RESULTS OF MARMAP OTTER TRAWL INVESTIGATIONS IN THE SOUTH ATLANTIC BIGHT. III. SUMMER 1974[1]

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Technical Report Number 41

November 1979

[1]This work is a result of research sponsored by the National Marine Fisheries Service (MARMAP Program Office) under Contract Number 6-35147 and by the South Carolina Wildlife and Marine Resources Department. MARMAP Contribution Number 168.

ABSTRACT

The distribution, relative abundance, composition, diversity and species associations of South Atlantic Bight groundfish were studied from stratified random 3/4 Yankee otter trawl collections during 14 August - 10 September 1974. The stratified mean catch/tow of groundfish was 31.578 kg which resulted in an estimated density of 2.827 kg/hectare. The highest average value of total biomass was in the 9-18 m depth zone (49.353 kg/tow) and the lowest average value was in the 56-110 m depth zone (6.296 kg/tow).

Omitting elasmobranchs, pelagic species and squids, the stratified mean catch/tow of demersal teleosts was 8.016 kg with highest mean catches (14.574 kg/tow) being found in the 19-27 m zone and lowest (0.588 kg/tow) in the 184-366 m zone. Density estimates of demersal teleosts were about 25% of the density estimates for total groundfish.

The numerically dominant demersal teleost was the southern porgy, Stenotomus aculeatus, which made up 23% of the catch. Orange filefish, Aluterus schoepfi, contributed 44.3% of the total demersal teleost weight. The most abundant pelagic species were the Spanish sardine, Sardinella anchovia, round scad, Decapterus punctatus, and butterfish, Peprilus triacanthus. Elasmobranchs were not abundant and were dominated by the roughtailed stingray Dasyatis centroura.

Indices of species diversity (mean number of species/tow, H' and species richness) were calculated and found to be variable but generally high inshore with a tendency to decrease with increasing depth. In addition numerical classification was utilized to define faunal assemblages.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

We thank the Groundfish Survey Group at the National Marine Fisheries Service Laboratory at Woods Hole, Massachusetts for designing the groundfish survey for the South Atlantic Bight.

Programs for diversity calculations and numerical classification were provided by Dr. D. Boesch and Mr. W. Blystone of the Virginia Institute of Marine Science. Dr. A. G. Gash adapted these programs to our ADP system. D. Machowski, C. Brosseau, N. Kopacka of the South Carolina Marine Resources Research Institute provided invaluable help in data processing.

Mr. O. Pashuk provided hydrographic information and Ms. K. Swanson drew all the figures. Dr. Robert Lowe and G. Ulrich reviewed the manuscript and provided constructive comments.

Special thanks go to the past crew of the R/V Dolphin, all field personnel of the South Carolina MARMAP project and Dr. V. G. Burrell, Jr., Director of S.C.M.R.R.I. who initiated the survey and provided support and encouragement. Ms. Kathleen Meuli demonstrated patience and professionalism in typing and organizing the manuscript.

INTRODUCTION

This report is the third in a series summarizing the MARMAP otter trawl surveys from Cape Fear to Cape Canaveral in depths from 9 to 366 m. Readers are referred to Wenner et al. (1979) for an introduction to the literature.

MATERIALS and METHODS

The survey lasted from 14 August to 1 September 1974. We towed a 3/4 scale version of a Yankee No. 36 trawl (Wilk and Silverman 1976) from the R/V Dolphin (a 32.6 m converted tug) at 6.5 km/h. A stratified random sampling design (Grosslein 1969) was employed to allocate trawl tows within strata which were southward projections of MARMAP strata utilized by the Northeast Center of the National Marine Fisheries Service. The strata were subdivisions of six depth zones in which the total effort of 70 trawl tows was allocated as follows: (1) 9-18 m zone, 14 tows; (2) 19-27 m zone, 18 tows; (3) 28-55 m zone, 13 tows; (4) 56-110 m zone, 8 tows; (5) 111-183 m zone, 10 tows; (6) 184-366 m zone, 7 tows. Only successful trawls on sand bottom habitats were analyzed. Trawl tows on live bottom having large amounts of sponges and/or corals and fish species associated with coral reefs (Wenner et al. 1979, Table 1). Fishes were sorted by species, measured and weighed. Hydrographic observations were taken after each trawl with Niskin bottles and reversing thermometers.

Data handling techniques were essentially the same as described in Wenner et al. (1979a). Individual stratum boundaries were collapsed within depth zones, resulting in six previously described zones. These were each treated as a large stratum for the biomass estimates. The stratified mean catch/tow was calculated according to Cochran (1977) and the estimated variance of the mean catch/tow after Clarke and Brown (1977). Because of the negative binomial distribution of the trawl catches, calculations were made on both untransformed and ln $(x+1)$ transformed data (Taylor 1953; Elliott 1972). The Bliss (1967) approximation was used in retransforming the data from logarithmic to original units.

Much of the variability of South Atlantic Bight trawl collections results from occasional catches of large elasmobranchs such as Dasyatis spp. and large catches of pelagic species such as Decapterus punctatus (Wenner et al. 1979). Analyses were performed both on total biomass and demersal bony fishes (total biomass-[elasmobranchs + pelagics + squids]). Biomass estimates were expanded by the area swept method (Rohr and Gutherz 1977) with the sweep of the net being 8.748 m (T. Azarovitz, N.M.F.S., Woods Hole, Mass., personal communication) and 3.241 km the distance covered during a standard tow. All estimates are minimum estimates and have not been adjusted by availability or vulnerability factors for our trawl since they are unknown.

After removal of the squids and pelagic fishes, diversity indices (H' [Pielou 1975] and species richness [Margalef 1968]) were calculated for demersal fishes. The data were then subjected to cluster analysis to compare the similarity between assemblages of organisms (normal analysis) and to compare similarity in the distribution patterns of species (inverse analysis) (Boesch 1977). The Canberra metric coefficient was used in the analysis. In the previous report (Wenner et al. 1979) data were subjected to a log transformation. The log transformation of the data, possibly, was too severe (Clifford and Stephenson 1975). The data were subjected to a square root transformation and standardized by dividing the transformed value of the number of species at a given station by the sum of the transformed values for all collections. The sorting strategy was flexible with $\beta = -0.25$ (Boesch 1977 and Clifford and Stephenson 1975).

Only benthic fish species which were collected at three or more trawl stations were included in the analysis. Examination of species and site groups to determine suitability of the groups and misclassifications was done by nodal analysis (Boesch 1977). Constancy (the number of stations in a site-group in which a given species occurs) and fidelity (the comparison of the frequency of occurrence of a species within a site-group to the overall frequency of occurrence in the whole study area) were examined. A species-group is rated high in constancy if found in all stations in a site-group, and high in fidelity if found in only one site-group.

An index of relative abundance (Musick and McEachran 1972) for each depth zone was calculated for the most abundant and widely distributed species as:

$$\text{Index of Relative Abundance} = \frac{1}{n} \Sigma \ln(x+1)$$

where n = number of trawls in a depth zone

x = number of individuals or weight of a given species for each tow in a depth zone.

RESULTS and DISCUSSION

Hydrography

Highest bottom water temperatures (28°C) were in the inshore areas near Savannah, Georgia (Fig. 1). Most of the open shelf habitat during the summer of 1974 had bottom temperatures of 24 to 26°C with no thermal difference in latitude within the study area. Bottom isotherms were compacted beyond the shelf break and showed a general decrease in bottom temperature with depth.

Bottom salinities were lowest (34 °/oo) in the area near Charleston, South Carolina, where there are numerous estuaries (Fig. 2). Almost the entire shelf area of the South Atlantic Bight had bottom salinities from 35 to 36 °/oo. Thus most of the survey area had relatively homogeneous hydrographic conditions during the summer of 1974.

Biomass

Mean catch/tow values ($\bar{y}_h$) of total groundfish weight and demersal bony fish weight for both transformed (ln[kg+1]) and untransformed catch data are in Tables 1 and 2. Analysis of variance on the transformed demersal bony fish catches showed significant differences in mean catch/tow with the 3/4 Yankee trawl between depth zones (Table 3). Scheffe's linear contrast to isolate significant differences between treatment means (Guenther 1964) showed three groups. There was a depth-related trend in mean catches with lowest values being found in the deeper water zones (Table 4).

The stratified mean catch/tow of total trawl caught groundfish was 31.578 (lower and upper 90% confidence limits [CL]: 21.476; 41.679) kg with untransformed data. The Bliss (1967) approximation of the stratified mean catch/tow with transformed data was 30.407 (lower and upper 90% CL: 23.109; 39.914) kg.

Stratified mean catch/tow values for untransformed and transformed demersal bony fish catches were: (a) untransformed: $\bar{x}$ = 8.016; 90% CL: 6.202; 9.829; (b) transformed: $\bar{x}$ = 8.302; 90% CL: 6.640; 10.324 kg. The removal of squids, elasmobranchs and pelagic fishes reduced the variance of the untransformed data from 2592 to 83 whereas the transformed variance was reduced 50%.

Density estimates for the South Atlantic Bight 3/4 Yankee trawl survey based on 2.835 hectares as the swept area during a standard drag in kg/ha were:

	$\bar{x}$	lower 90% CL	upper 90% CL
total groundfish - untransformed	11.138	7.575	14.702
total groundfish - transformed	10.726	8.151	14.079
demersal bony fish - untransformed	2.827	2.188	3.467
demersal bony fish - transformed	2.928	2.342	3.642

It should be understood that, when utilizing trawl data to obtain mean catch/tow, density estimates, and the expansion of these variables to standing stock values, the relationship of the trawl catch rate to the fish community should be known. We lack information to make adjustments for the 3/4 Yankee trawl in the South Atlantic Bight. Thus, all density estimates and the standing stock estimates of Table 5 should be considered minimum values.

Demersal Bony Fishes

A total of 8832 individuals representing 145 species in 44 families of demersal bony fishes were collected. Numerically, the most important family was the Sparidae with 2085 individuals in four species, closely followed by the Balistidae with 2073 individuals in six species (Table 6). The most speciose families were the Bothidae (17 species), Triglidae (16 species) and the Ophidiidae (9 species).

The most abundant demersal bony fish species was the southern porgy, Stenotomus aculeatus, whose 2036 individuals accounted for 23% of the catch (Table 7). The orange filefish made up 29.2% of the total weight of the catch, making it the top ranking species by weight.

Southern porgy, S. aculeatus, ranked first in total number and weight (Table 8) in trawls in the inshore (9-18 m) depth zone. Planehead filefish, Stephanolepis hispidus, was the numerically dominant fish species in the 19-27 m zone, where the 1535 individuals accounted for 44.6% of the total number of demersal bony fish. Although only 114 Aluterus schoepfi were collected in this zone, their large individual weights (~ 1 kg/individual) resulted in this species ranking first (44.3%) in total weight (Table 9). In the

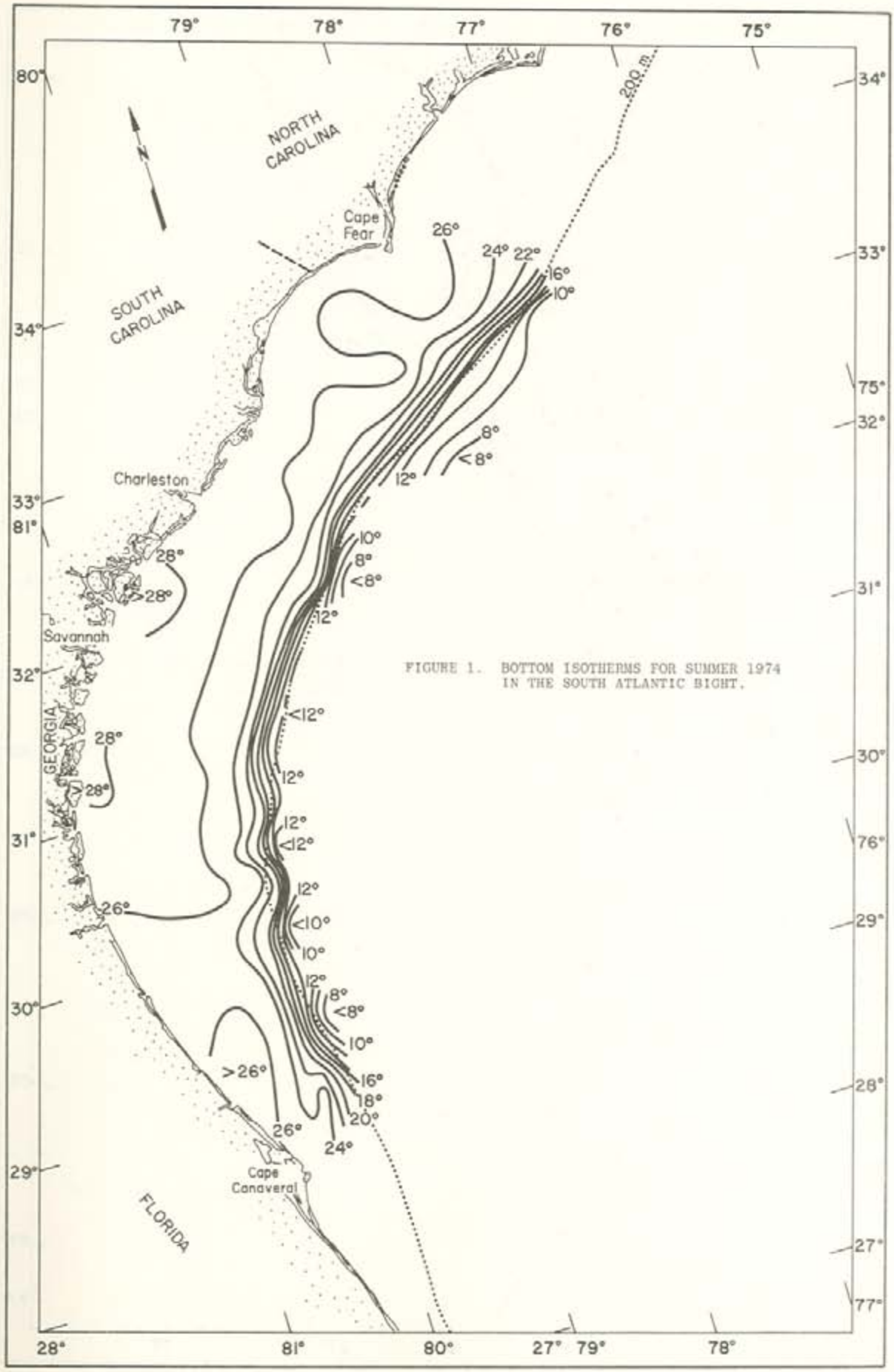

FIGURE 1. BOTTOM ISOTHERMS FOR SUMMER 1974 IN THE SOUTH ATLANTIC BIGHT.

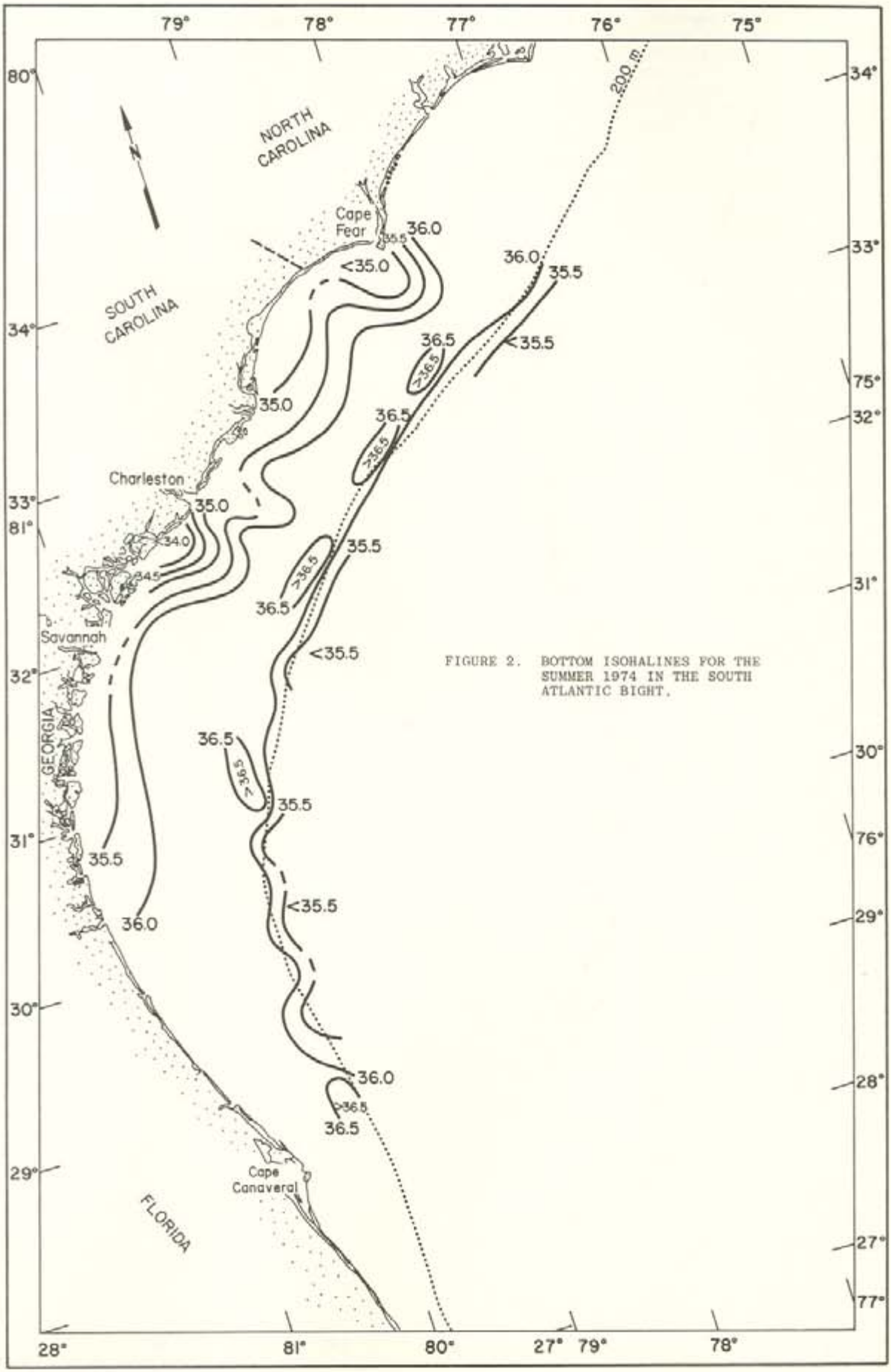

FIGURE 2. BOTTOM ISOHALINES FOR THE SUMMER 1974 IN THE SOUTH ATLANTIC BIGHT.

Table 1. Mean catch/tow ($\bar{y}_h$) values for total trawl caught groundfish on untransformed and transformed {ln(weight + 1)} data by depth zone for the summer 1974 South Atlantic Bight survey. Bliss' (1967) approximation of the mean was applied to the transformed values.

Depth Zone (m)	$\bar{y}_h$ biomass (kg/tow) untransformed	$\bar{y}_h$ biomass (kg/tow) transformed	Area of zone (km^2)	Number of tows
9-18	49.353	53.416	18083	14
19-27	25.454	25.595	16100	18
28-55	34.131	31.243	22367	13
56-110	6.296	7.225	4775	8
111-183	16.727	15.823	3615	10
184-366	20.725	22.124	9724	7

Table 2. Mean catch/tow ($\bar{y}_h$) values for demersal bony fish (total weight-[elasmobranch weight + pelagic weight + squid weight]) on untransformed and transformed {ln(weight + 1)} data by depth zone for the summer 1974 South Atlantic Bight survey. Bliss' (1967) approximation of the mean was applied to the transformed values.

Depth Zone (m)	$\bar{y}_h$ biomass (kg/tow) untransformed	$\bar{y}_h$ biomass (kg/tow) transformed	Area of zone (km^2)	Number of tows
9-18	11.420	11.947	18083	14
19-27	14.574	15.651	16100	18
28-55	5.536	5.673	22367	13
56-110	3.682	3.987	4775	8
111-183	2.827	2.881	3615	10
184-366	0.588	0.595	9724	7

Table 3. Analysis of variance of the mean catch/tow in kg of demersal bony fishes between depth zones.

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Between zones	5	31.193	6.238	10.48*
Among zones	64	38.091	0.595	
Total	69	69.284		

*Significant at the 90% level.

Table 4. Scheffe's multiple range comparison of the transformed mean catch/tow of demersal bony fishes in the six depth zones. Underscoring of treatments groups those that are not significantly different at the 90% level.

Depth zone (m)	9-18	19-27	28-55	56-110	111-183	184-366
$\bar{x}$ (ln[kg + 1])	2.255	2.435	1.603	1.280	1.091	0.395
Number of tows	14	18	13	8	10	7

Table 5. Minimum standing stock estimates of groundfish in the South Atlantic Bight during summer 1974. LCL and UCL = lower and upper 90% confidence limits respectively.

	Mean	LCL	UCL
total groundfish - untransformed	8.32	5.65	10.98
total groundfish - transformed	8.01	6.09	10.51
demersal bony fish - untransformed	2.11	1.63	2.59
demersal bony fish - transformed	2.19	1.75	2.72

Table 6. Ranking of families of demersal bony fishes by numerical abundance during the summer 1974 groundfish survey in the South Atlantic Bight.

Family	Number of Individuals	Weight (kg)	Number of Species
Sparidae	2085	86.4	4
Balistidae	2073	197.8	6
Synodontidae	1175	47.7	7
Serranidae	887	61.9	7
Gadidae	431	18.1	2
Triglidae	424	17.7	16
Bothidae	364	19.8	17
Haemulidae	249	9.0	3
Ophidiidae	232	10.8	9
Ariidae	146	22.3	1
Lutjanidae	146	13.3	3
Sciaenidae	105	14.5	8
Percichthyidae*	64	1.1	3
Ogcocephalidae	60	2.4	5
Scorpaenidae	56	3.1	6
Argentiniidae	42	0.6	1
Carreidae	31	0.5	3
Labridae	31	1.8	3
Chlorophthalmidae	30	0.4	1
Tetraodontidae	26	2.7	5
Ostraciidae	23	3.5	1
Ephippidae	22	2.9	1
Moridae	22	1.0	1
Congridae	18	0.6	2
Cynoglossidae	9	0.7	4
Muraenidae	9	0.9	1
Diodontidae	8	1.3	1
Polymixiidae	8	0.3	1
Mullidae	7	0.7	2
Ophichthidae	7	0.6	2
Batrachoididae	6	0.7	1
Uranoscopidae	6	0.3	1
Soleidae	5	0.3	1
Merluccidae	4	0.3	2
Syngnathidae	4	0.4	4
Lophiidae	3	0.2	1
Macrouridae	3	0.1	1
Muraenesocidae	3	0.2	1
Gobiidae	2	0.2	2
Rachycentridae	2	0.2	1
Antennariidae	1	0.1	1
Caproidae	1	0.1	1
Carapidae	1	0.1	1
Priacanthidae	1	0.5	1
GRAND TOTAL	8832	556.1	145

*The family Percichthyidae is an assemblage of unrelated groups. Although Synagrops is probably not referable to this family, it is herein placed in this group until a published revision of this assemblage is available (G. D. Johnson, personal communication).

Table 7. Ranking by total number and total weight for demersal bony fishes for 70 trawls made during summer 1974 groundfish survey in the South Atlantic Bight.

Species	Total Number	Percent of Total Catch	Cumulative Percent	Number of Occurrences
Stenotomus aculeatus	2036	23.0		25
Stephanolepis hispidus	1883	21.3	44.3	39
Synodus poeyi	713	8.1	52.4	17
Diplectrum formosum	712	8.1	60.5	42
Urophycis regius	430	4.9	65.4	9
Synodus foetens	255	2.9	68.3	44
Prionotus carolinus	185	2.1	70.4	11
Citharichthys arctifrons	173	2.0	72.4	7
Aluterus schoepfi	167	1.9	74.3	25
Arius felis	146	1.6	75.9	5

Species	Total Weight (kg)	Percent of Total Catch	Cumulative Percent	Number of Occurrences
Aluterus schoepfi	162.134	29.2		25
Stenotomus aculeatus	76.753	13.8	43.0	25
Diplectrum formosum	55.686	10.0	53.0	42
Stephanolepis hispidus	32.680	5.9	58.9	39
Synodus foetens	31.187	5.6	64.5	44
Arius felis	22.323	4.0	68.5	5
Urophycis regius	17.992	3.2	71.7	9
Rhomboplites aurorubens	12.648	2.3	74.0	7
Syacium papillosum	9.674	1.7	75.7	17
Prionotus carolinus	8.666	1.6	77.3	11

Table 8. Numerically dominant demersal bony fish species by depth for summer 1974 groundfish survey in the South Atlantic Bight. N_1 = number of occurrences; N = total trawls in zone.

Depth Zone (m)	Species	Total Number	Percent of Total in Depth Zone	N_1/N
9-18	Stenotomus aculeatus	1443	50.7	11/14
	Stephanolepis hispidus	299	10.5	10/14
	Diplectrum formosum	225	7.9	12/14
	Arius felis	146	5.1	5/14
	Prionotus carolinus	133	4.7	7/14
	Haemulon aurolineatum	64	2.2	3/14
	Synodus foetens	62	2.2	12/14
	Ophidion beani	47	1.6	4/14
	Prionotus scitulus	46	1.6	6/14
	Larimus fasciatus	39	1.4	2/14
19-27	Stephanolepis hispidus	1535	44.6	17/18
	Stenotomus aculeatus	548	15.9	10/18
	Diplectrum formosum	371	10.8	18/18
	Rhomboplites aurorubens	134	3.9	5/18
	Aluterus schoepfi	114	3.3	15/18
	Synodus foetens	105	3.1	17/18
	Haemulon striatum	102	3.0	3/18
	Ophidion beani	75	2.2	5/18
	Haemulon aurolineatum	74	2.2	4/18
	Prionotus carolinus	52	1.5	4/18
28-55	Diplectrum formosum	116	23.4	12/13
	Synodus poeyi	78	15.7	11/13
	Stephanolepis hispidus	44	8.9	5/13
	Stenotomus aculeatus	44	8.9	10/13
	Aluterus schoepfi	33	6.6	3/13
	Pagrus pagrus	27	5.4	7/13
	Hemipteronotus novacula	17	3.4	5/13
	Rhomboplites aurorubens	6	1.2	7/13
	Centropristis ocyurus	5	1.0	1/13
	Synodus foetens	80	16.1	2/13
56-110	Synodus poeyi	596	60.7	8/8
	Saurida sp.	75	7.6	1/8
	Serranus notospilus	64	6.5	5/8
	Trachinocephalus myops	58	5.9	3/8
	Syacium papillosum	42	4.3	4/8
	Bellator militaris	25	2.6	2/8
	Centropristis ocyurus	16	1.6	4/8
	Saurida brasiliensis	15	1.5	2/8
	Ogcocephalus parvus	9	0.9	3/8
	Halientichthys aculeatus	8	0.8	3/8
111-183	Urophycis regius	427	43.8	8/10
	Citharichthys arctifrons	171	17.5	5/10
	Peristedion gracile	101	10.4	4/10
	Synodus poeyi	36	3.7	2/10
	Serranus notospilus	32	3.3	4/10
	Saurida brasiliensis	31	3.2	2/10
	Glossanodon pygmaeus	30	3.1	5/10
	Synagrops spinosa	24	2.5	3/10
	Synagrops bella	22	2.2	3/10
	Halieutichthys aculeatus	16	1.6	4/10
184-366	Chlorophthalmus agassizi	30	29.4	4/7
	Laemonema barbatulum	22	21.6	2/7
	Glossanodon pygmaeus	12	11.8	1/7
	Synagrops bella	11	10.8	3/7
	Helicolenus dactylopterus	7	6.9	3/7
	Coelorinchus sp.	3	2.9	1/7
	Merluccius bilinearis	3	2.9	1/7
	Urophycis regius	3	2.9	1/7
	Trachyscorpia cristulata	2	2.0	1/7

Table 9. Dominant demersal bony fish species by weight for summer 1974 groundfish survey in the South Atlantic Bight by depth zone. N_1 = number of occurrences; N = total trawls in zone.

Depth Zone (m)	Species	Total Weight (kg)	Percent of Total in Depth Zone	N_1/N
9-18	Stenotomus aculeatus	47.828	29.9	11/14
	Arius felis	22.323	14.0	5/14
	Aluterus schoepfi	16.783	10.5	3/14
	Diplectrum formosum	10.125	6.3	12/14
	Rachycentron canadum	8.165	5.1	2/14
	Prionotus carolinus	5.644	3.5	7/14
	Menticirrhus americanus	5.190	3.2	4/14
	Larimus fasciatus	4.990	3.1	2/14
	Stephanolepis hispidus	4.584	2.9	10/14
	Haemulon aurolineatum	4.537	2.8	2/14
19-27	Aluterus schoepfi	116.221	44.3	15/18
	Diplectrum formosum	30.037	11.4	18/18
	Stephanolepis hispidus	26.542	10.1	17/18
	Stenotomus aculeatus	25.096	9.6	10/18
	Synodus foetens	15.270	5.8	17/18
	Rhomboplites aurorubens	12.094	4.6	5/18
	Haemulon aurolineatum	3.929	1.5	4/18
	Ophidion beani	3.376	1.3	5/18
	Syacium papillosum	3.276	1.2	4/18
	Equetus lanceolatus	3.275	1.2	2/18
28-55	Aluterus schoepfi	29.130	40.5	7/13
	Diplectrum formosum	15.524	21.6	12/13
	Synodus foetens	11.032	15.3	11/13
	Stenotomus aculeatus	3.729	5.2	3/13
	Calamus leucosteus	1.814	2.5	2/13
	Stephanolepis hispidus	1.354	1.9	10/13
	Pagrus pagrus	1.208	1.7	5/13
	Hemipteronotus novacula	1.054	1.5	7/13
	Synodus intermedius	1.008	1.4	3/13
	Lactophrys quadricornis	0.654	0.9	3/13
56-110	Trachinocephalus myops	5.544	18.8	3/8
	Synodus poeyi	5.304	18.0	8/8
	Calamus leucosteus	4.536	15.4	1/8
	Syacium papillosum	4.082	13.8	4/8
	Synodus foetens	1.108	3.8	4/8
	Saurida sp.	0.907	3.1	1/8
	Sphoeroides pachygaster	0.907	3.1	1/8
	Serranus notospilus	0.854	2.9	5/8
	Bellator militaris	0.554	1.9	2/8
	Porichthys porosissimus	0.454	1.5	1/8
111-183	Urophycis regius	17.892	63.3	8/10
	Peristedion gracile	1.108	3.9	4/10
	Ancylopsetta dilecta	1.008	3.6	3/10
	Paralichthys squamilentus	0.907	3.2	1/10
	Saurida normani	0.554	2.0	2/10
	Citharichthys arctifrons	0.500	1.8	5/10
	Glossanodon pygmaeus	0.500	1.8	5/10
	Ogcocephalus radiatus	0.500	1.8	5/10
	Halieutichthys aculeatus	0.400	1.4	4/10
	Serranus notospilus	0.400	1.4	4/10
184-366	Helicolenus dactylopterus	1.107	26.9	3/7
	Laemonema barbatulum	1.007	24.5	2/7
	Chlorophthalmus agassizi	0.400	9.7	4/7
	Synagrops bella	0.300	7.3	3/7
	Citharichthys arctifrons	0.100	2.4	1/7
	Coelorinchus sp.	0.100	2.4	1/7
	Glossanodon pygmaeus	0.100	2.4	1/7
	Merluccius albidus	0.100	2.4	1/7
	Merluccius bilinearis	0.100	2.4	1/7

28-55 m depth zone, sand perch, Diplectrum formosum, ranked first with 116 individuals (23.4%). Again A. schoepfi contributed the largest weight. The 596 offshore lizardfish, Synodus poeyi, comprised 60.7% of the demersal bony fish catch in the 56-110 m zone but their small size accounted for only 18% of the weight. Trawls in the two outside zones (111-183 m; 184-366 m) generally had very low catches. Spotted hake, Urophycis regius dominated the 111-183 m zone whereas Chlorophthalmus agassizi was numerically most important in the deepest trawls.

Southern porgy: Stenotomus aculeatus

Southern porgy, Stenotomus aculeatus, was the most abundant demersal bony fish during the summer 1974 survey. This species was found throughout the study area (Fig. 3) in depths from 11-128 m (15.4-28.2°C) and exhibited greatest density in the 9-18 m depth zone. The specimens taken in 11 of the 14 trawls in this zone accounted for 70.9% of the total number and 63.2% of the total weight of S. aculeatus for the entire survey. The index of relative abundance was highest in the inshore zone and showed a general decrease with increasing depth (Fig. 4A). A single specimen was trawled in 128 m and represents the only individual taken in depths greater than 32 m. Although the size frequency distributions overlap, larger individuals tended to occur in deeper water (Fig. 4B). Mean size for all zones was 11.7 cm FL (range 6-17 cm FL). Abundance statistics for southern porgy are in Table 10.

Planehead filefish: Stephanolepis hispidus

Stephanolepis hispidus, the second most numerically abundant demersal teleost, comprising 21.3% of the total number and 5.9% of the total weight of the demersal catch, was widely distributed during the summer survey (Fig. 5) from Cape Fear to Cape Canaveral in depths from 11 to 42 m (23-28°C). Although five individuals were taken in depths from 80 to 99 m, these were not included in the analysis because of their small size and the known association of juveniles of this species with the pelagic Sargassum community. Stephanolepis hispidus was found in 82% of the 45 trawls in the three inshore depth zones. Maximum catch rates, both in numbers and weight, occurred in the 19-27 m zone where S. hispidus was collected in all but one of the 18 trawls (Fig. 4C). Although there was an increase in average size with depth, this was the result of a larger number of juveniles less than 8 cm TL in the 9-18 m and 19-27 m zones (Fig. 4D). Overall mean size was 9.3 cm TL (range 2-19 cm TL). Abundance statistics for planehead filefish are in Table 10.

Offshore lizardfish: Synodus poeyi

This species ranked third numerically, comprising 9.1% of the total number of demersal teleosts. Due to small individual size, this species failed to contribute significantly to the biomass of the area. Synodus poeyi was taken from 20 to 128 m (15.9-26.4°C) in the middle shelf area (Fig. 6). Maximum catch rates (149 individuals and 1.33 kg/hour trawl) occurred in the 56-110 m depth zone, where 84% of the total number and 85% of the total weight of S. poeyi were taken (Fig. 7A). Since this species showed irregular occurrences in other depth zones, no density estimates or corresponding standing stock estimates were calculated. There was a slight increase in modal size with increasing depth (Fig. 7B). Fishes taken in the 111-184 m depth zone were about 1.6 cm FL larger than those in the two shallower zones where S. poeyi occurred in any numbers.

Sand perch: Diplectrum formosum

Sand perch, one of the most ubiquitous species in the sand bottom habitat in depths less than 56 m (Fig. 8), ranked fourth in number (8.1%) and third in weight (10.0%) of demersal teleosts. It occurred from 11 to 42 m (23.0-28.2°C), with maximum catch rates in the 19-27 m depth zone (Fig. 7C). Catches in this depth zone represented 52% of the total number and 54% of the total weight of D. formosum taken. Large fishes (> 15 cm FL) were present in all three inshore depth zones, but smaller fishes were restricted to the 9-18 m and 19-27 m zones. This apparent depth preference of juveniles resulted in an increase in average size with increasing depth (Fig. 7D). The overall mean size was 15 cm FL (range 3-31 cm FL).

Spotted hake: Urophycis regius

Urophycis regius was limited to the upper part of the continental slope in depths from 128 to 293 m (10.2-16.2°C) (Fig. 9) and was the fifth most numerically abundant and the seventh most important demersal teleost by weight. Ninety-nine percent of the total number and weight of spotted hake were collected in 8 of 10 trawls in the 111-183 m zone (Fig. 10A), where the catch per effort was 85.4 individuals/hour and 17.89 kg/hour. Mean length for U. regius was 14.8 cm TL (range 12-25 cm TL) (Fig. 10B).

Inshore lizardfish: Synodus foetens

Synodus foetens, widely distributed throughout the study area (Fig. 11) was taken in depths from 11 to 101 m (15.8-28.2°C). Maximum catches occurred in the 19-27 m depth zone (Fig. 10C). Ninety-seven percent of the total number and 96% of the total weight of S. foetens were found in depths less than 56 m.

Length frequency distributions (Fig. 10D) indicated that 86% of the juveniles (< 15 cm FL) were trawled in the 9-18 m depth zone. The increase in mean size with increased depth was caused by the occurrence of juveniles in shallow waters, since larger fish were taken in all zones to 110 m.

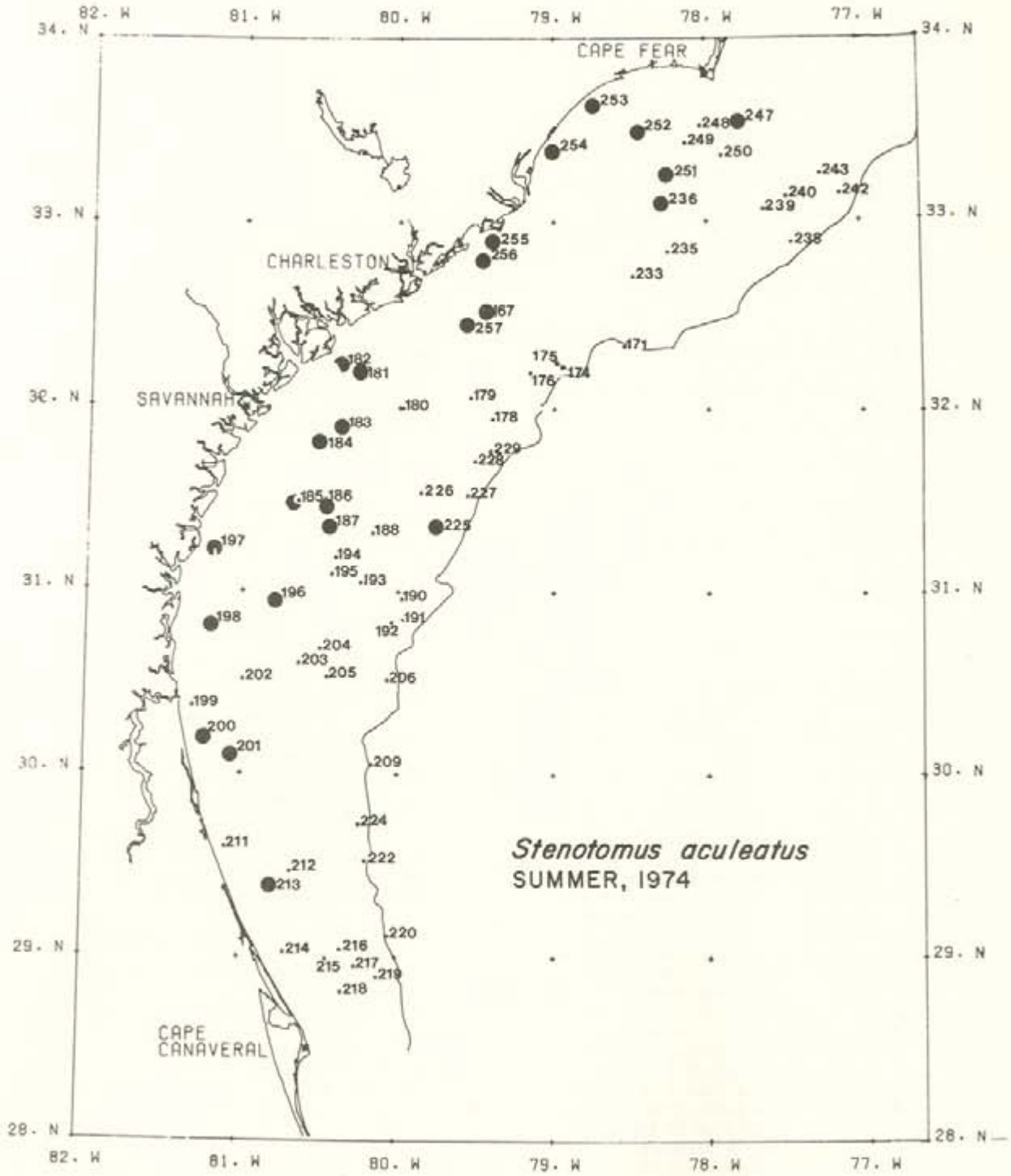

FIGURE 3. DISTRIBUTION OF SOUTHERN PORGY, STENOTOMUS ACULEATUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

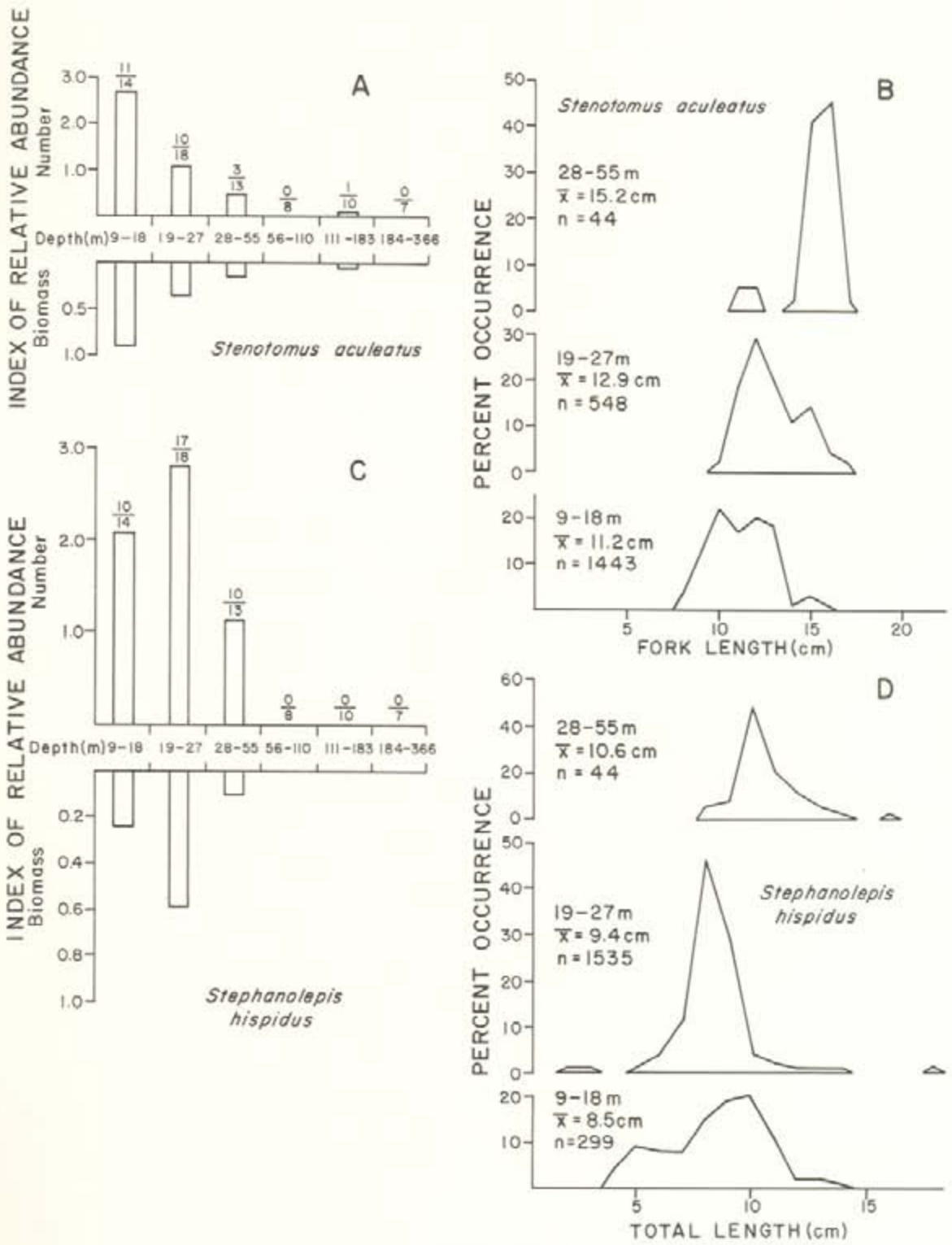

FIGURE 4. INDEX OF RELATIVE ABUNDANCE OF SOUTHERN PORGY, STENOTOMUS ACULEATUS (A), AND PLANEHEAD FILEFISH, STEPHANOLEPIS HISPIDUS (C), DURING THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMBER IN NUMERATOR = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN ZONE. LENGTH FREQUENCY DISTRIBUTION BY DEPTH ZONE FOR S. ACULEATUS (B), AND S. HISPIDUS (D) DURING THE SURVEY.

Table 10. Abundance statistics for the most common occurring groundfish in the summer 1974 groundfish survey in the South Atlantic Bight. LCL and UCL = lower and upper 90% confidence limits. Values in parentheses following standing stock values are expansion factors for $\bar{x}$, LCL and UCL. Standing stock weight estimates are in metric tons. Stratified weights/tow are in kg.

Species		Depth Zone (m)	Stratified Mean Catch/Tow Untransformed LCL<$\bar{x}$<UCL	Stratified Mean Catch/Tow Transformed LCL<$\bar{x}$<UCL	Density (# or kg/hectare) Untransformed LCL<$\bar{x}$<UCL	Density (# or kg/hectare) Transformed LCL<$\bar{x}$<UCL	Standing Stock Estimate Untransformed LCL<$\bar{x}$<UCL	Standing Stock Estimate Transformed LCL<$\bar{x}$<UCL
Stenotomus aculeatus	number	9-55	15.4 <60.8 <106.2	26.9 <45.4 <76.2	5.4 <21.4 <37.4	9.5 <16.0 <26.9	2.12<8.35<14.59($\times 10^7$)	3.70<6.24<10.47($\times 10^7$)
	weight		1.26< 2.20< 2.28	1.12< 1.65< 2.32	0.31< 0.78< 1.24	0.39< 0.58< 0.82	1.21<3.02< 4.82($\times 10^3$)	1.54<2.27< 3.19($\times 10^3$)
Stephanolepis hispidus	number	9-55	13.7 <45.5 < 77.3	26.9 <42.2 <65.8	4.8 <16.1 <27.3	9.5 <14.9 <23.2	1.89<6.26<10.63($\times 10^7$)	3.70<5.80< 9.04($\times 10^7$)
	weight		0.29< 0.65< 1.26	0.44< 0.65< 0.87	0.10< 0.27< 0.44	0.16< 0.23< 0.31	0.40<1.06< 1.73($\times 10^3$)	0.61<0.89< 1.20($\times 10^3$)
Diplectrum formosum	number	9-55	11.0 <17.1 < 23.2	12.8 <17.6 <24.1	3.9 < 6.0 < 8.2	4.5 < 6.2 < 8.5	1.51<2.35< 3.19($\times 10^7$)	1.75<2.42< 3.32($\times 10^7$)
	weight		0.85< 1.17< 1.50	0.90< 1.15< 1.45	0.30< 0.41< 0.53	0.32< 0.41< 0.51	1.16<1.61< 2.06($\times 10^3$)	1.23<1.58< 1.99($\times 10^3$)
Synodus foetens	number	9-55	4.0 < 5.2 < 6.4	4.3 < 5.5 < 6.9	1.4 < 1.8 < 2.2	1.5 < 1.9 < 2.4	0.55<0.72< 0.88($\times 10^7$)	0.59<0.75< 0.95($\times 10^7$)
	weight		0.40< 0.58< 0.76	0.43< 0.57< 0.71	0.14< 0.20< 0.27	0.15< 0.20< 0.25	0.54<0.80< 1.05($\times 10^3$)	0.59<0.78< 0.98($\times 10^3$)
Aluterus schoepfi	number	9-55	2.0 < 3.6 < 5.2	2.2 < 3.2 < 4.5	0.7 < 1.3 < 1.8	0.8 < 1.1 < 1.6	0.27<0.42< 0.72($\times 10^7$)	0.31<0.44< 0.62($\times 10^7$)
	weight		2.00< 3.50< 5.22	2.10< 3.04< 4.26	0.63< 1.23< 1.84	0.74< 1.07< 1.50	2.44<4.80< 7.18($\times 10^3$)	2.89<4.18< 5.86($\times 10^3$)
Decapterus punctatus	number	9-110	49.9 <140.9 < 232.1	68.9 <118.8<204.2	17.6 <49.7 <81.9	24.3 <41.9 <72.0	0.75<2.11< 3.48($\times 10^8$)	1.04<1.78< 3.07($\times 10^8$)
	weight		0.98< 2.61< 4.25	1.22< 1.77< 2.45	0.35< 0.92< 1.50	0.43< 0.62< 0.86	1.48<3.93< 6.38($\times 10^3$)	1.84<2.65< 3.67($\times 10^3$)
Total Squid	number	9-366	33 <49.9 < 66.7	58 <87.1 <129.6	11.6 <17.6 <23.6	20.6 <30.7 <45.7	0.87<1.31< 1.76($\times 10^8$)	1.53<2.29< 3.41($\times 10^8$)
	weight		0.77< 1.53< 2.28	.94< 1.23< 1.57	0.27< 0.54< 0.80	0.33< 0.43< 0.55	2.03<4.02< 6.01($\times 10^3$)	2.47<3.24< 4.13($\times 10^3$)

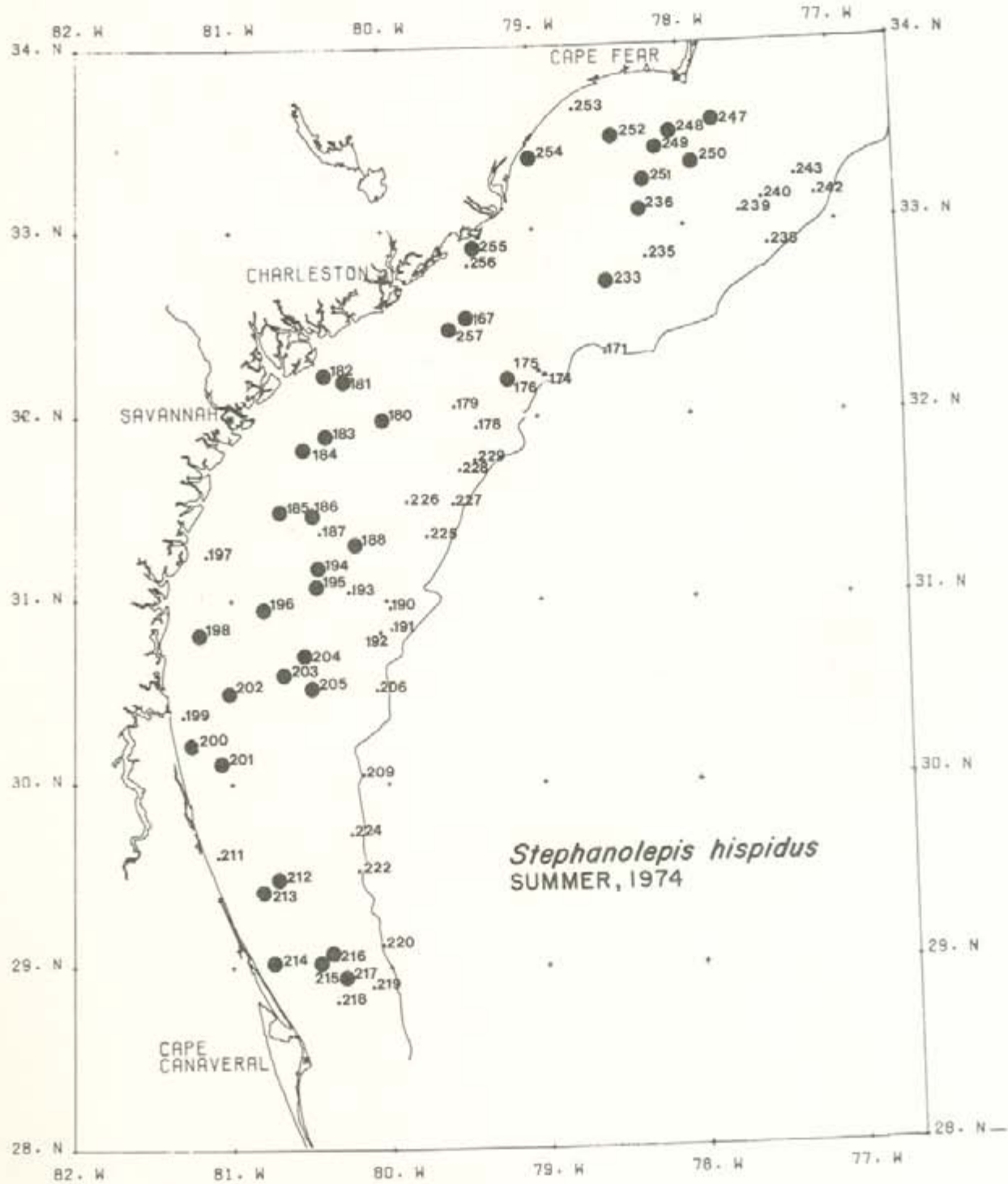

FIGURE 5. DISTRIBUTION OF PLANEHEAD FILEFISH, STEPHANOLEPIS HISPIDUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

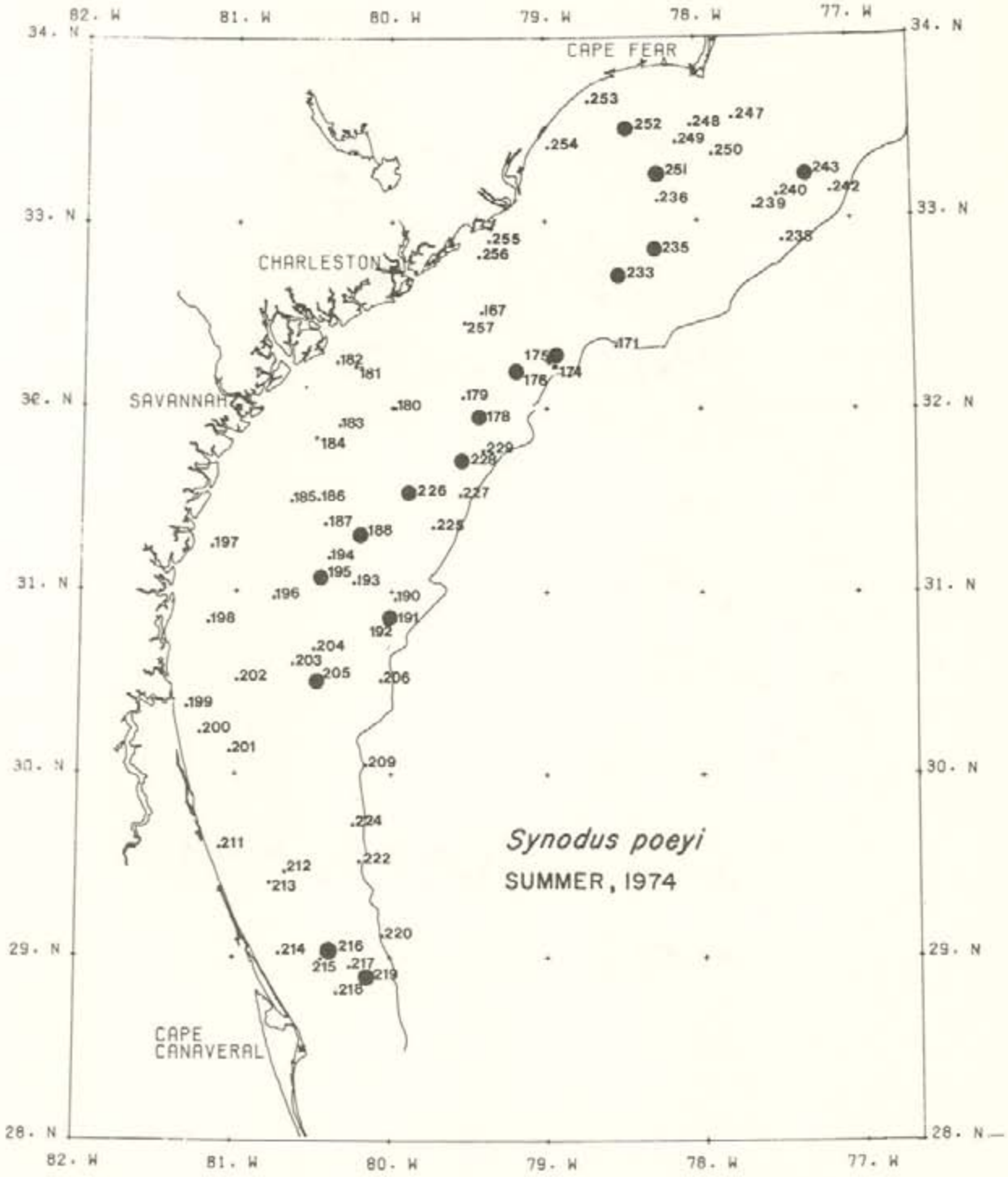

FIGURE 6. DISTRIBUTION OF OFFSHORE LIZARDFISH, SYNODUS POEYI, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

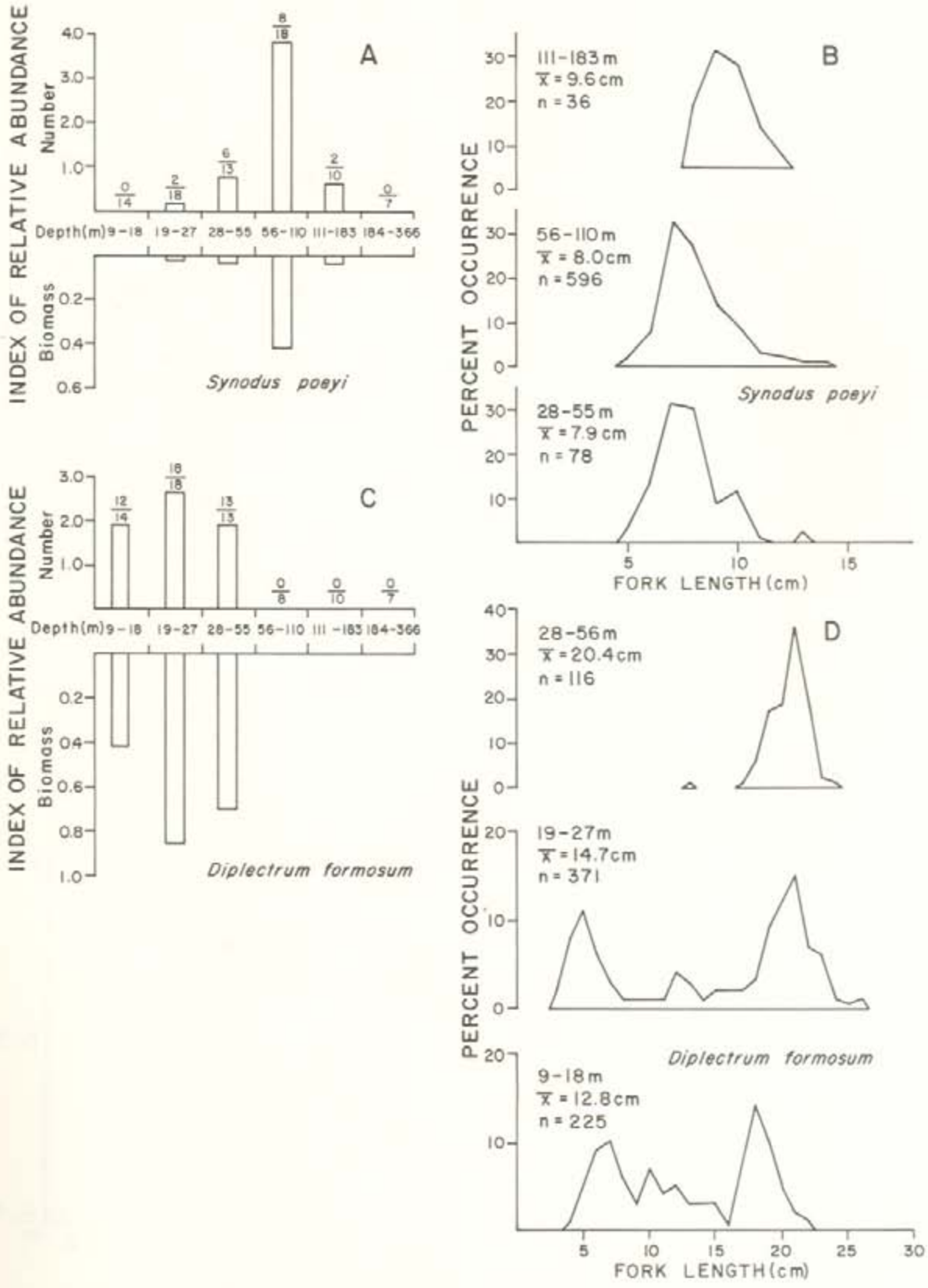

FIGURE 7. INDEX OF RELATIVE ABUNDANCE FOR OFFSHORE LIZARDFISH, SYNODUS POEYI (A), AND SAND PERCH, DIPLECTRUM FORMOSUM (C), IN THE SAND BOTTOM HABITAT OF THE SOUTH ATLANTIC BIGHT DURING THE SUMMER OF 1974. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCY DISTRIBUTIONS OF S. POEYI (B) AND D. FORMOSUM (D) BY THE DEPTH ZONE FOR THE SUMMER 1974 GROUNDFISH SURVEY.

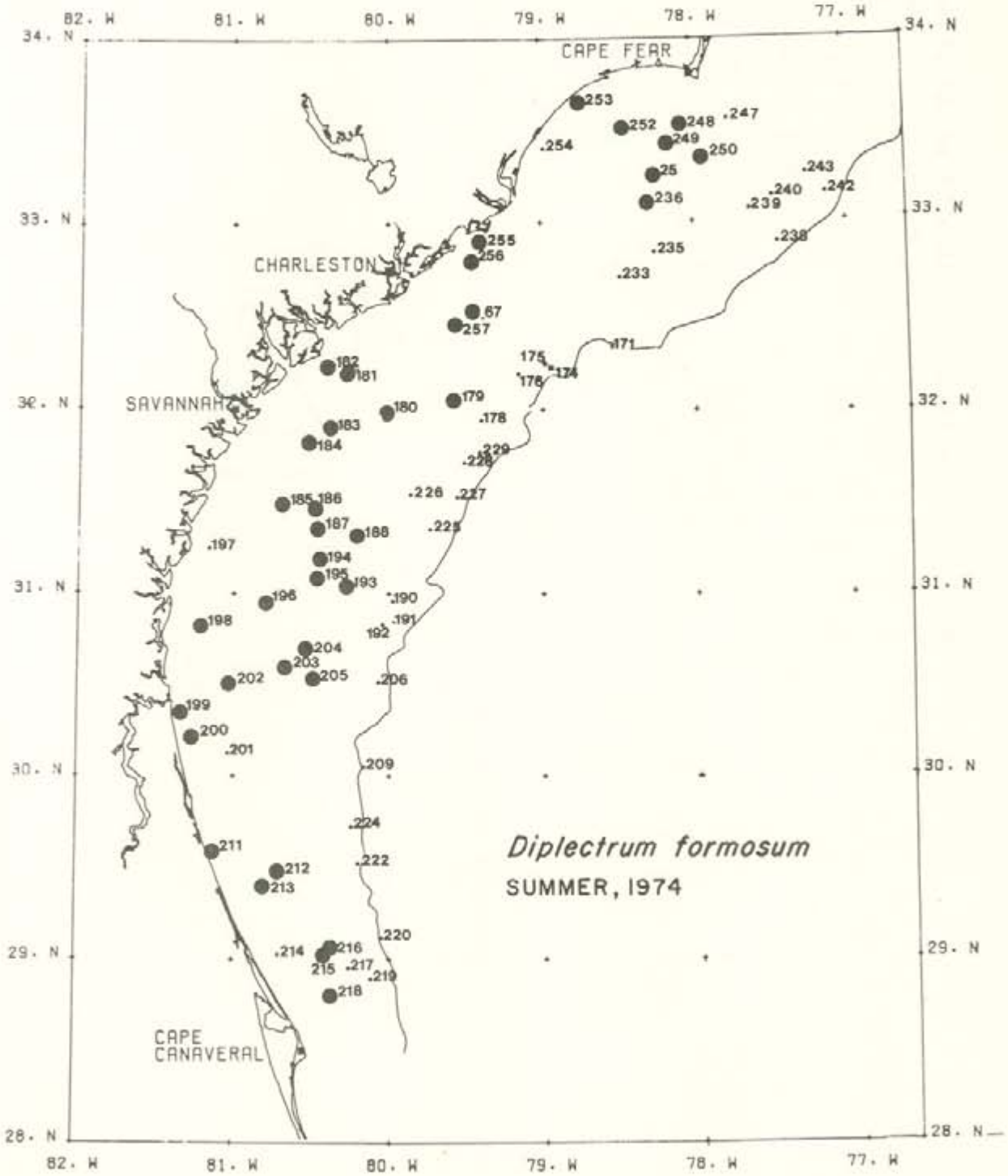

FIGURE 8. DISTRIBUTION OF SAND PERCH, DIPLECTRUM FORMOSUM, DURING THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

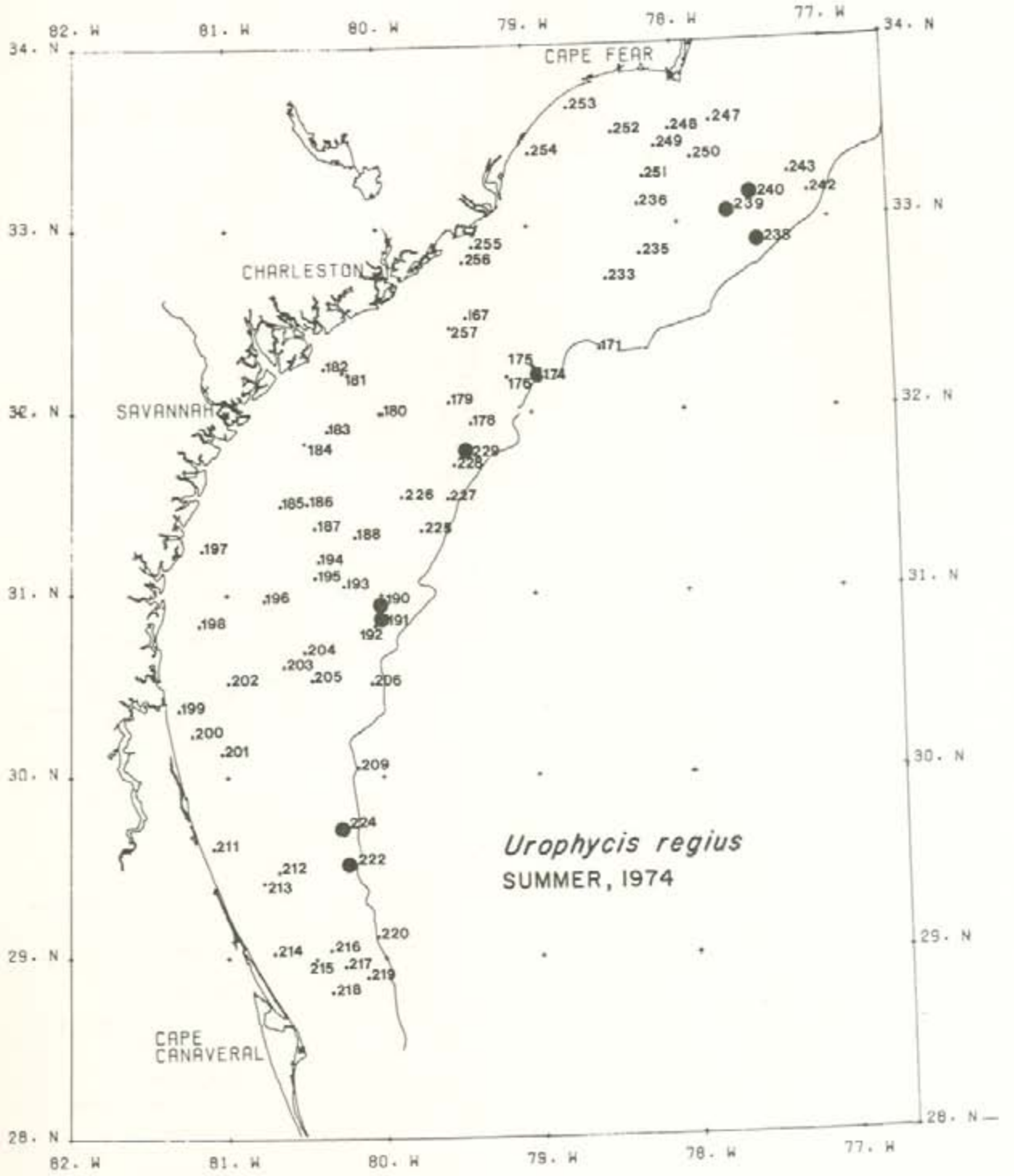

FIGURE 9. DISTRIBUTION OF SPOTTED HAKE, UROPHYCIS REGIUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

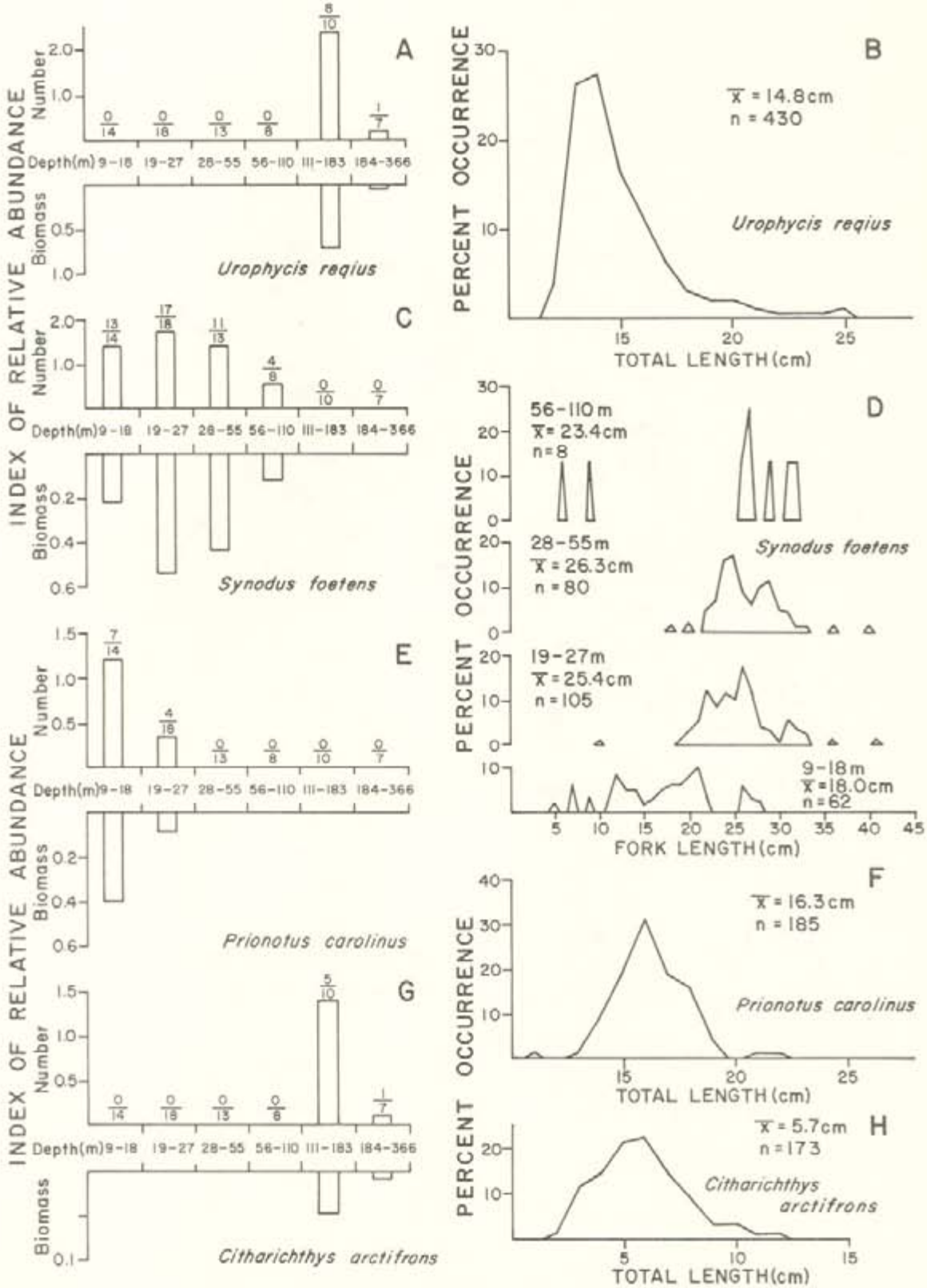

FIGURE 10. INDEX OF RELATIVE ABUNDANCE FOR SPOTTED HAKE, UROPHYCIS REGIUS (A) INSHORE LIZARDFISH, SYNODUS FOETENS (C), NORTHERN SEAROBIN, PRIONOTUS CAROLINUS (E) AND GULF STREAM FLOUNDER, CITHARICHTHYS ARCTIFRONS (G) DURING THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMBER IN NUMERATOR = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN ZONE. LENGTH FREQUENCY DISTRIBUTION OF U. REGIUS (B), S. FOETENS (D), P. CAROLINUS (F) AND C. ARCTIFRONS (H) DURING THE SURVEY.

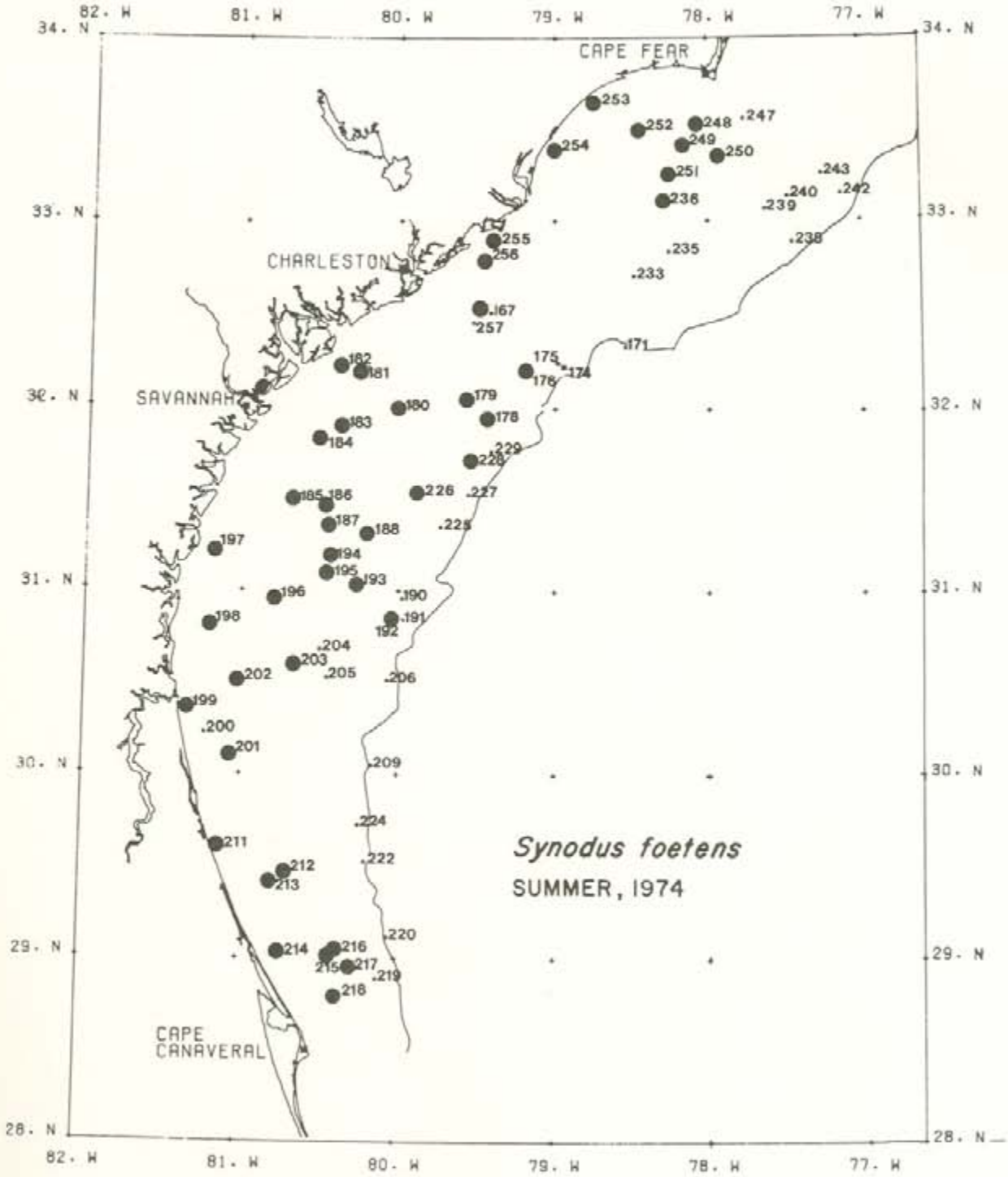

FIGURE 11. DISTRIBUTION OF INSHORE LIZARDFISH, SYNODUS FOETENS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

Northern searobin: Prionotus carolinus

Northern searobins were collected from 11 to 25 m (26.2-28.2°C) (Fig.12). Maximum catches occurred in the 9-18 m depth zone (Fig. 10E) where P. carolinus was found in 50% of the 14 trawls. Catches in this zone accounted for 72% of the total number and 65% of the total weight of northern searobins. The average size of P. carolinus was 16.3 cm TL (range 11-22 cm TL) (Fig. 10F).

Gulf Stream flounder: Citharichthys arctifrons

Citharichthys arctifrons like Urophycis regius was limited in its distribution to the two deepest zones (Fig. 10G), which represented trawls made on the upper portion of the continental slope. All but a single specimen were collected in the 111-183 m depth zone. The average size of C. arctifrons was 5.7 cm TL (range 2-12 cm TL) (Fig. 10H).

Orange filefish: Aluterus schoepfi

Although only 167 Aluterus schoepfi were collected during the course of this survey (Fig. 13), their large average weight (0.97 kg) contributed to their dominant ranking in total weight of the demersal teleost catch. This species was found from 12 to 41 m (24.3-28.2°C) with maximum abundance in the 19 to 28 m depth zone (Fig. 14A). Trawls here accounted for 68% of the total number and 72% of the total weight of orange filefish during the summer 1974 survey. Mean size was 45 cm TL (range 9-54 cm TL) (Fig. 14B). Abundance statistics for this species are in Table 11.

Dusky flounder: Syacium papillosum

Dusky flounder, Syacium papillosum, were not abundant during the summer 1974 survey with only 94 individuals occurring in otter trawls in the South Atlantic Bight (Fig. 15) in depths from 11 to 99 m (21.5-28.1°C). Maximum catches both in numbers and weight were in the 56 to 110 m depth zone (Fig. 14C), where the catch/unit effort was 10.5 individuals with a weight of 1.02 kg per hour trawl time. In this zone 45% of the total number and 42% of the total weight of S. papillosum were taken. The average size was 21 cm TL (range from 7-30 cm TL) (Fig. 14D).

Other Demersal Bony Fish Species

The sea catfish, Arius felis, was collected in 5 of 14 trawls made in the 9-18 m zone, all in the southern part of the survey area, primarily off northern Florida. Catch/hour trawled in the 9-18 m zone was 20.9 individuals with a weight of 3.19 kg. Mean size was 22.1 cm FL (range 20-29 cm FL).

Vermilion snapper, Rhomboplites aurorubens, were taken infrequently from 15 to 37 m (24.8-26.5°C). Ninety-four percent of the total number (142) and 96% of the total weight (12.65 kg) was caught in 5 of 18 trawls in the 19-27 m zone. The catch/hour trawled for this zone was 14.9 individuals with a weight of 1.34 kg. The average size was 17.2 cm FL (range 6-22 cm FL).

A total of 138 tomtate, Haemulon aurolineatum, with a weight of 8.470 kg was taken in 7 of 32 trawls made in depths from 9-27 m. The catch/hour trawl time in these depths was 8.6 individuals with a weight of 0.530 kg. The average size for these tomtate was 14.4 cm FL (range 10-22 cm FL).

The most abundant cusk-eel was the longnose cusk-eel, Ophidion beani, which was found in 9 of 32 trawls made in the two inshore zones. The catch/hour trawl time was 7.6 individuals with a weight of 0.337 kg. The average size was 18.4 cm TL with a range from 8 to 22 cm.

Although both red porgy, Pagrus pagrus, and black sea bass, Centropristis striata, are important commercial fishes in the South Atlantic Bight, they are generally restricted in their distribution to the "sponge-coral, live bottom" or the high-relief shelf break habitats of this area. During the course of the 1974 summer survey, 29 P. pagrus with a mean size of 13 cm FL were collected in the sand habitat. All but two of these were in five trawls in the 28-36 m zone. The 29 black sea bass were taken in 4 trawls made in depths from 9-27 m and had an average size of 16 cm TL.

Elasmobranchs

The 28 elasmobranchs (Table 11), representing seven species in five families, accounted for 42.5% of the total groundfish catch by weight. By weight, elasmobranch catches were dominated by the roughtailed stingray, Dasyatis centroura, whose five individuals averaged 133.4 kg each. Numerical catches of elasmobranchs were down during the 1974 summer survey (n = 28) when compared to the fall 1973 survey (n = 139) and the spring 1974 survey (n = 201). The weight was greatest in the spring 1974 catch (2998.1 kg) and least in the fall 1973 catch (671.4 kg). The fall 1973 catch contained more elasmobranchs than that in the present survey, but they were of a smaller size.

Pelagic Fishes

A total of 22,884 pelagic fishes (twenty-nine species, ten families) were taken incidentally to bottom trawl operations in the South Atlantic Bight during the summer of 1974. The Clupeidae (four species) was numerically the most abundant family (9,569 individuals) and comprised 41.8% of the total pelagic catch. Carangids comprised 36.7% of the pelagic catch (Table 12). The dominant three families (Clupeidae, Carangidae, and Stromateidae) accounted for 91.5% by number and 95.6% by weight of the total pelagic catch. The Spanish sardine, Sardinella anchovia, round scad, Decapterus punctatus, and the butterfish, Peprilus triacanthus, made up 89% of the

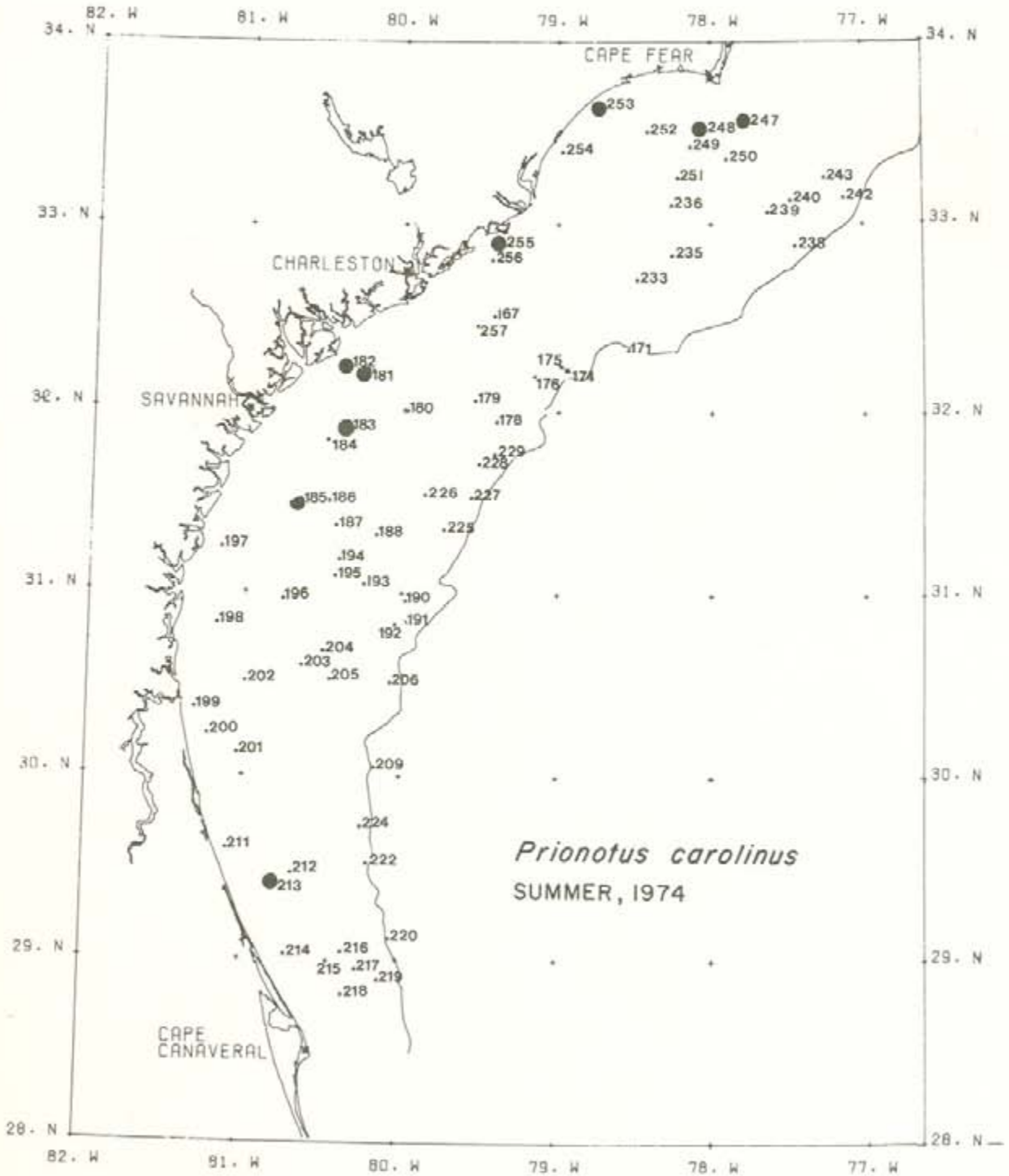

FIGURE 12. DISTRIBUTION OF NORTHERN SEAROBIN, PRIONOTUS CAROLINUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT ; SMALL DOTS = SPECIES ABSENT.

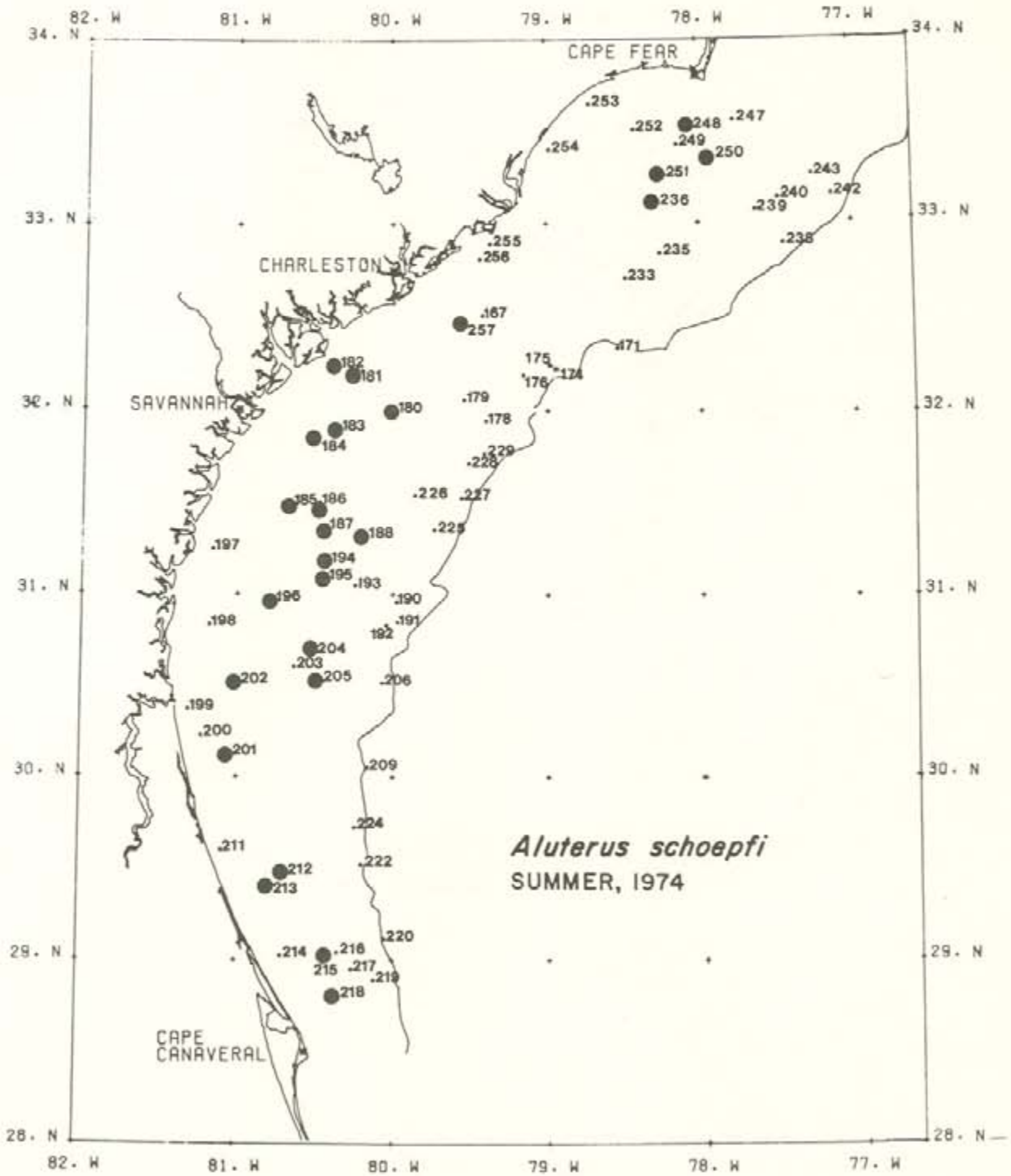

FIGURE 13. DISTRIBUTION OF ORANGE FILEFISH, ALUTERUS SCHOEPFI, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

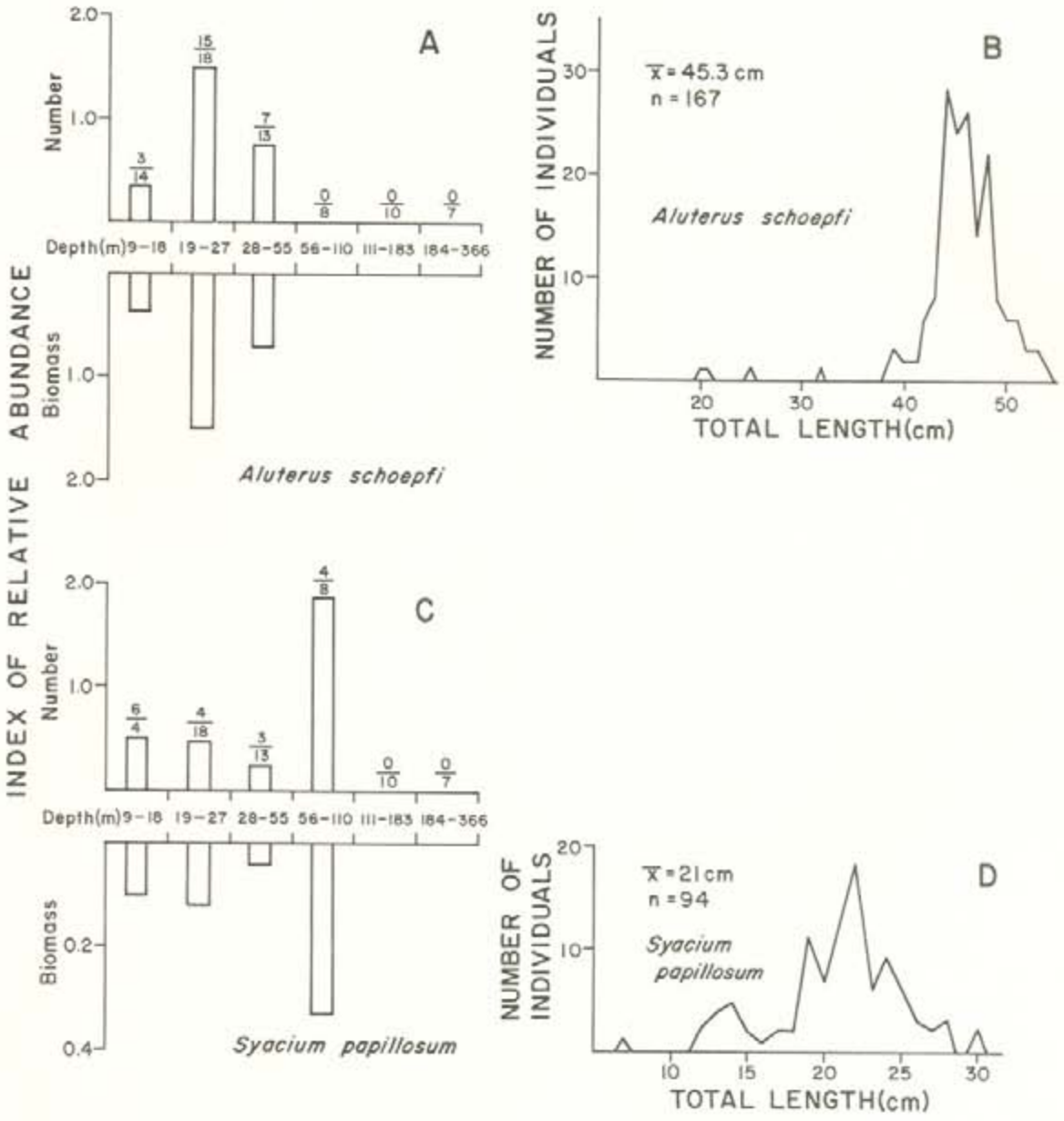

FIGURE 14. INDEX OF RELATIVE ABUNDANCE OF ORANGE FILEFISH, ALUTERUS SCHOEPFI (A) AND DUSKY FLOUNDER, SYACIUM PAPILLOSUM (C), DURING THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMBER IN NUMERATOR = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCY DISTRIBUTION OF A. SCHOEPFI (B) AND S. PAPILLOSUM (D) DURING THE SURVEY.

Table 11. Rankings of elasmobranch species by total number and total weight for R/V Dolphin 1974 summer groundfish survey in the South Atlantic Bight. N_1 = number of occurrences in the 70 successful trawls.

Rank	Species	Total Number	Percent of Total Elasmobranchs	N_1
1	Breviraja plutonia	9	32.1	3
2	Raja eglanteria	6	21.4	6
3	Dasyatis centroura	5	17.9	5
4	Raja garmani	5	17.9	3
5	Ginglymostoma cirratum	1	3.6	1
6	Myliobatis fremenvillei	1	3.6	1
7	Rhinobatis lentiginosus	1	3.6	1
	Total Number	28		

Rank	Species	Total Weight (kg)	Percent of Total Elasmobranchs	N_1
1	Dasyatis centroura	666.792	80.2	5
2	Ginglymostoma cirratum	158.760	19.1	1
3	Raja eglanteria	2.823	0.3	6
4	Myliobatis freminvillei	0.907	0.1	1
5	Rhinobatis lentiginosus	0.907	0.1	1
6	Raja garmani	0.654	0.1	3
7	Breviraja plutonia	0.300	---	3
	Total Weight	831.142		

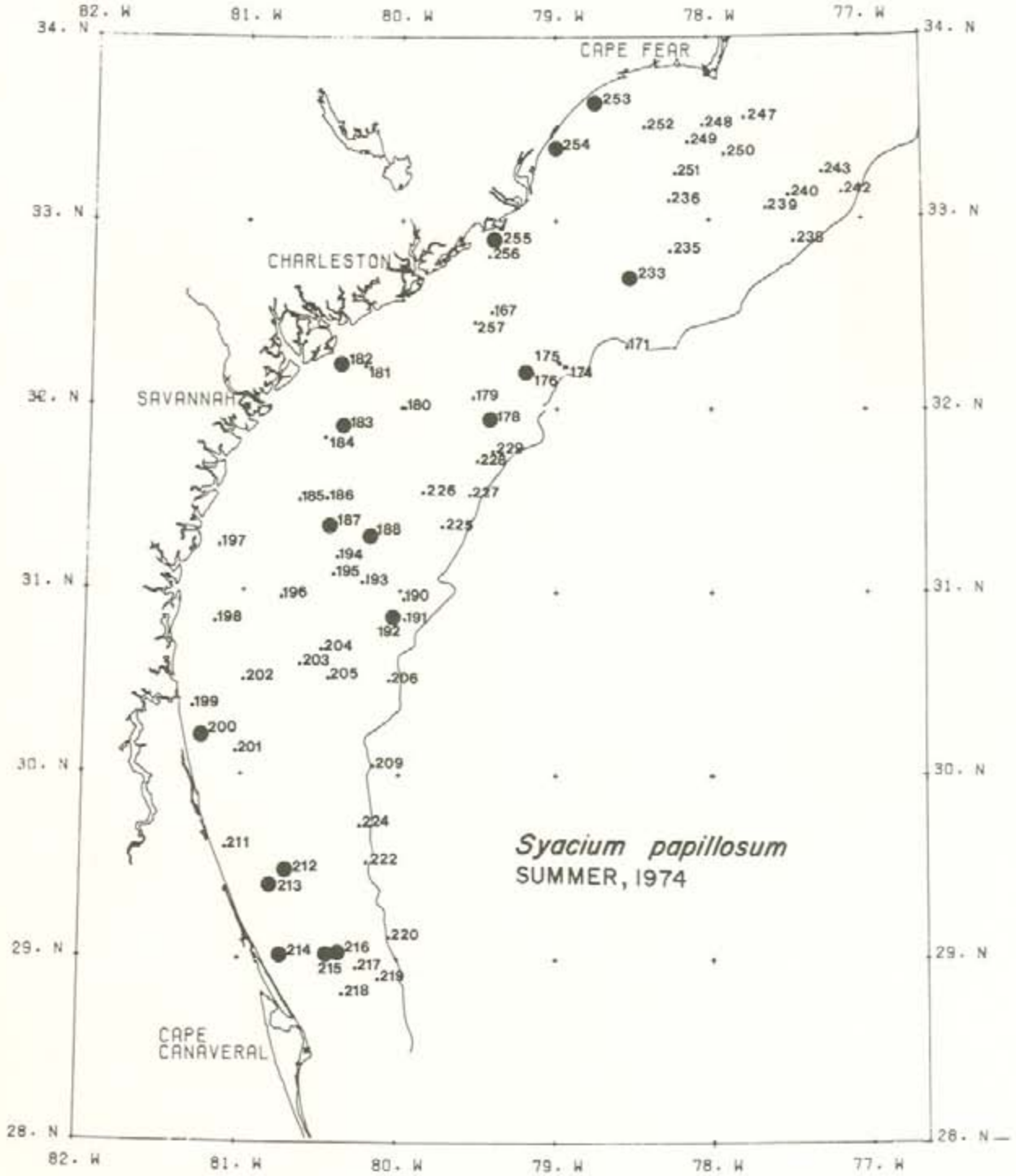

FIGURE 15. DISTRIBUTION OF DUSKY FLOUNDER, SYACIUM PAPILLOSUM, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

Table 12. Ranking by total number for families of pelagic fishes taken during the summer 1974 groundfish survey in the South Atlantic Bight.

Rank	Family	Total Number	Total Weight (kg)	Number of Species
1	Clupeidae	9569	139.9	4
2	Carangidae	8402	183.7	10
3	Stromateidae	2973	107.7	3
4	Engraulidae	1843	7.6	3
5	Scombridae	79	7.6	3
6	Pomatomidae	8	3.6	1
7	Ariommidae	4	0.4	2
8	Echeneidae	3	0.5	1
9	Fistulariidae	1	0.1	1
10	Sphyraenidae	1	0.1	1
	Total	22,884	451.2	29

total number and 91% of the total weight of pelagic fishes. Rankings of the ten most important species by numbers and weight are in Table 13.

Catch rates were highest in the 9-18 m depth zone, where engraulids and carangids dominated the pelagic catches, and lowest in the 111-183 m depth zone (Fig. 16A). Engraulids were principal constituents of the pelagic fauna in depths to 55 m, whereas carangids (primarily D. punctatus) were abundant to 110 m. Pelagic fishes in the deepest zone were dominated by P. triacanthus (Tables 14 and 15).

Spanish sardine: Sardinella anchovia

The most numerous pelagic species was the Spanish sardine, S. anchovia. This species was collected from 12 to 42 m (23.7-28.2°C) and made up 41.6% of the total number and 30.4% of the total weight of pelagic fishes. All catches of S. anchovia occurred in the three inshore depth zones where it was found in 13 of 45 trawls. Catches in 19-27 m accounted for 99.1% of the total number and 98.3% of the total weight of S. anchovia. The average size was 10.8 cm FL (range 6-16 cm FL) (Fig. 16B).

Round scad: Decapterus punctatus

The second most abundant pelagic fish was D. punctatus, which was collected throughout the South Atlantic Bight from 11 to 80 m (19.3-28.2°C) (Fig. 17). Round scad accounted for 34.5% of the total number and 37.1% of the total weight of pelagic fishes. The index of relative abundance showed catch rates were the highest in the two depth zones from 19 to 55 m where D. punctatus occurred in 19 of 31 trawls (Fig. 16C). This species was not encountered in the two deepest zones. Abundance statistics for this species are in Table 10.

Juvenile round scad from 4-6 cm FL were found inshore of 28 m (Fig. 16D). Beyond 28 m the catches were made up of individuals from 10 to 17 cm FL.

Other Pelagic Fishes

A total of 2968 butterfish, P. triacanthus, weighing 107.25 kg was taken during the survey. All but 4 were found in a trawl made at 196 m (11.1°C). The average size was 12.7 cm FL (range 6-15 cm FL).

All Anchoa lyolepis (n = 1329) were taken in two drags at 12 and 13 m (27.2-28.1°C). These individuals were extremely small ($\bar{x}$ FL = 5 cm, range 4-8 cm FL), thus accounting for their relatively low weight (1.45 kg).

Atlantic bumper, Chloroscombrus chrysurus, occurred in 7 of 14 trawls in the 9-18 m depth zone, where 99.5% of the total number and 99.2% of the total weight were taken. The catch/hour trawled was 61.4 individuals with a weight of 1.770 kg in this zone. The average size was 10.4 cm FL (range 2-16 cm FL).

Cephalopods

A total of 3576 squid weighing 117.130 kg was taken during the survey. The numerical catch rate was highest in 9-18 m, but greatest in weight in 111-183 m (Fig. 18A). Squid occurred in 73% of the 70 trawls made. Squid abundance statistics are in Table 10.

For relative abundance and size distribution all long-fin squids were placed in the Loliginidae. Loliginids had their lowest catches in mid-shelf depths (Fig. 18B). The average size was 6.6 cm mantle length (range 1-34 cm mantle length) (Fig. 18C).

Illex illecebrosus occurred at 7 of 17 stations on the upper portion of the continental slope in depths from 192 to 338 m (8.1-16.2°C) (Fig. 18D). Ninety-three percent of the total number and 97% of the total weight were taken in three trawls in the deepest zone. The average size of I. illecebrosus was 17.7 cm mantle length (range 6-24 cm) (Fig. 18E).

Demersal Fish Diversity

During the summer 1974 groundfish survey, 156 species of demersal fishes (teleosts and elasmobranchs) were collected in the sand bottom (open shelf and slope) habitat in the South Atlantic Bight. The total number of species was highest in the 9-18 and 19-27 m depth zones and lowest in the 184-366 m zone (Table 16). The average number of species/tow followed the same pattern. A plot of the number of species/tow against depth showed the same basic trends as demonstrated for previously analyzed cruises, that is, inshore depths generally had a larger but highly variable number of species/tow values. These values decreased both in magnitude and variability with depth (Fig. 19A).

Species diversity as measured by the Shannon-Weaver information function did not follow the trend in so pronounced a fashion as did the number of species (Fig. 19B). Relatively high and variable values occurred at each depth. Species richness had the same pattern as the number of species/tow (Fig. 19C). The elevated diversity values in the deeper water was thus attributable to collections having relatively few species but individuals being evenly distributed in those species. Shallow water trawls that had high diversity values had both elevated species richness and evenness (APPENDIX IV). The ranges for diversity and richness for each depth zone are:

Depth zone (m)	H'(bits/indiv)	Species Richness
9-18	0.121-3.570	0.355-5.428
19-27	0.146-3.599	0.593-5.172
28-55	0.596-3.108	0.738-3.860
56-110	0.0 -3.043	0.0 -3.860
111-183	0.402-2.740	0.910-2.896
184-366	0.0 -2.515	0.0 -2.189

Table 13. Dominant pelagic fishes by number and weight for the summer 1974 groundfish survey in the South Atlantic Bight. Total number of trawls = 70.

Rank	Species	Total Number	Percent of Total Pelagics	Number of Occurrences
1	Sardinella anchovia	9516	41.6	13
2	Decapterus punctatus	7894	34.5	31
3	Peprilus triacanthus	2968	13.0	3
4	Anchoa lyolepis	1329	5.8	2
5	Chloroscombrus chrysurus	432	1.9	8
6	Anchoa hepsetus	368	1.6	3
7	Engraulidae	146	0.6	2
8	Scomber japonicus	76	0.3	4
9	Caranx crysos	40	0.2	7
10	Etrumeus teres	28	0.1	2
	Total Number	22,884		

Rank	Species	Total Weight (kg)	Percent of Total Pelagics	Number of Occurrences
1	Decapterus punctatus	167.498	37.1	31
2	Sardinella anchovia	137.248	30.4	13
3	Peprilus triacanthus	107.250	23.8	3
4	Chloroscombrus chrysurus	12.474	2.8	8
5	Scomber japonicus	6.097	1.4	4
6	Anchoa hepsetus	4.666	1.0	3
7	Pomatomus saltatrix	3.629	0.8	2
8	Caranx crysos	1.861	0.4	7
9	Opisthonema oglinum	1.661	0.4	4
10	Engraulidae	1.461	0.3	2
	Total Weight	451.123		

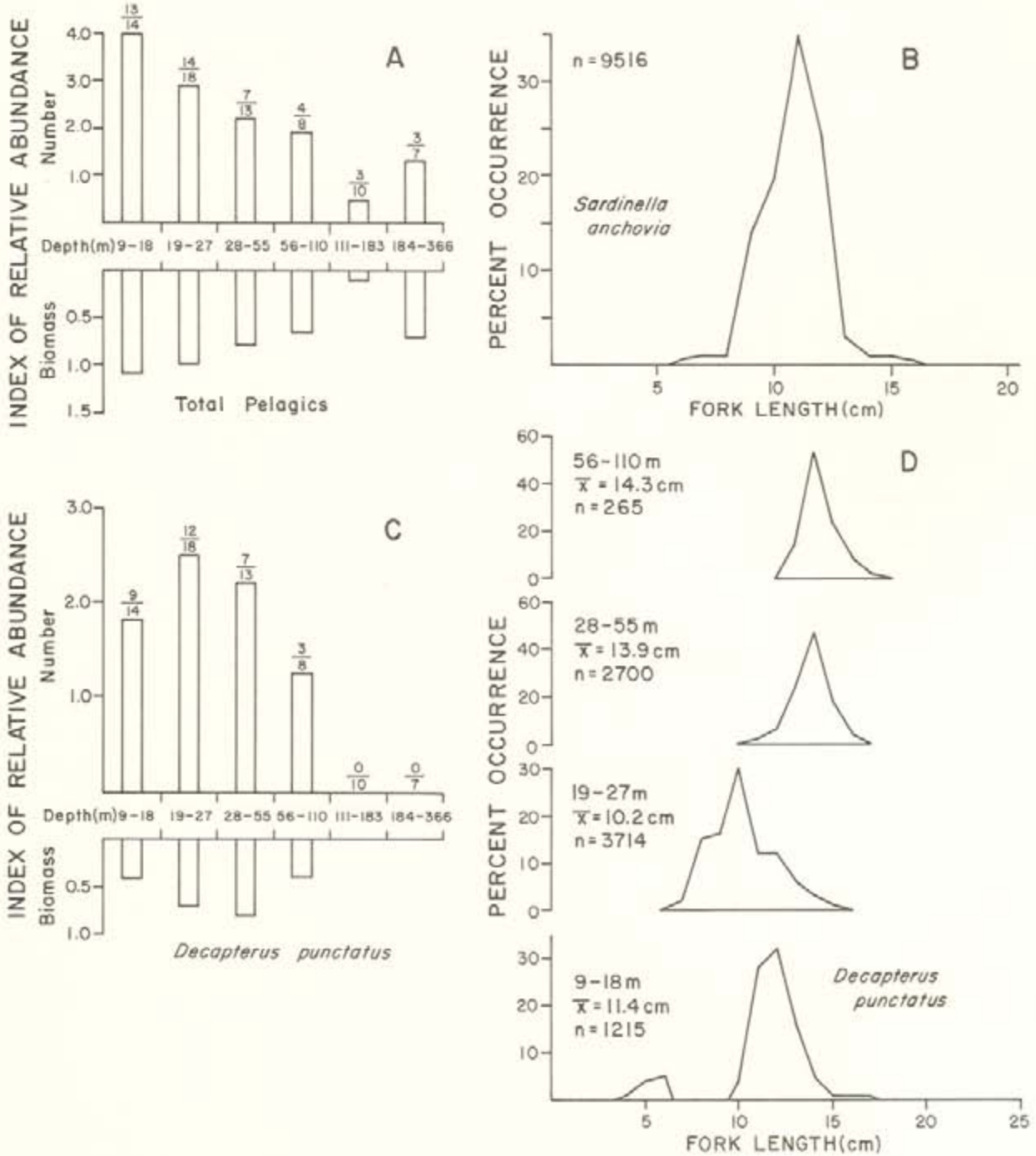

FIGURE 16. INDEX OF RELATIVE ABUNDANCE FOR TOTAL PELAGIC SPECIES (A) AND ROUND SCAD, DECAPTERUS PUNCTATUS (C), FOR THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMERATOR IN FRACTION = NUMBER OF TIMES PRESENT; DENOMINATOR = TOTAL NUMBER OF TRAWLS IN DEPTH ZONE. LENGTH FREQUENCY DISTRIBUTION FOR ALL ZONES OF SARDINELLA ANCHOVIA (B) AND FOR EACH DEPTH ZONE OF D. PUNCTATUS (D).

Table 14. Numerically dominant pelagic fishes for the summer 1974 groundfish survey by depth zone. N_1 = number of occurrences; N = total number of trawls in zone.

Depth Zone (m)	Species	Total Number	Percent of Total in Depth Zone	N_1/N
9-18	Anchoa lyolepis	1329	36.9	2/14
	Decapterus punctatus	1215	33.7	9/14
	Chloroscombrus chrysurus	430	11.9	7/14
	Anchoa hepsetus	368	10.2	3/14
	Engraulidae	146	4.1	2/14
19-27	Sardinella anchovia	9435	71.6	6/18
	Decapterus punctatus	3714	28.2	12/18
	Opisthonema oglinum	17	0.1	1/18
	Scomber japonicus	9	0.1	3/18
	Caranx bartholomaei	3	---	2/18
28-55	Decapterus punctatus	2700	98.6	7/13
	Sardinella anchovia	34	1.2	4/13
	Ariomma regulus	2	0.1	2/13
	Decapterus macarellus	1	---	1/13
	Fistularia villosa	1	---	1/13
56-110	Decapterus punctatus	265	70.5	3/8
	Scomber japonicus	67	17.8	1/8
	Trachurus lathami	26	6.9	3/8
	Etrumeus teres	18	4.8	1/8
111-183	Etrumeus teres	10	71.4	1/10
	Peprilus triacanthus	3	21.4	1/10
	Trachurus lathami	1	7.1	1/10
184-366	Peprilus triacanthus	2964	99.9	1/7
	Ariomma bondi	1	---	1/7
	Carangidae	1	---	1/7
	Caranx crysos	1	---	1/7

Table 15. Dominant pelagic fish species by weight for R/V Dolphin 1974 summer groundfish survey by depth zone. N_1 = number of trawls in zone.

Depth Zone (m)	Species	Total Weight (kg)	Percent of Total in Depth Zone	N_1/N
9-18	Decapterus punctatus	25.970	46.2	9/14
	Chloroscombrus chrysurus	12.374	22.0	7/14
	Anchoa hepsetus	4.666	8.3	3/14
	Pomatomus saltatrix	3.639	6.4	2/14
	Caranx crysos	1.661	3.0	5/14
19-27	Sardinella anchovia	134.933	72.9	6/18
	Decapterus punctatus	47.432	25.6	12/18
	Opisthonema oglinum	1.361	0.7	1/18
	Scomber japonicus	0.654	0.4	3/18
	Caranx bartholomaei	0.200	0.1	2/18
28-55	Decapterus punctatus	84.924	98.6	7/13
	Sardinella anchovia	0.754	0.9	4/13
	Ariomma regulus	0.200	0.2	2/13
	Decapterus macarellus	0.100	0.1	1/13
	Fistularia villosa	0.100	0.1	1/13
56-110	Decapterus punctatus	9.172	58.3	3/8
	Scomber japonicus	5.443	34.6	1/8
	Trachurus lathami	0.654	4.2	3/8
	Etrumeus teres	0.454	2.9	1/8
111-183	Etrumeus teres	0.454	69.4	1/10
	Peprilus triacanthus	0.100	15.3	1/10
	Trachurus lathami	0.100	15.3	1/10
184-366	Peprilus triacanthus	107.050	99.7	1/7
	Ariomma bondi	0.100	0.1	1/7
	Carangidae	0.100	0.1	1/7
	Caranx crysos	0.100	0.1	1/7

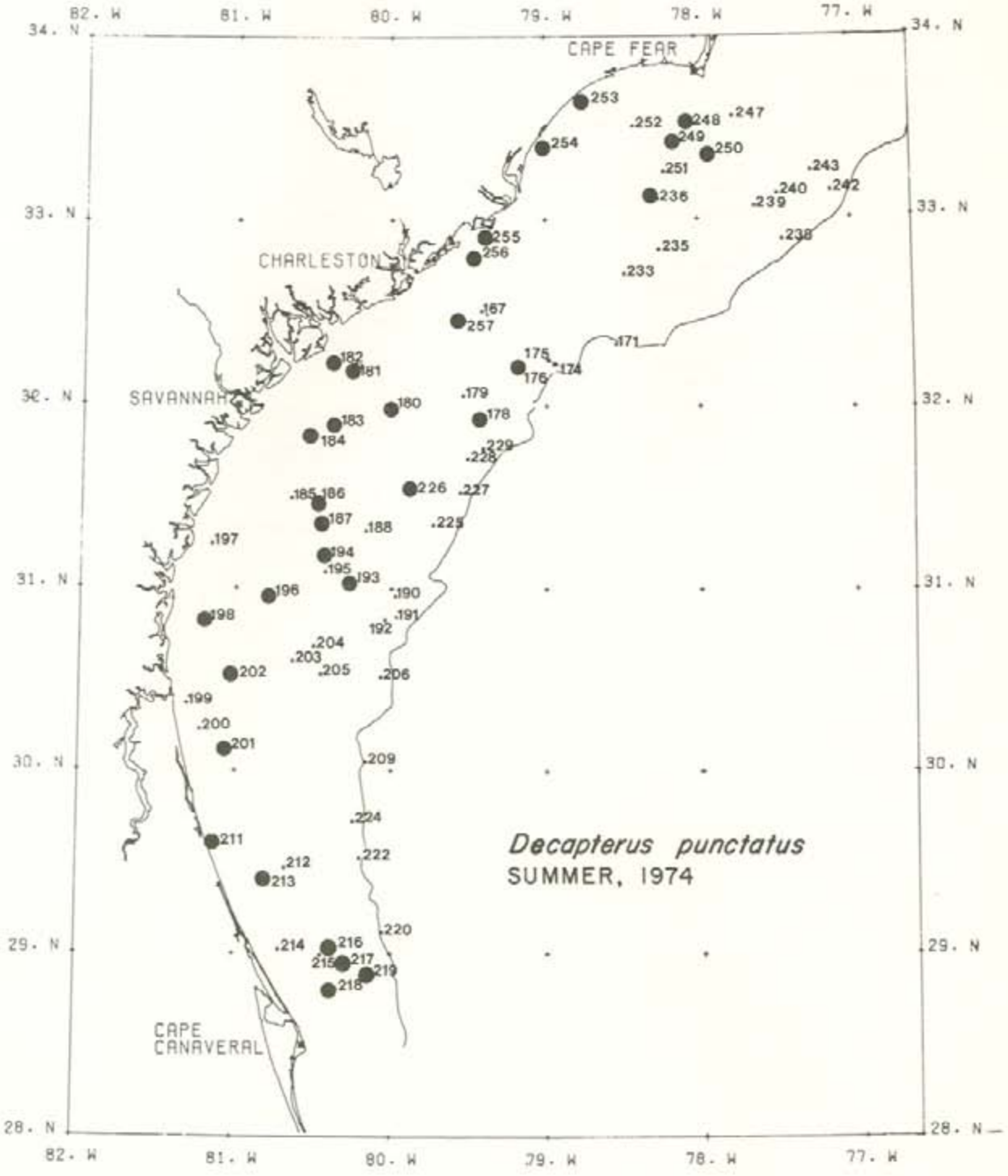

FIGURE 17. DISTRIBUTION OF ROUND SCAD, DECAPTERUS PUNCTATUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

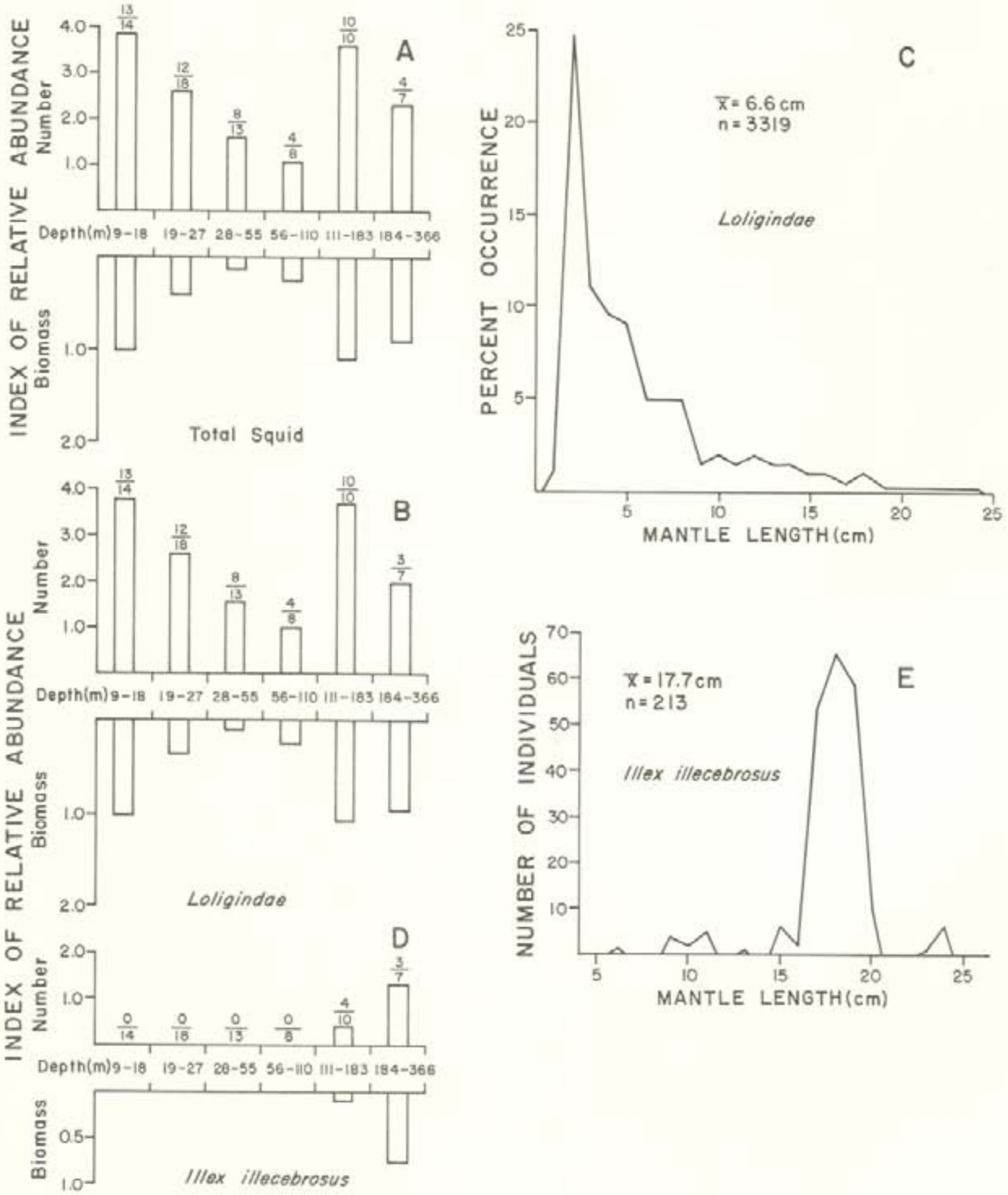

FIGURE 18. INDEX OF RELATIVE ABUNDANCE OF TOTAL SQUID (A), LOLIGINIDAE (B) AND ILLEX ILLECEBROSUS (D) IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1974 GROUNDFISH SURVEY. NUMBER IN NUMERATOR = TRAWLS IN DEPTH ZONE WHERE SPECIES PRESENT; DENOMINATOR = TOTAL TRAWLS. LENGTH FREQUENCY DISTRIBUTION OF LOLIGINIDAE (C) AND ILLEX ILLECEBROSUS (E) DURING THE SURVEY.

Table 16. Total number of species, mean number of species/tow and mean number of individuals/tow for demersal fishes (elasmobranchs and demersal bony fishes) in the South Atlantic Bight during the summer 1974 groundfish survey.

Depth Zone (m)	Total Number of Demersal Species	Mean Number of Demersal Species/tow	Mean Number of Individuals/tow
9-18	69	13.9	203.7
19-27	64	11.4	191.3
28-55	32	8.0	38.5
56-110	44	9.5	122.5
111-183	41	9.0	98.2
184-366	18	4.0	15.9

Table 17. Characteristics of seven site groups as defined by cluster analysis for the sand bottom habitat during summer 1974.

Site Group	Number of Stations	$\bar{x}$ Depth (m)	Depth Range (m)	Latitudinal Range of Stations
1	14	16	11-25	30° -33.6°
2	7	22	11-42	28.9°-33.4°
3	18	26	18-35	28.8°-33.5°
4	5	34	20-41	29° -33.5°
5	7	77	44-101	28.9°-32.7°
6	12	140	91-219	29.1°-33.1°
7	3	308	254-338	30° -32.3°

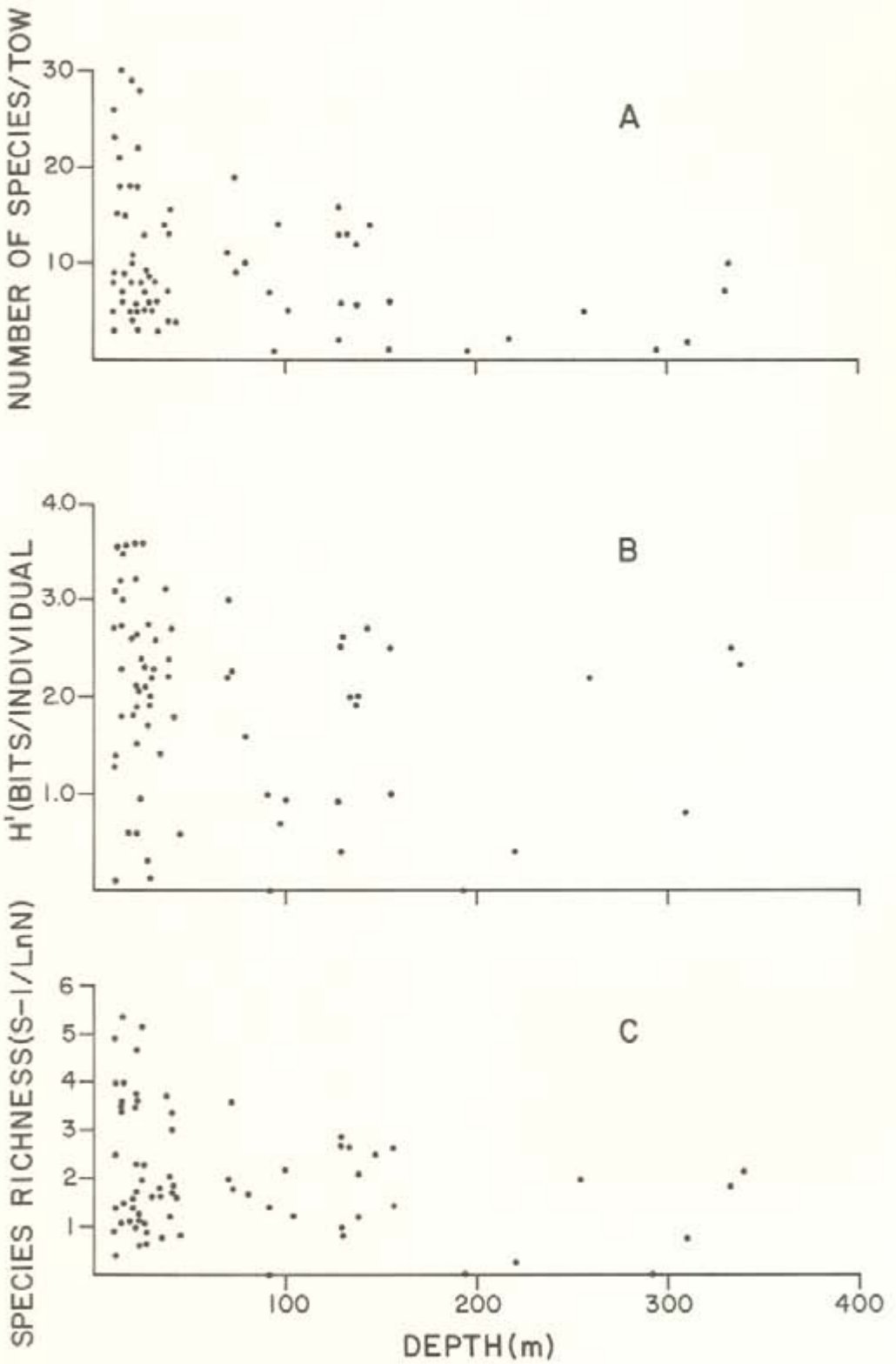

FIGURE 19. PLOTS OF THE NUMBER OF SPECIES/TOW (A), SHANNON-WEAVER DIVERSITY (H' BITS/INDIVIDUAL) (B) AND SPECIES RICHNESS (S-1/ln N WHERE S = NUMBER OF DEMERSAL SPECIES AND N = NUMBER OF INDIVIDUALS IN A TRAWL SAMPLE (C) AGAINST TRAWL DEPTH FOR THE SUMMER 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT.

The average number of individuals/tow was highest in the two inshore zones (Table 16) and lowest in the 184-366 m and 28-55 m zones. This paucity of both species and individuals in the deepest zone appears to be a consistent result of 3/4 Yankee trawls in the South Atlantic Bight.

If the number of pelagic species is included in the total number of species caught, the summer 1974 survey collected 185 fish species.

Demersal Fish Community Structure

The use of numerical classification to compare similarity between assemblages of organisms resulted in the formation of seven site groups (Fig. 20). The major faunal division occurred between the relatively shallow water stations on the continental shelf (site groups 1 through 4) and stations beyond the shelf break (site groups 5 through 7). Although there was overlap in depths between site groups, a general trend for depth-related groupings of stations was apparent (Table 17). Latitude did not play a significant role as a determinant of fish assemblages during the summer of 1974.

Inverse analysis (species cluster) resulted in eleven species groups with a range of three to fourteen demersal fish species per group. The strongest division between species groups (Fig. 21) resulted in the separation into shallow (Groups A through F) and deep water groups (Groups G through K). Species group A with fourteen species was a shallow water group which showed moderate constancy (Fig. 22) and high fidelity (Fig. 23) to site group 1. Site group one had fourteen trawls with a mean depth of 16 m. In summary, the species that comprise group A can be expected to occur frequently and are somewhat restricted in their distribution to shallow water trawls (11 to 25 m) in the South Atlantic Bight during the summer months. The same pattern was demonstrated by species group B with eleven species.

Species group C with eight species contained the dominant and widely distributed demersal fish of the South Atlantic Bight during the summer of 1974. This group had high or moderate constancy in site groups 1 through 4. Trawls within these site groups were in depths from 11 to 42 m and were made throughout the study area. This group had low or very low fidelity to the above mentioned site groups indicating that their distribution was not limited to a specific set of trawl collections. In shallow waters these species were ubiquitous.

Species group G was comprised of nine species which for the most part were found beyond the shelf break. Although many of these species had wide bathymetric ranges (Dasyatis centroura: 15-128 m; Kathetostoma albigutta: 39-137 m; Glossanodon pygmaeus: 128-219 m; Halieuthichthys aculeatus: 71-137 m; Ogcocephalus radiatus: 14-137 m; Ophichthus ocellatus: 22-155 m; Lepophidium cervinum: 22-137 m; Synagrops bella: 128-338 m; Polymixia lowei: 128-333 m), they occurred most frequently in the deeper water trawls in the South Atlantic Bight during the summer of 1974. This group had moderate constancy and high fidelity in site group 6 which was made up of 12 trawls in depths of 91-219 m. This demonstrated that, although found at other depths, such as site group 2, species group G occurred most frequently in stations beyond the shelf break on the upper part of the continental slope.

Species group H with four species had moderate constancy and high fidelity to site group 6 and low constancy and fidelity to site group 7. These fishes (Urophycis regius: 128-293 m; Citharichthys arctifrons: 128-254 m; Peristedion gracile: 128-146 m; Synagrops spinosa: 128-338 m) were found in deeper water than species of Group G and were more restricted in their depth range.

Species groups I and J both had low constancy and high fidelity to site group 6, indicating that they were relatively rare in the summer otter trawl survey. When encountered, they occupied the upper part of the continental slope.

The deepest group (K) had both high constancy and fidelity to site group 7. The three trawls of site group 7 averaged 308 m and the three species of group K (Breviraja plutonia, Chlorophthalmus agassizi, Helicolenus dactylopterus) co-occurred and were restricted to these trawls.

SUMMARY

A stratified random sampling design consisting of 70 one-half hour 3/4 Yankee otter trawls was used to assess the groundfish community from Cape Fear to Cape Canaveral in depths from 9 to 366 m from 14 August to 10 September 1974. The use of untransformed data gave a stratified mean catch/tow of 31.6 kg/tow for total groundfish. Demersal bony fishes accounted for approximately 25% of this mean value whereas squid accounted for 5%. The remainder was made up of elasmobranchs and pelagic species.

Forty-four families with 145 species were represented in the demersal bony fish catch. The Sparidae was the numerically dominant family with the Balistidae accounting for the greatest percentage of weight. The most numerous demersal teleost was the southern porgy, Stenotomus aculeatus, whereas the orange filefish, Aluterus schoepfi, contributed the most weight to the catches.

Ten families of pelagic fishes were represented. The Clupeidae, Carangidae, Stromateidae, and Engraulidae accounted for over 99% of the total number and weight of the pelagic catch. Sardinella

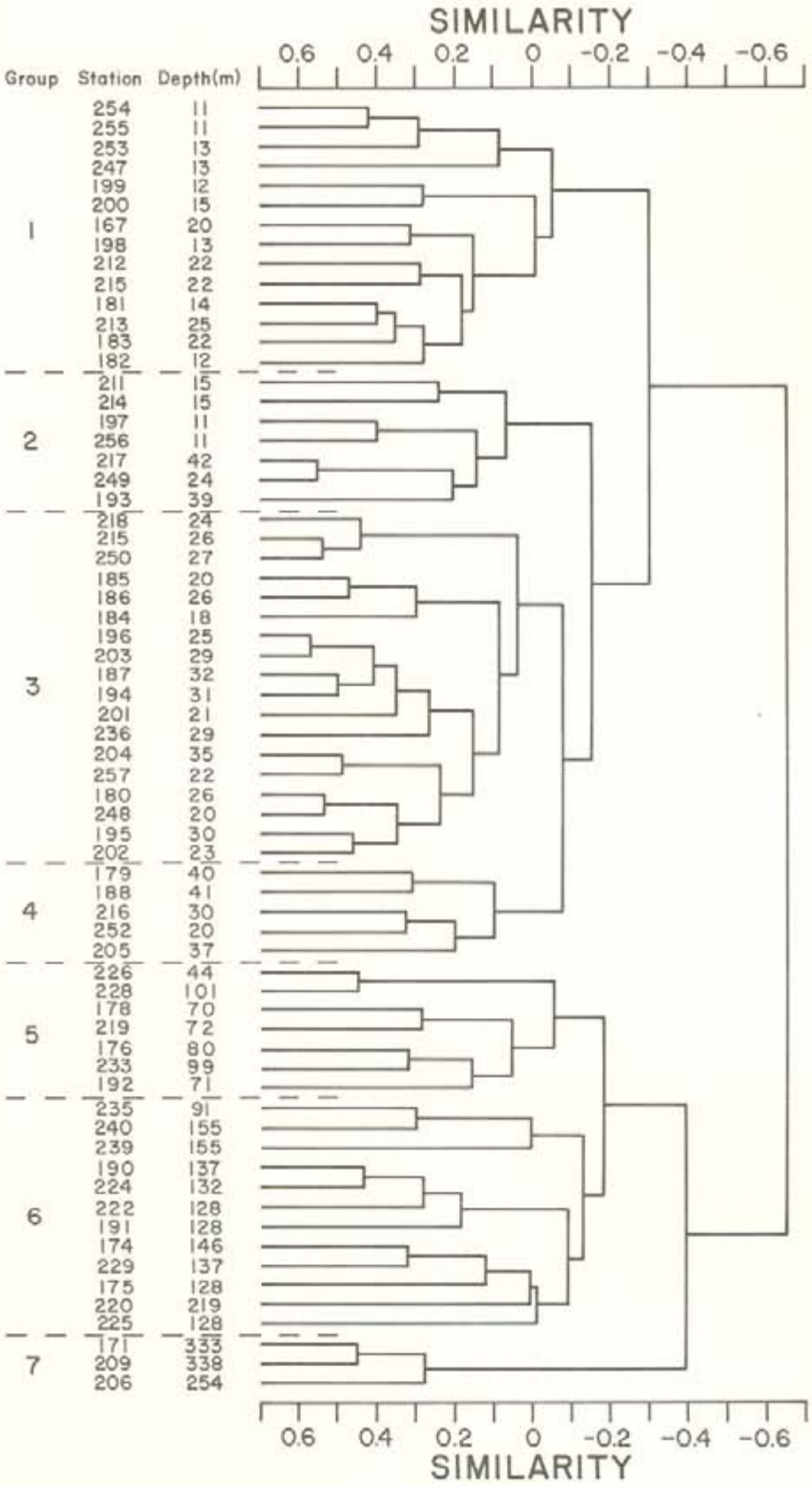

FIGURE 20. STATION CULSTER (NORMAL ANALYSIS) FOR SUMMER 1974 SAND BOTTOM STATIONS. CANBERRA-METRIC CORRELATION, SQUARE ROOT TRANSFORMED DATA, STANDARDIZED, FLEXIBLE SORTING WITH $\beta = -0.25$.

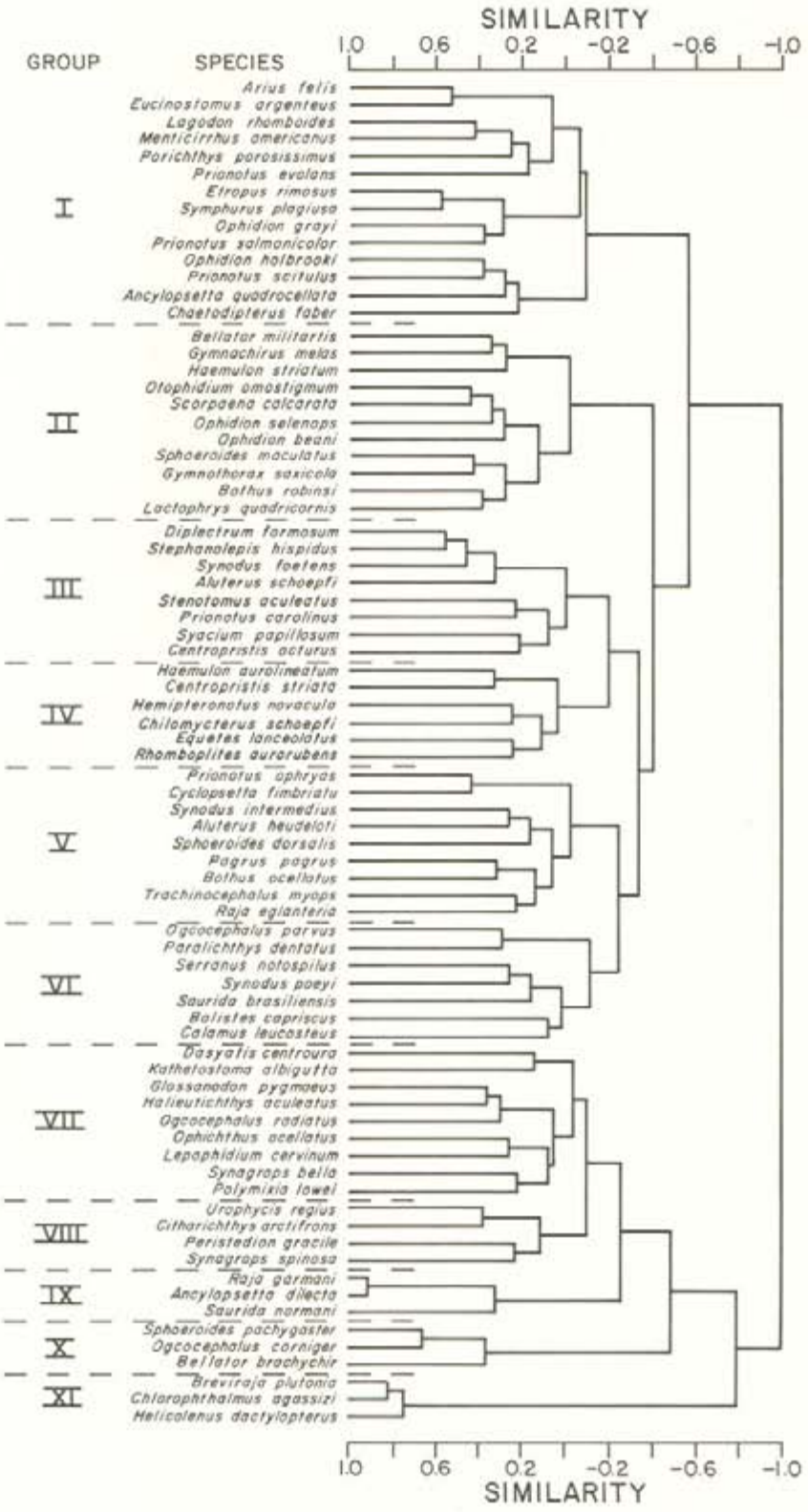

FIGURE 21. SPECIES CLUSTER (INVERSE ANALYSIS) FOR SUMMER 1974 SAND BOTTOM STATIONS. METHODOLOGY SAME AS FIGURE 19.

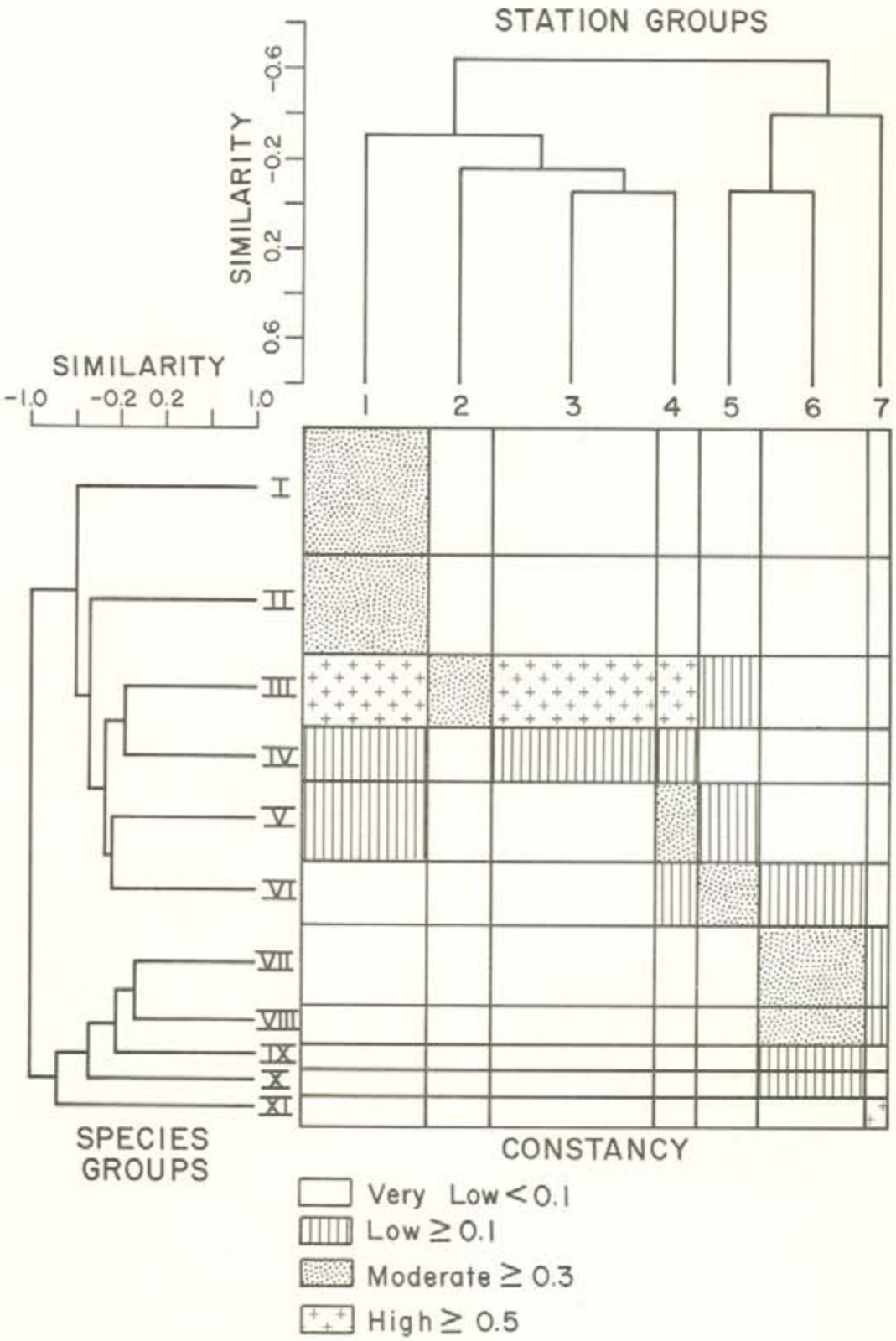

FIGURE 22. NODAL CONSTANCY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING SUMMER 1974.

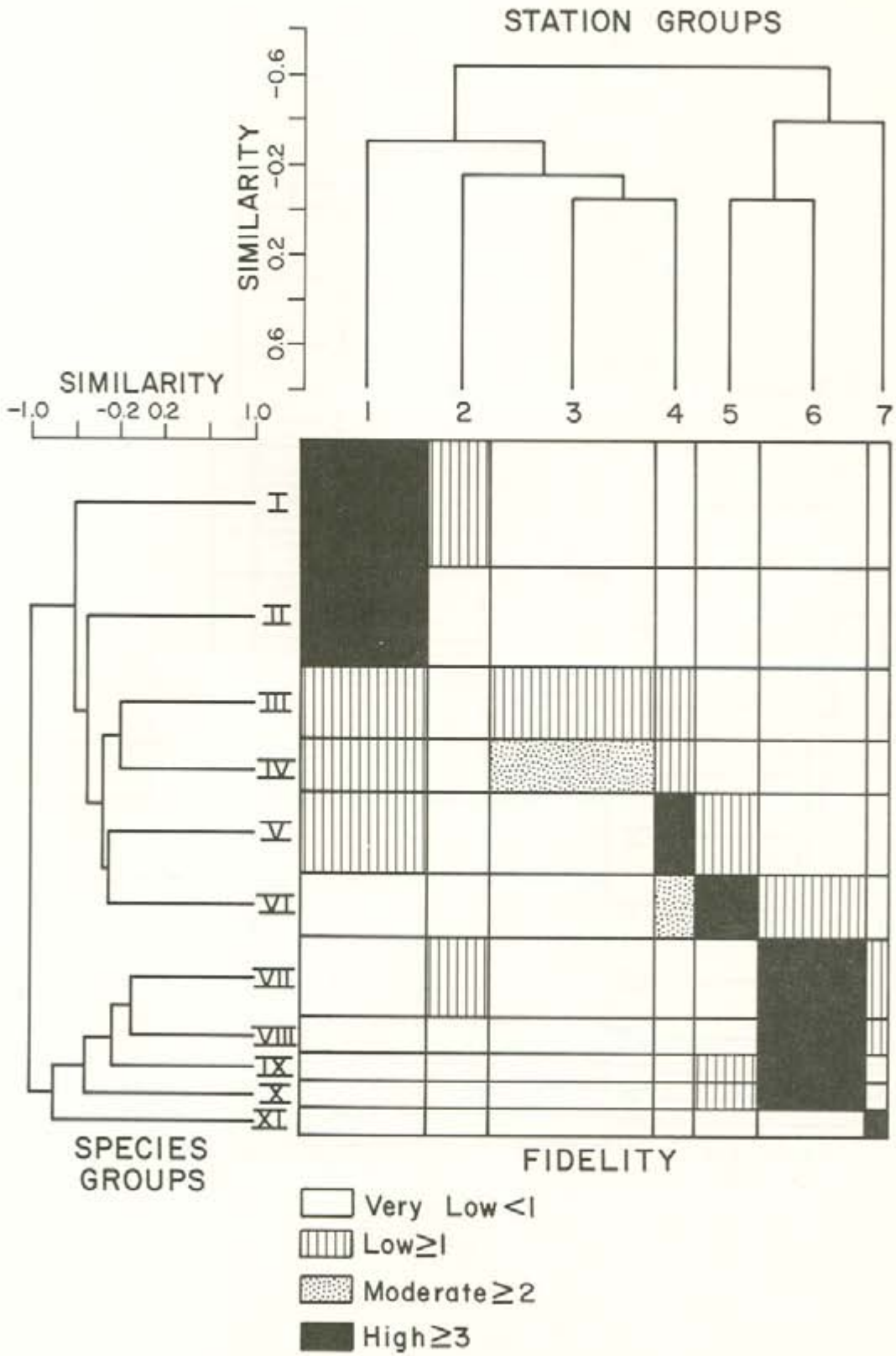

FIGURE 23. NODAL FIDELITY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING THE SUMMER OF 1974.

anchovia ranked first in numerical abundance, whereas Decapterus punctatus was first by weight.

Squid occurred in 73% of the trawls. Catch rates were highest in the 9-18 m and the 111-183 m depth zones. The loliginids were by far the most abundant group and were found at all depths. Illex illecebrosus, however, was found in small numbers only in depths greater than 190 m.

Diversity index values showed a great deal of variability but demonstrated a tendency to decrease in magnitude with increasing trawl depth. A total of 156 species of demersal teleosts and elasmobranchs were collected. In addition, 29 species of pelagic fishes were encountered for a total of 185 fish species.

Cluster analysis showed that in general depth was more important than latitude in determining similarity in otter trawl collections. The dominant demersal species formed a widely distributed species group. The lack of latitudinal effects on species associations is understandable since the open-shelf habitat of the South Atlantic Bight is relatively homogeneous and the summer of 1974 was characterized by hydrographic stability.

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LIST OF APPENDICES

APPENDIX I. Collection data for otter trawl stations during the 1974 summer groundfish survey in the South Atlantic Bight.

Collection Number	Latitude	Longitude	Depth (m)	Temperature (°C)	Salinity (PPT)
74167	32°30.2'N	79°25.1'W	20	27.2	35.55
74171	32°19.0'N	78°32.5'W	333	11.8	35.82
74174	32°13.6'N	78°58.7'W	146	14.2	36.22
74175	32°13.8'N	78°59.2'W	128	20.7	36.77
74176	32°10.5'N	79°09.4'W	80	22.8	26.63
74178	31°56.5'N	79°24.0'W	70	22.5	36.49
74179	32°02.5'N	79°32.5'W	40	24.4	36.39
74180	31°59.9'N	79°58.8'W	26	26.7	36.31
74181	32°12.7'N	80°14.4'W	14	28.2	35.92
74182	32°14.0'N	80°21.5'W	12	28.1	35.01
74183	31°54.0'N	80°20.5'W	22	27.2	36.29
74184	31°50.0'N	80°29.5'W	18	27.8	36.18
74185	31°29.5'N	80°39.0'W	20	27.2	36.29
74186	31°30.0'N	80°28.5'W	26	26.5	36.32
74187	31°22.0'N	80°25.7'W	32	26.2	36.35
74188	31°19.0'N	80°10.0'W	41	24.3	36.48
74190	30°57.5'N	79°58.5'W	137	15.5	36.29
74191	30°50.3'N	80°00.0'W	128	15.9	36.36
74192	30°49.7'N	80°02.5'W	71	21.8	36.56
74193	31°02.8'N	80°14.6'W	39	23.7	36.54
74194	31°11.0'N	80°24.2'W	31	25.9	36.44
74195	31°05.5'N	80°25.7'W	30	26.4	36.37
74196	30°58.0'N	80°45.5'W	25	26.7	36.28
74197	31°14.6'N	81°09.6'W	11	28.0	35.23
74198	30°49.7'N	81°10.7'W	13	27.2	35.73
74199	30°22.0'N	81°18.7'W	12	25.8	36.00
74200	30°13.5'N	81°13.5'W	15	25.4	36.06
74201	30°07.5'N	81°02.1'W	21	25.7	36.23
74202	30°31.0'N	80°59.5'W	23	27.5	35.99
74203	30°36.2'N	80°38.0'W	29	26.4	36.15
74204	30°41.0'N	80°30.0'W	35	25.4	36.20
74205	30°31.8'N	80°27.2'W	37	24.8	36.31
74206	30°30.9'N	80°04.0'W	254	11.0	35.32
74209	30°03.0'N	80°09.7'W	338	8.1	35.10
74211	29°36.0'N	81°05.5'W	15	25.5	36.07
74212	29°28.2'N	80°40.5'W	22	26.0	36.20
74213	29°24.7'N	80°46.3'W	25	26.2	36.20
74214	29°01.5'N	80°42.5'W	15	26.8	36.12
74215	28°59.5'N	80°26.5'W	22	24.6	36.21
74216	29°02.4'N	80°21.0'W	30	23.0	36.28
74217	28°57.0'N	80°15.5'W	42	24.2	36.36
74218	28°48.5'N	80°20.5'W	24	24.2	36.30
74219	28°53.5'N	80°07.0'W	72	19.3	36.57
74220	29°07.0'N	80°03.0'W	219	13.0	35.74
74222	29°31.5'N	80°11.9'W	128	13.0	35.70
74224	29°43.5'N	80°14.5'W	132	16.2	36.13
74225	31°21.0'N	79°44'0'W	128	15.4	36.00
74226	31°32.3'N	79°51.5'W	44	24.7	36.30
74227	31°31.5'N	79°33.5'W	196	11.1	35.48
74228	31°42.7'N	79°30.7'W	101	15.8	36.08
74229	31°46.0'N	79°24.7'W	137	13.1	35.76
74233	32°42.0'N	78°29.0'W	99	21.5	36.60
74235	32°50.0'N	78°15.3'W	91	20.5	36.43
74236	33°06.5'N	78°15.5'W	29	26.3	36.14
74238	32°53.0'N	77°26.8'W	293	10.2	35.42
74239	33°04.0'N	77°37.5'W	155	13.4	35.87
74240	33°08.0'N	77°28.5'W	155	12.7	35.77
74242	33°08.8'N	77°07.4'W	311	9.7	35.37
74243	33°15.5'N	77°15.0'W	91	16.5	36.29
74247	33°33.5'N	77°45.5'W	13	26.2	35.91
74248	33°31.2'N	78°02.0'W	20	27.5	34.65
74249	33°25.5'N	78°08.0'W	24	25.5	35.97
74250	33°21.5'N	77°53.7'W	27	25.2	36.24
74251	33°15.5'N	78°13.0'W	26	25.8	36.22
74252	33°30.5'N	78°25.0'W	20	25.5	35.74
74253	33°39.0'N	78°42.5'W	13	26.2	34.96
74254	33°24.0'N	78°58.5'W	11	26.7	34.91
74255	32°53.5'N	79°22.0'W	11	27.1	35.37
74256	32°48.4'N	79°26.0'W	11	27.5	35.32
74257	32°27.0'N	79°31.7'W	22	24.6	36.29

APPENDIX II. Catches of demersal fish by numbers and weight (kg) for individual depth zones for the summer 1974 groundfish survey in the South Atlantic Bight.

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Orectolobidae	Ginglymostoma cirratum	1	158.8										
Rhinobatidae	Rhinobatos lentiginosus	1	0.9										
Rajidae	Raja eglanteria	1	0.5	1	0.5	2	0.6	2	1.4				
	Raja germani									5	0.7		
	Breviraja plutonia											9	0.3
Dasyatidae	Dasyatis centroura	2	283.5			2	283.5			1	99.8		
Myliobatidae	Myliobatis freminvillei							1	0.9				
Muraenidae	Gymnothorax saxicola	2	0.2	7	0.7								
Muraenesocidae	Hoplunnis sp.									3	0.2		
Congridae	Conger sp.	1	0.1										
	Congridae	2	0.1	13	0.2			1	0.1	1	0.1		
Ophichthidae	Mystriophis intertinctus			1	0.1								
	Ophichthus ocellatus			2	0.1			1	0.1	3	0.3		
Argentinidae	Glossanodon pygmaeus									30	0.5	12	0.1
Synodontidae	Saurida brasiliensis					1	0.1	15	0.2	31	0.2		
	Saurida normani							1	0.1	5	0.6		
	Saurida sp.							75	0.9				
	Synodus foetens	62	3.8	105	15.3	80	11.0	8	1.1				
	Synodus intermedius			1	0.1	5	1.0	4	0.5				
	Synodus poeyi			3	0.2	78	0.5	596	5.3	36	0.2		
	Trachinocephalus myops	1	0.1	5	0.4	5	0.7	58	5.5				
Chlorophthalmidae	Chlorophthalmus agassizi											30	0.4
Ariidae	Arius felis	146	22.3										
Batrachoididae	Porichthys porosissimus	4	0.2					2	0.5				
Lophiidae	Lophius americanus									3	0.2		
Antennariidae	Antennarius sp.							1	0.1				
Ogcocephalidae	Halieathichthys aculeatus							8	0.3	16	0.4		
	Ogcocephalus corniger							3	0.2	2	0.2		
	Ogcocephalus parvus					1	0.1	9	0.3				
	Ogcocephalus radiatus	1	0.1	1	0.1	1	0.1			16	0.5		
	Zalieutes mcgintyi									2	0.1		
Gadidae	Urophycis earlii	1	0.1										
	Urophycis regius									427	17.9	3	0.1
Merluccidae	Merluccius albidus											1	0.1
	Merluccius bilinearis											3	0.1
Maridae	Laemonema barbatulum											22	1.0
Macrouridae	Coelorinchus sp.											3	0.1
Ophidiidae	Lepophidium jeannae							1	0.1				
	Lepophidium cervinum			1	0.1					4	0.3		
	Ophidion beani	47	2.0	75	3.4								
	Ophidion holbrooki	23	1.3	21	1.2			1	0.1				
	Ophidion grayi	13	0.8	1	0.1								
	Ophidion selenops	11	0.3	12	0.3								
	Ophidion sp.			4	0.1								
	Otophthidium omostigmum			15	0.4								
	Rissola marginata	3	0.2										

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Carapidae	Carapus bermudensis	1	0.1										
Polymixiidae	Polymixia lowei									7	0.2	1	0.1
Caproidae	Antigonia capros									1	0.1		
Syngnathidae	Hippocampus erectus							1	0.1				
	Syngnathus fuscus	1	0.1										
	Syngnathus springeri							1	0.1				
	Syngnathus sp.			1	0.1								
Percichthyidae	Synagrops bella									22	0.3	11	0.3
	Synagrops spinosa									24	0.3	1	0.1
	Synagrops sp.									6	0.1		
Serranidae	Centropristis philadelphica	16	0.6										
	Centropristis ocyurus	9	0.4	7	0.3	5	0.2	16	0.4	1	0.1		
	Centropristis striata	24	1.4	5	1.4								
	Diplectrum formosum	225	10.1	371	30.0	116	15.5						
	Serranus notospilus							64	0.9	22	0.4		
	Serranus phoebe							5	0.2				
	Serranidae											1	0.1
Priacanthidae	Priacanthus arenatus							1	0.5				
Rachycentridae	Rachycentron canadum	2	8.2										
Lutjanidae	Lutjanus aya	2	0.2										
	Lutjanus campechanus	2	0.5										
	Rhomboplites aurorubens	2	0.1	134	12.1	6	0.5						
Gerridae	Eucinostomus argenteus	29	0.3										
	Eucinostomus gula	1	0.1										
	Eucinostomus sp.	1	0.1										
Haemulidae	Haemulon aurolineatum	64	4.5	74	3.9								
	Haemulon striatum			102	0.3								
	Haemulidae	8	0.1	1	0.1								
Sparidae	Calamus leucosteus	4	1.4	2	0.1	3	1.8	7	4.5				
	Lagodon rhomboides	4	0.4										
	Pagrus pagrus			1	0.1	27	1.2	1	0.1				
	Stenotomus aculeatus	1443	47.8	548	25.1	44	3.7			1	0.1		
Sciaenidae	Cynoscion nebulosus	1	0.1										
	Cynoscion nothus	3	0.5										
	Equetus lanceolatus	1	0.1	24	3.3								
	Larimus fasciatus	39	5.0										
	Leiostomus xanthurus	2	0.1										
	Menticirrhus americanus	30	5.2										
	Micropogonias undulatus	2	0.2										
	Pareques umbrosus	3	0.1										
Mullidae	Mullus auratus			5	0.5			1	0.1				
	Pseudupeneus maculatus							1	0.1				
Ephippidae	Chaetodipterus faber	21	2.5	1	0.5								
Labridae	Decodon puellaris							2	0.1				
	Hemipteronotus novacula			11	0.5	17	1.0						
	Labridae			1	0.1								
Uranoscopidae	Kathetostoma albigutta					1	0.1			5	0.2		
Gobiidae	Bollmannia sp.					1	0.1						
	Gobiidae			1	0.1								

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Scorpaenidae	Helicalenus dactylopterus											7	1.1
	Pontius rathbuni									1	0.1		
	Scorpaena agassizi							1	0.1				
	Scorpaena brasiliensis							1	0.1				
	Scorpaena calcarata	1	0.1	43	1.4								
	Trachyscorpia cristulata											2	0.1
Triglidae	Bellator brachychir							2	0.2	1	0.1		
	Bellator egretta							4	0.1				
	Bellator militaris			10	0.3			25	0.6	1	0.1		
	Bellator sp.									2	0.1		
	Peristedion gracile									101	1.1		
	Peristedion miniatum											1	0.1
	Prionotus alatus	3	0.1							2	0.1		
	Prionotus carolinus	133	5.6	52	3.0								
	Prionotus evolans	4	0.3										
	Prionotus ophryas	1	0.1	3	0.2	1	0.1	1	0.1				
	Prionotus roseus	1	0.1	4	0.1								
	Prionotus salmonicolor	14	2.5	1	0.1								
	Prionotus scitulus	46	1.8	7	0.6								
	Prionotus stearnsi									2	0.1		
	Prionotus tribulus	1	0.1										
	Triglidae									1	0.1		
Bothidae	Ancylopsetta dilecta									7	1.0		
	Ancylopsetta quadrocellata	5	0.5	3	1.4								
	Bothus ocellatus			10	0.1	1	0.1	3	0.1				
	Bothus robinsi	4	0.3	19	0.7	1	0.1						
	Citharichthys arctifrons									171	0.5	1	0.1
	Citharichthys cornutus	1	0.1										
	Citharichthys macrops			2	0.1								
	Cyclopsetta fimbriata			5	0.7	1	0.5						
	Etropus crossotus	8	0.2										
	Etropus rimosus	16	0.4										
	Gastropsetta frontalis					2	0.6						
	Hippoglossina oblonga											1	0.1
	Paralichthys dentatus			1	0.1			2	0.2				
	Paralichthys lethostigma	2	1.4										
	Paralichthys squamilentus									2	0.9		
	Scophthalmus aquosus			1	0.1								
	Syacium papillosum	14	1.7	33	3.3	5	0.7	42	0.4				
Cynoglossidae	Symphurus diomedianus							2	0.1				
	Symphurus plagiusa	5	0.4										
	Symphurus urospilus			1	0.1								
	Symphurus sp.			1	0.1								
Soleidae	Gymnachirus melas			3	0.2			2	0.1				
Balistidae	Aluterus heudeloti	1	0.1	8	1.7	2	0.2						
	Aluterus schoepfi	20	16.8	114	116.2	33	29.1						
	Balistis capriscus			4	0.3	3	0.3	1	0.1	1	0.1		
	Monacanthus ciliatus			1	0.1								
	Monacanthus sp.									1	0.1		
	Stephanolepis hispidus	299	4.6	1535	26.5	44	1.4	5	0.2				

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Ostraciidae	Lactophrys quadricornis	6	0.8	13	2.1	4	0.7						
Tetraodontidae	Lagocephalus laevigatus					1	0.1						
	Sphoeroides dorsalis	1	0.1	3	0.3	5	0.4						
	Sphoeroides maculatus	3	0.3	2	0.2								
	Sphoeroides pachygaster							2	0.9	3	0.2		
	Sphoeroides spengleri			1	0.1			5	0.1				
Diodontidae	Chilomycterus schoepfi	1	0.1	5	1.0	2	0.2						

APPENDIX III. Collection numbers for fishes taken during the summer 1974 groundfish survey in the South Atlantic Bight.

Family	Species	Collection Numbers For Each Occurrence
Orectolobidae	Ginglymostoma cirratum	74181
Rhinobatidae	Rhinobatos lentiginosus	74199
Rajidae	Raja eglanteria	74179 74192 74205 74215 74235 74247
	Raja garmani	74174 74175 74190
	Breviraja plutonia	74171 74206 74209
Dasyatidae	Dasyatis centroura	74175 74193 74211 74214 74217
Myliobatidae	Myliobatis freminvillei	74178
Muraenidae	Gymnothorax saxicola	74182 74200 74212 74213 74215
Muraenesocidae	Hoplunnis sp.	74222 74224
Congridae	Conger sp.	74200
	Congridae	74167 74181 74183 74190 74233
Ophichthidae	Mystriophis intertinctus	74183
	Ophichthus ocellatus	74190 74215 74224 74233 74240
Clupeidae	Etrumeus teres	74174 74228
	Opisthonema oglinum	74182 74211 74215 74255
	Sardinella anchovia	74181 74184 74186 74193 74194 74196 74199 74201 74202 74217 74218 74236 74257
	Clupeidae	74255
Engraulidae	Anchoa hepsetus	74182 74199 74200
	Anchoa lyolepis	74182 74198
	Engraulidae	74214 74255
Argentinidae	Glossanodon pygmaeus	74174 74190 74191 74220 74222 74224
Synodontidae	Synodus foetens	74167 74176 74178 74179 74180 74181 74182 74183 74184 74185 74186 74187 74188 74192 74193 74194 74195 74196 74197 74198 74199 74201 74202 74203 74211 74212 74213 74214 74215 74216 74217 74218 74226 74228 74236 74248 74249 74250 74251 74252 74253 74254 74255 74256

Family	Species	Collection Numbers For Each Occurrence		
Synodontidae (cont.)	Synodus intermedius	74178	74179	74188
		74213	74226	
	Synodus poeyi	74175	74176	74178
		74188	74191	74192
		74195	74205	74216
		74219	74226	74228
		74233	74235	74243
		74251	74252	
	Trachinocephalus myops	74167	74176	74179
		74183	74188	74192
		74198	74205	74215
		74233	74252	
	Saurida brasiliensis	74175	74178	74179
		74191	74219	
	Saurida normani	74174	74175	74228
	Saurida sp.	74176		
Chlorophthalmidae	Chlorophthalmus agassizi	74171	74206	74209
		74242		
Ariidae	Arius felis	74197	74199	74200
		74211	75214	
Batrachoididae	Porichthys porosissimus	74192	74199	74200
Lophiidae	Lophius americanus	74174	74240	
	Lophius sp.	74215		
Antennariidae	Antennarius sp.	74176		
Ogcocephalidae	Halieutichthys aculeatus	74190	74191	74192
		74222	74224	74228
		74233		
	Ogcocephalus corniger	74191	74192	74235
		74240		
	Ogcocephalus parvus	74176	74192	74205
		74233		
	Ogcocephalus radiatus	74175	74181	74188
		74190	74191	74213
		74222	74224	
	Zalieutes mcgintyi	74174		
Gadidae	Urophycis earlli	74182		
	Urophycis regius	74174	74190	74191
		74222	74224	75229
		74238	74239	74240
Merluccidae	Merluccius albidus	74209		
	Merluccius bilinearis	74209		
Moridae	Laemonema barbatulum	74171	74209	
Macrouridae	Macrouridae	74209		
Exocoetidae	Cypselurus exsiliens	74190		
Ophidiidae	Lepophidium cervinum	74190	74212	74224
		74229		

Family	Species	Collection Numbers For Each Occurrence
Ophidiidae (cont.)	Lepophidium jeannae	74233
	Ophidion beani	74167 74181 74183 74184 74198 74212 74213 74214 74215
	Ophidion grayi	74181 74198 74199 74200 74213
	Ophidion holbrooki	74167 74181 74182 74183 74192 74198 74200 74212 74213 74214 74253
	Ophidion selenops	74167 74181 74182 74198 74213 74215
	Ophidion sp.	74213
	Otophidium omostigmum	74167 74183 74213 74215
	Rissola marginata	74198 74199
Carapidae	Carapus bermudensis	74181
Polymyxiidae	Polymixia lowei	74171 74191 74224
Caproidae	Antigonia capros	74222
Fistulariidae	Fistularia villosa	74194
Syngnathidae	Hippocampus erectus	74219
	Syngnathus fuscus	74199
	Syngnathus springeri	74192
	Syngnathus sp.	74201
Percichthyidae	Synagrops bella	74171 74174 74175 74209 74220 74224
	Synagrops spinosa	74174 74191 74209 74229
	Synagrops sp.	74174
Serranidae	Centropristis philadelphica	74199 74200
	Centropristis ocyurus	74178 74179 74181 74183 74184 74192 74193 74200 74213 74219 74224 74233 74252 74253
	Centropristis striata	74185 74186 74200 74253
	Diplectrum formosum	74167 74179 74180 74181 74182 74183 74184 74185 74186 74187 74188 74193 74194 74195 74196 74197 74198 74199 74200 74201 74202 74203 74204 74205 74211 74212 74213 74214 74215 74216 74217 74218 74236 74248 74249 74250 74251 75252 74253 74255 74256 74257

Family	Species	Collection Numbers For Each Occurrence
Serranidae (cont.)	Serranus notospilus	74174 74175 74176 74178 74191 74192 74219 74229 74235
	Serranus phoebe	74192 74219
	Serranidae	74227
Priacanthidae	Priacanthus arenatus	74192
Pomatomidae	Pomatomus saltatrix	74182 74197
Rachycentridae	Rachycentron canadum	74211 74214
Echeneidae	Echeneis sp.	74181
Carangidae	Caranx bartholomaei	74185 74201
	Caranx crysos	74197 74201 74211 74227 74253 74254 74256
	Chloroscombrus chrysurus	74182 74198 74199 74200 74211 74214 74250 74253
	Decapterus macarellus	74193
	Decapterus punctatus	74176 74178 74180 74181 74182 74183 74184 74186 74187 74193 74194 74196 74198 74201 74202 74211 74213 74216 74217 74218 74219 74226 74236 74248 74249 74250 74253 74254 75255 74256 74257
	Decapterus sp.	74253
	Seriola rivoliana	74201
	Trachurus lathami	74176 74219 74225 74228
	Vomer setapinnis	74197 74198
	Carangidae	74171
Lutjanidae	Lutjanus aya	74198 74199
	Lutjanus campechanus	74200
	Rhomboplites aurorubens	74185 74186 74200 74201 74205 74213 74257
Gerridae	Eucinostomus argenteus	74199 74200 74211
	Eucinostomus gula	74200
	Eucinostomus sp.	74214
Haemulidae	Haemulon aurolineatum	74167 74186 74200 74212 74215 74247 75253

Family	Species	Collection Numbers For Each Occurrence
Haemulidae (cont.)	Haemulon striatum	74212 74213 74215
	Haemulidae	74201 74253
Sparidae	Calamus leucosteus	74178 74205 74236 74252 74253
	Lagodon rhomboides	74182 74199 74200 74253
	Pagrus pagrus	74179 74188 74192 74193 74194 74215 74236
	Stenotomus aculeatus	74167 74181 74182 74183 74184 74185 74186 74187 74194 74196 74197 74198 74200 74201 74213 74225 74236 74247 74251 74252 74253 74254 74255 74256 74257
Sciaenidae	Cynoscion nebulosus	74199
	Cynoscion nothus	74199
	Equetus lanceolatus	74184 74185 74186
	Equetus umbrosus	74253
	Larimus fasciatus	74182 74254
	Leiostomus xanthurus	74199
	Menticirrhus americanus	74182 74199 74200 74214
	Micropogonias undulatus	74199 74253
Mullidae	Mullus auratus	74178 74215
	Pseudopeneus maculatus	74176
Ephippidae	Chaetodipterus faber	74167 74181 74182 74197 74199
Sphyraenidae	Sphyraena borealis	74214
Labridae	Decodon puellaris	74219
	Hemipteronotus novacula	74179 74185 74186 74187 74188 74194 74195 74196 74201 74203 74205 74218
	Labridae	74212
Uranoscopidae	Kathetostoma albigutta	74190 74191 74193
Gobiidae	Bollmannia sp.	74187
	Gobiidae	74167
Scombridae	Auxis thazard	74201
	Scomber japonicus	74201 74218 74228 74257

Family	Species	Collection Numbers For Each Occurrence		
Scombridae (cont.)	Scomberomorus maculatus	74197		
Scorpaenidae	Helicolenus dactylopterus	74171	74206	74209
	Pontinus rathbuni	74224		
	Scorpaena agassizi	74235		
	Scorpaena brasiliensis	74233		
	Scorpaena calcarata	74182	74183	74213
		74215		
	Trachyscorpia cristulata	74206		
Stromateidae	Peprilus alepidotus	74181	74182	74200
	Peprilus triacanthus	74190	74200	74227
	Peprilus sp.	74198		
Ariommidae	Ariomma bondi	74238		
	Ariomma regulus	74187	74194	74201
Triglidae	Bellator brachychir	74233	74235	74240
	Bellator egretta	74219		
	Bellator militaris	74192	74212	74213
		74215	74233	74239
	Bellator sp.	74175		
	Peristedion gracile	74174	74175	74225
		74229		
	Peristedion miniatum	74242		
	Prionotus alatus	74191	74200	
	Prionotus carolinus	74181	74182	74183
		74184	74185	74213
		74247	74248	74253
		74254	74255	
	Prionotus evolans	74200	74253	74254
	Prionotus ophryas	74178	74179	74183
		74214	74215	
	Prionotus roseus	74213	74214	
	Prionotus salmonicolor	74198	74199	74200
		74201	74211	
	Prionotus scitulus	74167	74181	74182
		74183	74199	74200
		74253	74254	
	Prionotus stearnsi	74191		
	Prionotus tribulus	74199		
	Triglidae	74224		
Bothidae	Ancylopsetta dilecta	74174	74175	74190

Family	Species	Collection Numbers For Each Occurrence
Bothidae (cont.)	Ancylopsetta quadrocellata	74167 74182 74199 74212 74253 74254 74255
	Bothus ocellatus	74188 74192 74215
	Bothus robinsi	74181 74182 74205 74212 74213 74214 74215
	Citharichthys arctifrons	74174 74183 74190 74191 74206 74224 74229
	Citharichthys cornutus	74181
	Citharichthys macrops	74215
	Cyclopsetta fimbriata	74179 74183 74212 74215
	Etropus crossotus	74199 74200
	Etropus rimosus	74182 74198 74199 74200
	Gastropsetta frontalis	74179 74188
	Hippoglossina oblongua	74209
	Paralichthys dentatus	74176 74202 74233
	Paralichthys lethostigma	74199 74200
	Paralichthys squamilentus	74191
	Scophthalmus aquosus	74183
	Syacium papillosum	74176 74178 74182 74183 74187 74188 74192 74200 74212 74213 74214 74215 74216 74233 74253 74254 74255
Soleidae	Gymnachirus melas	74192 74212 74213
Cynoglossidae	Symphurus diomedianus	74233
	Symphurus plagiusa	74182 74198 74199 74255
	Symphurus urospilus	74167
	Symphurus sp.	74167
Balistidae	Aluterus heudelóti	74179 74188 74213 74215 74218 74247 74250 74251
	Aluterus schoepfi	74180 74181 74182 74183 74184 74185 74186 74187 74188 74194 74195 74196 74201 74202 74204 74205 74212 74213 74215 74218 74236 74248 74250 74251 74257

Family	Species	Collection Numbers For Each Occurrence
Balistidae (cont.)	Balistes capriscus	74167 74175 74180 74186 74195 74205 74226 74228
	Monacanthus ciliatus	74215
	Stephanolepis hispidus	74167 74176 74180 74181 74182 74183 74184 74185 74186 74187 74188 74194 74195 74196 74198 74200 74201 74202 74203 74204 74205 74212 74213 74214 74215 74216 74217 74233 74236 74247 74248 74249 74250 74251 75252 74253 74254 74255 74257
	Monacanthus sp.	74175
Ostraciidae	Lactophrys quadricornis	74182 74183 74186 74195 74198 74200 74202 74205 75212 74213 74214 74215 74236
Tetraodontidae	Lagocephalus laevigatus	74205
	Sphoeroides dorsalis	74181 74188 74196 74203 74213 74215 75216 74236
	Sphoeroides maculatus	74181 74182 74183 74200 74213
	Sphoeroides spengleri	74215 74219
	Sphoeroides pachygaster	74191 74235 74240
Diodontidae	Chilomycterus schoepfi	74185 74186 74188 74193 74196 74200

APPENDIX IV. Diversity values by depth zone for successful sand bottom trawls in the South Atlantic Bight during summer 1974.

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness
9-18	74181	14	21	270	2.991	0.681	3.572
	74182	12	23	242	3.126	0.691	4.008
	74184	18	9	1005	0.576	0.181	1.157
	74197	11	5	184	1.371	0.590	0.767
	74198	13	15	59	2.726	0.697	3.433
	74199	12	26	156	3.560	0.757	4.950
	74200	15	30	251	3.570	0.727	5.428
	74211	15	7	43	2.270	0.808	1.595
	74214	15	15	31	3.537	0.905	4.076
	74247	13	6	71	1.797	0.695	1.173
	74253	13	18	119	3.246	0.778	3.557
	74254	11	9	26	2.701	0.852	2.455
	74255	11	8	119	1.302	0.434	1.464
	74256	11	3	276	0.121	0.076	0.355
19-27	74167	20	18	114	2.682	0.643	3.589
	74180	26	5	38	2.082	0.896	1.099
	74183	22	22	331	2.768	0.620	3.619
	74185	20	11	472	0.630	0.182	1.624
	74186	26	13	179	2.299	0.621	2.313
	74196	25	8	33	2.354	0.785	2.002
	74201	21	10	194	2.130	0.641	1.708
	74202	23	6	38	1.570	0.607	1.374
	74212	22	18	110	3.284	0.787	3.616
	74213	25	28	185	3.568	0.742	5.172
	74215	22	29	373	3.599	0.741	4.728
	74218	24	5	23	1.854	0.798	1.275
	74248	20	5	42	1.827	0.787	1.070
	74249	24	3	29	0.940	0.593	0.593
	74250	27	5	575	0.348	0.150	0.629
	74251	26	7	671	0.146	0.052	0.921
	74252	20	8	21	2.618	0.872	2.299
	74257	22	5	16	2.139	0.921	1.442
28-55	74179	40	13	54	2.757	0.745	3.008
	74187	32	8	48	2.610	0.870	1.808
	74188	41	16	76	2.392	0.598	3.463
	74193	39	7	18	2.209	0.787	2.075
	74194	31	7	31	2.216	0.789	1.747
	74195	30	8	41	1.912	0.637	1.885
	74203	29	5	31	1.710	0.736	1.164
	74204	35	3	15	1.399	0.883	0.738
	74205	37	14	29	3.108	0.816	3.860
	74216	30	6	17	2.011	0.778	1.764
	74217	42	4	6	1.792	0.896	1.674
	74226	44	4	42	0.596	0.298	0.802
	74236	29	9	92	2.287	0.721	1.769
56-110	74176	80	10	186	1.643	0.494	1.722
	74178	70	11	132	2.241	0.647	2.048
	74192	71	19	141	3.043	0.716	3.637
	74219	72	9	86	2.225	0.702	1.796
	74228	101	5	26	0.927	0.399	1.227
	74233	99	14	316	0.733	0.192	2.258
	74235	91	7	68	0.998	0.355	1.422
	74243	91	1	25	0.0	0.0	0.0

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness
111-183	74174	146	14	165	2.740	0.719	2.546
	74175	128	13	63	2.535	0.685	2.896
	74190	137	12	153	1.932	0.539	2.186
	74191	128	16	217	2.594	0.648	2.788
	74222	128	6	235	0.402	0.155	0.915
	74224	132	13	76	2.082	0.562	2.770
	74225	128	2	3	0.918	0.918	0.910
	74229	137	6	62	1.987	0.768	1.211
	74239	155	6	6	2.585	1.000	2.790
	74240	155	2	2	1.000	1.000	1.442
184-366	74171	333	7	22	2.515	0.896	1.941
	74206	254	5	7	2.235	0.963	2.055
	74209	338	10	61	2.348	0.706	2.189
	74220	219	2	13	0.391	0.391	0.389
	74227	196	1	1	0	0	0
	74238	293	1	3	0	0	0
	74242	311	2	4	0.811	0.811	0.721

APPENDIX V. Groundfish weights for otter trawls in the South Atlantic Bight during summer 1974.

Depth Zone (m)	Collection Number	Depth (m)	Total Weight (kg)	Pelagic Weight (kg)	Elasmobranch Weight (kg)	Squid Weight (kg)	Demersal Bony Fish Weight (kg)
9-18	74181	14	177.753	0.754	158.760	3.175	15.064
	74182	12	19.765	2.234	0	1.361	16.170
	74184	18	66.795	23.656	0	7.258	35.881
	74197	11	29.693	5.090	0	0.920	23.683
	74198	13	4.069	0.500	0	1.361	2.208
	74199	12	16.970	4.736	0.907	0.454	10.873
	74200	15	12.347	0.380	0	0.794	11.173
	74211	15	162.789	12.901	136.080	4.082	9.726
	74214	15	154.065	1.561	147.420	0.454	4.630
	74247	13	2.370	0	0.454	0	1.916
	74253	13	10.773	0.400	0	1.361	9.012
	74254	11	4.684	0.908	0	1.814	1.962
	74255	11	8.257	0.400	0	2.268	5.589
	74256	11	20.612	2.721	0	5.897	11.994
19-27	74167	20	7.186	0	0	1.350	5.836
	74180	26	13.553	1.814	0	0.200	11.539
	74183	22	18.058	0.100	0	0.894	17.064
	74185	20	24.995	0.100	0	0	24.895
	74186	26	20.660	2.822	0	0	17.838
	74196	25	8.665	1.007	0	0	7.658
	74201	21	108.298	66.320	0	0.200	41.778
	74202	23	14.109	4.083	0	0.100	9.926
	74212	22	40.919	0	0	0	40.919
	74213	25	16.362	0.100	0	2.268	13.994
	74215	22	25.289	1.361	0.454	2.268	21.206
	74218	24	102.084	93.365	0	1.814	6.905
	74248	20	5.554	0.454	0	0.454	4.636
	74249	24	1.761	0.100	0	0.200	1.461
	74250	27	19.706	0.200	0	0	19.506
	74251	26	13.454	0	0	0	13.454
	74252	20	2.868	0	0	0.454	2.414
	74257	22	14.661	13.254	0	0.100	1.307
28-55	74179	40	7.860	0	0.100	0.454	7.306
	74187	32	6.851	0.200	0	0.100	6.551
	74188	41	5.827	0	0	0.090	5.737
	74193	39	152.557	48.636	102.060	0.454	1.407
	74194	31	38.802	32.052	0	0	6.750
	74195	30	3.422	0	0	0	3.422
	74203	29	3.929	0	0	0	3.929
	74204	35	7.004	0	0	0.100	6.904
	74205	37	5.083	0	0.454	0.100	4.529
	74216	30	2.405	0.454	0	0.190	1.761
	74217	42	185.469	3.275	181.440	0.100	0.654
	74226	44	0.854	0.454	0	0	0.400
	74236	29	23.634	1.007	0	0	22.627
56-110	74176	80	7.151	1.461	0	0	5.690
	74178	70	8.865	0.100	0.907	0	7.858
	74192	71	10.727	0	0.907	0.907	8.913
	74219	72	9.519	7.811	0	0.100	1.608
	74228	101	8.665	6.351	0	1.814	0.500
	74233	99	3.128	0	0	0.100	3.028
	74235	91	2.215	0	0.454	0	1.761
	74243	91	0.100	0	0	0	0.100

Depth Zone (m)	Collection Number	Depth (m)	Total Weight (kg)	Pelagic Weight (kg)	Elasmobranch Weight (kg)	Squid Weight (kg)	Demersal Bony Fish Weight (kg)
111-183	74174	146	13.704	0.454	0.454	10.080	2.716
	74175	128	101.900	0	99.892	0.554	1.454
	74190	137	4.375	0.100	0.100	0.907	3.268
	74191	128	11.833	0	0	1.361	10.472
	74222	128	7.758	0	0	2.268	5.490
	74224	132	2.761	0	0	0.200	2.561
	74225	128	0.400	0.100	0	0.100	0.200
	74229	137	2.215	0	0	0.907	1.308
	74239	155	11.186	0	0	10.986	0.200
	74240	155	11.143	0	0	10.543	0.600
184-366	74171	333	1.607	0.100	0.100	0	1.407
	74206	254	0.500	0	0.100	0	0.400
	74209	338	4.629	0	0.100	2.822	1.707
	74220	219	2.568	0	0	2.368	0.200
	74227	196	109.972	107.150	0	2.722	0.100
	74238	293	25.602	0.100	0	25.402	0.100
	74242	311	0.200	0	0	0	0.200