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FOOD AND FEEDING OF BLACK SEA BASS, *Centropristis striata,* IN LIVE BOTTOM HABITATS IN THE SOUTH ATLANTIC BIGHT

GEORGE R. SEDBERRY

Marine Resources Research Institute, P. O. Box 12559, Charleston, SC 29412-2559

Abstract: The food habits of black sea bass, *Centropristis striata,* were investigated by examining stomach contents of specimens collected from live bottom reef habitats in the South Atlantic Bight. Black sea bass had a generalized diet of motile epibenthic live bottom reef species, mainly amphipods, decapods, and fishes. Black sea bass fed selectively on a few species of amphipods. Dominant amphipods in the diet, a caprellid (*Caprella equilibra*) and a corophoid (*Erichthonius brasiliensis*), were higher in relative abundance in black sea bass stomachs than in benthic samples. Other species of caprellids (*Caprella penantis, Luconacia incerta, Phtisica marina*) were positively selected for as prey on deeper reefs but not on inner shelf reefs. Small polychaetes, which dominated benthic samples, were not consumed by black sea bass. Smaller black sea bass ate relatively more small crustaceans (mainly amphipods) and larger fish fed more on decapods (primarily brachyurans) and fishes. Black sea bass selectively fed on live bottom reef organisms that were not frequently consumed by several other species of fishes examined from the same habitat, but they had a relatively high level of diet overlap with southern porgy, *Stenotomus aculeatus,* sheepshead, *Archosargus probatocephalus,* and pinfish, *Lagodon rhomboides.*

Key Words: *Centropristis striata*; black sea bass; feeding selectivity; live bottom; South Atlantic Bight.

INTRODUCTION

The black sea bass, *Centropristis striata* (L.), is a medium sized serranid that occurs from Cape Ann, Maine, to Cape Canaveral, Florida, and (as a separate subspecies) in the Florida Keys and from Pensacola to Placida, Florida (Hardy, 1978; Smith, 1978; Robins et al., 1980). Black sea bass generally occur around hard substrates such as pilings, wrecks, artificial reefs, and other man-made structures, as well as on rough bottom and natural reefs (Hardy, 1978). Although seasonally migratory in the northern part of their range, black sea bass in the South Atlantic Bight are more sedentary and occur on scattered outcrops of sedimentary rock on the continental shelf where they are a dominant (by abundance and biomass) member of the ichthyofauna (Musick and Mercer, 1977; Sedberry and Van Dolah, 1984). Such hard bottom habitats, also known as live bottom (Struhsaker, 1969), coral patches (Huntsman and MacIntyre, 1971), and sponge–coral habitat (Powles and Barans, 1980; Wenner, 1983) support a wide variety of large sessile invertebrates such as sponges, octocorals, and ascidians, and have a high diversity of motile epifaunal invertebrates associated with the substrate and with the larger sessile species (Wenner et al., 1983, 1984; Wendt et al., 1985). Motile invertebrate species, including decapods, amphipods, polychaetes and mollusks, are important prey for many demersal marine fishes in a variety of habitats (Darnell, 1958; Tyler, 1972; Sedberry and Musick, 1978; Macpherson, 1981; Sedberry, 1983). These invertebrate taxa, as well as fishes, are also important in the diet of black sea bass in inshore estuarine areas (Hildebrand and Schroeder, 1928), nearshore jetties (Van Dolah et al., 1987) and on inner shelf (15 m depth) artificial reefs (Steimle and Ogren, 1982; South Carolina Wildlife and Marine Resources Department, 1984). Descriptions of the food habits of black sea bass occurring on natural hard bottom reefs in the South Atlantic Bight have not been published. On the southeastern continental shelf, the occurrence of black sea bass is restricted to (excluding man-made habitats) these reef areas; however, the dependence of black sea bass on these live bottom reefs for food and shelter is poorly understood. The purpose of this paper is to describe the food habits of black sea bass collected from offshore reefs in the South Atlantic Bight and to determine the dependence of this species on reef habitat for food by comparing stomach contents to samples of benthic invertebrates taken from these reef habitats.

METHODS

I collected stomachs of black sea bass during six cruises in 1980 and 1981 from 11 live bottom stations (Fig. 1). Stations were located in each of three depth zones representing the inner shelf (16–22 m depth, three stations), middle shelf (23–37 m depth, four stations) and the outer shelf (46–69 m depth, four stations). Delineation of depth zones was based on distribution of fish assemblages as noted in previous studies and on community analysis of catches in the present study (Struhsaker, 1969; Miller and Richards, 1980; Sedberry and Van Dolah, 1984). Fishes were collected primarily from standard-distance tows with a roller-rigged high-rise trawl (Hillier, 1974), which is effective in sampling fishes on rough bottom (Smith, 1977). Some specimens were collected with traps, hook-and-line, or vertical longline (Olsen et al., 1974). Sampling for fishes was restricted to live bottom habitat, which was mapped for each station using underwater television. Detailed descriptions of station locations and fish sampling techniques are described elsewhere (Sedberry and Van Dolah, 1984; South Carolina Wildlife and Marine Resources Department, 1984).

Fish were measured (standard length, SL) to the nearest mm at sea and their stomachs were removed, individually labeled, and preserved in 10% seawater-formalin. After transfer to 50% isopropanol, contents of individual stomachs were sorted by taxa and counted. Colonial forms were counted as one organism. Volume displacement of food items was measured using a graduated cylinder, or estimated by using a 0.1 cm^2 grid (Windell, 1971).

Because of the bias inherent in some methods of quantifying food habits, (Hynes, 1950; Pinkas et al., 1971; Windell, 1971), the relative contribution of food items to the diet was determined using three methods: (1) percent frequency occurrence (F), (2) percent numerical abundance (N), and (3) percent volume displacement (V). Percent frequency, number, and volume were calculated for prey species and for prey items grouped into higher taxonomic categories, for discrete intervals of

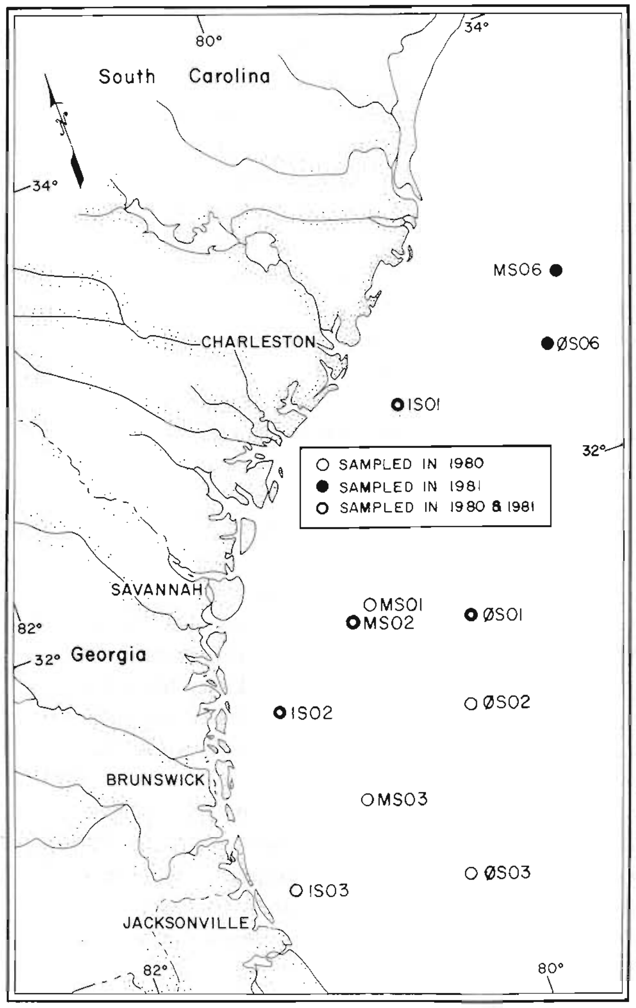

FIG. 1. Stations sampled for black sea bass in 1980 and 1981. "IS" stations are inner shelf stations, "MS" refers to middle shelf stations, and "OS" stations are on the outer continental shelf.

SL. Values are presented only for those prey species that occurred with a frequency of at least 1% or which made up at least 1% of the total number or volume of prey.

In order to determine the selectivity or dependence of black sea bass on live bottom macrobenthic organisms, stomach samples were compared to benthic samples taken from the hard substrate using Ivlev's index of electivity (Ivlev, 1961). Negative electivity values within the range of the index (−1 to +1) imply that the prey species is either avoided or that it is unavailable to the predator, whereas positive values imply a preference for the prey species or that the predator feeds on species found in a different habitat than that sampled by the benthic sampler. A value near 0 implies no selectivity by the predator, i.e., the fish is feeding on the prey in proportion to the prey's relative abundance in samples taken in the habitat.

The electivity index was calculated for species that were numerically dominant in benthic samples or in fish stomach samples collected at inner and middle shelf stations (too few stomach samples were obtained at outer shelf stations for comparison). Benthic samples and stomach collections were pooled by depth zone for comparison. Benthic samples were obtained with a suction sampler at the seven inner and middle shelf live bottom sites during the same time periods in which fish were collected in 1980 and 1981. Details of benthic sampling are provided elsewhere (Wenner et al., 1983, 1984) and are only summarized here. Briefly, scuba divers obtained five replicate suction samples at each inner and middle shelf station by scraping the hard substrate enclosed by a 0.1 m^2 quadrat box while simultaneously sucking with an airlift device similar to that described by Chess (1979). Suction samples were collected in 1.0 mm mesh bags.

Dietary comparisons were made between black sea bass and 13 other co-occurring live bottom demersal fishes that were sampled at the same time as the black sea bass and were analyzed in a similar manner (South Carolina Wildlife and Marine Resources Department, 1984; Sedberry, 1985, 1987). These other species were *Diplectrum formosum* (sand perch), *Mycteroperca microlepis* (gag), *M. phenax* (scamp), *Apogon pseudomaculatus* (twospot cardinalfish), *Lutjanus campechanus* (red snapper), *Rhomboplites aurorubens* (vermilion snapper), *Archosargus probatocephalus* (sheepshead), *Calamus leucosteus* (whitebone porgy), *Lagodon rhomboides* (pinfish), *Pagrus pagrus* (red porgy), *Stenotomus aculeatus* (southern porgy), and *Equetus lanceolatus* (jackknife-fish). These species included fishes that are important in live bottom fisheries or that dominated by number or weight in trawl catches in the 1980–1981 cruises (Sedberry and Van Dolah, 1984).

Similarity in diet between predators was measured using the Bray–Curtis measure (Bray and Curtis, 1957), and values were presented in a trellis diagram. Because sample sizes of predators were unequal, abundance of prey items was standardized as percent numerical abundance for each predator (Clifford and Stephenson, 1975; Boesch, 1977). Only prey items that were identified to species were included in the similarity analyses.

Similarity in diet among all the species examined was also determined using numerical classification techniques (cluster analysis) on the data matrix generated by the Bray–Curtis measure. Each predator was treated as a collection, and all predators were subjected to normal cluster analysis. Similarity among groups of predators was expressed in the form of dendrograms generated using flexible sorting with $B = -0.25$ (Lance and Williams, 1967; Clifford and Stephenson, 1975).

RESULTS

Black sea bass were abundant in the study area and made up a large portion of trawl catches. They were most abundant in trawl tows at inner shelf stations (mean catch/tow = 11.9), frequent at the middle shelf (5.4/tow), and rare at the outer shelf (<0.1/tow). Approximately 220 species of prey were identified in 313 black sea bass stomachs that contained food. Amphipods, decapods, and fishes dominated the diet (Table 1). Amphipods (mainly caprellids and the epifaunal tube-dweller, *Erichthonius brasiliensis*) were frequently found in large numbers but, because of their small size, contributed little to the food volume. Decapods were frequently consumed, and brachyurans (e.g., *Pilumnus sayi, Ovalipes stephensoni*) were the most important decapods. Fishes were frequently consumed and made up a large portion of prey volume. Ascidians, ophiuroids, polychaetes, and cephalopods were commonly found in stomach samples. Ascidians and cephalopods made up a significant portion of the prey volume. Amphipods dominated in frequency, number, and volume in the smallest size class of black sea bass (Table 2). Other small crustaceans (mysids, isopods, small decapods) were also important in the diet of small black sea bass. Fishes and larger brachyuran decapods were more important than amphipods in the diet of larger size classes of black sea bass. Although amphipods were frequently found in high numbers in larger black sea bass, decapods and fishes contributed the greatest volume of prey for larger black sea bass. Ascidians were important too in the diet of larger black sea bass, and cephalopods were consumed in small amounts by all size classes.

Selectivity analysis indicated that black sea bass appear to select motile epifaunal amphipods as their most abundant prey (Table 3). Electivity values were usually positive for amphipods and other crustaceans that were included in the diet of black sea bass. Polychaetes, such as *Exogone dispar* and *Filograna implexa,* that dominated in benthic samples were not utilized as prey by black sea bass.

Although black sea bass consumed prey species that were also eaten by the 13 other fishes examined, black sea bass had the greatest overlap in diet with southern porgy, *Stenotomus aculeatus* (Fig. 2). Southern porgy fed mainly on the amphipods *Erichthonius brasiliensis, Phtisica marina,* and *Caprella equilibra,* which were also dominant food items of black sea bass. Black sea bass had a relatively high dietary overlap with pinfish, *Lagodon rhomboides,* and sheepshead, *Archosargus probatocephalus. Erichthonius brasiliensis* was the most abundant prey species for both of these predators. Pinfish and, especially, sheepshead fed on sessile invertebrates (such as ascidians) that were often consumed by black sea bass.

DISCUSSION

The black sea bass is a generalized carnivore that preys on a variety of motile organisms. Some sessile invertebrates were also consumed. Link (1980) studied the food habits of black sea bass in North Carolina waters and also noted a generalized diet. On the South Atlantic Bight continental shelf, black sea bass are found only on natural or artificial reefs for most of their life history. The results of the present study indicate that they feed heavily on invertebrate species that are closely associated with the reef habitats (Wenner et al., 1983, 1984; Wendt et al., 1985).

In addition to motile invertebrates, fishes were very important in the diet of larger black sea bass. Most of the species consumed are abundant species in live bottom habitats, and some of them are restricted to that habitat (Miller and Richards, 1980; Wenner, 1983; Sedberry and Van Dolah, 1984). It is apparent that black sea bass are very dependent on live bottom organisms for prey. Most invertebrate prey were consumed in higher numbers than their relative abundance in benthic samples collected from the live bottom habitat. This fact, coupled with the dominance of live bottom species among the fishes found in the diets indicates the dependence of black sea bass on live bottom reefs for feeding grounds. Some of the other predators studied appear to have less dependence on live bottom

Table 1

Percent frequency occurrence (F), percent number (N), and percent volume (V) of prey items and higher taxonomic groups of food in the diet of black sea bass, *Centropristis striata.* Prey items that occurred with F, N, and V of less than 1% are not included.

Higher Taxon Prey Item	F	N	V
Algae	0.6	<0.1	<0.1
Anthophyta	0.3	<0.1	<0.1
Foraminifera	0.3	<0.1	<0.1
Porifera	3.2	0.2	1.1
Cnidaria			
Hydrozoa			
Aglaophenia trifida	3.2	0.2	<0.1
Halecium sp. A	1.3	0.1	<0.1
Hydroidea undetermined	1.0	0.1	<0.1
Sertulariidae undetermined	1.0	0.1	<0.1
Total Hydrozoa	9.6	0.7	0.1
Anthozoa			
Actiniaria undetermined	0.3	<0.1	1.2
Telesto fruticulosa	2.9	0.2	0.1
Total Anthozoa	3.8	0.3	1.3
Annelida			
Polychaeta			
Notopygos crinita	2.2	0.2	0.2
Phyllodoce castanea	1.0	0.1	<0.1
Polychaeta undetermined	3.8	0.3	1.4
Total Polychaeta	11.5	0.9	1.8
Mollusca			
Gastropoda	2.9	0.3	0.4

Higher Taxon Prey Item	F	N	V
Pelecypoda			
Laevicardium laevigatum	4.2	0.4	1.7
L. pictum	1.3	0.1	0.4
Pteria colymbus	1.3	0.1	<0.1
Total Pelecypoda	8.0	0.9	2.3
Cephalopoda			
Loligo sp.	2.9	0.2	3.2
Loligo plei	0.3	<0.1	1.6
Loliguncula brevis	0.6	<0.1	2.0
Total Cephalopoda	3.8	0.3	6.8
Crustacea			
Copepoda			
Labidocera aestiva	1.0	0.5	<0.1
Total Copepoda	1.3	0.6	<0.1
Cirripedia			
Balanus trigonus	1.9	0.2	0.2
Balanus venustus	2.2	0.3	0.1
Total Cirripedia	4.5	0.5	0.3
Stomatopoda	0.3	<0.1	<0.1
Mysidacea			
Bowmaniella portoricensis	1.6	0.4	<0.1
Mysidae undetermined	1.3	0.4	<0.1
Total Mysidaceae	2.6	0.8	<0.1

Table 1
Continued.

Higher Taxon Prey Item	F	N	V
Cumacea	1.0	0.1	<0.1
Tanaidacca	0.3	<0.1	<0.1
Isopoda			
Carpias bermudensis	1.6	0.3	<0.1
Paracerceis caudata	4.2	0.8	0.1
Total Isopoda	7.0	1.4	0.1
Amphipoda			
Ampelisca vadorum	1.0	0.1	<0.1
Caprella equilibra	16.0	15.8	0.6
C. penantis	1.6	0.4	<0.1
Caprellidae undetermined	4.2	8.1	0.2
Cerapus tubularis	1.3	0.2	<0.1
Elasmopus sp. A	2.6	0.2	<0.1
Erichthonius brasiliensis	17.6	43.2	0.5
Gammaridea undetermined	6.7	1.0	<0.1
Gammaropsis sp. A	2.6	0.4	<0.1
Leucothoe spinicarpa	1.3	0.1	<0.1
Luconacia incerta	4.2	0.7	<0.1
Lysianopsis alba	1.6	0.1	<0.1
Melita appendiculata	3.5	0.3	<0.1
Photis sp.	1.0	0.1	<0.1
P. pugnator	5.4	1.5	<0.1
Phtisica marina	1.9	0.6	<0.1
Podocerus sp. A	1.6	0.2	<0.1
Stenothoe georgiana	4.5	0.5	<0.1
Total Amphipoda	35.5	74.4	1.5

Higher Taxon Prey Item	F	N	V
Decapoda			
Brachyura megalopae	1.0	0.1	<0.1
Brachyura undetermined	13.7	1.1	1.6
Calappa angusta	1.3	0.1	1.0
Cronius ruber	0.3	<0.1	2.9
Cycloes bairdii	1.0	0.1	0.3
Dromidia antillensis	1.0	0.1	0.4
Leptochela papulata	1.0	0.1	<0.1
Lucifer faxoni	2.9	0.6	<0.1
Majidae undetermined	1.0	0.1	0.2
Metoporhaphis calcarata	1.0	0.1	0.1
Mithrax sp.	1.3	0.1	0.2
M. pleuracanthus	3.2	0.2	1.9
Natantia undetermined	9.6	1.0	0.1
Neopontonides beaufortensis	1.3	0.1	<0.1
Ovalipes stephensoni	2.9	0.3	2.2
Paguridae undetermined	1.6	0.2	<0.1
Pagurus sp.	4.2	0.3	<0.1
P. carolinensis	2.9	0.2	<0.1
P. hendersoni	3.2	0.4	<0.1
Pelia mutica	1.9	0.2	0.1
Periclimenes longicaudatus	2.6	0.3	0.1
Pilumnus sp.	1.6	0.1	0.2
P. sayi	10.9	0.9	6.8
Pitho lherminieri	2.2	0.2	0.4
Podochela riisei	4.2	0.3	0.9

Table 1
Continued.

Higher Taxon Prey Item	F	N	V
Portunidae undetermined	1.0	0.1	0.2
Processa sp.	1.0	0.1	<0.1
P. hemphilli	1.3	0.1	<0.1
Sicyonia brevirostris	1.0	0.1	1.5
S. typica	1.3	0.1	0.4
Stenorhynchus seticornis	1.3	0.1	0.2
Synalpheus longicarpus	1.0	0.1	0.1
S. townsendi	1.6	0.2	<0.1
Thor sp.	1.6	0.4	<0.1
Xanthidae undetermined	1.9	0.1	<0.1
Total Decapoda	62.3	11.2	26.2
Crustacea undetermined	1.0	0.1	<0.1
Sipunculida	0.6	<0.1	0.1
Bryozoa			
Schizoporella cornuta	3.5	0.2	0.2
Total Bryozoa	6.4	0.5	0.2
Echinodermata			
Echinoidea	0.3	<0.1	<0.1
Ophiuroidea	9.3	0.9	0.7
Holothuroidea	1.3	0.1	1.2
Chaetognatha	1.0	1.0	<0.1
Chordata			
Ascidiacea			
Ascidiacea undetermined	7.3	0.6	2.1

Higher Taxon Prey Item	F	N	V
Diplosoma macdonaldi	4.8	0.3	7.7
Distaplia bermudensis	3.8	0.3	1.8
Styela plicata	0.6	<0.1	1.1
Total Ascidiacea	15.0	1.3	13.4
Cephalochordata	0.3	<0.1	<0.1
Pisces			
Decapterus punctatus	0.6	0.1	1.8
Haemulon aurolineatum	1.3	0.2	1.4
Porichthys porosissimus	0.6	<0.1	3.9
Rhomboplites aurorubens	0.6	0.2	8.9
Sardinella aurita	1.0	0.1	0.6
Stenotomus aculeatus	1.9	0.8	2.7
Teleostei undetermined	20.4	1.6	21.3
Total Pisces	29.4	3.3	42.3
Number of stomachs examined		441	
Examined stomachs with food		313	

epifaunal communities (Sedberry, 1985). Many fed extensively on infauna or nekton.

Although black sea bass fed selectively on live bottom species of amphipods, polychaetes that dominated benthic samples were not utilized as prey. This is probably a result of the small size of these polychaetes (Day, 1967; Gardiner, 1975). As has been previously noted, larger prey are frequently over-represented in the diet of benthic feeding fishes (Hyatt, 1979). In addition, the most abundant benthic invertebrate, *Filograna implexa,* constructs reef-like aggregations of calcareous worm tubes in which they dwell and thus are only available to specialized predators with crushing molars that are lacking in black sea bass. Thus, although black sea bass appear to have diverse and euryphagous food habits (Link, 1980), they are actually rather selective when their diet is compared with the composition of macrobenthic prey communities.

The feeding habits of black sea bass changed considerably with increasing size of the fish. As has been noted for other fishes, this change resulted from a switch to larger species of prey as the predator grows (Tyler, 1972; Ross, 1978; Werner, 1979; Sedberry, 1983). Although small species of prey, such as amphipods and other small crustaceans, were abundant in the diet of the largest black sea bass examined, larger prey taxa such as fishes and decapods made up the greatest prey volume for large black sea bass. Black sea bass have a relatively large mouth (Hardy, 1978) and are thus able to ingest a wide range of prey sizes (Hyatt, 1979).

Randall (1967) studied the food habits of many species of West Indian reef fishes and found that those fishes could be grouped into distinct feeding types. Classification (cluster analysis) of predators in the present study according to prey composition generally grouped the fishes into distinct feeding types similar to Randall's (1967) classification. Black sea bass had a generalized diet of motile prey species and had a relatively high diet overlap with other fishes (*Stenotomus aculeatus, Lagodon rhomboides*) that also had mainly consumed motile invertebrates and with the sheepshead, *Archosargus probatocephalus.* Sheepshead have a diet dominated by sessile invertebrates, but also consume many motile species, such as *Erichthonius brasiliensis* and *Caprella equilibra* which live on sessile invertebrates (Sedberry, 1987). Black sea bass also consumed some sessile invertebrates (e.g., ascidians) that were consumed by sheepshead. Most other predators fed differently than black sea bass and fed more on zooplankton and small nekton (*Rhomboplites aurorubens, Apogon pseudomaculatus*), on fishes (*Mycteroperca microlepis, Lutjanus campechanus, M. phenax,* or on infaunal invertebrates assöciatied with sandy substrates found adjacent to reef areas (*Haemulon aurolineatum, Diplectrum formosum, Equetus lanceolatus*). Other predators that fed on motile live bottom invertebrates and fishes (*Calamus leucosteus, Pagrus pagrus*) have teeth specialized for feeding on hard shelled invertebrates (barnacles, mollusks, hermit crabs) that were not frequently consumed by black sea bass.

It is apparent, even from the relatively small number of species examined (compared to 172 demersal species collected by trawl in this study), that there is a great variety of feeding types among fishes in the live bottom habitat. The diversity of feeding types and feeding habitats results in a generally low diet overlap and allows many species of fishes to coexist in the relatively scarce live bottom areas (as opposed to open shelf sand bottom habitat) of the South Atlantic Bight.

Table 2

Percent frequency occurrence (F), percent number (N), and percent volume (V) of higher taxonomic groups of food in the diet of *Centropristis striata*, by length interval.

	Length Intervals (mm SL)														
	50–100			101–150			151–200			201–250			>250		
Prey Taxon	F	N	V	F	N	V	F	N	V	F	N	V	F	N	V
Algae				1.7	<0.1	<0.1	0.7	0.1	<0.1						
Anthophyta				1.7	<0.1	0.1									
Foraminifera				1.7	0.1	<0.1									
Porifera							4.4	0.4	1.8	4.3	0.8	1.5	3.6	1.0	0.3
Cnidaria															
Hydrozoa				6.9	0.2	0.2	8.7	0.8	0.1	11.4	2.1	<0.1	21.4	6.1	0.1
Anthozoa				3.4	0.1	0.6	4.4	0.4	0.2	2.9	0.5	0.1	7.1	2.0	3.7
Annelida															
Polychaeta				22.4	0.7	22.0	12.3	1.3	2.7	5.7	1.1	0.4	7.1	2.0	<0.1
Mollusca															
Gastropoda							2.9	0.4	<0.1	7.1	1.3	1.2			
Pelecypoda				6.9	0.3	1.0	9.4	1.2	4.1	8.5	2.4	1.9	7.1	5.1	1.3
Cephalopoda	5.3	0.2	6.8	1.7	<0.1	<0.1	4.4	0.4	9.7	2.9	0.5	6.3	7.1	3.1	5.7
Crustacea															
Copepoda				1.7	0.7	0.1	1.4	0.7	<0.1	1.4	0.3	<0.1			
Cirripedia				1.7	<0.1	0.9	7.2	1.1	0.8	4.3	1.1	0.1			
Stomatopoda										1.4	0.3	<0.1			
Mysidacea	5.3	2.6	3.6	5.2	0.4	0.3	2.2	0.9	<0.1	1.4	0.3	<0.1			
Cumacea	5.3	0.2	0.4	1.7	0.2	<0.1	0.7	0.1	<0.1						
Tanaidacea							0.7	0.1	<0.1						

Table 2
Continued.

Prey Taxon	50–100			101–150			151–200			201–250			>250		
	F	N	V	F	N	V	F	N	V	F	N	V	F	N	V
Isopoda	23.6	1.1	6.3	17.2	1.9	1.6	4.4	1.4	0.1	1.4	0.3	<0.1			
Amphipoda	94.7	93.8	74.9	51.7	86.8	15.1	33.3	64.5	1.8	20.0	40.8	0.3	10.7	32.6	0.1
Decapoda	36.8	1.5	5.1	65.5	6.1	30.6	71.0	15.5	35.2	52.9	27.6	19.9	53.6	22.4	24.7
Sipunculida							1.4	0.1	0.4						
Bryozoa				3.4	0.1	0.1	8.0	0.7	0.3	5.7	1.1	0.2	10.7	5.1	0.1
Echinodermata															
Echinoidea							0.7	0.1	<0.1						
Ophiuroidea	15.8	0.6	3.0	17.2	1.0	5.2	8.7	0.8	0.6	5.7	1.1	0.8			
Holothuroidea				1.7	<0.1	0.6				4.3	0.8	3.3			
Chaetognatha							2.2	2.8	0.1						
Chordata															
Ascidiacea				6.9	0.2	3.1	15.9	1.6	8.7	21.4	4.8	17.1	21.4	8.2	15.1
Cephalochordata				1.7	<0.1	0.2									
Pisces				17.2	0.7	18.3	30.4	4.7	33.5	40.0	12.9	46.9	42.9	12.2	48.8
Number of stomachs examined		24			73			190			105			49	
Examined stomachs with food		19			58			138			70			28	
Mean length of fish with food		81.3			132.4			174.8			223.7			274.4	

Table 3

Relative abundance (percent of total number of individuals) and electivity values (E) for dominant benthic species in suction samples and *Centropristis striata* stomachs. Dominant species include those that ranked in the five most abundant species within stomach or benthic samples in either depth zone, for collections pooled for all seasons and years.

	Inner Shelf			Middle Shelf		
	Fish Stomachs	Benthic Samples	E	Fish Stomachs	Benthic Samples	E
Dominant species—suction samples						
Chone americana	—	0.33	−1.00	—	0.81	−1.00
Erichthonius brasiliensis	51.82	2.89	0.89	6.94	0.30	0.92
Exogone dispar	—	3.71	−1.00	—	0.47	−1.00
Filograna implexa	—	20.42	−1.00	—	63.87	−1.00
Luconacia incerta	0.36	3.27	−0.80	2.12	1.03	0.34
Malacoceros glutaeus	—	0.41	−1.00	—	0.81	−1.00
Podocerus sp. A	0.84	2.87	−0.94	0.59	0.27	0.38
Syllis spongicola	—	2.15	−1.00	—	1.90	−1.00
Total	53.02	36.05		9.65	69.46	
Dominant species—stomachs						
Caprella equilibra	17.06	1.55	0.83	10.71	0.34	0.93
Caprella penantis	—	0.07	−1.00	2.12	0.42	0.67
Erichthonius brasiliensis	51.82	2.89	0.89	6.94	0.30	0.92
Luconacia incerta	0.36	3.27	−0.80	2.12	1.03	0.34
Paracerceis caudata	1.04	0.54	0.31	—	0.08	−1.00
Pilumnus sayi	0.84	0.07	0.85	1.29	0.02	0.97
Photis pugnator	1.79	2.68	−0.20	0.59	0.80	−0.15
Phtisica marina	—	0.01	−1.00	2.94	0.03	0.98
Total	72.91	11.08		26.71	3.02	

Although many fishes are abundant on live bottom, the degree of their dependence on this habitat varies. It is apparent that black sea bass are more dependent on invertebrates and fishes that are closely associated with live bottom habitat (Wenner et al., 1983, 1984; Sedberry and Van Dolah, 1984; Wendt et al., 1985) than are some other co-existing live bottom fishes.

Many of the species of crustaceans that were abundant in the diet of black sea bass are motile species that are associated with sponges and corals (Wendt et al., 1985). Although sponges and corals are not heavily utilized as prey by black sea bass, it is apparent that these sessile organisms provide habitat for the motile species consumed by black sea bass and other live bottom fishes. As a result of damage to sponges and corals by demersal trawling (Wenner, 1983; Van Dolah et al., 1987) the South Atlantic Fishery Management Council (SAFMC, 1988) has proposed a ban on trawling for live bottom fishes in the South Atlantic Bight. As suggested by Wenner (1983), large sessile invertebrates serve as habitat for the kinds of prey (i.e., small crustaceans) that are important for demersal fishes, including black sea bass. The data of Wendt et al. (1985) and those reported herein demonstrate that large attached invertebrates are important indirect sources of food for an important fishery species, the black sea bass. It appears, then, that regulation of fishing activities that destroy large attached invertebrates may be important in regulating the amount of prey available to benthic-feeding fishes

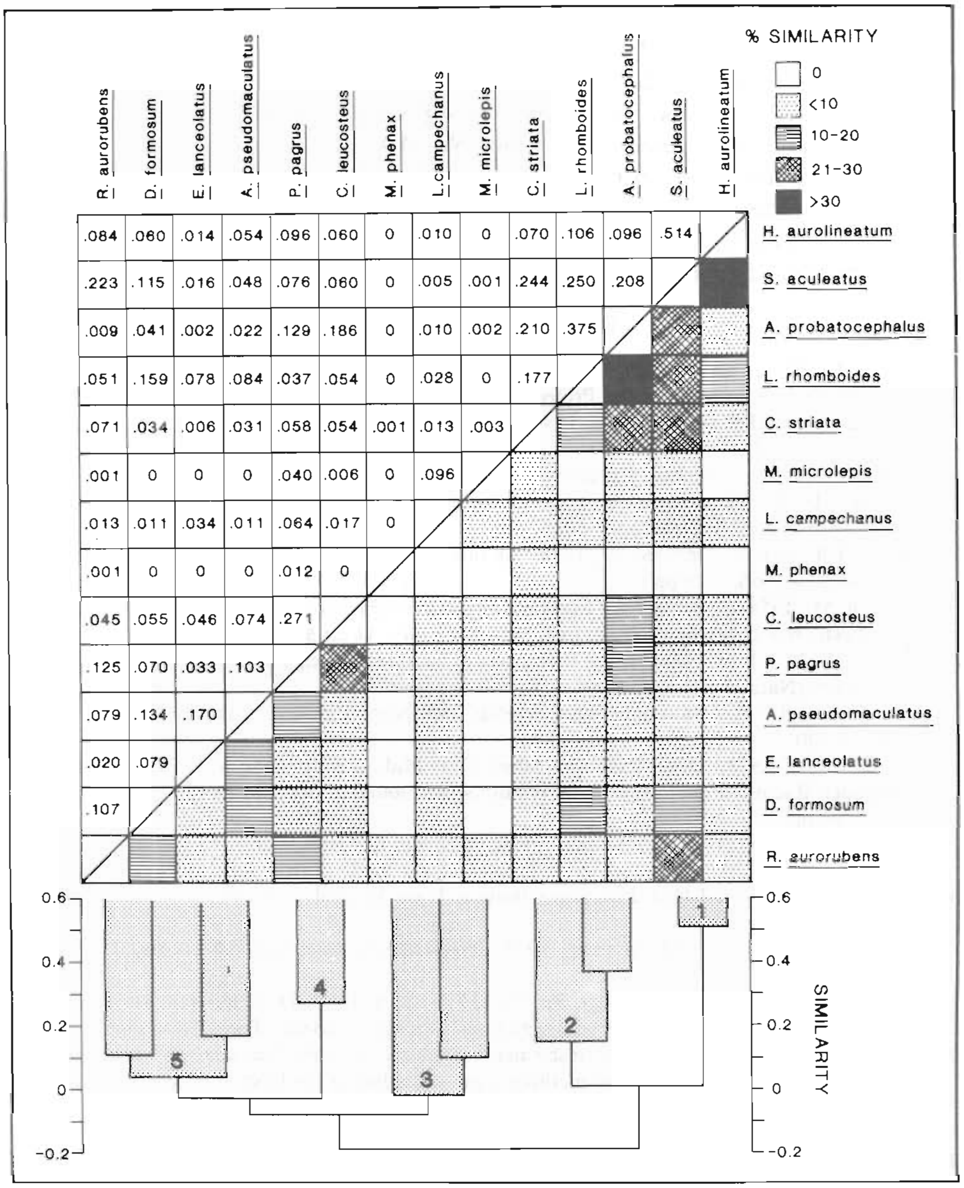

FIG. 2. Bray–Curtis similarity values and classification hierarchy (flexible sorting) for predators based on similarity of prey species composition and relative abundance.

which, in turn, could affect the availability of these species to fisheries that do not severely damage sessile colonial invertebrates, such as trap and hook-and-line fishing.

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