesh screen sieve and gently washed with fresh water. Prey were sorted and identified to the lowest possible taxonomic level, counted, and measured volumetrically to the nearest 0.1 ml by water displacement in a graduated cylinder. Prey too digested for unequivocal identification were recorded as "remains" and assigned to the appropriate prey category. *Sargassum*, small molluscan shells, and insect parts found in some stomachs were considered non-food items probably ingested incidentally during normal feeding and were not used in our description of the diet.

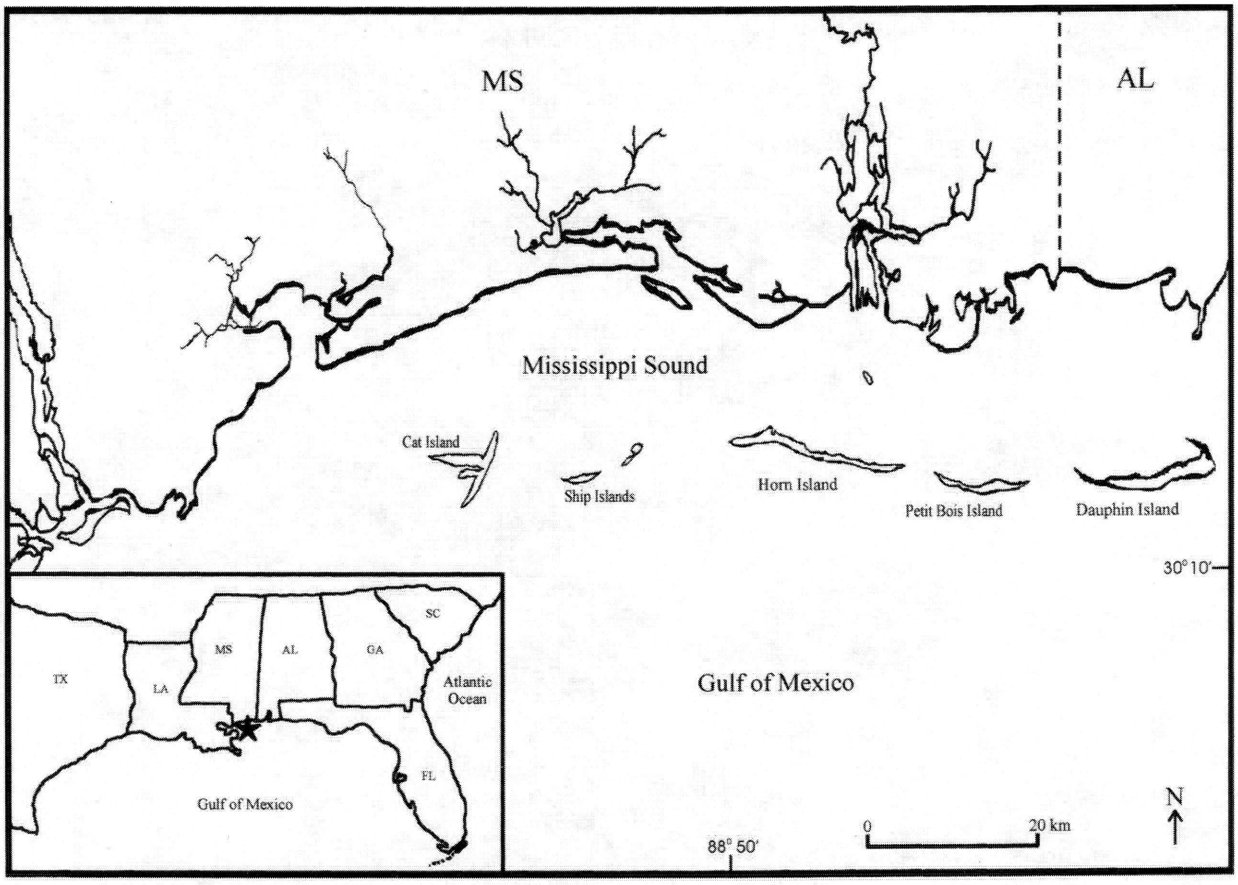


**Figure 1. Map of the study area located off Mississippi.**

**Diet analysis**

Diet composition was categorized as percent numeric abundance (%*N*), percent of total volume (%*V*) and percent frequency of occurrence (%*F*) (Hyslop 1980). These dietary metrics were combined to assess overall prey importance for *L. surinamensis* with the Index of Relative Importance (IRI) (Pinkas 1971), where the importance of an item is directly related to the size of the value: IRI = (%*N* + %*V*) x %*F*. The IRI also was expressed as a percentage (%IRI) (Cortés 1997). Stomach contents for the entire sample were pooled for the above computations. Empty stomachs were excluded from computations.

## RESULTS

One hundred thirty six *L. surinamensis* stomachs contained prey (76%), and 42 (24%) were empty. Tripletail with prey in their stomachs ranged from 183 to 787 mm TL ($\bar{x}$ = 522.6 mm) and 0.14 to 10.5 kg TW ($\bar{x}$ = 3.64 kg). Crustaceans (shrimp and crabs) and fishes occurred in 72.2% and 65.4% of the stomachs, respectively (Figure 2). Thirty-two prey types were identified, 22 to genus or species level (Table 1).

Crustaceans and fishes in the diet were almost equal in total number of prey (50.3% and 49.7%, respectively) and total prey volume (49.4% and 50.6%, respectively) but differed substantially in %IRI contribution to the diet (38.6 and 61.4, respectively) (Figure 2).

Shrimp contributed 18.5%*N*, 33.4%*V*, 48.6%*F* and 25.7%IRI to the diet. As a group, penaeid shrimp (*Farfantepenaeus aztecus, Farfantepenaeus* sp., *Litopenaeus setiferus*, *Trachypenaeus similis*, and unidentified penaeids) accounted for 16.2%*N*, 31.5%*V* and 25.3%IRI of the overall diet (Table 1). Among crustaceans, *F. aztecus* was the dominant prey and most frequently (20.6%*F*) identified prey item in the diet. *Farfantepenaeus aztecus* ranked second in importance numerically (5.9%) among crustaceans, and ranked second in volumetric importance (16.7%) and %IRI (15.8) among all prey consumed (Table 1). Other identifiable penaeid shrimp (*L. setiferus* and *Farfantepenaeus* sp.), unidentifiable penaeids, and shrimp remains (all pooled) occurred more frequently and in greater abundance (12.4%*N*) than did *F. aztecus*.

Crabs contributed 31.8%*N*, 16.0%*V*, 41.2%*F* and 12.9%IRI to the diet. Identifiable crabs were members

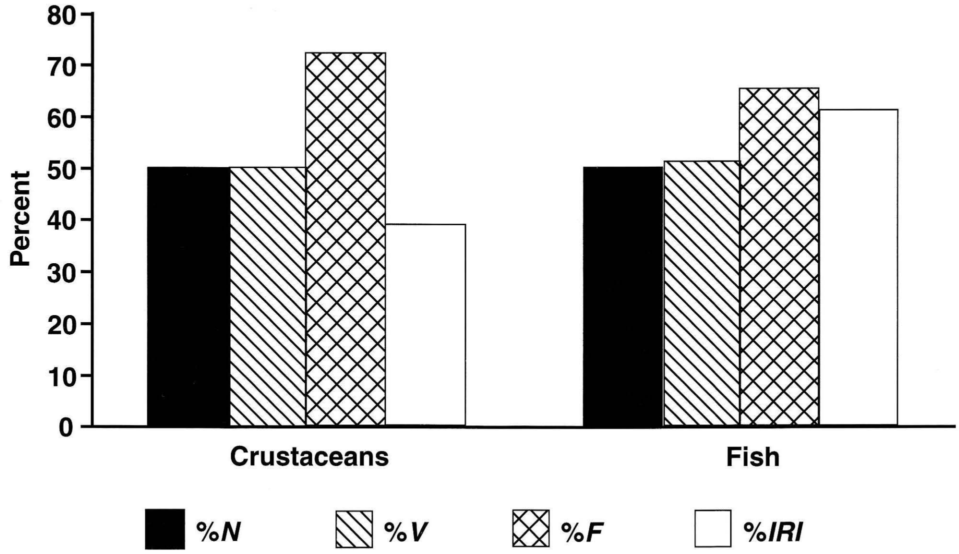


**Figure 2. Percent numerical abundance (%*N*), percent total volume (%*V*), percent frequency of occurrence (%*F*) and percent index of relative importance (%IRI) for principal prey categories in the diet of *Lobotes surinamensis* from the northcentral Gulf of Mexico.**

of the family Portunidae and included *Callinectes sapidus, C. similis, Portunus gibbesii, P. sayi, P.* spp. and other specimens which could be identified only to family level (Table 1). *Callinectes sapidus* was the most important crab prey consumed (Table 1) and, in terms of numerical abundance, was the predominant crustacean in the diet (8.9%*N*). *Callinectes similis, P. gibbessi, P. sayi, Portunus* spp. and unidentified portunids were all consumed in similar numbers.

The relative importance of the fish group (61.1%IRI) was more than twice that of shrimp (25.7%IRI) and almost five times greater than crabs (12.9%IRI). Fish prey were represented by 12 species plus *Anchoa* spp., Clupeidae, Carangidae, Blenniidae, Bothidae, and Soleidae. In terms of relative importance, *Brevoortia patronus* was the most important identifiable fish consumed (12.4%IRI) and the second most important item among all identifiable prey. Of total prey consumed, *Chloroscombrus chrysurus* was the most abundant identifiable prey (16.9%*N*) and the third most important identifiable prey based upon %IRI (7.4). *Anchoa* spp. occurred in only three stomachs (2.2%*F*) but ranked third, numerically, among identifiable fish.

Fish remains (unidentifiable fish taxa) dominated the diet on the basis of numeric importance (18.4%*N*), frequency occurrence (41.9%*F*) and %IRI (40.6) and ranked third in volumetric contribution (10.1%*V*). Fish of lesser contribution to the diet were *Bascanichthys bascanium, Myrophis punctatus, Porichthys plectrodon, Menidia beryllin*a, *Selar crumenophthalmus, Lagodon rhomboides, Chaetodipterus faber, Hypsoblennius hentzi, Peprilus alepidotus, Peprilus burti, Anchoa* sp., and unidentified members of families Clupeidae, Carangidae, Blennidae, Bothidae, and Soleidae.

## DISCUSSION

The diversity of crustaceans and fishes in the diet reflected opportunistic feeding by *L. surinamensis* on a variety of regionally abundant prey in the northcentral Gulf. Although most fishes consumed by tripletail were infrequently encountered and represented by few specimens, our findings that the overall relative importance of teleost prey to the diet of tripletail was greater than shrimp and crabs were consistent with those of Merriner and Foster (1974) off North Carolina. In terms of relative importance, *B. patronus*, *Anchoa* spp., and *C. chrysurus* were the dominant identifiable piscine prey in our study. Merriner and Foster (1974) reported that *Opisthonema oglinum* and *Brevoortia tyrannus* were of greater importance to the diet than other teleost or crustacean prey.

Among crustaceans, *F. aztecus* and portunid crabs, particularly *C. sapidus*, were more important in this study than reported by Merriner and Foster (1974). Squid were found in stomachs of North Carolina tripletail (Merriner and Foster 1974) but were not encountered during our study. We observed no major prey items from inshore tripletail that were not present in stomachs from Gulf specimens ($n$ = 7). Unfortunately,

TABLE 1

**Diet composition of tripletail, *Lobotes surinamensis*, from Mississippi coastal waters, 1995–1997. Percent frequency of occurrence is based on stomachs containing food ($n$ = 136). Unid. = unidentified. Total stomachs analyzed = 178; No. (%) containing prey = 136 (76%); No. (%) empty = 42 (24%); T = trace amount (< 0.1).**

| Prey | Number of Individual prey items | Percent Number | Volume (mL) | Percent Volume | Percent Frequency Occurrence | Index of Relative Importance (IRI) | Percent IRI |
|---|---|---|---|---|---|---|---|
| **Class Crustacea** | | | | | | | |
| *Farfantepenaeus aztecus* | 35 | 5.9 | 312.6 | 16.7 | 20.6 | 465.6 | 15.8 |
| *Litopenaeus setiferus* | 17 | 2.8 | 127.1 | 6.8 | 10.3 | 98.9 | 3.4 |
| *Farfantepenaeus* sp. | 23 | 3.9 | 115.5 | 6.2 | 14.0 | 141.4 | 4.8 |
| *Trachypenaeus similis* | 1 | 0.2 | 0.1 | T | 0.8 | 0.2 | T |
| Unid. penaeid | 20 | 3.4 | 34.3 | 1.8 | 7.4 | 38.5 | 1.3 |
| Shrimp remains | 14 | 2.3 | 36.1 | 1.9 | 2.9 | 12.9 | 0.4 |
| *Callinectes sapidus* | 53 | 8.9 | 103.9 | 5.6 | 9.6 | 139.2 | 4.7 |
| *Callinectes similis* | 27 | 4.5 | 68.0 | 3.6 | 8.1 | 65.6 | 2.2 |
| *Portunus gibbesii* | 17 | 2.8 | 25.0 | 1.3 | 3.7 | 15.2 | 0.5 |
| *Portunus sayi* | 24 | 4.0 | 17.8 | 1.0 | 3.7 | 18.5 | 0.6 |
| *Portunus* spp. | 29 | 4.9 | 19.7 | 1.1 | 5.9 | 35.4 | 1.2 |
| Unid. portunid | 16 | 2.7 | 34.7 | 1.9 | 9.6 | 44.2 | 1.5 |
| Crab remains | 24 | 4.0 | 28.6 | 1.5 | 11.8 | 64.9 | 2.2 |
| **Class Osteichthyes** | | | | | | | |
| *Bascanichthys bascanium* | 1 | 0.2 | 33.0 | 1.8 | 0.7 | 1.4 | T |
| *Myrophis punctatus* | 1 | 0.2 | 11.0 | 0.6 | 0.7 | 0.6 | T |
| *Brevoortia patronus* | 34 | 5.7 | 472.8 | 25.3 | 11.8 | 365.8 | 12.4 |
| Unid. clupeid | 1 | 0.2 | 30.0 | 1.6 | 0.7 | 1.3 | T |
| *Anchoa* spp. | 26 | 4.3 | 6.7 | 0.4 | 2.2 | 10.3 | 0.4 |
| *Porichthys plectrodon* | 1 | 0.2 | 0.5 | T | 0.7 | 0.1 | T |
| *Menidia beryllina* | 4 | 0.7 | 9.5 | 0.6 | 1.5 | 2.0 | 0.1 |
| *Chloroscombrus chrysurus* | 101 | 16.9 | 79.0 | 4.2 | 10.3 | 217.3 | 7.4 |
| *Selar crumenophthalmus* | 1 | 0.2 | 50.0 | 2.7 | 0.7 | 2.0 | 0.1 |
| Unid. carangid | 1 | 0.2 | 0.5 | T | 0.7 | 0.1 | T |
| *Lagodon rhomboides* | 2 | 0.3 | 11.2 | 0.6 | 1.5 | 1.4 | T |
| *Chaetodipterus faber* | 1 | 0.2 | 6.0 | 0.3 | 0.7 | 0.4 | T |
| *Hypsoblennius hentzi* | 1 | 0.2 | 3.5 | 0.2 | 0.7 | 0.3 | T |
| Unid. blenniid | 5 | 0.8 | 1.4 | 0.1 | 0.7 | 0.6 | T |
| *Peprilus alepidotus* | 2 | 0.3 | 32.0 | 1.7 | 0.7 | 1.4 | 0.1 |
| *Peprilus burti* | 2 | 0.3 | 2.0 | 0.1 | 0.7 | 0.3 | T |
| Unid. bothid | 1 | 0.2 | 2.0 | 0.1 | 0.7 | 0.2 | T |
| Unid. soleid | 1 | 0.2 | 3.0 | 0.2 | 0.7 | 0.3 | T |
| Fish remains | 110 | 18.4 | 189.6 | 10.1 | 41.9 | 1,194.2 | 40.6 |
| **Total** | **596** | | **1,867.1** | | | **2,940.5** | |

we were not able to examine ontogenetic diet patterns due to small sample sizes.

Our sample consisted of tripletail caught exclusively with hook-and-line gear; therefore, most of the fish we examined were probably actively feeding at the time of capture. We could not determine whether the large number of fish with empty stomachs was related to lack of feeding or to regurgitation.

We have observed that captive tripletail consume food by suction-feeding, a method of feeding previously reported for tripletail by Breder (1925) and other species (Lauder 1983, Liem 1993, Luczkovich et al. 1995). Although tripletail have sharp incisors on upper and lower jaws, most identifiable prey in our study were consumed whole, suggesting that suction-feeding is used by tripletail when they drift as camouflaged predators within *Sargassum* mats and when floating under debris.

The diversity of prey consumed by tripletail suggests that their foraging behavior is versatile. For example, anchovies, clupeids, carangids, and stromateids are important components of the open-water ichthyofauna, whereas portunid crabs are both nektonic and benthic. Furthermore, shrimps, eels, and blennies are predominantly benthic inhabitants, and bothids and soleids are demersal.

This study represents the first account of the diet of *L. surinamensis* from the northern Gulf. Knowledge of tripletail diet is necessary to develop a better understanding of the life history requirements and trophic ecology of this species.

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