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FEEDING HABITS AND FOOD OF THE LONGSPINED PORGY, *Stenotomus caprinus* BEAN

The longspined porgy, *Stenotomus caprinus* Bean, is an abundant species in the 40 to 100 meter depth range over much of the northern and western Gulf of Mexico. Gunter & Knapp (1951), Siebenaler (1952), Hildebrand (1954), Caldwell (1955), Roithmayr (1965), Moore *et. al.* (1970), Perry (1970), Franks *et. al.* (1972) and Chittenden & McEachran (1976) have documented the occurrence of this species in the 20 to 120 meter range. Despite ample evidence that the porgy is a major member of the offshore demersal fish population, there have been no published reports on the feeding behavior or food of this fish. This study was undertaken in the hopes of characterizing major food items and feeding patterns within the species.

Materials and Methods

All specimens of *Stenotomus caprinus* examined in this study were taken with an 8.3 m otter trawl at random locations in offshore waters of Mississippi, Alabama and Florida. Duration of drags ranged from 15 to 45 minutes with the majority lasting approximately 30 minutes. Collections were made from October 1972 to August 1976. Both day and night trawls were made over a depth range of 10 to 140 meters. Representative samples were taken for all months of the year except January.

A total of 3,534 specimens were obtained. Of this number, 301 fish from 23 to 145 mm were dissected and examined for stomach contents. Intestines were carefully separated from stomachs at their juncture to avoid mixing of materials. Intestinal materials were originally

examined and found to be digested to such an extent that accurate identification was impossible. Therefore, only stomach contents were used in determination of feeding habits and food. The number of fish examined per station was reduced from 20 to 10 when it was determined that larger subsamples were repetitious, and adequate species representation could be obtained using smaller subsamples. All identifications of stomach contents were made using a dissecting microscope.

Results and Discussion

Our data indicate that the longspined porgy is an opportunistic bottom feeder with a diet composed mainly of smaller invertebrates, with crustaceans and polychaetes predominant. Distribution of the porgy population within the study area did not appear to be limited to specific zones due to availability of food items. Feeding occurred over all bottom types encountered, and no preference for a particular area was noted (Fig. 1).

Within the population as a whole, there was a marked tendency for smaller individuals to inhabit shallower waters. An attempt was made to determine whether this separation was based on feeding preferences of different size groups. It was discovered that individuals of similar size taken in different areas were feeding on totally different items. The only noteworthy differences in the food items of large and small individuals were in the size of the prey. Substrate appears to be the major controlling factor in determining which organisms will be most heavily preyed upon.

Data indicate that most feeding occurs during daylight hours. As indicated in Table 1, most night trawls between 1800 and 0600 produced fish whose stomachs

Figure 1. Sediment profile of the area encompassed in the study (Sediment map from the draft final report MAFLA CT5-30 contract between the Bureau of Land Management and the State University System Institute of Oceanography, St. Petersburg, FL). Dots represent stations at which *Stenotomus caprinus* were taken.

were either empty or in advanced stages of digestion. Those day trawls made between 0600 and 1800 produced fish whose stomachs contained recently ingested organisms.

The species list presented in Table 2 was compiled from all stomachs examined. Organisms were identified to species when possible, but often the condition of the specimen was not adequate for that accuracy. In all cases, the specimen was taken to the closest classification possible (in some cases to the family level, in others only to phylum). Organisms belonging to 10 separate phyla were identified from the stomachs of *S. caprinus*. Of these phyla, the vast majority of the food items were either Arthropoda or Annelida. Organisms belonging to the remaining eight phyla occurred infrequently.

Based on the data presented in Tables

1 and 2, it is possible to draw a number of conclusions about the feeding habits and food of the longspined porgy. First, the porgy is obviously a browser preying primarily on small polychaetes and crustaceans. The occurrence of organ-

Table 1. Relation between time of capture and condition of stomach contents in *S. caprinus*.

Time of capture	Total catch	Number examined	Condition of stomach materials
	nocturnal		
0540	6	6	Digested
0220	67	10	Empty
0200	*N.A.	1	Empty
0120	92	10	Partially digested
0100	*N.A.	1	Empty
0045	82	10	Mostly digested
0020	15	10	Mostly digested
2320	243	10	Empty
2345	10	10	Digested
2025	49	10	Mostly digested
2020	77	10	Partially digested
1900	25	10	Recently ingested
	diurnal		
1800	51	10	Recently ingested
1640	*N.A.	1	Recently ingested
1600	69	10	Recently ingested
1330	311	20	Recently ingested
1315	*N.A.	2	Recently ingested
1230	91	20	Recently ingested
1200	84	10	Recently ingested
1145	637	20	Recently ingested
1100	20	10	Recently ingested
1100	151	20	Recently ingested
1045	115	10	Recently ingested
0825	66	10	Digested
0655	11	10	Recently ingested

*N.A. - Not Available

Table 2. Species list prepared from stomach contents of *S. caprinus*.

Food Item	Number Stomachs containing item	Percentage	Food Item	Number Stomachs containing item	Percentage
PHYLUM PROTOZOA			unidentified	1	.3
Order Foraminiferida	5	1.7	Subclass Malacostraca		
PHYLUM CNIDARIA			Order Stomatopoda		
Class Hydrozoa			Unidentified Stomatopoda	3	1.0
unidentified	3	1.0	Family Lysosquillidae	1	.3
PHYLUM RHYNCHOCOELA			Family Squillidae	3	1.0
unidentified	7	2.3	Order Mysidacea		
PHYLUM ANNELIDA			Bowmaniella sp.	1	.3
Class Polychaeta			unidentified	6	2.0
Family Polynoidae			Order Cumacea		
Sthenolais boa	2	.7	unidentified	3	1.0
unidentified	1	.3	Order Tanaidacea		
Family Polydoridae			Leptochelia sp.	1	.3
Eupanthalus tubiflex	1	.3	unidentified	3	1.0
unidentified	5	1.7	Order Isopoda		
Family Phyllodocidae			unidentified	1	.3
Phyllodoce mucose	2	.7	Order Amphipoda		
unidentified	4	1.3	Unidentified Amphipoda	16	5.3
Family Amphinomidac			Suborder Gammaridea		
unidentified	3	1.0	Unidentified Gammaridea	14	4.7
Family Syllidae			Family Aoridae		
Typosyllis sp.	1	.3	Unicola sp.	3	1.0
unidentified	3	1.0	unidentified	1	.3
Family Pisionidae			Family Oeticerotidae		
Pisione remota	1	.3	unidentified	1	.3
Family Nephytidae			Family Ampeliscidae		
Aglaophamus sp.	1	.3	Ampeliscidae	11	3.7
unidentified	1	.3	Family Corophiidae		
Family Nereidae			Erichthonius sp.	5	1.7
Nereis rissei	10	3.3	Suborder Hyperidae		
unidentified	5	1.7	unidentified	1	.3
Family Glyceridae			Suborder Caprellidae		
Glycera sp.	3	1.0	unidentified	2	.7
Family Goniadidae			Order Decapoda		
Goniada littorea	5	1.7	Suborder Natantia		
Family Onuphidae			Unidentified Natantia	17	5.6
Diopatra cuprea	3	1.0	Section Panacidae		
Family Eunicidae			Family Peneidae		
Lysidine netta	2	.7	Hymenopenaeus sp.	1	.3
unidentified	3	1.0	Parapenaeus longirostris	2	.7
Family Lumbrineridae			unidentified	3	1.0
Lumbrineris sp.	2	.7	Family Sergestidae		
unidentified	15	4.9	Lucifer faxoni	5	1.7
Family Arbellidae			Section Caridea		
unidentified	3	1.0	Unidentified Caridea	28	9.3
Family Dorvilleidae			Family Pasiphaeidae		
Dorvillea sociabilis	2	.7	Leptochela papullata	6	2.0
Family Spionidae			Family Ogyrididae		
Paraprionospia pinnata	1	.3	Ogyrides sp.	2	.7
Scolecopsis sp.	1	.3	Family Hippolytidae		
Prionospio sp.	1	.3	Latreutes parvulus	1	.3
unidentified	34	11.3	Thor sp.	2	.7
Family Paraonidae			Family Alpheidae		
unidentified	1	.3	Automate sp.	1	.3
Family Cirratulidae			Family Processidae		
Tharyx annulosa	1	.3	Processa sp.	5	1.7
unidentified	3	1.0	Suborder Reptantia		
Family Orbinidae			Family Scyllaridae		
unidentified	1	.3	Scyllarus sp.	1	.3
Family Capitellidae			Section Anomura		
Notomastus hemipodus	1	.3	Muida sp.	11	3.7
unidentified	1	.3	Pargurus sp.	2	.7
Family Opheliidae			unidentified	1	.3
Travisia sp.	1	.3	Family Albuncidae		
Armandia maculata	16	5.3	Albunea sp.	6	2.0
unidentified	2	.7	Section Brachyura		
Family Maldanidae			unidentified	4	1.3
unidentified	5	1.7	Family Raninidae		
Family Ampharetidae			Ranilia sp.	2	.7
Milinna maculata	2	.7	Family Portunidae		
unidentified	4	1.3	Portunus sp.	2	.7
Family Terebellidae			unidentified	1	.3
Thelepus setosus	2	.7	Family Xanthidae		
unidentified	5	1.7	unidentified	1	.3
Family Sabellidae			Family Pinnotheridae		
unidentified	1	.3	Pinnixa sayana	1	.3
Family Sternapsidae			Crab Megalops (unindent)	16	5.3
Sternapsis scutata	2	.7	Subclass Cirrropedia		
PHYLUM MOLLUSCA			unidentified	1	.3
Class Cephalopoda			PHYLUM SIPUNCULOIDEA		
Class Scaphopoda	1	.3	unidentified	3	1.0
Class Gastropoda			PHYLUM BRYOZOA		
Caecum sp.	3	1.0	unidentified	4	1.3
unidentified	7	2.3	PHYLUM ECHINODERMATA		
Class Pelecypoda			unidentified	10	3.3
unidentified	6	2.0	PHYLUM CHORDATA		
Unidentified Shell Material	17	5.7	fish remains	22	7.3
PHYLUM ARTHROPODA					
Class Crustacea			PHYLUM PLATYHELMINTHES		
Subclass Ostracoda			Class Trematoda	20	6.6*
unidentified	3	1.0	PHYLUM NEMATODA		
Subclass Copepoda			Class Nematoda	78	25.5
Order Calanoida	6	2.0			
Order Harpacticoida	91	10.3			

*smaller specimens may have been overlooked

isms belonging to other phyla was scattered, but it must be assumed that they too can be utilized as food items. The structure of the mouth and teeth of the longspined porgy make this species particularly well adapted for nipping and crushing of substrate. The majority of the food items are creatures with either sedentary existence or those which spend daylight hours concealed in the substrate. Porgies probably locate prey organisms and nip away at places of concealment until the organisms are exposed. This type of feeding behavior would account for the presence of foraminiferans, bryozoans, hydroids, harpacticoid copepods, spionid polychaetes and other small organisms which probably are not large enough to be primary food sources.

Representatives of the phylum Mollusca were found in many stomachs. In addition to intact shells, stomachs and intestines contained a high percentage of crushed shell material. It is difficult to determine whether shell material originated from living molluscs or from the substrate.

Fish remains were found in 22 of the stomachs examined. These remains were generally in the form of scales or vertebrae, with only two incidences of intact fish occurring. It is unlikely that the porgy is a major predator of other fishes, but apparently fish are consumed on an opportunistic basis.

Of other phyla represented, it seems likely that the foraminiferans, bryozoans and hydroids were inadvertently consumed along with the primary food item. Echinoderms, sipunculids and nemerteans, on the other hand, probably are food items which are intentionally eaten when available.

In interpreting the data, it must be remembered that no attempt was made to determine the volume of food re-

presented by each organism. Obviously, one large polychaete would represent a larger volume of food than all the harpacticoid copepods found in all the stomachs. Information presented in Table 2 is qualitative.

A large percentage of the fish examined contained parasitic worms in the stomach and lower digestive tract. Nematodes had an especially high percentage of occurrence and were found in both encysted and active stages. Both trematodes and nematodes are included at the end of Table 2, but they should not be regarded as food items. The incidence of parasitic worms in the *S. caprinus* population appears to be extensive.

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- OCCURRENCE OF *Vaucheria adela*, *V. lii*, AND *V. nasuta* (XANTHOPHYCEAE) IN BRACKISH MARSHES OF THE NORTHERN GULF OF MEXICO.**
- Recent reports of algae from coastal regions of the Gulf of Mexico (Humm and Hamm, 1976; Kapraun, 1974; Pecora, 1976, 1977) indicate that species of *Vaucheria* are often a major component of the algal flora in the area studied. The low frequency of reports of these plants is due, in part, to the seasonal nature of their growth and to the frequent absence of fertile plants in field collections. My studies, conducted since 1974, indicate that maximum abundance of *Vaucheria* species along the Northern Gulf coast occurs during the winter months. This report is based on field and laboratory studies of *Vaucheria* from two locations: brackish marshes of Marsh Island in the western portion of St. Louis Bay, Mississippi (17 Feb. 1978) and marsh areas and tidal flats of the Aransas River, Texas (3 March 1978). *Vaucheria adela* and *V. lii* are here reported from the Gulf coast for the first time. *Vaucheria nasuta* is reported for the first time from Texas.
- Procedures for collection, maintenance of algal material, and documentation are as reported previously (Pecora, 1976, 1977) except that salinities were measured with a YSI Model R-33 SCT meter or an American Optical refractometer.
- OBSERVATIONS AND DISCUSSION**
- Vaucheria adela* Ott & Hommersand 1974. (Fig. 3)
- Filaments 15-33 μm in diameter, branched; monoecious; androphores terminal or infrequently intercalary, 156-552 μm long; antheridia pedicellate, hooked or coiled, lanceolate, 17-31 x 59-113 μm , with a terminal pore, 1-3 per androphore; antheridial pedicels variable in size, 19-276 μm long at 22-31 μm broad; oogonia solitary on filaments, rarely on androphores, subsessile, 60-72 x 96-134 μm , with a small distal vertical beak; oogonial pedicels to 245 μm long; oospores 46-86 x 58-110 μm , bearing a red-brown spot at maturity.
- Vaucheria adela* was collected in February 1978 at five locations on Marsh Island in St. Louis Bay, Hancock County, Mississippi. Several bright-green mats of *Vaucheria* were found on moist soil in a *Juncus roemerianus* marsh. These were generally in shaded sites along the edge of the marsh or along