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

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ABSTRACT

The distribution, relative abundance, species composition and diversity of groundfish in the South Atlantic Bight from Cape Fear to Cape Canaveral were studied from 3/4 Yankee otter trawl collections during the Spring of 1974. The stratified mean catch/tow for total groundfish was 53.382 kg/tow whereas demersal bony fish averaged 15.452 kg/tow. Much of the groundfish biomass of the sand bottom habitat of the South Atlantic Bight was made up of batoid elasmobranchs especially Dasyatis centroura and Myliobatis fremenvillei.

The most abundant demersal fish species was the southern porgy, Stenotomus aculeatus, which made up 75.6% of the total number and 38.4% of the total weight of demersal bony fishes. Numerically, the clearnose skate, Raja eglanteria, and Myliobatis fremenvillei were the most important elasmobranchs, however, twenty-three Dasyatis centroura with a weight of 2469 kg accounted for 82.4% of the elasmobranch biomass. Catches of pelagic species were dominated by the Engraulidae, Clupeidae and Carangidae which represented about 95% of the total number of pelagic fishes.

Demersal fish species diversity showed high variability inshore, largest values around the shelf-break and a general decrease with depth. There was an average of 11.3 species/tow with a range from 2 to 33 species for the entire survey.

Cluster analysis showed that depth was more important than latitude in determining faunal associations in the groundfish community of the South Atlantic Bight.

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INTRODUCTION

This present effort is a continuation of the summaries of groundfish surveys conducted by the MARMAP program at the Marine Resources Research Institute of the South Carolina Wildlife and Marine Resources Department in the South Atlantic Bight between Cape Fear and 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

A stratified random sampling design (Grosslein 1969) was employed to allocate trawl stations within strata which were a southward projection of the MARMAP strata utilized by the Northeast Center of the National Marine Fisheries Service from Cape Fear to Cape Canaveral (see Wenner et al. 1979 for strata map). The strata were subdivisions of six depth zones (9-18 m; 19-27 m; 28-55 m; 56-110 m; 111-183 m; 184-366 m).

A total of 84 0.5-h otter trawls (Appendix I) were made with 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 a speed of 6.5 km/h. Only successful trawls in non-live bottom habitats were analyzed. Live bottom stations had large amounts of sponges and/or coral and contained certain fish species that are known to associate with coral reefs (Wenner et al. 1979, Table 1). Fishes were sorted by species, measured and weighed. Hydrographic observations were taken at the end of each trawl with Niskin bottles and reversing thermometers.

Data handling techniques were essentially the same as previously reported. Individual stratum boundaries were collapsed within depth zones resulting in six previously described zones which 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 population variance of the mean catch/tow was computed by the methodology of 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 1973). The Bliss (1967) approximation was used in retransforming the data from logarithmic to original units.

Much of the variability of South Atlantic Bight trawl catches results from occasional catches of large elasmobranchs such as Dasyatis sp. and Large catches of pelagic species such as Decapterus punctatus (Wenner et al. 1979). Therefore, 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., pers. comm.) and 3.241 km as the distance oovered during a standard tow. All estimates are minimum estimates and have not been adjusted by availability or vulnerability factors to our trawl since the relations are unknown.

After removal of the squids and pelagic fishes, diversity indices (H' [see 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 the 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 a 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 3 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 a species-group is rated 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 some of the most abundant and widely distributed species by the following expression:

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

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

Bottom isotherms (Fig. 1) show the warming trend of the inshore waters from winter minimums. In the inshore area from Cape Fear to Savannah much of the shelf had bottom temperatures of 18°C. South of Savannah to Cape Canaveral bottom temperatures were higher. Beyond the shelf break there was a general decrease in bottom temperature with increasing depth. The shelf break was characterized by a general compacting of isotherms. Bottom isohalines showed the effects of fresh water runoff from the estuarine systems of Georgia and South Carolina. Generally there was an increase in salinity with increased distance from an estuary. Offshore waters and waters off Florida which are not affected by large estuarine systems had higher bottom salinities (Fig. 2).

Biomass

Mean catch/tow values for transformed and untransformed total groundfish weight (includes demersal bony fishes, elasmobranchs, pelagic species, squids) for the six depth zones are in Table 1; values for demersal bony fishes only are in Table 2. The highest mean value for total groundfish biomass was found in the 56-110 m zone. Lowest values were found in the two deepest zones.

Since the frequency distribution of the trawl catches of the demersal bony fishes was not normal, these data were transformed by ln (kg + 1) before significance testing. Analysis of variance showed significant differences in mean catches of demersal bony fishes between depth zones (Table 3) at the 90% level. Scheffe's linear contrast to detect significant differences between treatment means (Guenther 1964) showed two groups. Group I included mean values from the 4 shallow zones (9-110 m) whereas group II included mean values from all but the 19-27 m zone.

The stratified mean catch/tow for total untransformed groundfish weight was 53.382 kg/tow with 90% confidence limits of 36.611 and 70.152 kg/tow. Transformed data with the Bliss (1967) approximations of the mean gave a stratified mean catch/tow of 54.769 kg/tow with 90% confidence limits of 41.304 and 72.520 kg/tow. The use of transformed catches reduced the estimated variance from 8574 to 2.328.

Analysis of only the demersal bony fish catches showed that the removal of elasmobranchs, squids and pelagic fishes from the untransformed analysis lowered the estimated variance of the stratified mean catch/tow by 89%. The reduction of the estimated variance of the transformed data was 42%. Untransformed demersal bony fish catches had a stratified mean catch/tow of 15.452 kg/tow with 90% confidence limits of 9.988 and 20.916 kg/tow. Transformed demersal bony fish weights had a stratified mean catch/tow of 14.168 kg/tow with 90% confidence limits of 11.284 and 17.729 kg/tow.

Density estimates in kg/ha based on 2.835 ha as the swept area during a standard tow during the survey were (LCL and UCL = lower and upper 90% confidence limits respectively):

	$\bar{x}$	LCL	UCL
total groundfish (untransformed)	18.830	12.914	24.745
total groundfish (transformed)	19.319	14.569	25.580
demersal bony fish (untransformed)	5.450	3.523	7.378
demersal bony fish (transformed)	4.998	3.980	6.254

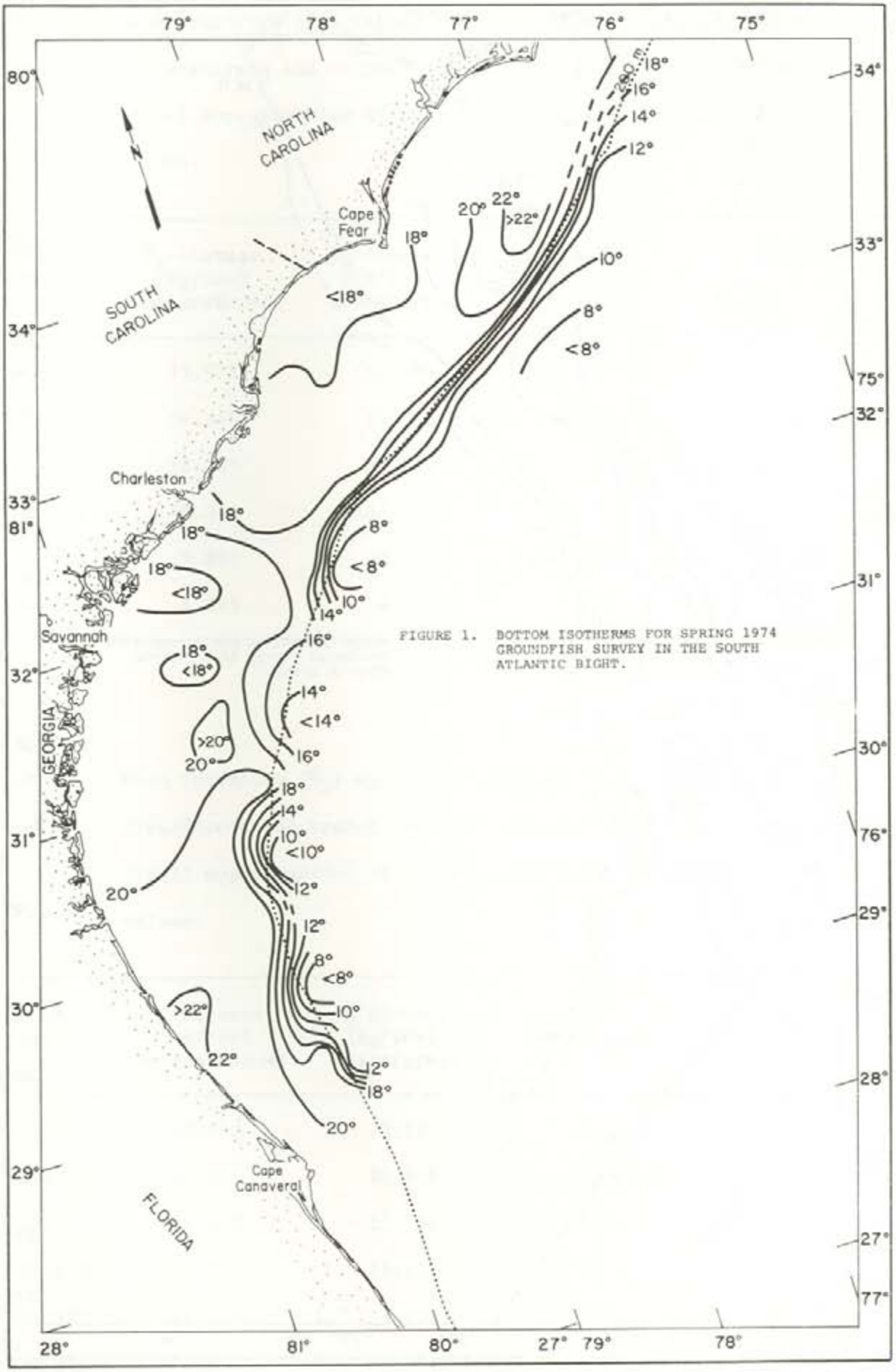

FIGURE 1. BOTTOM ISOTHERMS FOR SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT.

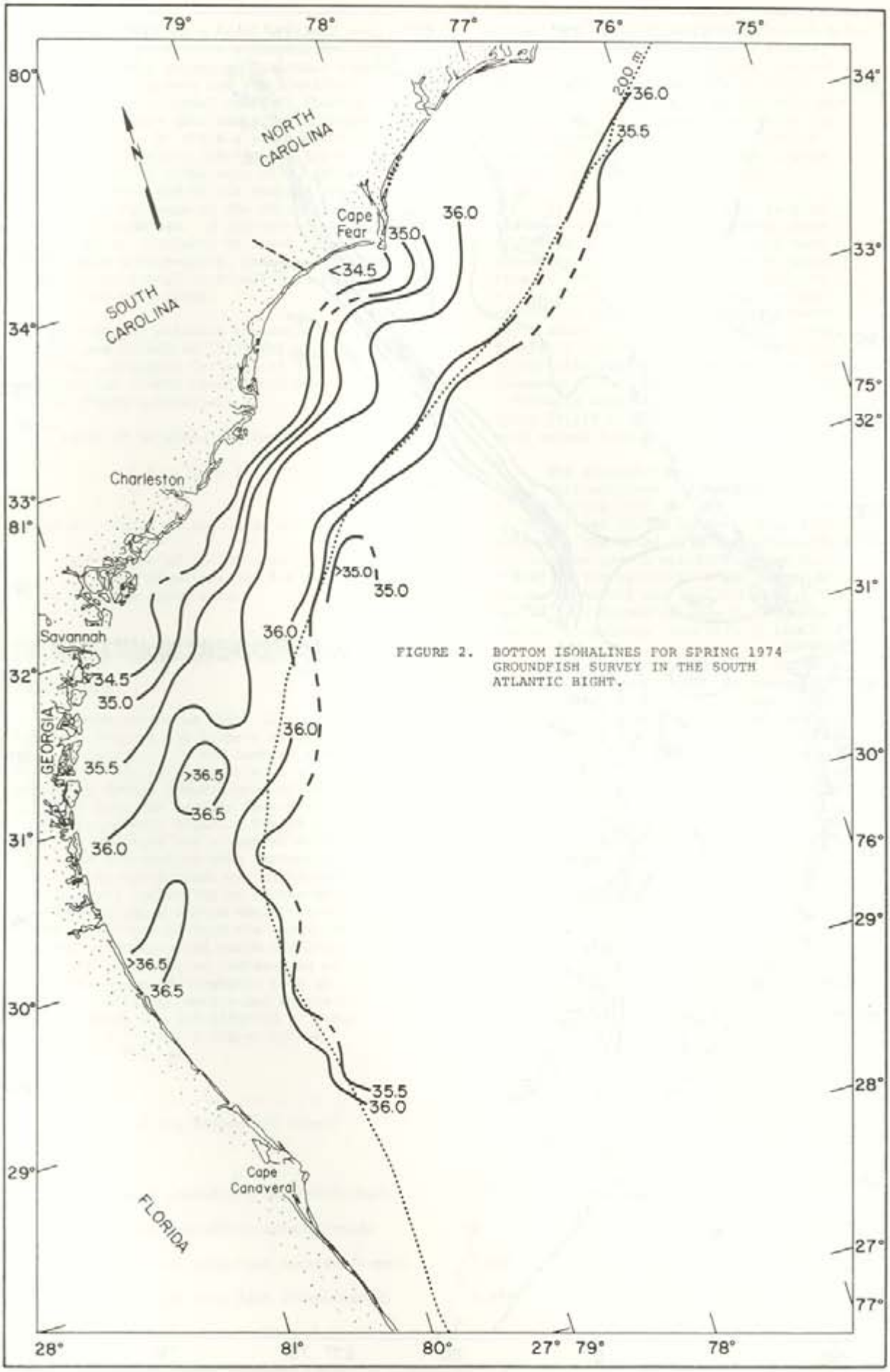

FIGURE 2. BOTTOM ISOHALINES FOR SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT.

Table 1. Mean catch/tow ($\bar{y}_h$) values for total trawl caught groundfish on untransformed and transformed data for Spring 1974. Bliss' (1967) approximation of the mean was applied to the transformed values.

depth (m)	$\bar{y}_h$ biomass (kg/tow) untransformed	$\bar{y}_h$ biomass (kg/tow) transformed	area of depth zone (km^2)	number of tows
9-18	73.975	83.643	18083	20
19-27	58.346	64.785	16100	19
28-55	48.595	53.244	22367	19
56-110	98.865	115.745	4775	9
111-183	29.885	28.724	3615	9
184-366	4.283	4.395	9724	8

Table 2. Mean catch/tow ($\bar{y}_h$) values for demersal bony fish only on untransformed and transformed data for Spring of 1974. Bliss' (1967) approximation of the mean was applied to the transformed values.

depth (m)	$\bar{y}_h$ biomass (kg/tow) untransformed	$\bar{y}_h$ biomass (kg/tow) transformed	area of depth zone (km^2)	number of tows
9-18	12.979	12.121	18083	20
19-27	24.724	24.649	16100	19
28-55	18.008	15.307	22367	19
56-110	16.247	16.628	4775	9
111-183	4.557	4.636	3615	9
184-366	2.478	2.542	9724	8

Table 3. Analysis of variance of the transformed mean catch/tow in kg of demerdal bony fish between depth zones. *Significant at the 90% level.

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Between zones	5	17.333	3.466	3.08*
Among zones	78	87.728	1.124	
Total	83	105.062		

Table 4. Scheff's multiple range comparison of the transformed mean catch/tow in the six depth zones. The horizontal line below treatment 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
$\bar{y}$(ln [kg + 1])	2.034	2.614	2.151	2.022	1.371	1.116
number of tows I	20	19	19	9	9	8
II						

Standing stock estimates for the non-live bottom groundfish community in the South Atlantic Bight during Spring 1974 should be viewed as minimum estimates (Table 5) since we have no information as to the effectiveness of the 3/4 Yankee trawl in sampling South Atlantic Bight groundfish.

Demersal Bony Fishes

The Spring 1974 groundfish survey collected 30,754 demersal bony fishes from 146 species in 45 families (Table 6) during 84 trawls (effort = 42 hr). As found for the Fall 1973 groundfish survey (Wenner et al. 1979), the Sparidae were the numerically most abundant demersal bony fish family in the South Atlantic Bight during the Spring of 1974. The southern porgy, Stenotomus aculeatus, made up 99.4% of the total sparid catch. The most speciose families during the survey were the Bothidae (22 species) and the Triglidae (17 species).

Stenotomus aculeatus dominated the catches in both total number and total weight. This species comprised 75.6% of the total number and 38.4% of the total weight of demersal bony fishes (Table 7). Aluterus schoepfi was represented by a relatively small number of individuals (237) which were of a large size (mean weight = 1.1 kg).

When numerical and weight dominance was examined by depth zone, the southern porgy, S. aculeatus, ranked first in total number and first in total weight in all but the 19-27 m zone where Aluterus schoepfi outweighed S. aculeatus (Table 8 and 9). In offshore waters beyond the shelf break, Urophycis regius became the most abundant demersal bony fish.

Southern Porgy: Stenotomus aculeatus

A total of 23,262 southern porgy, Stenotomus aculeatus, weighing 491.244 kg were taken in the open shelf habitat from Cape Fear (33. 8°N) to north of Cape Canaveral (29°N) during the Spring of 1974 (Fig. 3). Stenotomus aculeatus ranked first by total number caught and second by weight of all species. It comprised 23.2% of the total number and 10.4% of the weight of the total groundfish catch. Roughtailed stingray, Dasyatis centroura, was the only groundfish species to have a greater total weight. Southern porgy were collected in trawls from 9 to 124 m (15.1-20.9°C) with maximum catches occurring in the two inshore depth zones (9-18 m; 19-27 m) where it was found in 64% of the trawls. In the mid-shelf and shelf break zones, S. aculeatus was taken in 24% of the 37 trawls and was absent in the eight trawls in the deepest zone (Fig. 4A).

Length frequency distribution of S. aculeatus showed two major modal peaks (5 cm and 15 cm fork length) (Fig. 4B). The overall average size was 7.9 cm fork length with a range from 3 to 20 cm. Juveniles less than 10 cm fork length were taken only in the 9-18 m and 19-27 m depth zones where they made up 90% and 52% of the total number of southern porgy. During the Spring of 1974, adult S. aculeatus were found throughout the species bathymetric range (9-124 m) but juveniles were confined to depths less than 28 m.

Untransformed data gave a stratified mean catch per tow of 371 S. aculeatus with a weight of 8.043 kg/tow (90% confidence limits: 1.631; 14.456 kg/tow). The variability of the number/tow in this case was so great that confidence limits are essentially meaningless. The Bliss (1967) approximation of the mean of the transformed data gave a stratified mean catch/tow of 142.6 individuals/tow (90% confidence limits: 81; 250) with a weight of 3.272 kg/tow (90% confidence limits: 2.225; 4.659 kg/tow). Standing stock estimates based on these data are in Table 10.

Spotted hake: Urophycis regius

A total of 1081 spotted hake, Urophycis regius, with a weight of 30.863 kg were taken in depths from 9-287 m (7.4-20.7°C) in 45% of the 84 trawls made in the South Atlantic Bight during the Spring 1974 groundfish survey. Spotted hake ranked ninth by total number (1.1%) and thirteenth by total weight (0.7%) in the total groundfish catch. It was the second most abundant demersal bony fish species by number (3.5%) and the sixth most important by weight (2.4%). Trawl catches showed U. regius to occur from north of Cape Canaveral (29.2°N) to Cape Fear (33.8 N) (Fig. 5).

Although U. regius was taken in all depth zones, maximum catches both in numbers and weight were made in depths greater than 55 m (Fig. 4C), where spotted hake occurred in 69% of the trawls. Seventy percent of the total number and 87% of the total weight of U. regius were taken at depths greater than 55 m. In the 19-27 m and 28-55 m strata, U. regius was found relatively infrequently (27% of the trawls) and in small numbers.

A greater percentage of the smaller spotted hake were found inshore (Fig. 4D). Although individuals less than 20 cm total length were found in all zones, larger fishes tended to be concentrated in the deepest zone.

Untransformed data gave a stratified mean catch/tow of 9.8 individuals (90% confidence limits: 4.8; 14.8) with a weight of 0.259 kg/tow (90% confidence limits: 0.109; 0.409). Bliss' (1967) approximation of the transformed mean resulted in a stratified mean catch/tow of 6.0 individuals (90% confidence limits: 4.4; 8.0) with a weight of 0.250 kg/tow (90% confidence limits: 0.170; 0.335). Density estimates for spotted hake in the South Atlantic Bight during the Spring of 1974 were: untransformed data: 3.5 (90% confidence

Table 5. Minimum standing stock estimates of groundfish in the South Atlantic Bight during Spring of 1974. All values should be expanded by 10^4. Units are metric tons; LCL and UCL = lower and upper 90% confidence limits.

	Mean	LCL	UCL
total biomass (untransformed)	14.06	9.64	18.48
total biomass (transformed)	14.42	10.88	19.10
demersal bony fish (untransformed)	4.07	2.63	5.51
demersal bony fish (transformed)	3.73	2.97	4.67

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

Family	Number of Individuals	Weight (kg)	Number of Species
Sparidae	23,400	517.7	4
Synodontidae	1,290	94.9	8
Gadidae	1,084	31.6	2
Bothidae	1,010	53.9	22
Balistidae	775	299.0	7
Serranidae	658	76.0	8
Triglidae	576	37.0	17
Sciaenidae	362	40.7	6
Ophidiidae	235	10.5	7
Lutjanidae	206	24.1	2
Haemulidae	168	12.7	3
Scorpaenidae	143	7.7	7
Mullidae	125	10.7	2
Ogcocephalidae	113	3.1	3
Ephippidae	105	11.4	1
Argentinidae	86	0.9	2
Percichthyidae*	76	1.3	2
Polymixidae	76	2.2	1
Batrachoididae	33	1.4	1
Chlorophthalmidae	31	0.5	1
Tetraodontidae	30	3.9	4
Moridae	20	0.2	1
Uranoscopidae	20	1.5	1
Ariidae	16	2.3	1
Muraenescocidae	15	0.2	1
Ophichthidae	15	0.9	5
Congridae	13	0.6	4
Cynoglossidae	12	0.7	3
Muraendiae	11	1.3	1
Diodontidae	7	1.2	1
Ostraciidae	7	1.7	1
Caproidae	6	0.3	2
Labridae	5	0.8	1
Rachycentridae	5	20.0	1
Merluccidae	4	0.3	2
Zeidae	4	0.3	1
Centriscidae	3	0.1	1
Soleidae	2	0.2	1
Syngnathidae	2	0.1	1
Antennaridae	1	0.1	1
Apogonidae	1	0.1	1
Dactyloscopidae	1	0.1	1
Lophiidae	1	0.1	1
Priacanthidae	1	0.1	1
GRAND TOTAL	30,754	1274.4	146

*The family Percichthyidae is an assemblage of unrelated groups. Although both Synagrops bella and S. spinosa are not referable to this family, they are 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 (elasmobranchs, pelagic species and squid excluded) for 84 trawls made during the Spring 1974 groundfish survey in the South Atlantic Bight.

Species	Total Number	Percent of Total Demersal Bony Fish	Cumulative Percent	Number of Occurrences
Stenotomus aculeatus	23262	75.6		34
Urophycis regius	1081	3.5	79.1	38
Synodus foetens	702	2.3	81.4	59
Stephanolepis hispidus	514	1.7	83.1	36
Citharichthys arctifrons	473	1.5	84.6	11
Diplectrum formosum	456	1.5	86.1	46
Synodus poeyi	441	1.4	87.5	22
Syacium papillosum	342	1.1	88.6	30
Prionotus carolinus	272	0.9	89.5	13
Leiostomus xanthurus	239	0.8	90.3	1

Species	Total Weight (kg)	Percent of Total Demersal Bony Fish	Cumulative Percent	Number of Occurrences
Stenotomus aculeatus	491.244	38.4		34
Aluterus schoepfi	263.537	20.6	59.0	38
Synodus foetens	83.596	6.5	65.5	59
Diplectrum formosum	61.228	4.8	70.3	46
Syacium papillosum	37.091	2.9	73.2	30
Urophycis regius	30.863	2.4	75.6	38
Leiostomus xanthurus	28.123	2.2	77.8	1
Stephanolepis hispidus	25.490	2.0	79.8	36
Rhomboplites aurorubens	23.934	1.9	81.7	11
Prionotus carolinus	21.113	1.7	83.4	13

Table 8. Top ten numerically dominant demersal bony fish species by depth zone for R/V Dolphin Spring 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 Zone	N_1/N
9-18	Stenotomus aculeatus	16924	93.6	12/20
	Synodus foetens	305	1.7	19/20
	Urophycis regius	283	1.6	10/20
	Leiostomus xanthurus	239	1.3	1/20
	Diplectrum formosum	83	0.5	11/20
	Aluterus schoepfi	50	0.3	15/20
	Micropogonias undulatus	38	0.2	1/20
	Arius felis	16	0.1	2/20
	Menticirrhus americanus	16	0.1	6/20
	Centropristis striata	14	0.1	5/20
19-27	Stenotomus aculeatus	3825	76.6	13/19
	Diplectrum formosum	211	4.2	18/19
	Aluterus schoepfi	156	3.1	17/19
	Synodus foetens	155	3.1	18/19
	Stephanolepis hispidus	113	2.3	12/19
	Haemulon aurolineatum	97	1.9	3/19
	Chaetodipterus faber	67	1.3	1/19
	Pagrus pagrus	39	0.8	1/19
	Otophidium omostigmum	37	0.7	3/19
	Syacium papillosum	32	0.6	6/19
28-55	Stenotomus aculeatus	2074	58.3	6/19
	Stephanolepis hispidus	300	8.4	13/19
	Prionotus carolinus	260	7.3	7/19
	Diplectrum formosum	162	4.6	17/19
	Syacium papillosum	109	3.1	14/19
	Synodus poeyi	99	2.8	9/19
	Synodus foetens	73	2.1	17/19
	Scorpaena calcarata	68	1.9	8/19
	Bothus ocellatus	49	1.4	10/19
	Haemulon aurolineatum	40	1.1	4/19
56-110	Synodus poeyi	288	15.2	7/9
	Syacium papillosum	191	10.1	7/9
	Urophycis regius	191	10.1	6/9
	Rhomboplites aurorubens	174	9.2	4/9
	Stenotomus aculeatus	168	8.9	2/9
	Synodus foetens	165	8.7	3/9
	Stephanolepis hispidus	90	4.8	3/9
	Mullus auratus	81	4.3	2/9
	Equetus umbrosus	62	3.3	1/9
	Serranus notospilus	52	2.7	3/9
111-183	Urophycis regius	432	27.6	7/9
	Stenotomus aculeatus	271	17.3	1/9
	Citharichthys arctifrons	200	12.8	6/9
	Peristedion gracile	125	8.0	1/9
	Glossanodon pygmaeus	59	3.8	4/9
	Halieutichthys aculeatus	52	3.3	4/9
	Polymixia lowei	47	3.0	1/9
	Saurida normani	44	2.8	3/9
	Synodus poeyi	42	2.7	4/9
	Synagrops bella	38	2.4	7/9

Table 8 (continued)

Depth Zone (m)	Species	Total Number	Percent of Total in Zone	N_1/N
184-366	Citharichthys arctifrons	272	40.9	4/8
	Urophycis regius	135	20.3	5/8
	Peristedion sp.	57	8.6	1/8
	Synagrops bella	37	5.6	5/8
	Chlorophthalmus agassizi	31	4.7	5/8
	Polymixia lowei	28	4.2	3/8
	Glossanodon pygmaeus	26	3.9	4/8
	Laemonema barbatulum	20	3.0	2/8
	Helicolenus dactylopterus	13	2.0	2/8
	Synodus poeyi	9	1.4	1/8

Table 9. Top ten dominant demersal bony fish species by weight for Spring 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 Zone	N_1/N
9-18	Stenotomus aculeatus	123.283	47.5	12/20
	Aluterus schoepfi	50.348	19.4	15/20
	Leiostomus xanthurus	28.123	10.8	1/20
	Synodus foetens	16.475	6.3	19/20
	Diplectrum formosum	6.397	2.5	11/20
	Chaetodipterus faber	5.443	2.1	3/20
	Micropogonias undulatus	4.536	1.7	1/20
	Menticirrhus americanus	3.376	1.3	6/20
	Urophycis regius	2.954	1.1	10/20
	Centropristis striata	2.922	1.1	5/20
19-27	Aluterus schoepfi	178.717	38.0	17/19
	Stenotomus aculeatus	169.792	36.1	13/19
	Diplectrum formosum	31.851	6.8	18/19
	Synodus foetens	22.625	4.8	18/19
	Haemulon aurolineatum	9.073	1.9	3/19
	Rachycentron canadum	8.618	1.8	1/19
	Stephanolepis hispidus	6.952	1.5	12/19
	Centropristis striata	4.536	1.0	2/19
	Chaetodipterus faber	4.082	0.9	1/19
	Calamus leucosteus	3.730	0.8	4/19
28-55	Stenotomus aculeatus	169.495	49.5	6/19
	Aluterus schoepfi	34.473	10.1	6/19
	Diplectrum formosum	22.980	6.7	17/19
	Prionotus carolinus	20.159	5.9	7/19
	Syacium papillosum	18.346	5.4	14/19
	Stephanolepis hispidus	13.909	4.1	13/19
	Synodus foetens	11.383	3.3	17/19
	Rachycentron canadum	9.980	2.9	2/19
	Pagrus pagrus	8.618	2.5	2/19
	Scorpaena calcarata	2.924	0.9	8/19
56-110	Synodus foetens	32.205	22.0	3/9
	Rhomboplites aurorubens	22.073	15.1	4/9
	Stenotomus aculeatus	18.244	12.5	2/9
	Syacium papillosum	15.069	10.3	7/9
	Mullus auratus	7.712	5.3	2/9
	Urophycis regius	6.196	4.2	6/9
	Lagodon rhomboides	4.536	3.1	1/9
	Calamus leucosteus	4.082	2.8	1/9
	Stephanolepis hispidus	3.829	2.6	3/9
	Serranus phoebe	3.729	2.6	2/9
111-183	Urophycis regius	12.448	30.3	7/9
	Stenotomus aculeatus	10.433	25.4	1/9
	Peristedion gracile	2.722	6.6	1/9
	Mullus auratus	2.368	5.8	2/9
	Citharichthys arctifrons	1.407	3.4	6/9
	Lepophidium cervinum	1.208	2.9	5/9
	Kathetostoma albigutta	1.008	2.5	3/9
	Synagrops bella	0.700	1.7	7/9
	Ogcocephalus radiatus	0.654	1.6	3/9

Table 9 (continued)

Depth Zone (m)	Species	Total Weight (kg)	Percent of Total in Zone	N_1/N
184-366	Urophycis regius	8.265	41.7	5/8
	Citharichthys arctifrons	2.114	10.7	4/8
	Peristedion sp.	1.814	9.2	1/8
	Polymixia lowei	1.561	7.9	3/8
	Merluccius albidus	1.007	5.1	2/8
	Helicolenus dactylopterus	0.554	2.8	2/8
	Chlorophthalmus agassizi	0.500	2.5	5/8
	Synagrops bella	0.500	2.5	5/8
	Lagodon rhomboides	0.454	2.3	1/8
	Urophycis floridanus	0.454	2.3	1/8

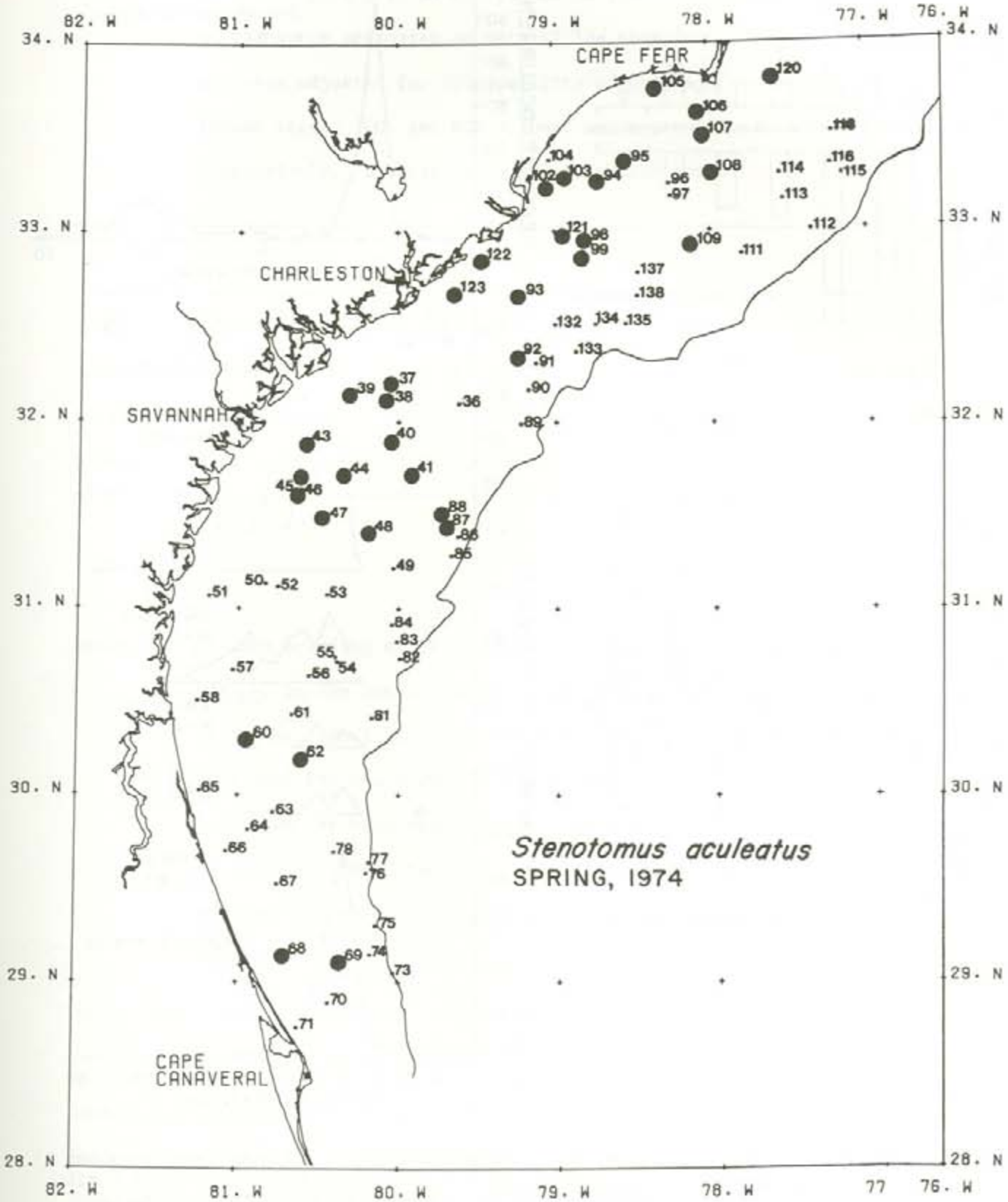

FIGURE 3. DISTRIBUTION OF SOUTHERN PORGY, STENOTOMUS ACULEATUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

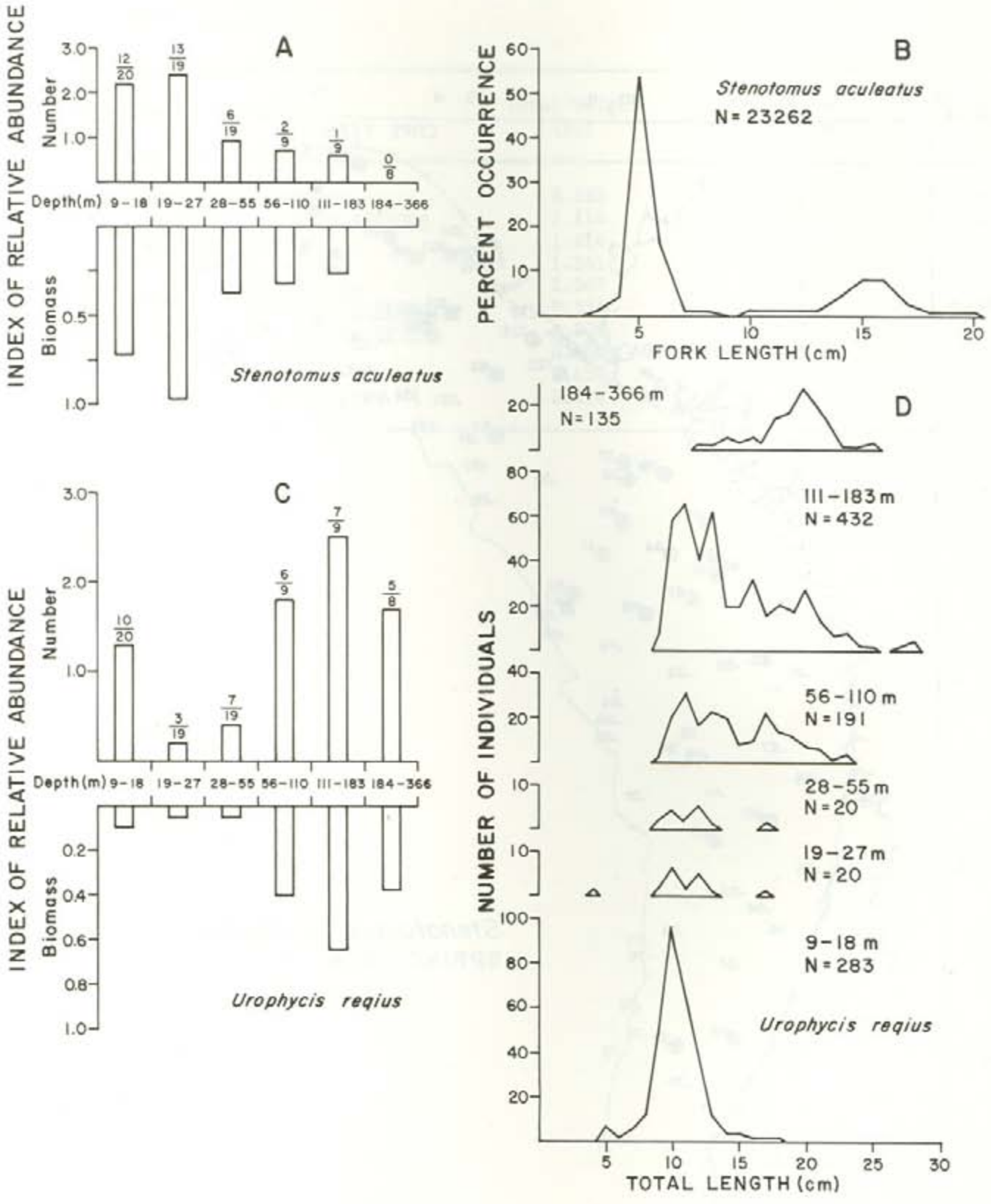

FIGURE 4. INDEX OF RELATIVE ABUNDANCE FOR SOUTHERN PORGY, STENOTOMUS ACULEATUS (A) AND SPOTTED HAKE, UROPHYCIS REGIUS (C) IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCIES OF S. ACULEATUS (B) AND U. REGIUS BY DEPTH ZONE (D) FOR SPRING 1974.

Table 10. Minimum standing stock estimates of the southern porgy, Stenotomus aculeatus, in the South Atlantic Bight during the Spring of 1974 in depths from 9 to 55 m. The Bliss (1967) approximation has been used for the estimates on natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	7.40×10^8	---	---
number (transformed)	2.84×10^8	1.62×10^8	4.99×10^8
biomass (untransformed)	1.60×10^4	0.33×10^4	2.88×10^4
biomass (transformed)	0.65×10^4	0.43×10^4	0.93×10^4

Table 11. Minimum standing stock estimates of the spotted hake, Urophycis regius, in the South Atlantic Bight during the Spring of 1974 in depths from 9 to 366 m. The Bliss (1967) approximation has been used for the estimates on natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	2.58×10^7	1.26×10^7	3.90×10^7
number (transformed)	1.58×10^7	1.17×10^7	2.11×10^7
biomass (untransformed)	0.68×10^3	0.29×10^3	1.08×10^3
biomass (transformed)	0.66×10^3	0.45×10^3	0.88×10^3

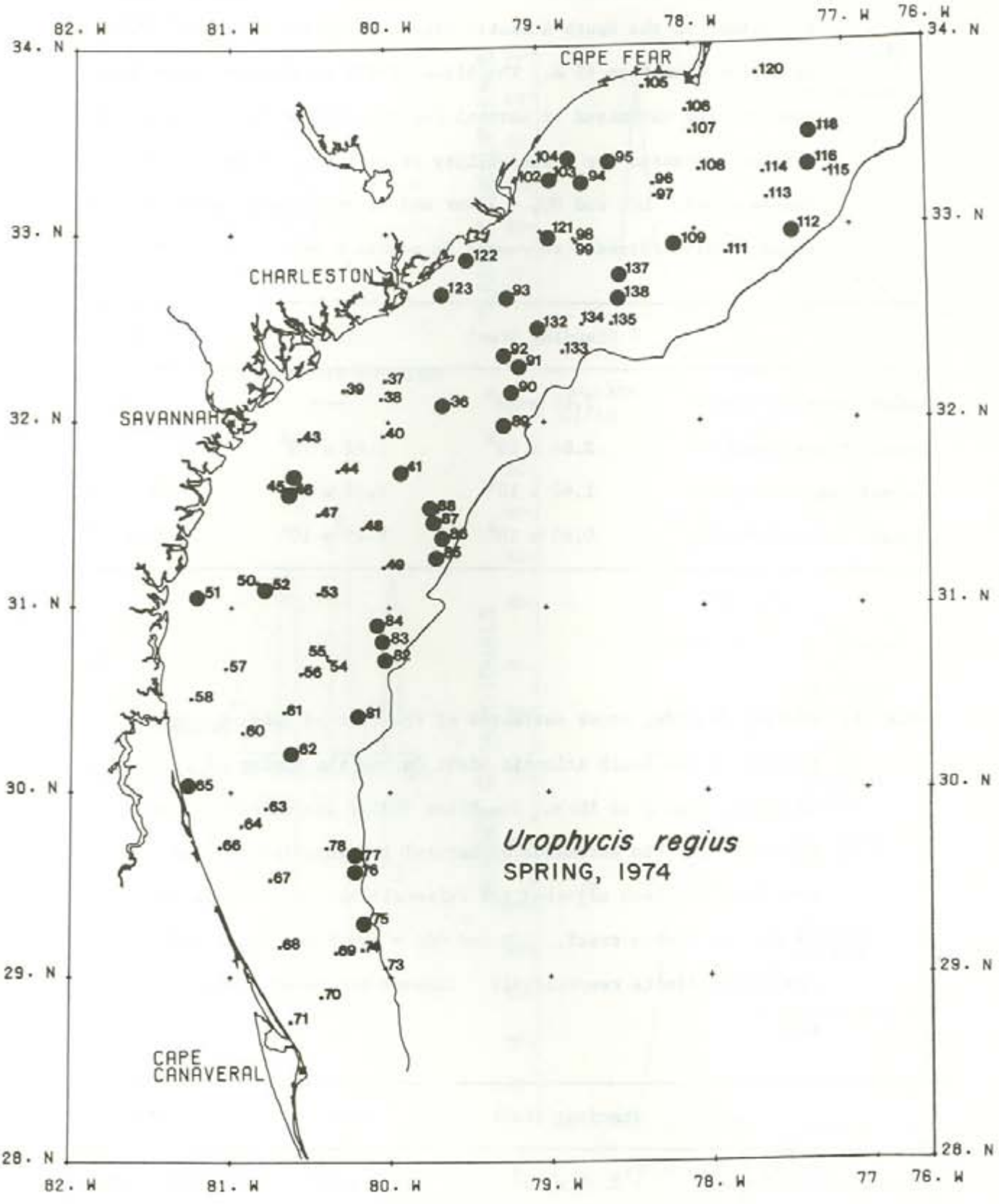

FIGURE 5. DISTRIBUTION OF SPOTTED HAKE, UROPHYCIS REGIUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

limits: 1.7; 5.2) indivduals/ha with a weight of 0.091 (90% confidence limits: 0.038; 0.144) kg/ha; transformed data 2.1 (90% confidence limits: 1.6; 2.8) individuals/ha with a weight of 0.088 (90% confidence limits 0.060; 0.118) kg/ha. Standing stock estimates based on these data are in Table 11.

Inshore lizardfish: Synodus foetens

A total of 702 inshore lizardfish, Synodus foetens, weighing 83.596 kg were collected in depths from 9 to 124 m (15.2-22.0°C) during the Spring 1974 groundfish survey in the South Atlantic Bight. Synodus foetens ranked eleventh by total number (0.7%) and seventh by weight (1.8%) of the total groundfish species taken. After separation of total groundfish into squids, pelagic species, elasmobranchs and demersal bony fishes, S. foetens ranked third in both number (2.3%) and weight (6.5%) of the demersal bony fishes.

Inshore lizardfish was one of the most ubiquitous fish species, being taken in 70% of the trawls from Cape Fear (33.8°N) to Cape Canaveral (28.7°N) (Fig. 6). The number caught per tow as reflected by the index of relative abundance was highest in the two inshore zones (Fig. 7A) where S. foetens was found in 97% of the trawls. Although the number caught/tow decreased with increasing depth, the weight increased or remained constanct until the 111-183 m zone. This was due to the paucity of smaller fishes (< 16 cm fork length) in deeper water (Fig. 7B). During the Spring of 1974 juveniles were restricted to inshore waters whereas larger individuals were found at all depths.

Untransformed data resulted in a stratified mean catch/tow of 9.4 individuals (90% confidence limits: 5.8-13.0) with a weight of 1.052 kg/tow (90% confidence limits: 0.485; 1.620) for the four zones inshore of 111 m. Bliss (1967) approximation of the transformed data gave a stratified mean catch/tow of 8.8 individuals (90% confidence limits: 7.0; 11.3) with a weight of 0.904 kg (90% confidence limits: 0.719; 1.110). Density estimates for S. foetens in the South Atlantic Bight during the Spring of 1974 were: untransformed data 3.3 individuals/ha; 0.371 kg/ha; transformed data: 3.1 individuals/ha; 0.319 kg/ha. Standing stock estimates for this species are in Table 12.

Planehead filefish: Stephanolepis hispidus

A total of 514 planehead filefish, Stephanolepis hispidus, weighing 25.490 kg were found from Cape Fear (33.8°N) to Cape Canaveral (28.8°N) (Fig. 8) in depths from 15 to 82 m (15.8-21.6°C). This species occurred in 39% of the total trawls and comprised 0.5% of the total number and weight of all groundfish taken during the Spring of 1974. Planehead filefish ranked fourth in number (1.7%) and eighth in weight (2%) of the demersal bony fishes. Maximum catches both in number and weight occurred in depths from 19 to 55 m (Fig. 7C). Three small individuals, 2-3 cm total length, were taken in the two deepest zones. These were not included with the benthic catch because of the known association of this species with pelagic Sargassum.

Length frequency distribuiton failed to show any depth related changes in size (Fig. 7D). The average size of trawl caught S. hispidus was 13.3 cm total length with a range from 3 to 24 cm.

Untransformed data gave a stratified mean catch/tow of 8.2 individuals (90% confidence limits = 3.9; 12.4) with a weight of 0.403 kg/tow (90% confidence limits: 0.221; 0.585). The stratified mean catch/tow based on transformed data was 5.5 individuals (90% confidence limits; 4.0; 7.6) with a weight of 0.364 kg/tow (90% confidence limits: 0.257; 0.481). Density estimates for the area in the four inshore zones (9-110 m) were: untransformed data: 2.9 individuals/ha; 0.142 kg/ha; transformed data: 2.0 individuals/ha; 0.129 kg/ha. Standing stock estimates for this species are in Table 13.

Gulf Stream flounder: Citharichthys arctifrons

The small sized Gulf Stream flounder, Citharichthys arctifrons, was the most abundant bothid collected during the Spring 1974 groundfish survey. This species was found from south of Cape Fear (33.4°N) to Cape Canaveral (29°N) in depths from 31 to 223 m (7.4-20.5°C) (Fig. 9). Although this species ranked 13th in total number caught (0.5%) of total groundfish, it accounted for less than 0.1% of the total groundfish weight. Gulf Stream flounder ranked fifth in numerical abundance and 28th by weight when demersal bony fish only were considered.

At first glance it appears that C. arctifrons has a relatively wide depth distribution. However, the single individual taken at 31 m was 3 cm total length which is slightly larger than the size of this species at transformation (Richardson and Joseph, 1973). Thus this specimen could have been a pelagic capture. If this record is indeed that of a pelagic one taken incidentally to a benthic trawl C. arctifrons is confined to the two outer depth zones where it occurred in 59% of the trawls (Fig. 10A). The average size of trawl caught C. arctifrons was 9.1 cm total length with a range from 3 to 13 cm (Fig. 10B).

Sand perch: Diplectrum formosum

The most abundant serranid, Diplectrum formosum, ranked fourteenth in total number (0.5%) and ninth in total weight (1.3%) of the total groundfish catch. It was the sixth most important demersal bony fish species by number (1.5%) and fourth by

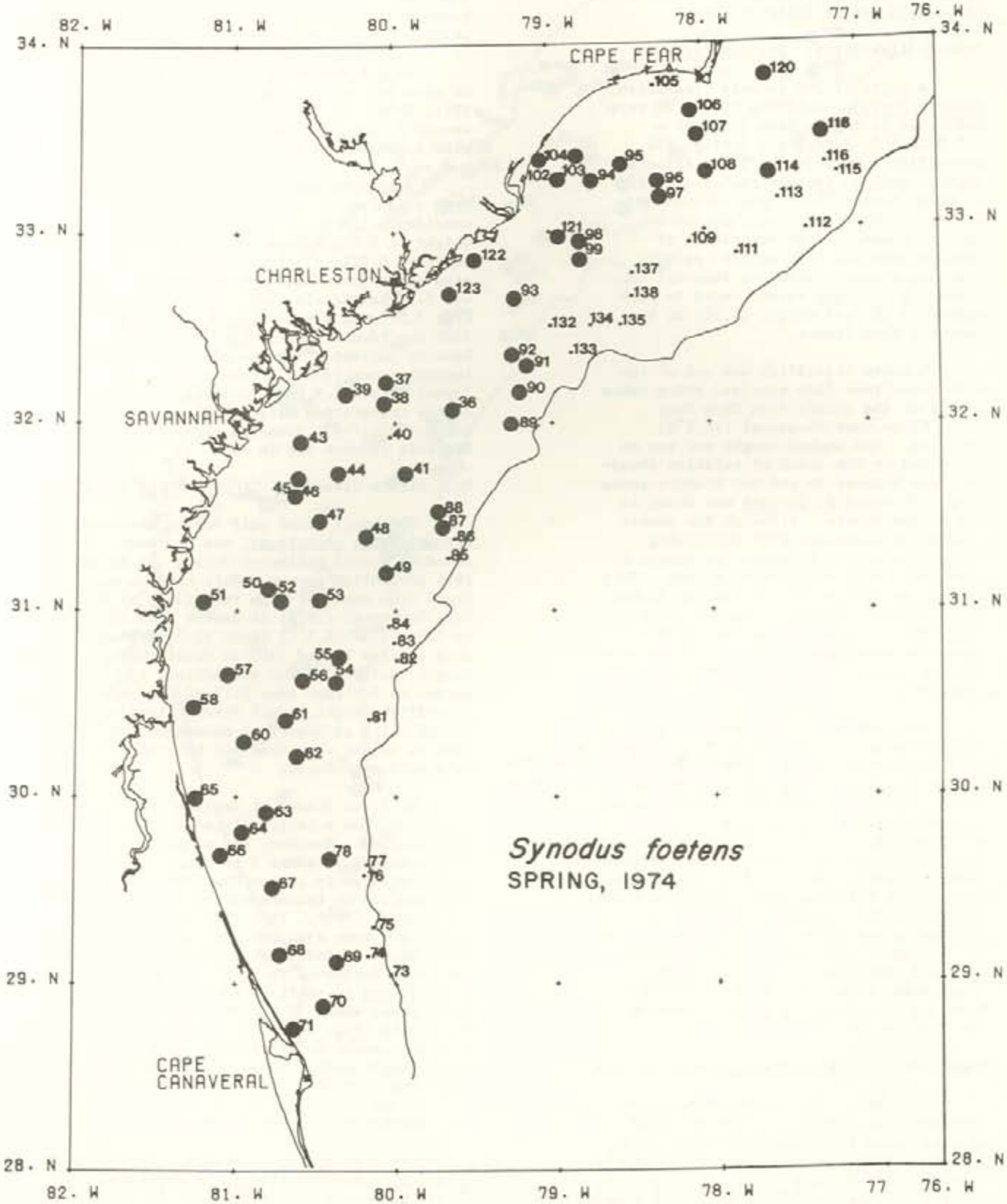

FIGURE 6. DISTRIBUTION OF INSHORE LIZARDFISH, SYNODUS FOETENS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

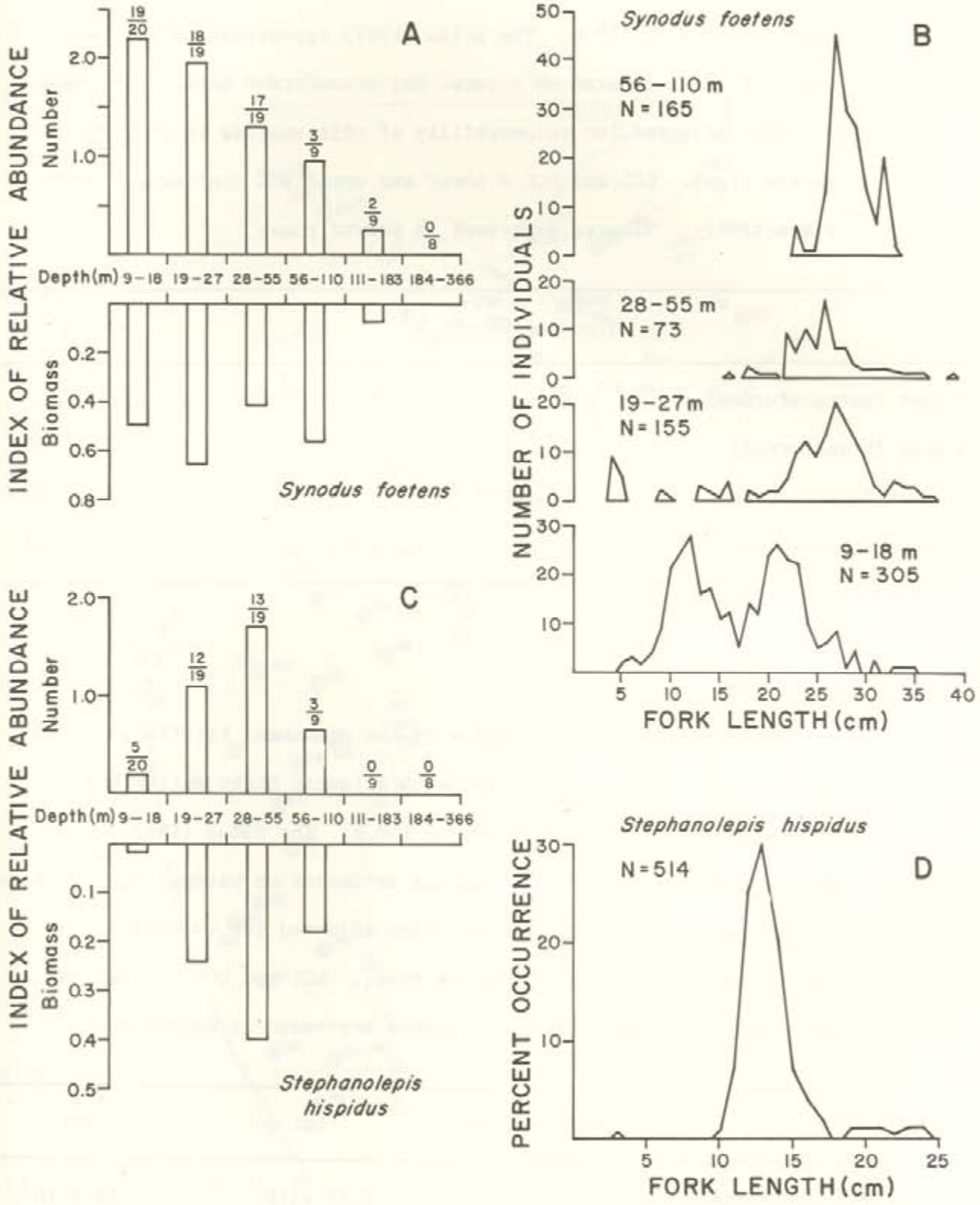

FIGURE 7. INDEX OF RELATIVE ABUNDANCE FOR INSHORE LIZARDFISH, SYNODUS FOETENS (A) AND PLANEHEAD FILEFISH, STEPHANOLEPIS HISPIDUS (C), IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCIES BY INDIVIDUAL DEPTH ZONE FOR S. FOETENS (B) AND FOR ALL DEPTH ZONES COMBINED FOR S. HISPIDUS (D) FOR SPRING 1974.

Table 12. Minimum standing stock estimates of the inshore lizardfish, Synodus foetens, in the South Atlantic Bight during the Spring of 1974 in depths from 9 to 110 m. The Bliss (1967) approximation has been used for the estimates on natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	2.04×10^7	1.26×10^7	2.81×10^7
number (transformed)	1.92×10^7	1.50×10^7	2.44×10^7
biomass (untransformed)	2.28×10^3	1.05×10^3	3.50×10^3
biomass (transformed)	1.95×10^3	1.55×10^3	2.40×10^3

Table 13. Minimum standing stock estimates of the planehead filefish, Stephanolepis hispidus, in the South Atlantic Bight during the Spring of 1974 in depths from 9 to 110 m. The Bliss (1967) approximation has been used for the estimates on natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	1.77×10^7	0.84×10^7	2.69×10^7
number (transformed)	1.20×10^7	0.87×10^7	1.65×10^7
biomass (untransformed)	0.87×10^3	0.48×10^3	1.27×10^3
biomass (transformed)	0.79×10^3	0.56×10^3	1.04×10^3

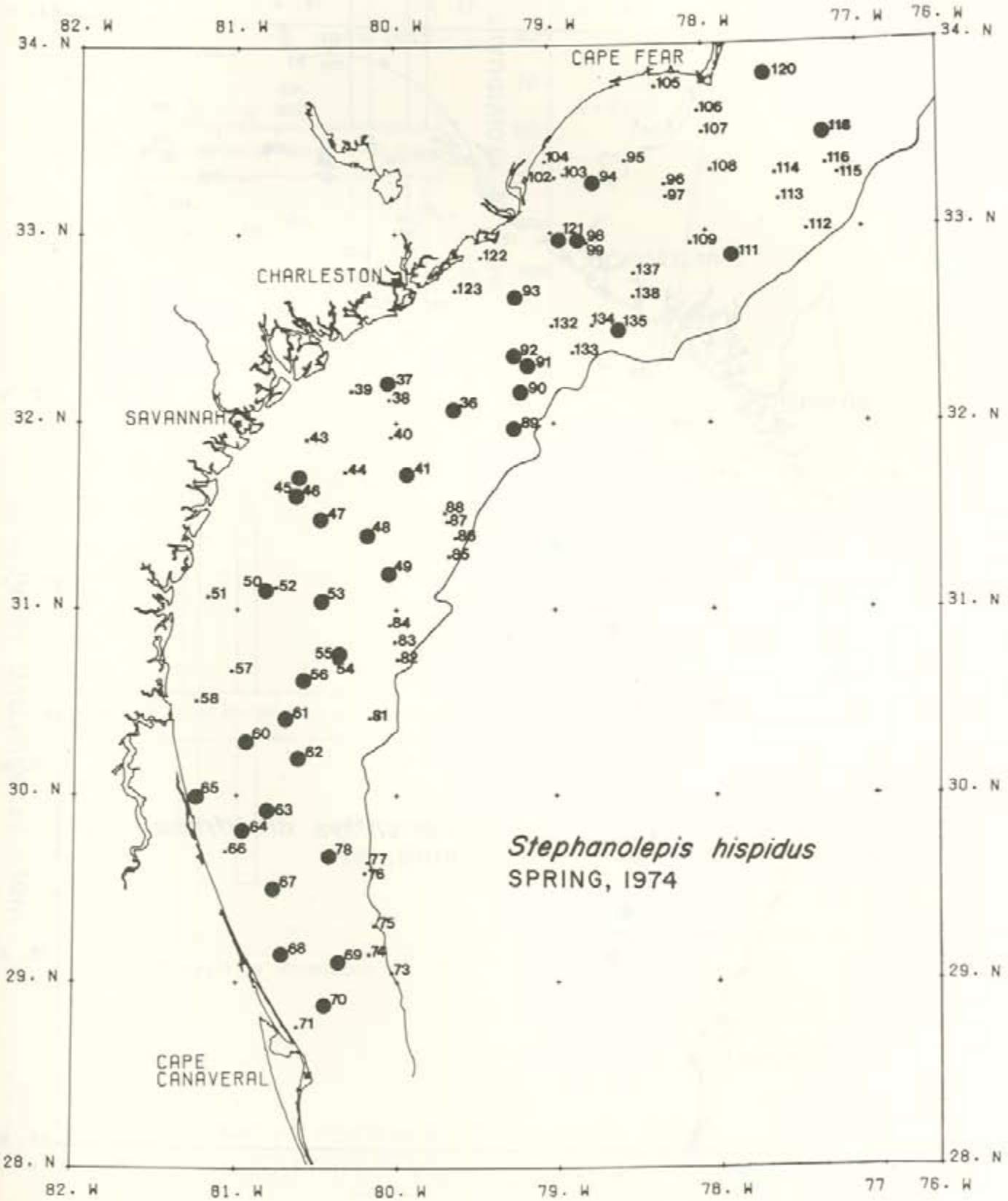

FIGURE 8. DISTRIBUTION OF PLANEHEAD FILEFISH, STEPHANOLEPIS HISPIDUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

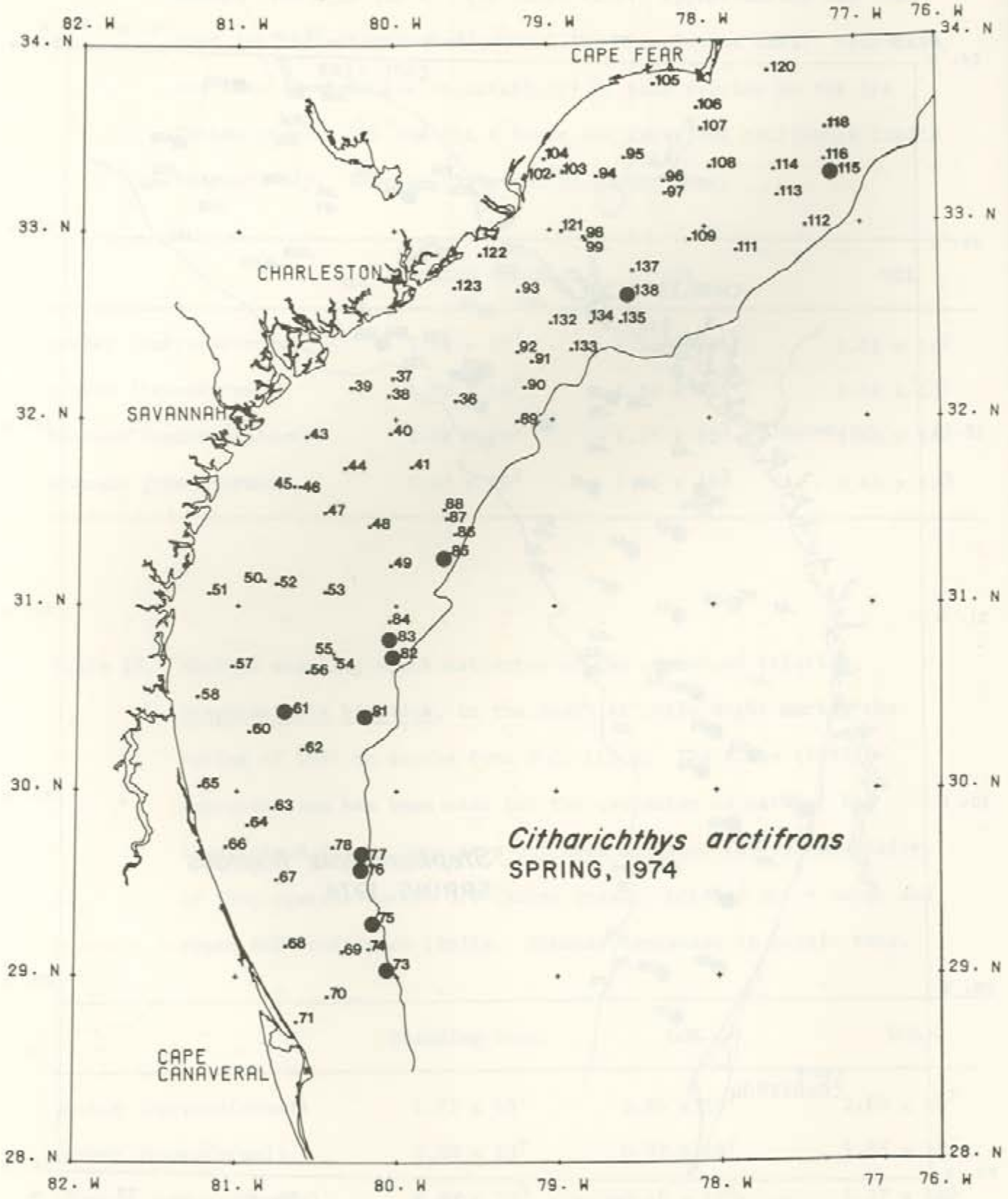

FIGURE 9. DISTRIBUTION OF GULF STREAM FLOUNDER, CITHARICHTHYS ARCTIFRONS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRINC 1974 GROUNDFISH SURVEY.

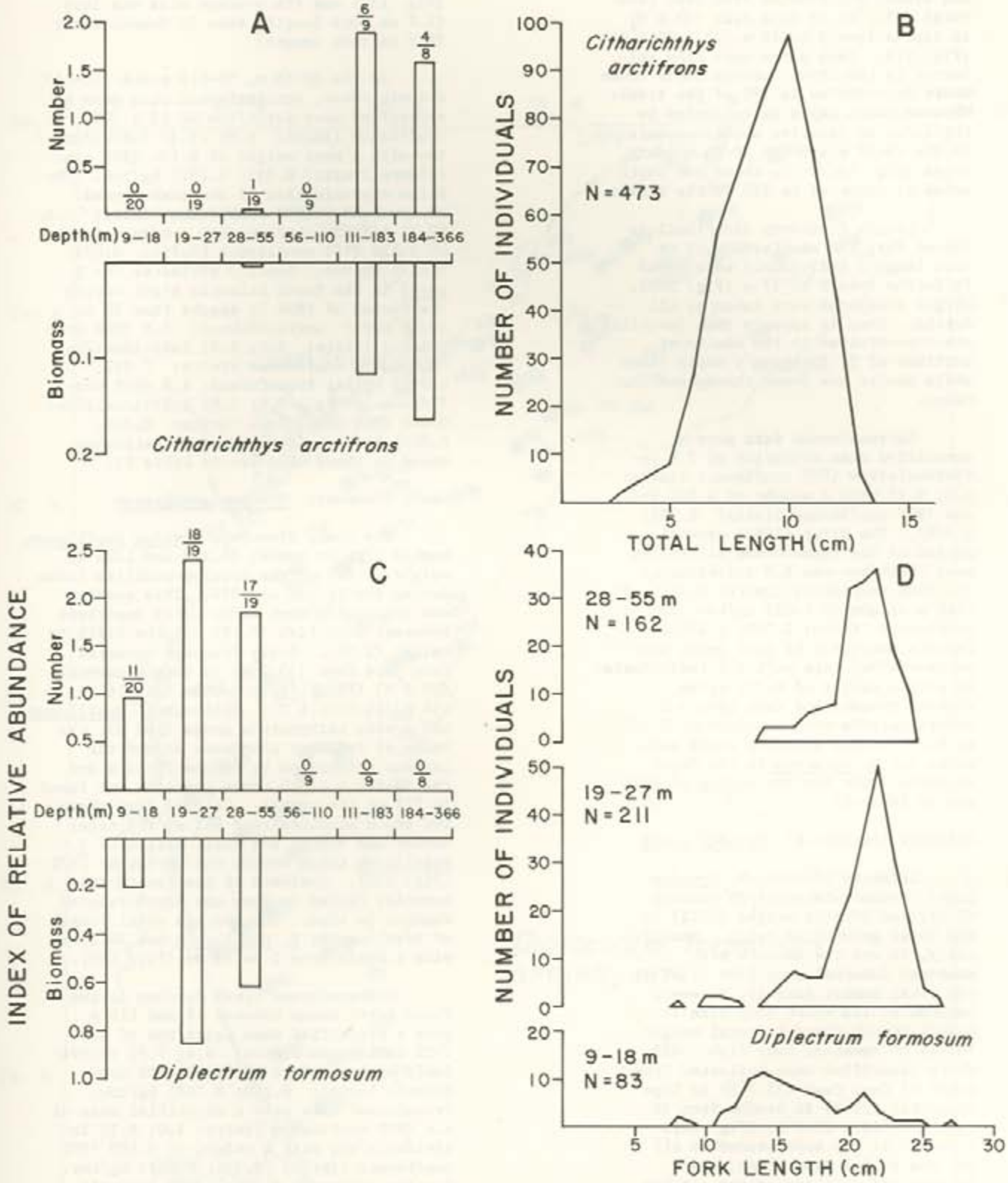

FIGURE 10. INDEX OF RELATIVE ABUNDANCE FOR GULF STREAM FLOUNDER, CITHARICHTHYS ARCTIFRONS (A) AND SAND PERCH, DIPLECTRUM FORMOSUM (C), IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCIES OF C. ARCTIFRONS FOR ALL ZONES (B) AND D. FORMOSUM FOR EACH ZONE (D) FOR SPRING 1974.

weight (4.8%). This species was encountered in 55% of the 84 trawls and was widely distributed from Cape Canaveral (28.7°N) to Cape Fear (33.8°N) in depths from 9 to 46 m (17.1-22.0°C) (Fig. 11). Sand perch were only collected in the three inshore depth zones where it occurred in 79% of the trawls. Maximum catch rates as reflected by the index of relative abundance were in the 19-27 m and the 28-55 m depth zones (Fig. 10C). In these two depth zones it occurred in 92% of the trawls.

Length frequency distributions showed that the smallest (< 13 cm fork length) individuals were found in depths from 9 to 27 m (Fig. 10D). Larger specimens were taken at all depths. Thus it appears that juveniles are concentrated in the shallower portions of D. formosum's depth range while adults are found throughout the range.

Untransformed data gave a stratified mean catch/tow of 7.9 individuals/tow (90% confidence limits: 6.0; 9.7) with a weight of 1.057 kg/tow (90% confidence limits: 0.756; 1.359). The Bliss (1967) approximation of the transformed stratified mean catch/tow was 8.8 individuals/tow (90% confidence limits: 6.7; 11.5) with a weight of 1.022 kg/tow (90% confidence limits: 0.798; 1.275). Density estimates of sand perch with untransformed data were 2.8 individuals/ha with a weight of 0.373 kg/ha whereas transformed data gave 3.1 individuals/ha with a weight of 0.361 kg/ha. Minimum standing stock estimates for D. formosum in the South Atlantic Bight for the Spring of 1974 are in Table 14.

Offshore lizardfish: Synodus poeyi

Offshore lizardfish, Synodus poeyi, ranked sixteenth in numbers (0.4%) and 39th by weight (0.1%) in the total groundfish catch. Numerically, it was the seventh most abundant demersal bony fish (1.4% of the total number caught), however, because of its small body size it ranked twenth-third in total weight (0.4%) of demersal bony fish. Offshore lizardfish were collected from south of Cape Fear (33.7°N) to Cape Canaveral (29°N) in depths from 26 to 252 m (10.1-20.7°C) (Fig. 12). Although it was encountered in all but the 9-18 m depth zone, the largest and most consistent catches of S. poeyi occurred in the 56-110 m depth zone (Fig. 13A) where it was found in 78% of the trawls. Sixty-five percent of the total number and 59% of the total weight of S. poeyi were taken in this zone. The 28-55 m depth zone accounted for 22% of the total number and 27% of the total weight of this species.

Juveniles less than 5 cm fork length were confined to the 28-55 m depth zone (Fig. 13B) and the average size was less (7.8 cm fork length) than in deeper water (9.9 cm fork length).

In the 28-55 m, 56-110 m and 111-183 m depth zones, untransformed data gave a stratified mean catch/tow of 13.1 (90% confidence limits: 6.9; 19.3) individuals/tow with a mean weight of 0.104 (90% confidence limits: 0.057; 0.152) kg/tow. The Bliss approximation of the transformed mean was 13.9 (90% confidence limits: 8.6; 22.2) individuals/tow with a mean weight of 0.126 (90% confidence limits: 0.074; 0.181) kg/tow. Density estimates for S. poeyi in the South Atlantic Bight during the Spring of 1974 in depths from 28 to 183 m were: untransformed: 4.6 (90% confidence limits: 2.4; 6.8) individual/ha; 0.045 (90% confidence limits: 0.022; 0.068) kg/ha; transformed: 4.9 (90% confidence limits: 3.0; 7.8) individuals/ha; 0.045 (90% confidence limits: 0.026; 0.064) kg/ha. Standing stock estimates based on these data are in Table 15.

Dusky flounder: Syacium papillosum

The dusky flounder, Syacium papillosum, ranked 17th in number (0.3%) and 12th in weight (0.8%) of the total groundfish taken during the Spring of 1974. This species was the eighth most numerically important demersal bony fish (1.1%) and the fifth by weight (2.9%). Dusky flounder occurred from Cape Fear (33.7°N) to Cape Canaveral (28.8°N) (Fig. 14) in depths from 16 to 124 m (15.8-21.1°C). Although S. papillosum had a wide bathymetric range (108 m), the index of relative abundance showed the largest catches to be in the 28-55 m and the 56-110 m depth zones where it was found in 75% of the trawls. Catches from these two zones accounted for 88% of the total number and 90% of the total weight of S. papillosum taken during the Spring of 1974 (Fig. 13C). Analysis of the length frequencies failed to show any depth related changes in size. The average total length of trawl caught S. papillosum was 20.5 cm with a range from 3 to 33 cm (Fig. 13D).

Untransformed trawl catches in the three depth zones between 19 and 110 m gave a stratified mean catch/tow of 5.4 (90% confidence limits: 2.8; 7.9) individuals with a weight of 0.540 (90% confidence limits: 0.290; 0.789) kg/tow. Transformed data gave a stratified mean of 4.4 (90% confidence limits: 3.0; 6.3) individuals/tow with a weight of 0.499 (90% confidence limits: 0.336; 0.682) kg/tow. Density estimates in the South Atlantic Bight during the Spring of 1974 for depths from 19 to 110 m were: untransformed: 1.9 (90% confidence limits: 1.0; 2.8) individuals/ha; 0.19 (90% confidence limits: 0.102; 0.278) kg/ha; transformed: 1.6 (90% confidence limits: 1.1; 2.2) individuals/ha; 0.176 (90% confidence limits: 0.119; 0.241) kg/ha. Standing stock estimates based on these data are in Table 16.

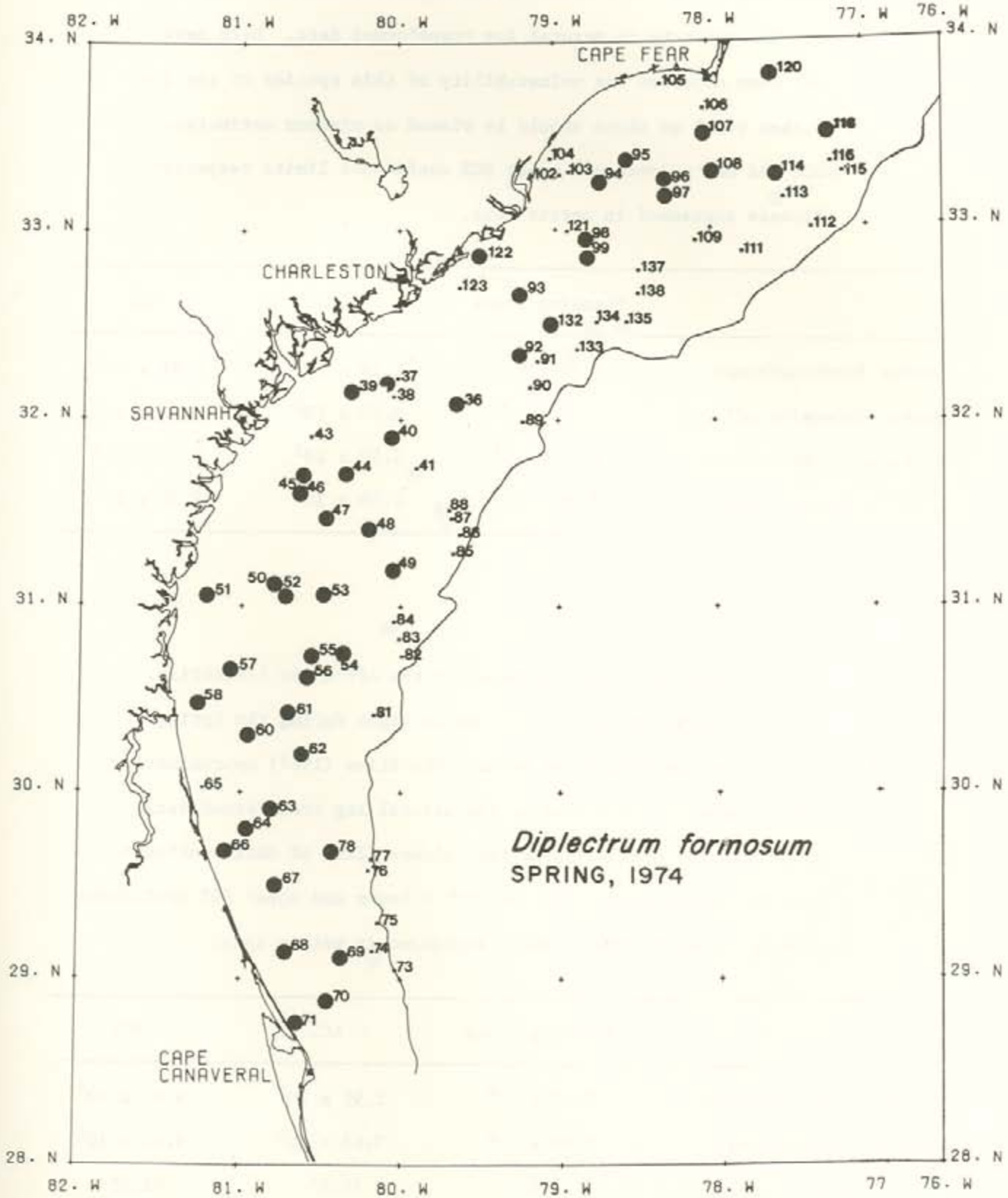

FIGURE 11. DISTRIBUTION OF SAND PERCH, DIPLECTRUM FORMOSUM, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

Table 14. Minimum standing stock estimates of the san perch, Diplectrum formosum, in the South Atlantic Bight during the Spring of 1974 from 9 to 55 m. The Bliss (1967) approximation has been used for the estimate on natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl so these should be viewed as minimum estimates. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	1.56×10^7	1.19×10^7	1.94×10^7
number (transformed)	1.75×10^7	1.33×10^7	2.28×10^7
biomass (untransformed)	2.11×10^3	1.50×10^3	2.71×10^3
biomass (transformed)	2.03×10^3	1.59×10^3	2.54×10^3

Table 15. Minimum standing stock estimates of the off-shore lizardfish, Synodus poeyi, in the South Atlantic Bight during the Spring of 1974 in depths from 28 to 183 m. The Bliss (1967) approximation of the mean has been used on the natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	5.55×10^6	2.91×10^6	8.91×10^6
number (transformed)	5.90×10^6	3.65×10^6	9.41×10^6
biomass (untransformed)	54.47	26.90	82.05
biomass (transformed)	53.51	31.45	76.63

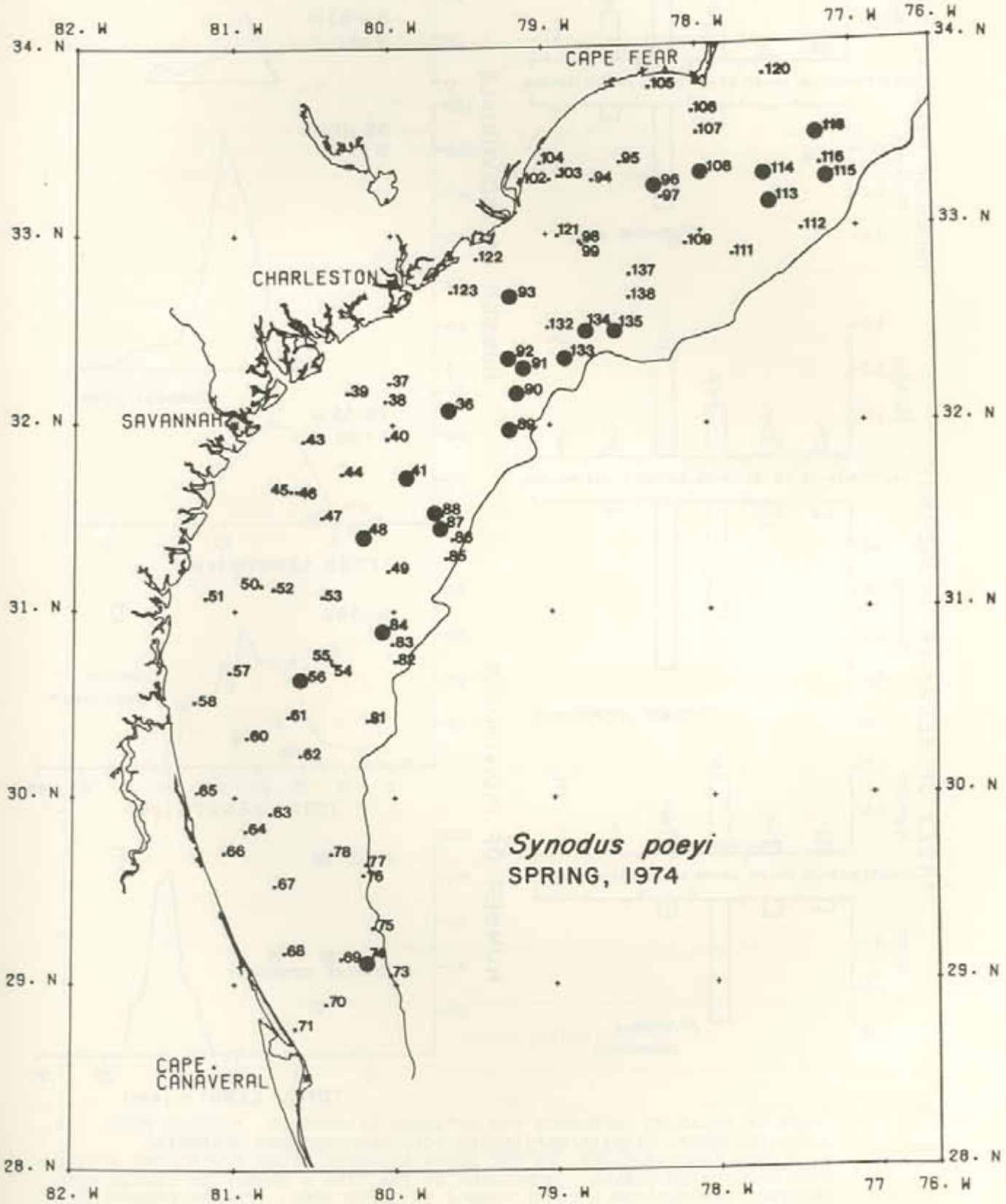

FIGURE 12. DISTRIBUTION OF OFFSHORE LIZARDFISH, SYNODUS POEYI, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

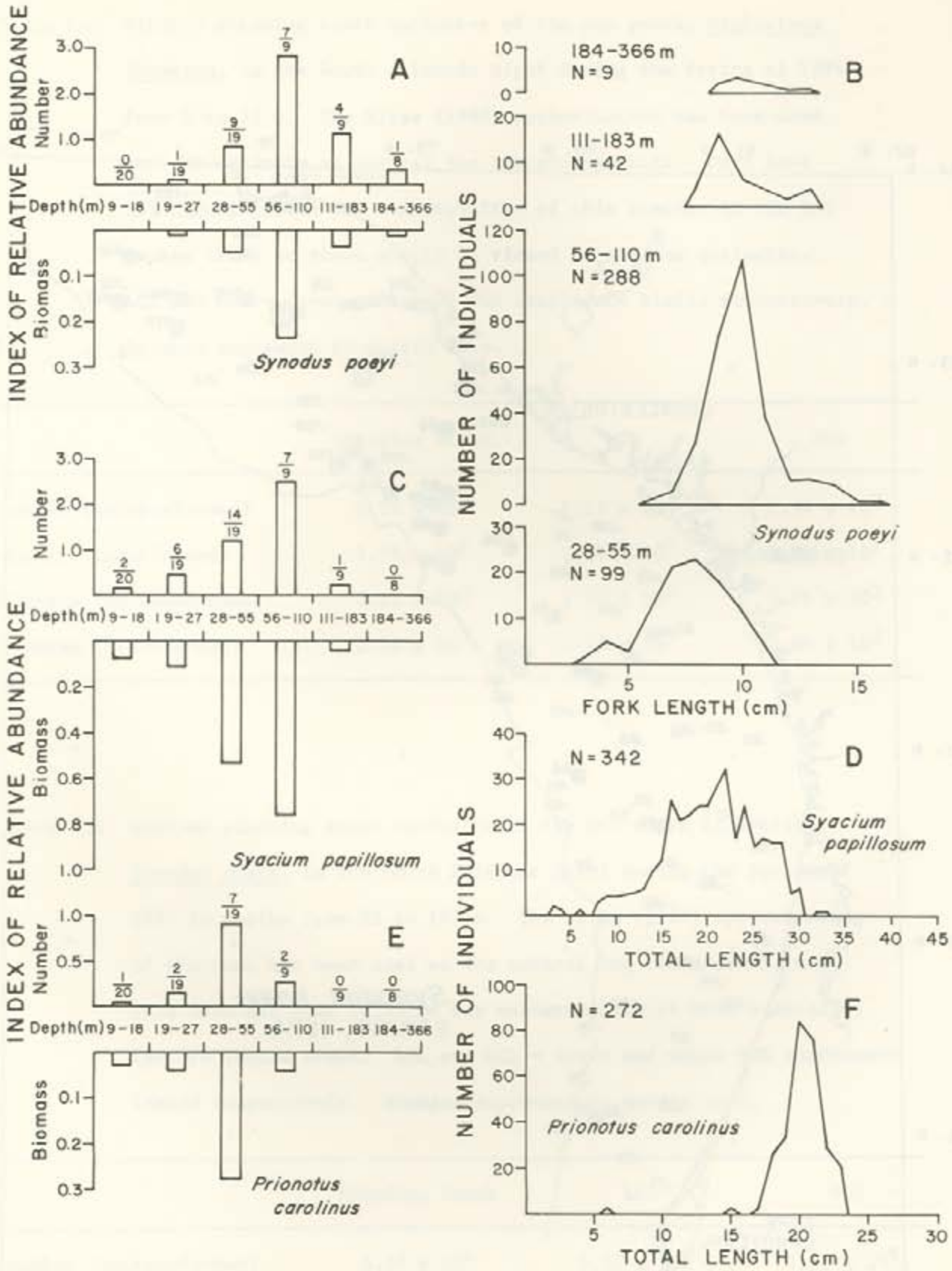

FIGURE 13. INDEX OF RELATIVE ABUNDANCE FOR OFFSHORE LIZARDFISH, SYNODUS POEYI (A), DUSKY FLOUNDER, SYACIUM PAPILLOSUM (C), AND NORTHERN SEAROBIN, PRIONOTUS CAROLINUS (E), IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCIES FOR S. POEYI BY DEPTH ZONE (B), AND S. PAPILLOSUM (D) AND P. CAROLINUS (F) FOR ALL ZONES FOR SPRING 1974.

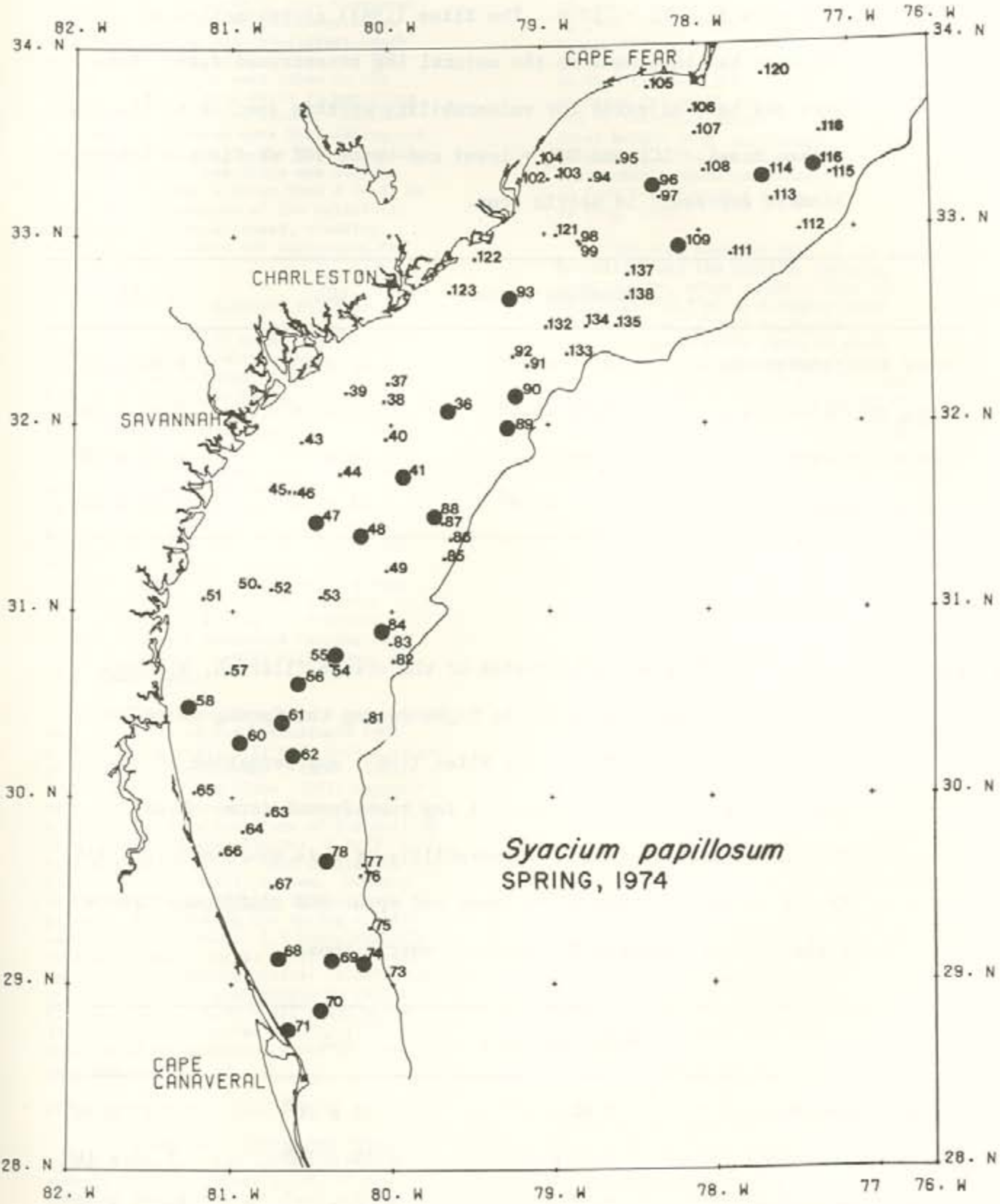

FIGURE 14. DISTRIBUTION OF DUSKY FLOUNDER, SYACIUM PAPILLOSUM, IN THE SOUTH ATLANTIC BIGHT DURING SPRING 1974 GROUNDFISH SURVEY.

Table 16. Minimum standing stock estimates of the dusky flounder, Syacium papillosum, in the South Atlantic Bight during the Spring of 1974 in depths from 19 - 110 m. The Bliss (1967) approximation of the mean has been used on the natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	4.62×10^6	2.41×10^6	6.83×10^6
number (transformed)	3.81×10^6	2.58×10^6	5.47×10^6
biomass (untransformed)	4.66×10^2	2.50×10^2	6.82×10^2
biomass (transformed)	4.31×10^2	2.91×10^2	5.89×10^2

Table 17. Minimum standing stock estimates of the orange filefish, Aluterus schoepfi, in the South Atlantic Bight during the Spring of 1974 in depths from 9 to 55 m. The Bliss (1967) approximation of the mean has been used on the natural log transformed data. Data have not been adjusted for vulnerability of this species to the 3/4 Yankee trawl. LCL and UCL = lower and upper 90% confidence limits respectively. Biomass expressed in metric tons.

	Standing Stock	LCL	UCL
number (untransformed)	7.54×10^6	2.51×10^6	12.57×10^6
number (transformed)	5.26×10^6	4.18×10^6	7.39×10^6
biomass (untransformed)	8.39×10^3	2.04×10^3	14.71×10^3
biomass (transformed)	5.78×10^3	4.27×10^3	7.64×10^3

Northern searobin: Prionotus carolinus

A total of 272 northern searobins, Prionotus carolinus, with a weight of 21.113 kg were taken in depths from 11 to 80 m (15.8-20.9°C) from south of Cape Fear (33.7°N) to north of Cape Canaveral (28.7°N). Although northern searobins were found in the four shallowest depth zones, 96% of the total number and 95% of the total weight were taken in the 28 to 55 m depth zone where P. carolinus occurred in 37% of the trawls. Catches in other depth zones were both infrequent and small (Fig. 13E). The average size for trawl caught searobins was 20.3 cm total length with a range from 6 to 23 cm (Fig. 13F). Because of the relatively low numbers of occurrences, standing stock estimates were not calculated for this species.

Orange filefish: Aluterus schoepfi

A total of 237 orange filefish, Aluterus schoepfi, with a weight of 263.537 kg, were taken in depths from 9 to 38 m (17.1-21.6°C) from Cape Fear (33.8°N) to Cape Canaveral (28.8°N) (Fig. 15). Orange filefish ranked eleventh in total number (0.2%) and second in weight (20.6%) of the demersal bony fish taken during the Spring of 1974. Catch rates as reflected by the index of relative abundance were highest in the 19-28 m depth zone where 66% of the total number and 68% of the total weight of A. schoepfi were taken (Fig. 16A). Orange filefish taken in the South Atlantic Bight during the Spring of 1974 were relatively large specimens ranging from 34 to 52 cm total length with a mean of 46 cm (Fig. 16B).

Untransformed data gave a stratified mean catch/tow of 3.8 individuals (90% confidence limits: 1.2; 6.3) with a weight of 4.200 (90% confidence limits: 1.027; 7.374) kg/tow. The Bliss (1967) approximation of the transformed data resulted in a stratified mean catch/tow of 2.8 individuals (90% confidence limits: 2.1; 3.7) with a weight of 2.896 (90% confidence limits: 2.141; 3.831) kg/tow. Density estimates for A. schoepfi in the South Atlantic Bight during the Spring of 1974 were: untransformed: 1.3 individuals/ha (90% confidence limits: 0.4; 2.2) 1.482 kg/ha (90% confidence limits: 0.362; 2.601); transformed: 1.0 individuals/ha (90% confidence limits: 0.7; 1.3); 1.021 kg/ha (90% confidence limits: 0.755; 1.351). Standing stock estimates based on these data are in Table 17.

Other Demersal Bony Fish Species

Although spot, Leiostomus xanthurus, ranked tenth in total number (0.8%) and seventh in total weight (2.2%) of the demersal bony fishes taken during the Spring of 1974, all of the 239 specimens were collected in a single trawl made in 16 m (21.1°C) just north of Cape Canaveral. These were all large spot with a mean size of 20 cm total length and a range from 17 to 22 cm.

A total of 201 vermilion snapper, Rhomboplites aurorubens, weighing 23.934 kg were taken in 11 of 84 trawls made in the South Atlantic Bight during the Spring of 1974. This species was collected from south of Cape Fear (33.4°N) to north of Cape Canaveral (29°N) in depths from 26 to 91 m (15.8-20.9°C). Highest catch rates occurred in the 55-110 m depth zone where 87% of the total number and 92% of the total weight of R. aurorubens were taken (Fig. 16C). The average size of these trawl caught vermilion snappers was 19.2 cm fork length with a range from 8 to 24 cm (Fig. 16D).

The most abundant fish of the family Haemulidae was the tomtate, Haemulon aurolineatum, which occurred from south of Cape Fear (33.5°N) to slightly north of Cape Canaveral (29°N) in depths from 13-66 m. The highest catch rates as shown by the index of relative abundance were in the 19 to 27 m and the 28 to 55 m depth zones where 86% of the total number and 92% of the toal weight of H. aurolineatum were taken (Fig. 17E). The average size for this species was 14.4 cm fork length with a range from 10 to 22 cm (Fig. 17F).

The smoothhead scorpionfish, Scorpaena calcarata, was the most abundant scorpaenid species during the Spring of 1974 groundfish survey in the South Atlantic Bight. It was found from south of Cape Fear (33.8°N) to Cape Canaveral (28.8°N) in depths of 20 to 124 m (17.5-20.9°C). Highest catch rates occurred in the 28-56 m depth zone where S. calcarata was collected in 8 of the 19 trawls. These accounted for 72% of the 94 specimens and 65% of the 4.5 kg taken during the survey. The average size was 12 cm total length with a range from 6 to 19 cm.

Elasmobranchs

A total of nine elasmobranch species from six families were collected during the Spring 1974 groundfish survey in the South Atlantic Bight. Although only 201 individuals represented only 0.6% of the total number of demersal groundfishes, their weight of 2998.124 kg was 70.1% of the total weight of demersal groundfishes. Elasmobranch catches as shown by the index of relative abundance were highest in the inshore (9-18 m) depth zone and lowest in the 184-366 m depth zone (Fig. 17A).

The numerically dominant elasmobranch species was the clearnose skate, Raja eglanteria, whose 80 individuals made up 39.8% of the total elasmobranch catch (Table 18). Clearnose skates were collected from south of Cape Fear (33.7°N) to north of Cape Canaveral (28.7°N) in depths from 9 to 38 m (17.1-20.9°C) (Fig. 18). Raja eglanteria was confined to the three inshore depth zones where it occurred in 24 of the 58 trawls. Maximum catches occurred in the 9 to 18 m depth zone where R.

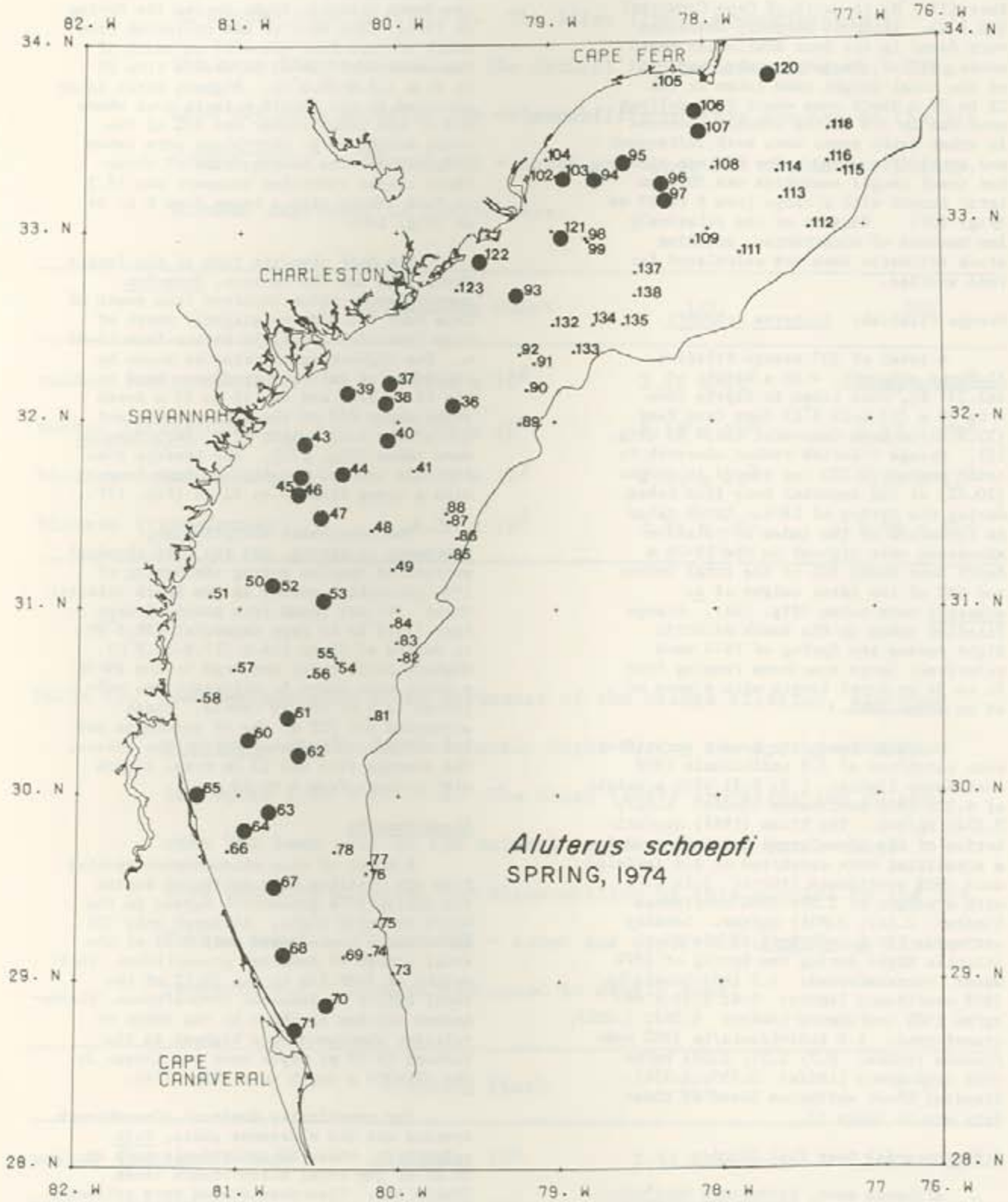

FIGURE 15. DISTRIBUTION OF ORANGE FILEFISH, ALUTERUS SCHOEPFI, IN THE SOUTH ATLANTIC BIGHT DURING SPRING 1974 GROUNDFISH SURVEY.

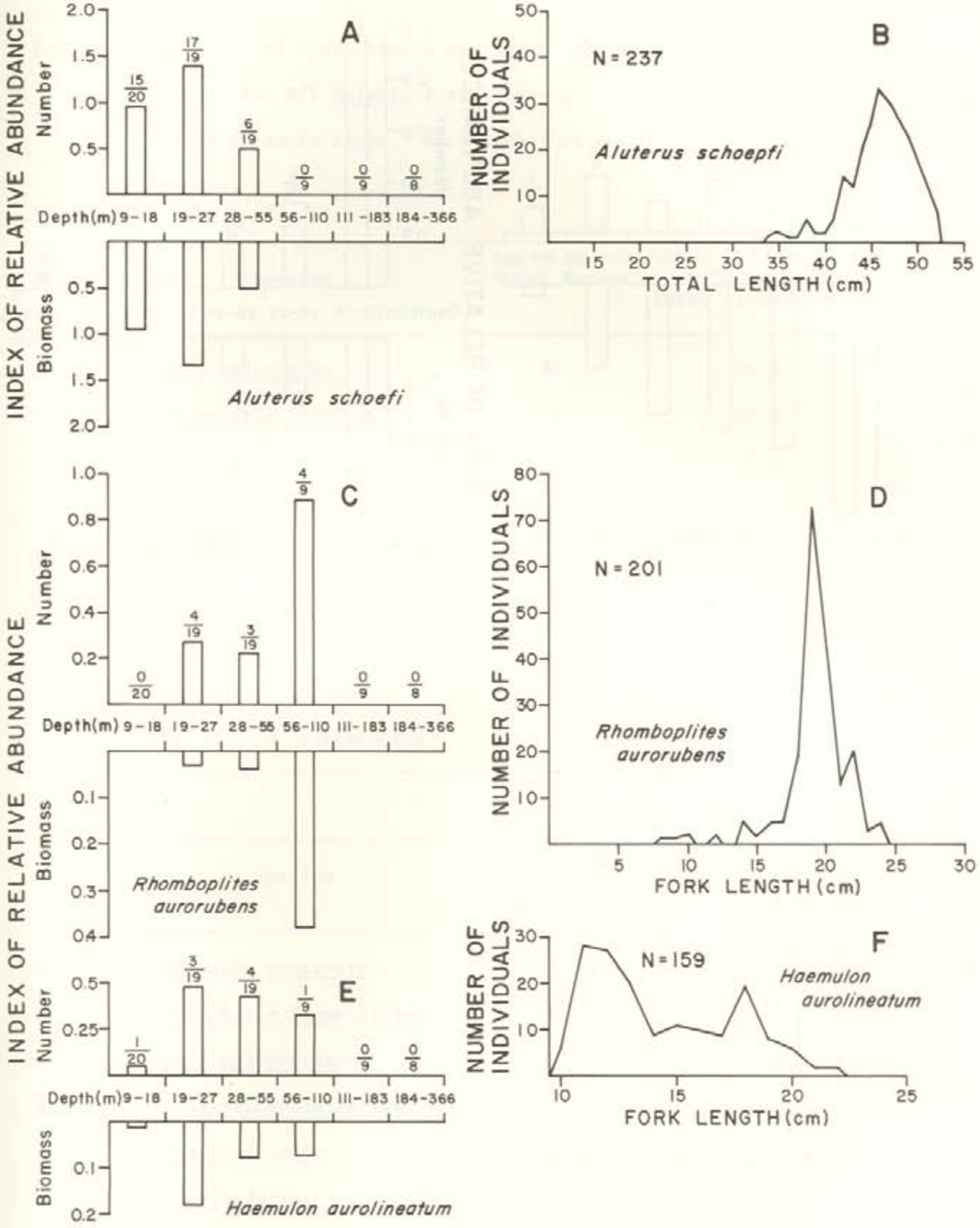

FIGURE 16. INDEX OF RELATIVE ABUNDANCE FOR ORANGE FILEFISH, ALUTERUS SCHOEPFI (A), VERMILION SNAPPER, RHOMBOPLITES AURORUBENS (C), AND TOMTATE, HAEMULON AUROLINEATUM (E) IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY. NUMERATOR IN FRACTION = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN DEPTH ZONE. LENGTH FREQUENCIES FOR A. SCHOEPFI (B) R. AURORUBENS (D) AND H. AUROLINEATUM (F) DURING SPRING 1974.

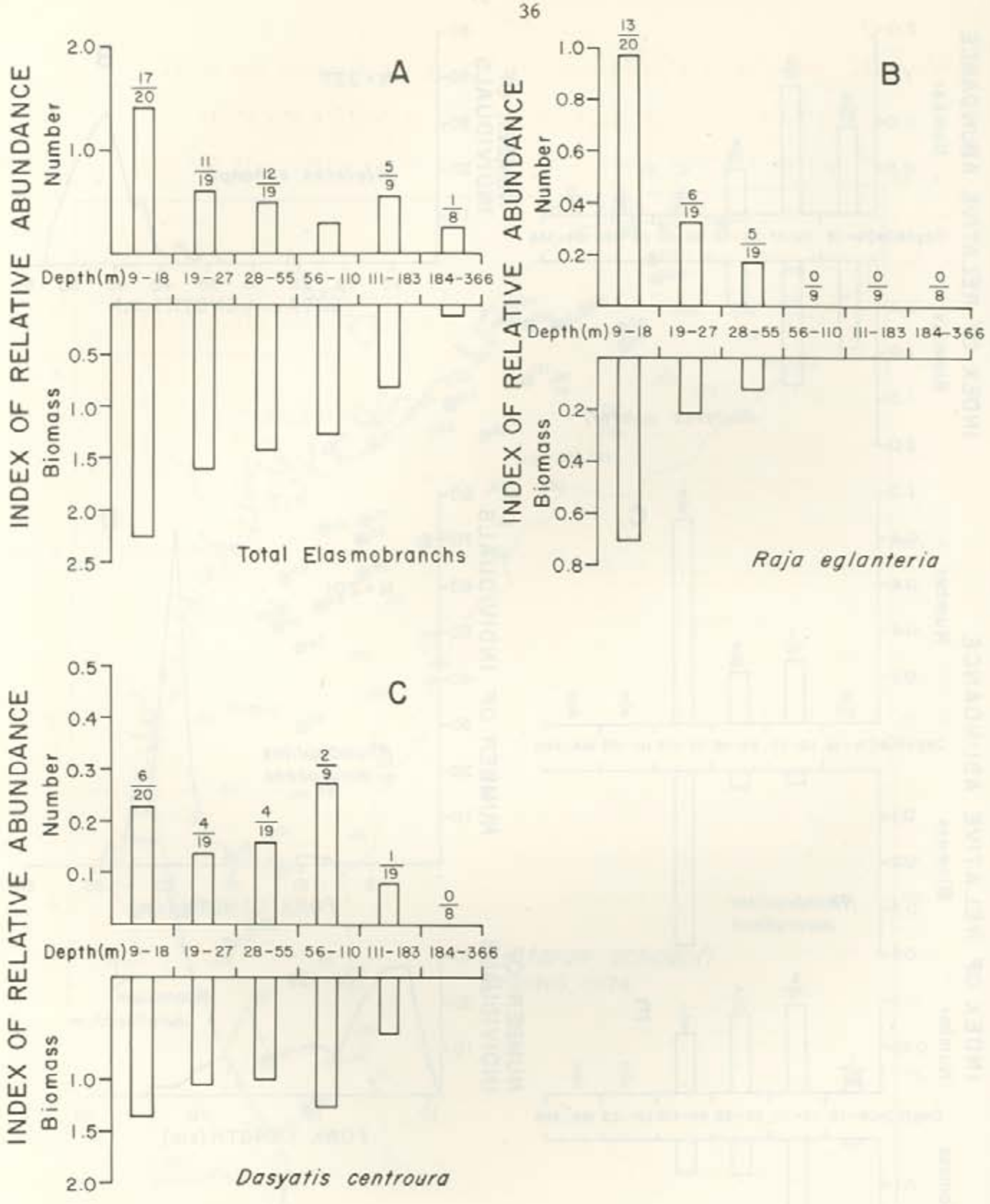

FIGURE 17. INDEX OF RELATIVE ABUNDANCE OF (A) TOTAL ELASMOBRANCH SPECIES, (B) RAJA EGLANTERIA AND (C) DASYATIS CENTROURA BY DEPTH ZONE FOR THE SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMERATOR IN FRACTION = NUMBER OF TRAWLS IN DEPTH ZONE WITH TAXON; DENOMINATOR = TOTAL NUMBER OF TRAWLS IN ZONE.

Table 18. Rankings of elasmobranch species by total number and total weight for R/V Dolphin Spring 1974 groundfish survey in the South Atlantic Bight. N_1 = number of occurrences in the 84 trawls.

Rank	Species	Total Number	Percent of Total Elasmobranchs	N_1
1	Raja eglanteria	80	39.8	24
2	Myliobatis freminvillei	78	38.8	4
3	Dasyatis centroura	23	11.4	17
4	Rhizoprionodon terraenovae	6	3.0	5
5	Mustelus canis	4	2.0	4
5	Raja garmani	4	2.0	4
7	Breviraja sp.	3	1.5	1
8	Breviraja plutonia	2	1.0	1
9	Rhinobatos lentiginosus	1	0.5	1

Rank	Species	Total Weight (kg)	Percent of Total Elasmobranch Weight	N_1
1	Dasyatis centroura	2468.978	82.4	17
2	Myliobatis fremenvillei	433.089	14.4	4
3	Raja eglanteria	37.949	1.3	24
4	Rhizoprionodon terraenovae	29.031	1.0	5
5	Mustelus canis	27.670	0.9	4
6	Breviraja sp.	0.454	0.01	1
6	Rhinobatos lentiginosus	0.454	0.01	1
7	Raja garmani	0.400	0.01	4
8	Breviraja plutonia	0.200	0.01	2

eglanteria was found in 13 of 20 trawls (Fig. 17B).

The roughtail stingray, Dasyatis centroura, was collected from south of Cape Fear (33.2°N) to north of Cape Canaveral (28.7°N) in depths from 13 to 124 m (15.2-22.0°C). Catch rates were relatively even in the four inshore depth zones (Fig. 17C). Although D. centroura was only represented by 23 individuals, these were extremely large specimens averaging over 100 kg/individual.

Bullnose rays, Myliobatis freminvillei, were taken in four trawls made in depths from 9 to 27 m (17.1-18.0°C) between Charleston (33°N) and Cape Fear (33.8°N). At a single station at Cape Fear in 13 m, 72 individuals with a total weight of 400 kg were collected in a single half-hour tow. Trawls such as this make net handling and catch sorting interesting, especially in a heavy sea.

Pelagic Species

A total of 53,464 pelagic fishes representing 26 species in ten families with a total weight of 362.241 kg were taken incidentally in bottom trawls made during the Spring of 1974 in the sand bottom habitat. The Engraulidae with five species was numerically the most abundant family. The Carangidae accounted for the greatest percentage of the total pelagic weight and was the most speciose family (Table 19). Round herring (Etrumeus teres), dusky anchovy (Anchoa lyolepis), Cuban anchovy (Anchoa cubana), round scad (Decapterus punctatus) and butterfish (Peprilus triacanthus) were the most abundant pelagic species. Cumulatively they accounted for 95.7% and 84.3% of the total number and weight of pelagic fishes during the survey (Table 20).

The index of relative abundance showed that catches of pelagic species were highest in the 9-18 and the 111-183 m depth zones (Fig. 19A) where 90% and 78% of the trawls had pelagic fishes. The 9-18 m depth zone pelagic fauna was dominated by two species of clupeids, Etrumeus teres and Sardinella anchovia, two species of engraulids, Anchoa lyolepis and A. cubana and the carangid, Decapterus punctatus. The stromateoid fish, Peprilus triacanthus, formed the greatest part of the catch in the 111-183 m zone (Table 21 and 22).

The use of untransformed total pelagic catch data gave a stratified mean catch/tow of 3.859 kg/tow with 90% confidence limits of 1.509 and 6.209 kg/tow. Bliss' (1967) approximation of the transformed data gave a stratified mean catch/tow of 2.238 kg/tow with 90% confidence limits of 1.685 and 2.905 kg/tow.

Standing stock estimates of pelagic species collected during the Spring 1974 groundfish survey in the South Atlantic Bight were: (A) untransformed data: 1.02×10^4 metric tons; 90% confidence limits 0.40×10^4 and 1.64×10^4 metric tons; (B) transformed data: 0.59×10^4 metric tons; 90% confidence limits 0.44×10^4 and 0.76×10^4 metric tons. These are by nature conservative estimates since most of the pelagic species are relatively invulnerable to our trawl. In addition these estimates have not been adjusted by any vulnerability factors to the 3/4 Yankee trawl. However, these estimates do provide a minimum preliminary estimate which can be re-evaluated when additional data become available.

Round herring: Etrumeus teres

Round herring, Etrumeus teres, were collected in 18% of the 84 trawl stations in the South Atlantic Bight during the Spring 1974 groundfish survey. Round herring ranked first by number (38.7%) and third by weight (22.4%) for the total pelagic catch. This species was widely distributed, being found south of Cape Fear (33.8°N) to northern Florida (29.7°N) (Fig. 20). Catches of this species were highly variable (0 to 16,886 individuals/tow). It had its greatest frequency of occurrence in the 9-18 m depth zone (30% of the tows) and had the highest average catch values there (Fig. 19B). Ninety-seven percent of the total number and 77% of the total weight of E. teres were collected in this zone. The average size was 7.1 cm fork length (range 2-20 cm) (Fig. 19C).

Dusky sardine: Anchoa lyolepis

Although Anchoa lyolepis ranked second in total number (24.4%) and fourth in total weight (6.0%) of the total pelagic fish species collected during the Spring of 1974, this species was found in only three of the 84 trawls. All these were in the inshore zones with 88% of the total catch coming in a single trawl off northern Florida. The average size was 6 cm fork length with a range from 5 to 8 cm fork length.

Cuban anchovy: Anchoa cubana

Cuban anchovy ranked third in total number (18.9%) and sixth in total weight (4.2%) of the catch of pelagic species. It occurred, however, in only 4 of the 82 stations. Better than 99% of the total catch of this species was taken in a single trawl off northern Florida. All trawls which collected this species were in depths less than 18 m. The average size was 6.7 cm fork length with a range from 6 to 8 cm.

Round scad: Decapterus punctatus

Roundscad, Decapterus punctatus, was one of the most widely distributed pelagic species. It was collected from south of Cape Fear to Cape Canaveral, Florida and occurred in 36% of the total number of trawls (Fig. 21). Decapterus punctatus

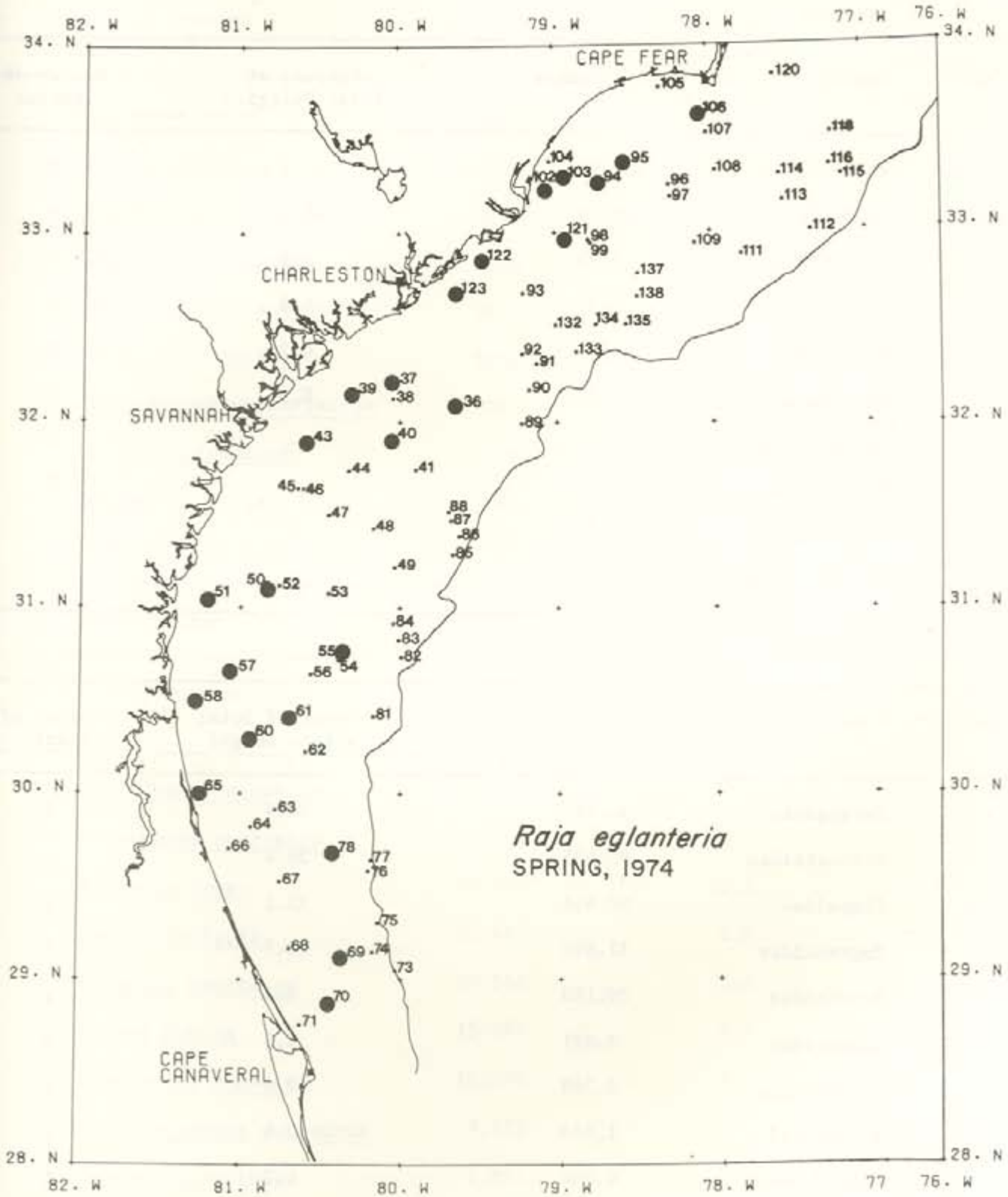

FIGURE 18. DISTRIBUTION OF CLEARNOSE SKATE, RAJA EGLANTERIA, IN THE SOUTH ATLANTIC BIGHT DURING SPRING 1974.

Table 19. Familes of pelagic fish species ranked by number and weight for 84 otter trawls made in the South Atlantic Bight during the Spring 1974 groundfish survey.

Rank	Family	Total Number	Percent of Total Pelagics	Number of Species
1	Engraulidae	23198	43.4	5
2	Clupeidae	22360	41.8	3
3	Carangidae	5092	9.5	8
4	Stromateidae	2632	4.9	1
5	Scombridae	110	0.2	3
6	Ariommidae	38	0.1	2
7	Sphyraenidae	16	-	1
8	Echeneidae	14	-	1
9	Pomatomidae	3	-	1
10	Fistulariidae	1	-	1
	Total Number	53464		

Rank	Family	Total Weight (kg)	Percent of Total Pelagic Weight	Number of Species
1	Carangidae	109.994	30.4	8
2	Stromateidae	95.535	26.4	1
3	Clupeidae	90.955	25.1	3
4	Engraulidae	37.892	10.5	5
5	Echeneidae	20.160	5.6	1
6	Scombridae	3.021	0.8	3
7	Sphyraenidae	2.368	0.6	1
8	Ariommidae	1.663	0.4	2
9	Pomatomidae	0.554	0.2	1
10	Fistulariidae	0.100		1
	Total Weight	362.241		

Table 20. Top ten pelagic species by number and weight Spring 1974 groundfish survey in the South Atlantic Bight. Total number of trawls = 84.

Rank	Species	Total Number	Percent Total Pelagics	Number of Occurrences
1	*Etrumeus teres*	20706	38.7	15
2	*Anchoa lyolepis*	13021	24.4	3
3	*Anchoa cubana*	10087	18.9	4
4	*Decapterus punctatus*	4717	8.8	30
5	*Peprilus triacanthus*	2632	4.9	31
6	*Sardinella anchovia*	1652	3.1	12
7	*Chloroscombrus chrysurus*	243	0.5	3
8	*Scomber japonicus*	95	0.2	3
9	*Anchoa hepsetus*	82	0.2	3
10	*Trachurus lathami*	56	0.1	11
	Total Number	53464		

Rank	Species	Total Weight (kg)	Percent of Total Pelagic Weight	Number of Occurrences
1	*Peprilus triacanthus*	95.535	26.4	31
2	*Decapterus punctatus*	91.812	25.3	30
3	*Etrumeus teres*	80.565	22.4	15
4	*Anchoa lyolepis*	21.647	6.0	3
5	*Echeneis naucrates*	20.160	5.6	9
6	*Anchoa cubana*	15.041	4.2	4
7	*Sardinella anchovia*	10.190	2.8	12
8	*Chloroscombrus chrysurus*	9.525	2.6	3
9	*Scomber japonicus*	2.821	0.8	3
10	*Trachurus lathami*	2.814	0.8	11
	Total Weight	362.241		

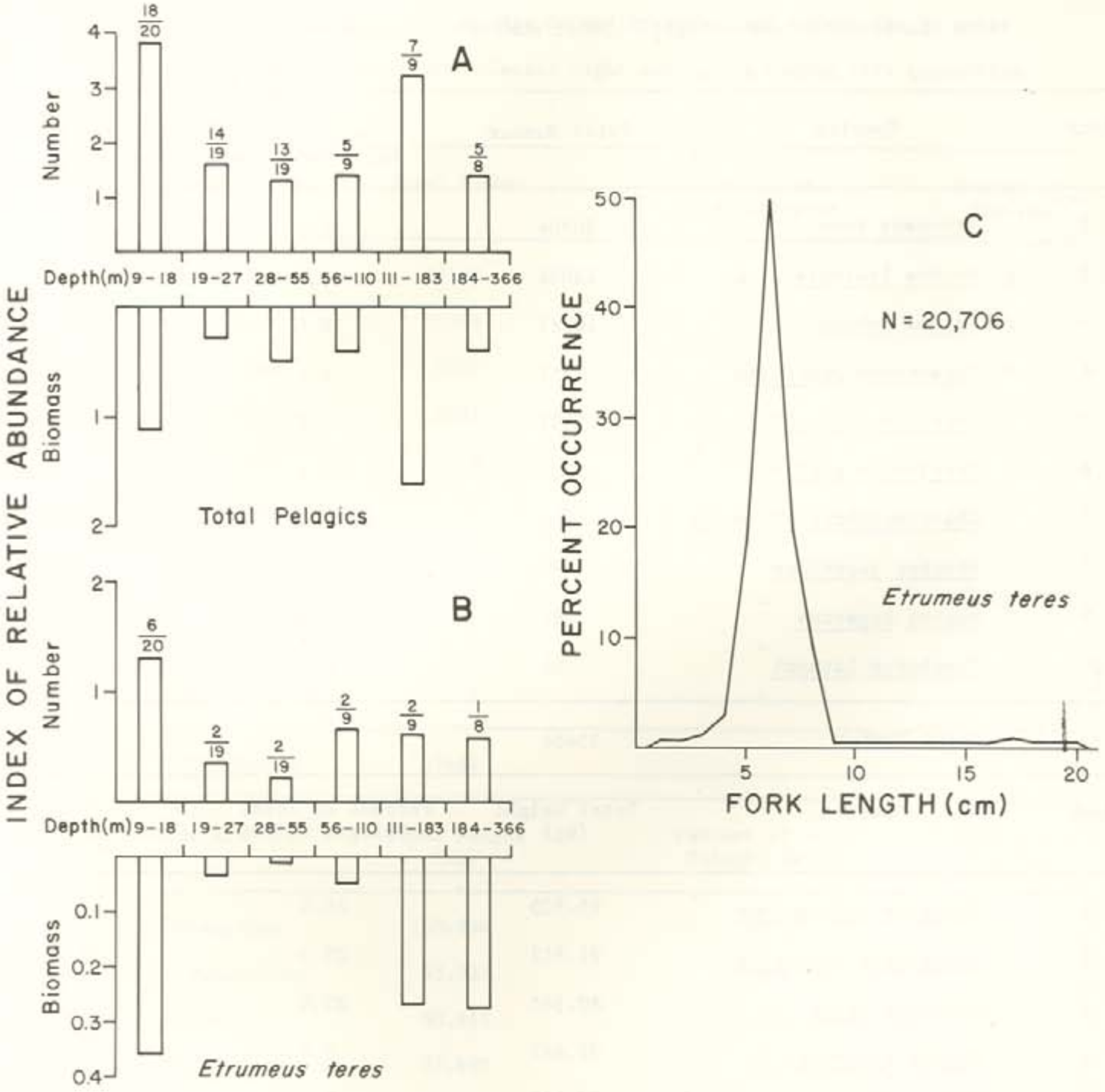

FIGURE 19. INDEX OF RELATIVE ABUNDANCE OF TOTAL PELAGIC SPECIES (A) AND ROUND HERRING, ETRUMEUS TERES (B), BY DEPTH ZONE FOR THE SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. THE NUMBER IN FRACTION = NUMBER OF TRAWLS IN DEPTH ZONE WITH PELAGIC SPECIES; DENOMINATOR = TOTAL NUMBER OF TRAWLS IN STRATUM. LENGTH FREQUENCY DISTRIBUTION FOR ETRUMEUS TERES (C) COLLECTED IN THE SOUTH ATLANTIC BIGHT DURING SPRING 1974.

Table 21. Top five numerically dominant pelagic fish species 1974 Spring groundfish survey by depth zone. N_1 = number of occurrences; N = total number of trawls in depth zone.

Depth zone (m)	Species	Total Number	Percent of Total in Zone	N_1/N
9-18	Etrumeus teres	20157	20.9	6/20
	Anchoa lyolepis	13021	26.4	3/20
	Anchoa cubana	10087	20.5	4/20
	Decapterus punctatus	3811	7.7	12/20
	Sardinella anchovia	1642	3.3	6/20
19-27	Etrumeus teres	178	48.6	2/19
	Decapterus punctatus	123	33.6	9/19
	Seriola zonata	21	5.7	1/19
	Peprilus triacanthus	16	4.4	5/19
	Anchoviella perfasciata	7	1.9	1/19
28-55	Decapterus punctatus	774	95.9	7/19
	Etrumeus teres	22	2.7	2/19
	Echeneis naucrates	3	0.4	2/19
	Sardinella anchovia	3	0.4	2/19
	Trachurus lathami	2	0.2	2/19
56-110	Peprilus triacanthus	284	77.0	2/9
	Etrumeus teres	29	7.9	2/9
	Trachurus lathami	20	5.4	1/9
	Sphyraena borealis	15	4.1	1/9
	Scomber japonicus	11	3.0	1/9
111-183	Peprilus triacanthus	2181	90.9	6/9
	Etrumeus teres	184	7.7	2/9
	Ariomma bondi	33	1.3	1/9
	Trachurus lathami	1	0.1	1/9
184-366	Etrumeus teres	136	65.0	1/8
	Peprilus triacanthus	71	34.0	3/8
	Ariomma regulus	1	0.5	1/8
	Ariomma bondi	1	0.5	1/8

Table 22. Top five dominant pelagic fish species by weight 1974 Spring groundfish survey by depth zone. N_1 = number of occurrences; N = total number of trawls in depth zone.

Depth zone (m)	Species	Total Weight (kg)	Percent of Total in Zone	N_1/N
9-18	Decapterus punctatus	65.011	33.3	12/20
	Etrumeus teres	62.368	31.9	6/20
	Anchoa lyolepis	21.647	11.1	3/20
	Anchoa cubana	15.041	7.7	4/20
	Sardinella anchovia	9.590	4.9	6/20
19-27	Decapterus punctatus	4.782	39.4	9/19
	Echeneis naucrates	4.183	34.5	4/19
	Seriola zonata	0.907	7.5	1/19
	Etrumeus teres	0.560	4.6	2/19
	Peprilus triacanthus	0.500	4.1	5/19
28-55	Decapterus punctatus	21.819	61.0	7/19
	Echeneis naucrates	12.701	35.5	2/19
	Ariomma regulus	0.454	1.3	1/19
	Etrumeus teres	0.200	0.6	2/19
	Sardinella anchovia	0.200	0.6	2/19
56-110	Peprilus triacanthus	12.248	61.8	2/9
	Sphyraena borealis	2.268	11.4	1/9
	Scomber japonicus	1.814	9.2	1/9
	Trachurus lathami	1.814	9.2	1/9
	Seriola dumerili	0.907	4.6	1/9
111-183	Peprilus triacanthus	78.111	88.5	6/9
	Etrumeus teres	9.172	10.4	2/9
	Ariomma bondi	0.907	1.0	1/9
	Trachurus lathami	0.100	0.1	1/9
184-366	Etrumeus teres	7.711	71.8	1/8
	Peprilus triacanthus	2.822	26.3	3/8
	Ariomma regulus	0.100	0.9	1/8
	Ariomma bondi	0.100	0.9	1/8

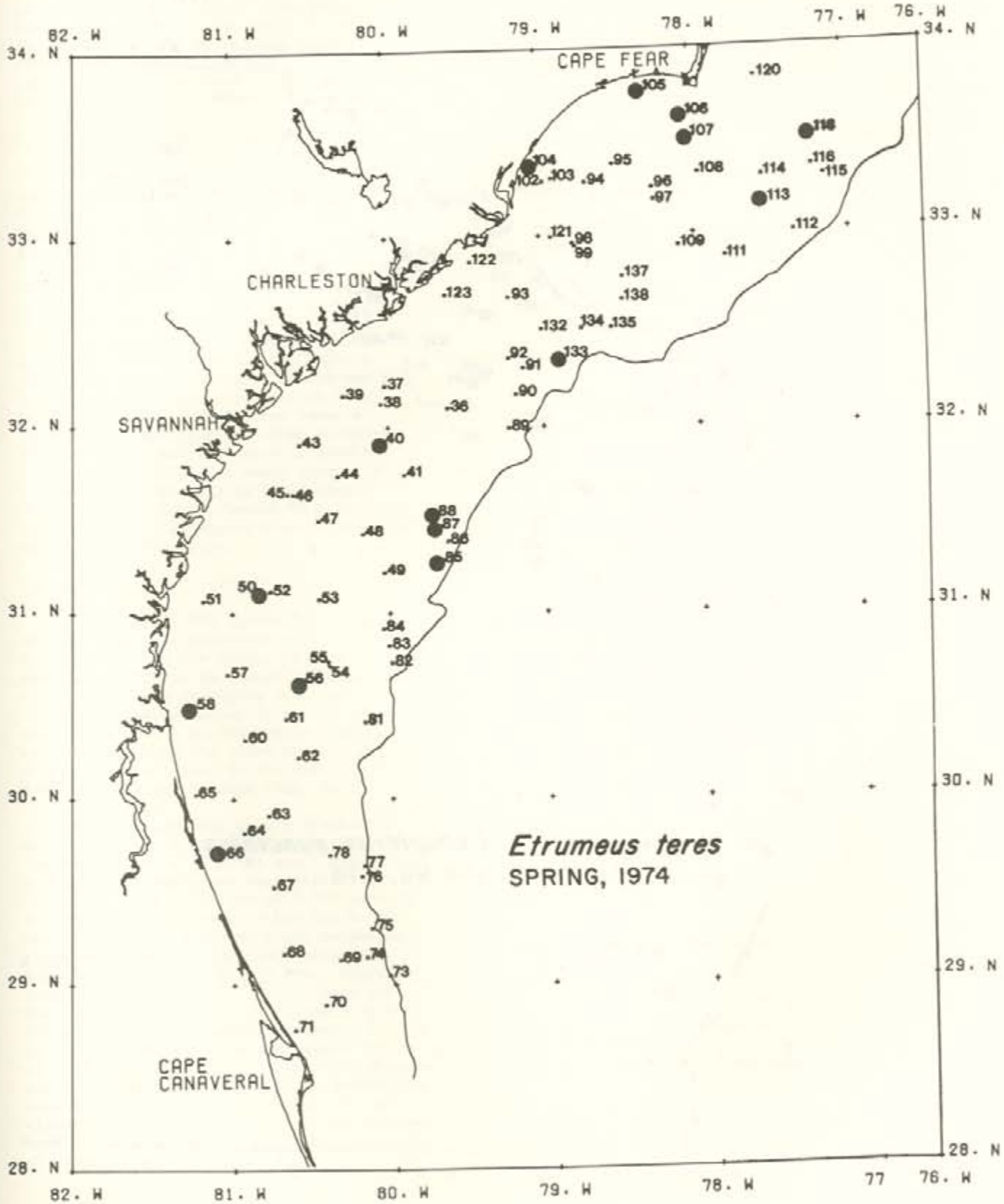

FIGURE 20. DISTRIBUTION OF ROUND HERRING, ETRUMEUS TERES, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

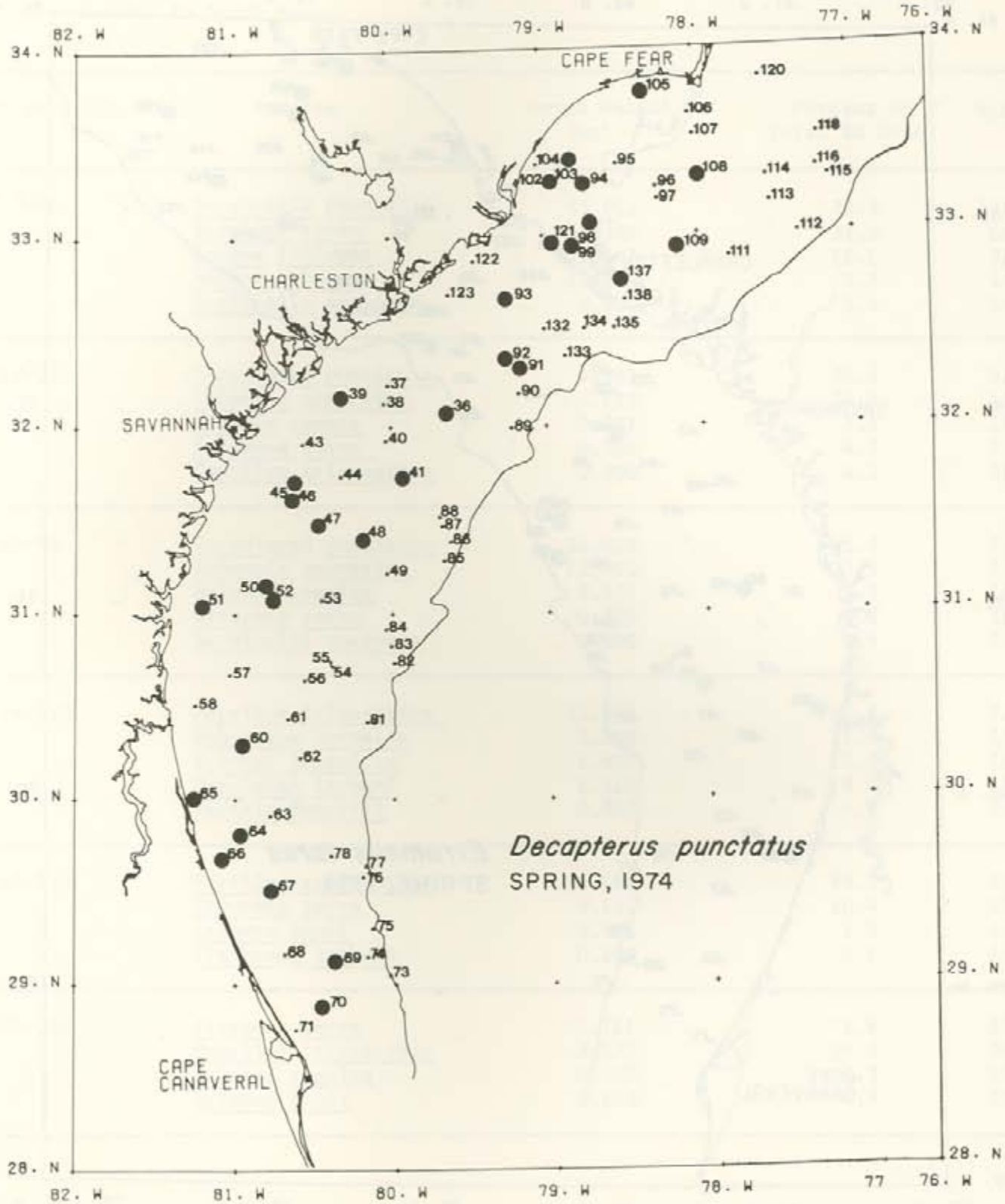

FIGURE 21. DISTRIBUTION OF DECAPTERUS PUNCTATUS IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 [illegible] GROUNDFISH SURVEY.

ranked fourth in total number (8.8%) and second in total weight (25.3% of the pelagic fishes during the Spring of 1974. Catch rates were the highest in the 9-18 m depth zone where D. punctatus occurred in 45% of the trawls. There was a general decrease in catch rates with increased depth (Fig. 22A) until it was absent from trawls in the two deepest zones. The average size was 11.6 cm fork length with a range from 2 to 19 cm (Fig. 22B).

Butterfish: Peprilus triacanthus

Butterfish, Peprilus triacanthus, ranked fifth in total number (4.9%) and first in total weight (26.4%) of pelagic fishes collected during the Spring 1974 groundfish survey. This species was found more frequently in trawls (37%) than other pelagics and was widespread in its distribution, occurring from Cape Fear to Cape Canaveral in all depth zones (Fig. 23). The highest catch rates by numbers and weight were in the 111-183 m depth zone where 82% of the total number and 81% of the total weight of butterfish were found (Fig. 22C). In the two inshore zones, P. triacanthus was taken quite regularly but in small numbers in trawls. Inshore butterfish were small juveniles with a modal size of 3 cm fork length. Those found in depths beyond 56 m were all large individuals ranging from 11 to 17 cm fork length (Fig. 22D).

Cephalopods

A total of 15,649 squids with a weight of 65.434 kg were collected in 77.4% of the 84 trawls during the Spring of 1974. The percent occurrence in trawls was high (80% +) in those made in depths less than 111 m. In the two deepest zones (> 111 m) squid were found in 53% of the trawls. Catch rates as shown by the index of relative abundance were lowest in the 56-110 m and the 184-366 m depth zones (Fig. 24A).

Untransformed data gave a stratified mean catch/tow of 0.749 kg/tow with 90% confidence limits of 0.581 and 0.916 kg/tow. Analysis of transformed data yielded a stratified mean catch/tow of 0.730 kg with 90% confidence limits of 0.604 and 0.866 kg/tow. Minimum standing stock estimates based on these data for South Atlantic Bight squid for Spring 1974 are: untransformed data: 1.97×10^3 metric tons with 90% confidence limits of 1.53 and 2.41×10^3 metric tons. Transformed data: 1.92×10^3 metric tons with 90% confidence limits of 1.59 and 2.28×10^3. As has been pointed out for pelagic fishes, these estimates are conservative in that the gear is not designed for squid assessment and the catches have not been adjusted for the vulnerability of squid to the 3/4 Yankee trawls.

Five taxonomic groupings of squid were collected during the Spring 1974 groundfish survey. Of these the brief squid, Lolliguncula brevis, was represented by a single specimen collected in the 9-18 m zones. Seventeen Illex illecebrosus were taken in depths from 38 to 287 m. This species accounted for only 0.1% of the total number and 2% of the total weight of the squid taken during the survey.

As indicated in the previous report (Wenner et al., 1979), the specific field identifications of the long-fin squid were questionable. Therefore, the Loliginidae as described herein is a grouping of Loligo pealei, L. plei in addition to juveniles of both species. The Loliginidae accounted for 99.9% of the total number and 98% of the total weight of squids in the South Atlatnic Bight during the Spring of 1974. Catch rates were highest in the 28-55 m depth zone where loliginids occurred in 17 to 19 trawls (Fig. 24B). Most of the loliginids were juveniles less than 6 cm mantle length (85%). The average size was 3.7 cm mantle length with a range from 1 to 27 cm mantle length (Fig. 24C).

Demersal Fish Diversity

The total number of demersal fish species (demersal bony fish plus elasmobranch species) taken during the Spring 1974 groundfish survey in the South Atlantic Bight was highest in the 56-110 m zone (depths beyond the shelf break) and lowest on the upper portion of the continental slope (184-366 m) (Table 23). The overall average for the entire survey was 11.3 with a range from 2 to 33 demersal species/tow. Plots of the number of demersal species/tow against depth of trawl showed that samples taken in depths shallower than 50 m were variable (Fig. 25A). Beyond 50 m there was a general trend for a decrease in the number of demersal species/tow.

Species diversity as measured by the Shannon-Weaver diversity index (h') and species richness (S-1/ln N) showed the same general trend of high variability in relatively shallower waters followed by a decrease in deeper waters (Fig. 25B and C). Ranges for diversity values in each of the six depth zones were:

Depth Zone (m)	H'(bits/individual)	Species Richness
9-18	0.008-2.814	0.229-3.388
19-27	0.353-3.482	0.558-4.568
28-55	0.488-3.404	1.800-4.331
56-110	0.409-3.554	0.582-5.279
111-183	1.282-3.470	1.230-3.881
184-366	0.469-2.310	0.434-1.970

Extremely low diversity values were caused by both low evenness values (J') resulting from the numerical dominance of trawls by a single species and low species richness, that is, some trawls contained only a few species. Mean diversity values were not calculated for each zone because of a lack of homogeneity in trawls within that zone. Diversity values for all stations in this

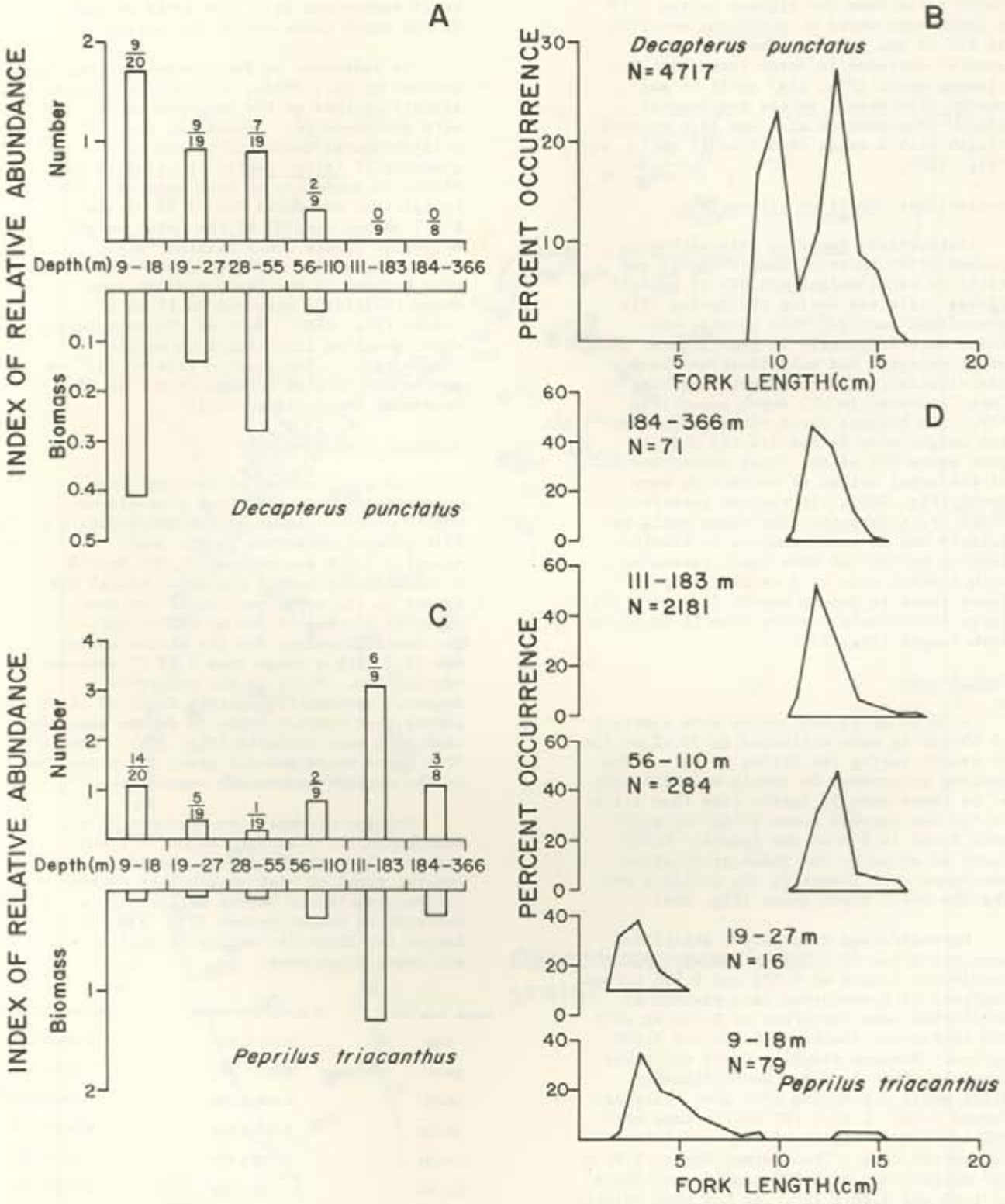

FIGURE 22. INDEX OF RELATIVE ABUNDANCE FOR ROUND SCAD, DECAPTERUS PUNCTATUS (A) AND BUTTERFISH, PEPRILUS TRIACANTHUS (C), FOR THE SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. THE NUMBERATOR IN FRACTION = THE NUMBER OF TRAWLS IN DEPTH ZONE WITH ROUND SCAD; DENOMINATOR = THE TOTAL NUMBER OF TRAWLS IN DEPTH ZONE. LENGTH FREQUENCY DISTRIBUTION OF DECAPTERUS PUNCTATUS (B) AND PEPRILUS TRIACANTHUS (D). BUTTERFISH LENGTHS ARE SEPARATED BY DEPTH ZONES. THE 28-55 M DEPTH ZONE IS NOT INCLUDED BECAUSE ONLY A SINGLE FISH WAS TAKEN THERE.

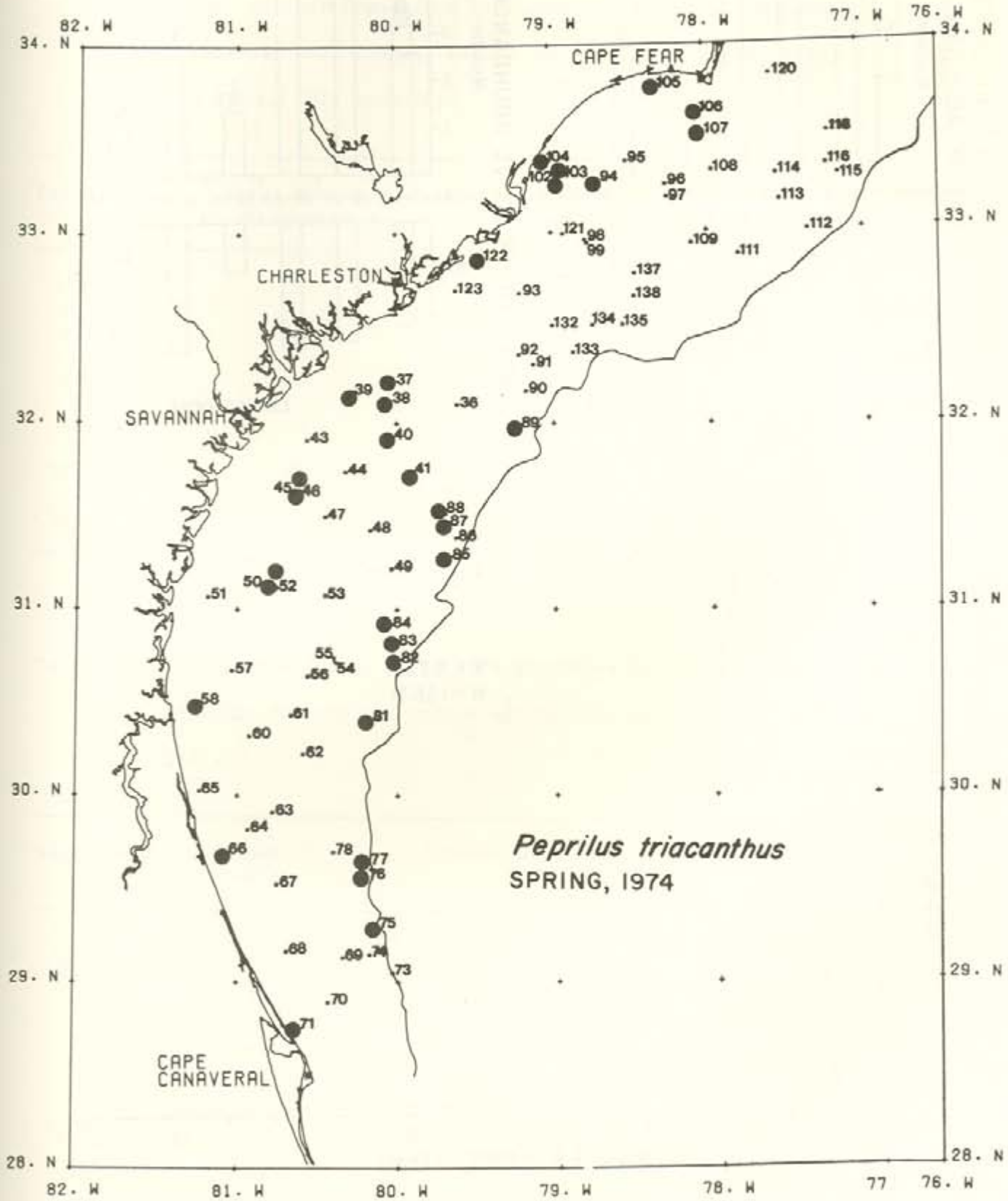

FIGURE 23. DISTRIBUTION OF BUTTERFISH, PEPRILUS TRIACANTHUS, IN THE SOUTH ATLANTIC BIGHT DURING THE SPRING 1974 GROUNDFISH SURVEY.

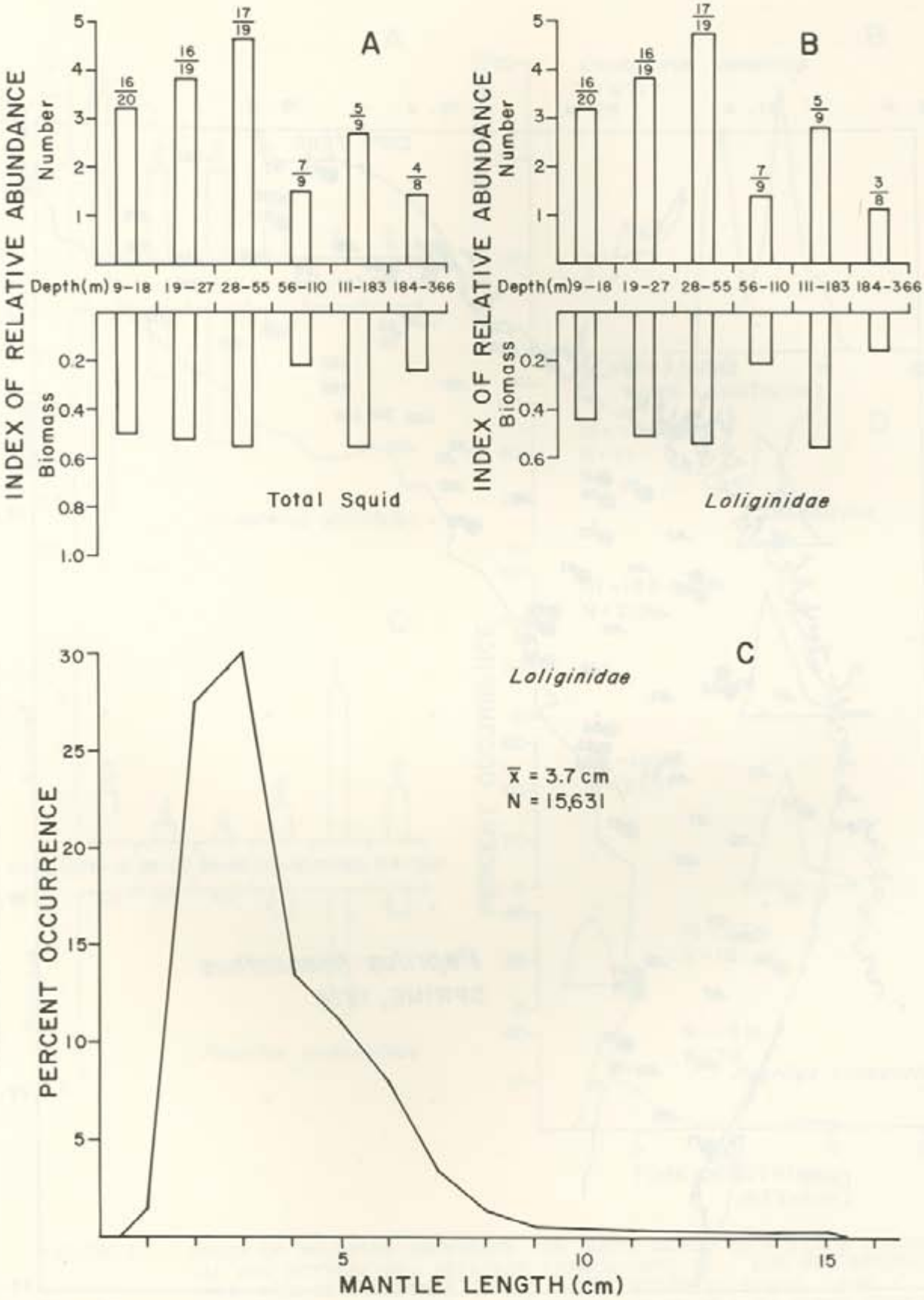

FIGURE 24. INDEX OF RELATIVE ABUNDANCE FOR (A) TOTAL SQUID AND (B) LONG FIN SQUID, LOLIGINIDAE, BY DEPTH ZONE FOR THE SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMERATOR IN FRACTION = NUMBER OF TRAWLS IN DEPTH ZONE WITH SQUID; DENOMINATOR = TOTAL TRAWLS IN ZONE. MANTLE LENGTH FREQUENCY FOR LONG FIN SQUID (C).

Table 23. Total number of species, mean number of species/tow and mean number of individuals/tow for demersal fishes (elasmobranch + demersal bony fishes) in the South Atlantic Bight during the Spring 1974 groundfish survey.

Depth zone (m)	Total Number of Species	Mean Number of Species/tow	Mean Number of Individuals/tow
9-18	55	9.3	912
19-27	66	10.8	264
28-55	63	13.2	188
56-110	73	16.7	211
111-183	50	11.7	175
184-366	30	6.8	83

Table 24. Characteristics of eight site groups as defined by cluster analysis for the san bottom habitat during the Spring of 1974.

Site Group	Number of Stations	$\bar{x}$ Depth (m)	Depth Range	Latitudinal Range of Stations
1	14	16.4	9-38	28.8° - 33.4°
2	13	19.7	13-27	30.5° - 33.6°
3	9	25.9	10-46	29.7° - 33.8°
4	7	30.1	20-38	29.5° - 31.1°
5	10	29.9	22-40	28.9° - 32.7°
6	12	58.7	29-91	29.2° - 33.5°
7	9	138.6	93-252	29.3° - 33.3°
8	10	203.9	126-287	29.1° - 33°

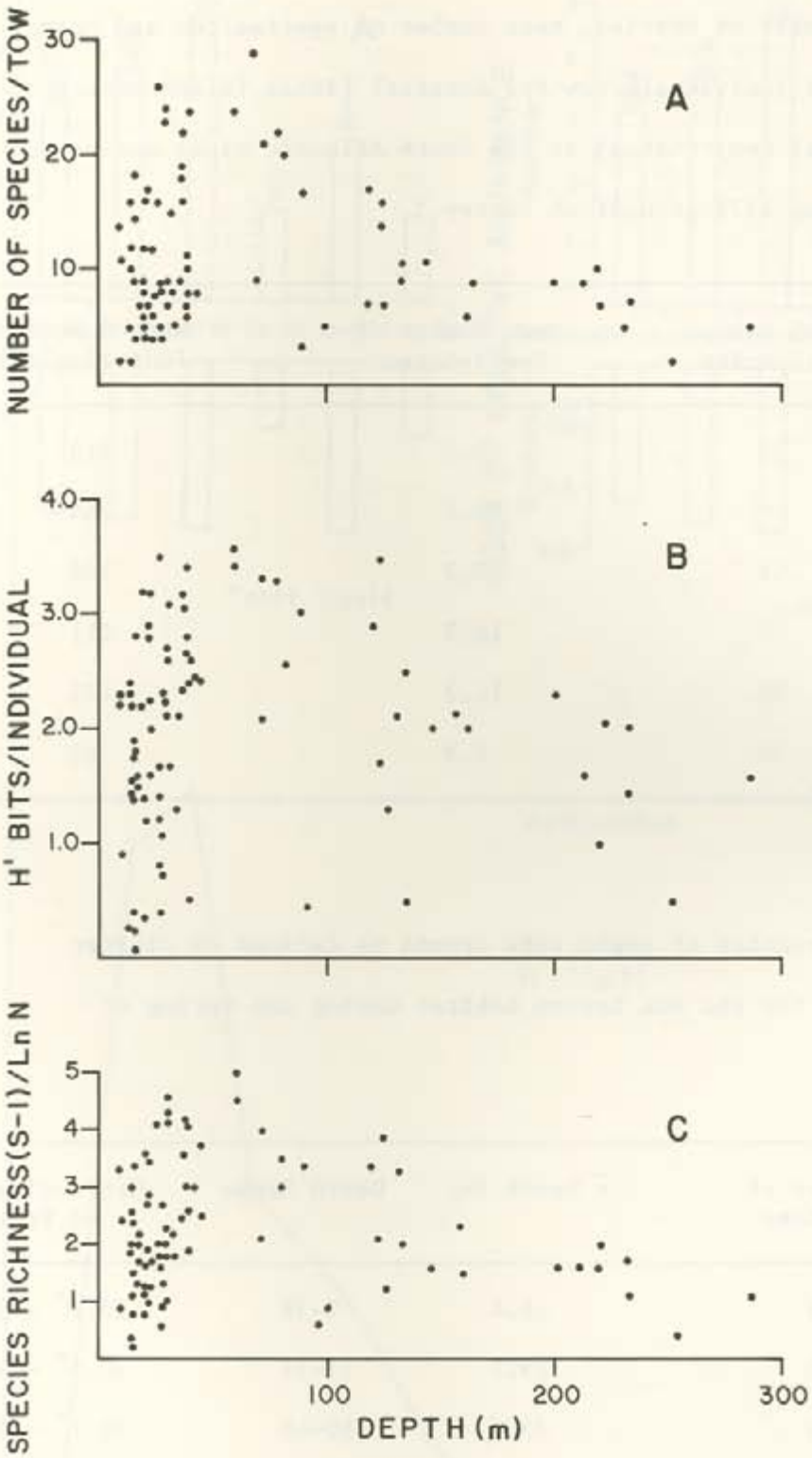

FIGURE 25. PLOTS OF THE NUMBER OF SPECIES/TOW (A), SHANNON-WEAVER SPECIES DIVERSITY (H', BITS/INDIVIDUAL) (B) AND SPECIES RICHNESS (S-1/ln N WHERE S = NUMBER OF DEMERSAL SPECIES AND N = NUMBER OF INDIVIDUALS IN A TRAWL SAMPLE) (C) AGAINST TRAWL DEPTH FOR THE SPRING 1974 GROUNDFISH SURVEY IN THE SOUTH ATLANTIC BIGHT.

survey are in Appendix IV.

The results of the Spring 1974 groundfish survey show a trend similar to the Fall 1973 survey in the South Atlantic Bight with high variability in shallow water and a gradual decrease in diversity statistics with depth. During the Fall 1973, the greatest values of mean number of species/tow were in the 9-18 m zone whereas during the Spring of 1974 highest values were recorded in the 56-110 m depth zone.

During the Spring 1974 groundfish survey a total of 156 species of demersal fishes were collected. In addition 26 species of pelagic fishes were identified during the survey. This was slightly lower than that found during the fall 1973 which gave 166 demersal species and 41 pelagic species (Wenner et al., 1979). Although some inshore-offshore and north-south migrations may become apparent with more detailed analysis, it appears that the faunal composition of the South Atlantic Bight is relatively stable.

Community Analysis

The use of cluster analysis divided collections into eight site groups (Fig. 26). The major division between site groups occurred in depths greater than 90 m where shelf stations were separated from slope stations. Although a general depth related trend in the six shelf groups was observed, a great deal of overlap between site group depth ranges was present. Latitude appeared to have little importance in grouping collections since most site groups contained stations from the northern as well as the southern portions of the sampling area (Table 24).

The species cluster gave ten groups (Fig. 27). Group A was comprised of eight species that are relatively eurybathic and widely distributed in the open shelf habitat of the South Atlantic Bight. This assemblage has a moderate or a high constancy in the five inshore station groups (Fig. 28) but has low or very low fidelity (Fig. 29). This can be interpreted as showing that the fishes in Group A are ubiquitous and can be expected to co-occur in 3/4 Yankee trawls made in the South Atlantic Bight in spring in depths to 40 m. The low fidelity demonstrates that during this season they are not restricted in their distribution to a specific group of collections.

Group B is a conglomeration of loosely associated species as evidenced by the low similarity within the group and within the group chaining. Several of these species (Hemipteronotus novacula, Sphoeroides maculatus, Saurida brasiliensis, etc.) are relatively rare and thus did not exhibit defineable distribution patterns. With this in mind, it is reasonable to expect the lack of cohesiveness in the assemblage. Plainly and simply they are a "garbage group".

Species group C, comprised of the relatively rare Lactophrys quadricornis and Chilomycterus schoepfi, is an example of rare species lumped together as a group by the analysis.

Group D is an assemblage of eight species which are mainly found in mid-shelf depths although some individuals of certain species, i.e. Urophycis regius and Ophidion holbrooki, occur in shallow water. This species group had high constancy and moderate fidelity in site groups 5 and 6 (22-40 m and 29-91 m) suggesting that this group has its maximum abundance and can be expected in trawls made in mid and outer shelf depths.

Group I comprised of Raja garmani and Prionotus alatus showed both high constancy and fidelity to site group 7 which were mainly upper slope stations in the South Atlantic Bight. Group J with 7 species shows both high constancy and fidelity to site group 8 which is made up of ten stations with the greatest average depth (203.9 m).

In summary, cluster analysis has not provided a clear cut classificatory scheme by latitude or depth. Although a broad faunal division between shelf and slope stations and species is apparent and some depth related trends are possibly indicated, the relatively stable thermal regime and the lack of real habitat differences on the open shelf provide a rational explanation for the widespread latitudinal and depth distribution of most common species which result in no clear cut faunal divisions.

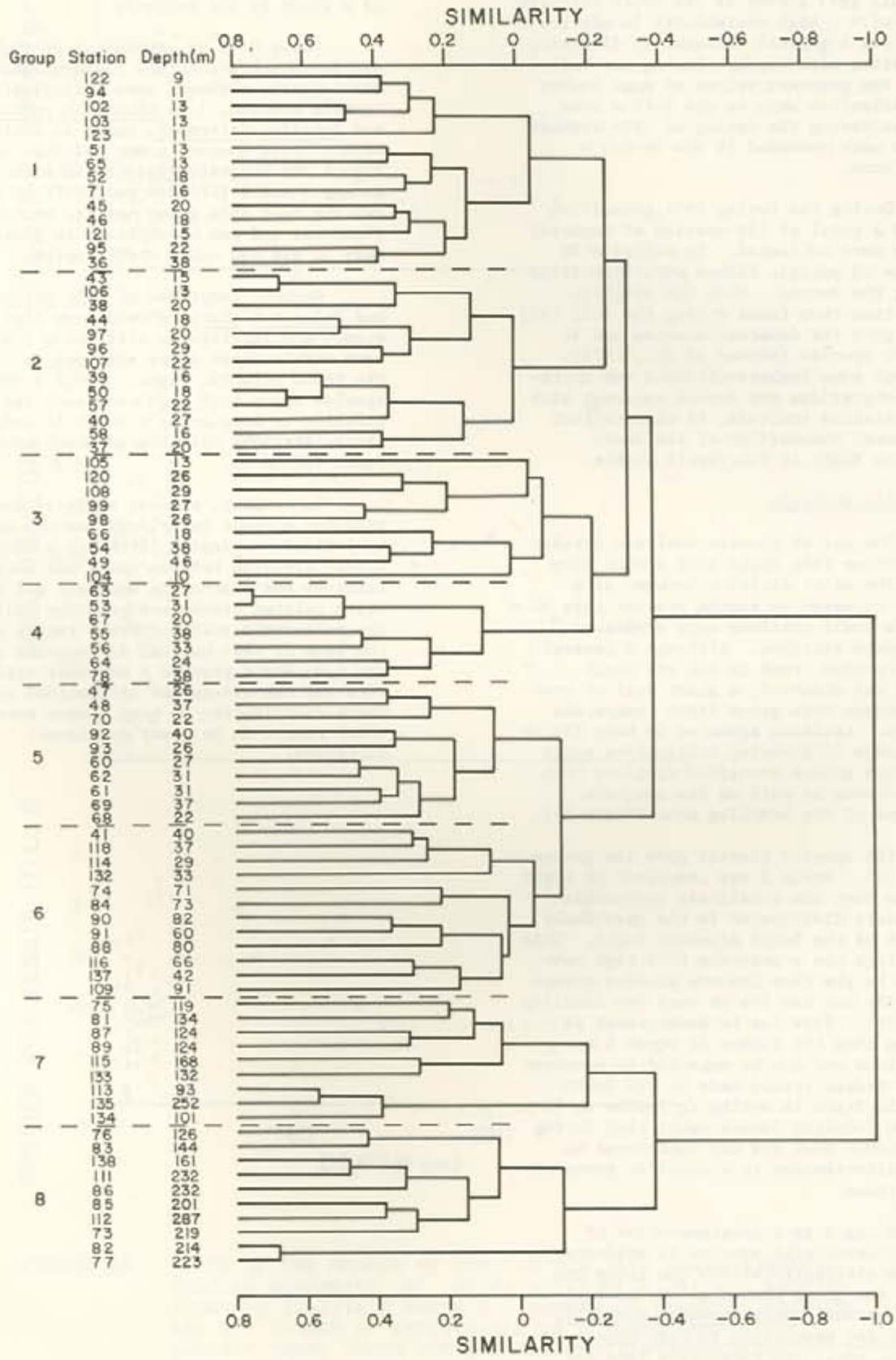

FIGURE 26. STATION CLUSTER (NORMAL ANALYSIS) FOR SPRING 1974 SAND BOTTOM STATIONS. CANBERRA-METRIC CORRELATION, SQUARE FOOT TRANSFORMED DATA, STANDARDIZED, FLEXIBLE SORTING WITH $\beta = -0.25$.

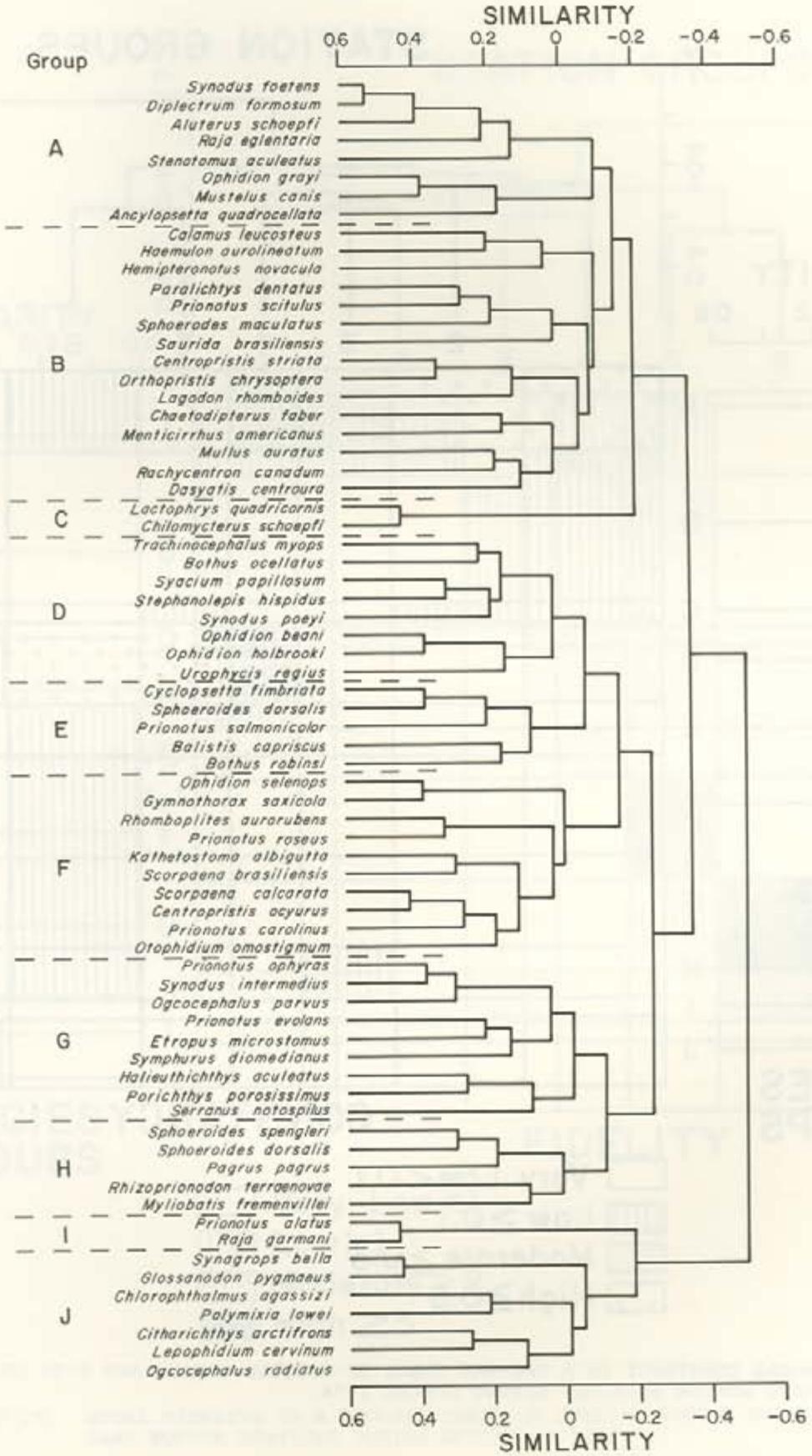

FIGURE 27. SPECIES CLUSTER (INVERSE ANALYSIS) FOR SPRING 1974 SAND BOTTOM STATIONS. METHODOLOGY SAME AS FIG. 26.

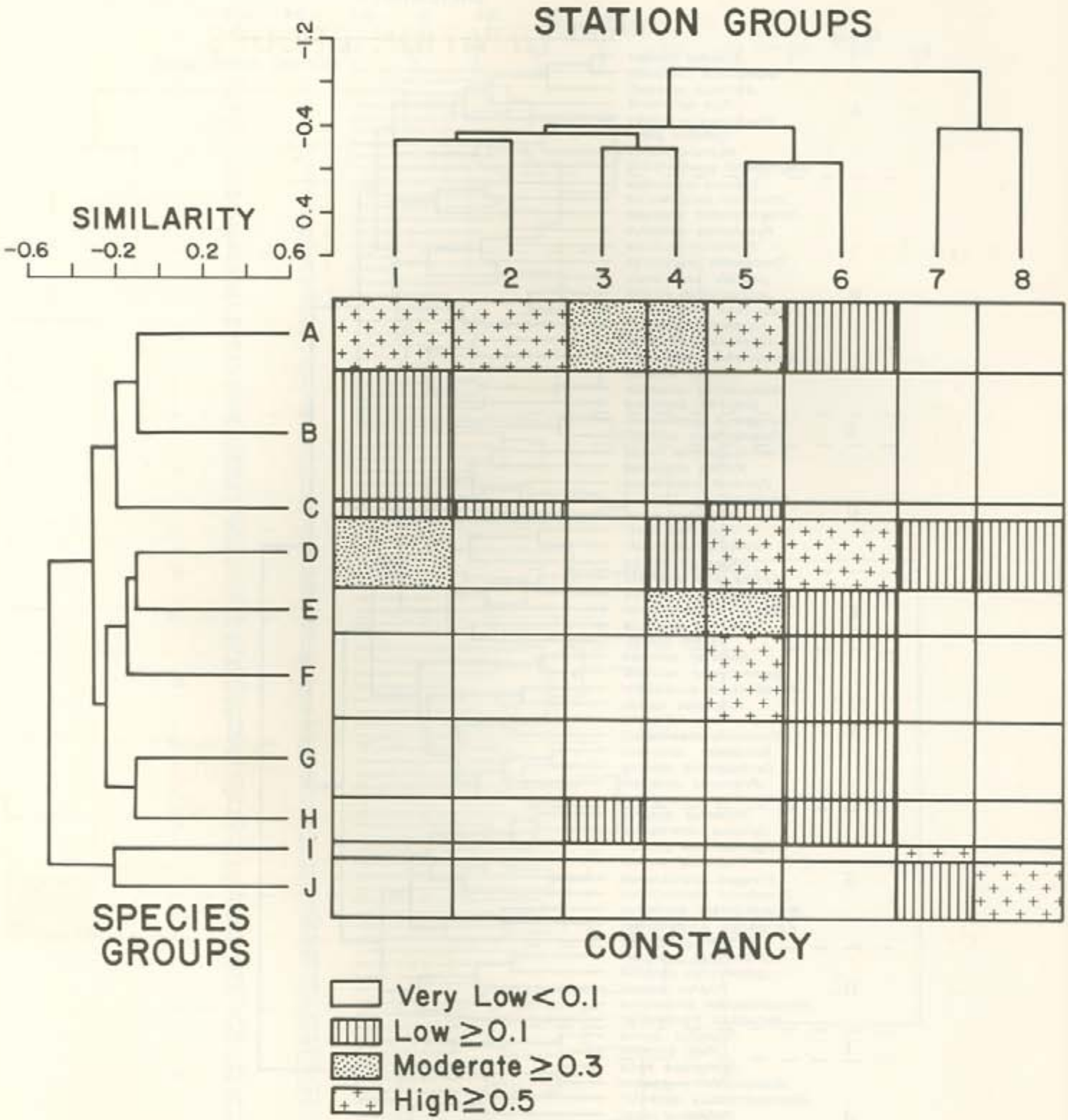

FIGURE 28. NODAL CONSTANCY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING SPRING 1974.

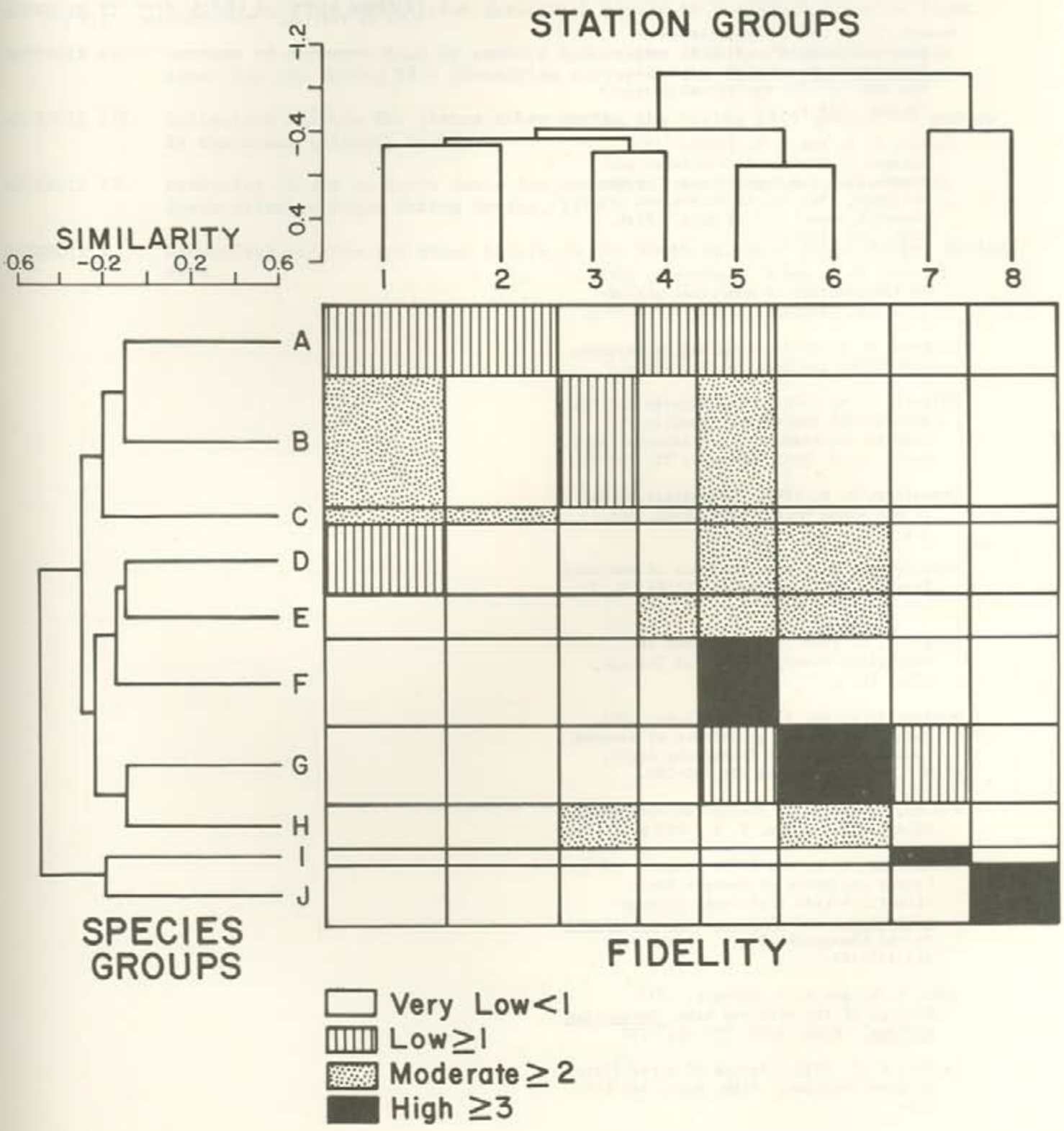

FIGURE 29. NODAL FIDELITY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING SPRING OF 1974.

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

APPENDIX I. Station data for Spring 1974 groundfish survey in the South Atlantic Bight.

Collection Number	Latitude	Longitude	Depth (m)	Temperature (°C)	Salinity (PPT)
74036	32°05.0'N	79°37.0'W	38	19.1	36.11
74037	32°12.5'N	80°01.0'W	20	17.1	35.00
74038	32°06.7'N	80°02.0'W	20	17.4	35.15
74039	32°09.5'N	80°17.0'W	16	17.1	34.51
74040	31°55.5'N	80°02.0'W	27	18.4	35.69
74041	31°44.5'N	79°54.0'W	40	18.9	35.85
74043	31°54.5'N	80°34.0'W	15	18.5	34.17
74044	31°44.2'N	80°19.4'W	18	17.6	35.91
74045	31°38.5'N	80°38.5'W	20	--	--
74046	31°38.4'N	80°37.0'W	18	18.5	35.17
74047	31°30.0'N	80°27.0'W	26	18.9	36.02
74048	31°25.5'N	80°10.0'W	37	20.1	35.93
74049	31°13.0'N	80°02.0'W	46	18.9	36.21
74050	31°08.0'N	80°50.0'W	18	19.2	35.90
74051	31°04.0'N	80°11.0'W	13	19.0	35.85
74052	31°07.0'N	80°45.5'W	18	19.2	36.15
74053	31°04.5'N	80°27.0'W	31	19.9	36.56
74054	30°43.3'N	80°23.5'W	38	--	--
74055	30°44.0'N	80°24.0'W	38	20.4	36.37
74056	30°38.5'N	80°33.7'W	33	20.6	36.35
74057	30°40.3'N	81°02.0'W	22	19.7	36.37
74058	30°30.5'N	81°15.0'W	16	20.0	36.44
74060	30°19.2'N	80°55.0'W	27	20.9	36.57
74061	30°26.0'N	80°40.0'W	31	20.5	36.41
74062	30°13.5'N	80°35.5'W	31	20.5	36.38
74063	29°54.7'N	80°46.8'W	27	21.3	36.31
74064	29°49.0'N	80°56.0'W	24	21.6	36.36
74065	30°01.5'N	81°14.0'W	13	20.6	36.54
74066	29°42.0'N	81°04.0'W	18	22.0	36.38
74067	29°31.5'N	80°45.1'W	20	21.1	36.17
74068	29°10.0'N	80°20.5'W	22	20.7	36.36
74069	29°08.0'N	80°26.0'W	37	18.9	36.20
74070	28°53.5'N	80°37.5'W	22	19.6	36.27
74071	28°45.5'N	80°02.0'W	16	21.1	36.24
74073	29°03.0'N	80°10.5'W	219	10.2	35.30
74074	29°09.0'N	80°08.6'W	71	20.2	36.18
74075	29°18.2'N	80°12.0'W	119	13.3	35.72
74076	29°35.0'N	80°11.0'W	126	8.5	35.20
74077	29°38.5'N	80°24.0'W	223	7.4	35.06
74078	29°41.9'N	80°10.0'W	38	19.5	36.23
74081	30°25.0'N	79°59.5'W	134	14.4	35.89
74082	30°44.0'N	80°00.5'W	214	13.4	35.75
74083	30°49.5'N	80°02.5'W	144	13.6	35.76
74084	30°55.0'N	79°40.0'W	73	20.7	36.48
74085	31°17.0'N	79°37.5'W	201	13.5	36.00
74086	31°23.0'N	79°40.7'W	232	14.7	36.28
74087	31°28.1'N	79°41.5'W	124	15.2	36.13
74088	31°31.0'N	79°13.5'W	80	15.8	36.14
74089	31°59.5'N	79°10.5'W	124	15.9	36.18
74090	32°09.2'N	79°07.5'W	82	17.2	36.22
74091	32°17.7'N	79°07.5'W	60	17.5	36.12
74092	32°20.8'N	79°13.0'W	40	17.9	36.26
74093	32°40.4'N	79°12.5'W	26	18.4	36.11
74094	33°17.0'N	78°41.5'W	16	17.8	34.94
74095	33°22.7'N	78°30.6'W	22	18.0	35.66
74096	33°15.0'N	78°15.5'W	29	--	--
74097	33°11.0'N	78°15.0'W	27	18.2	36.25
74098	32°57.5'N	78°47.0'W	26	--	--
74099	32°56.5'N	78°46.2'W	27	18.1	35.87
74102	33°17.5'N	78°58.0'W	13	--	--
74103	33°18.5'N	78°54.5'W	13	18.2	34.15
74104	33°22.8'N	79°01.6'W	10	17.9	34.29
74105	33°46.5'N	78°18.5'W	13	17.1	34.27
74106	33°38.5'N	78°02.5'W	13	17.5	34.85
74107	33°31.5'N	78°00.5'W	22	17.9	35.76
74108	33°19.4'N	77°57.4'W	29	18.5	36.07
74109	32°56.0'N	78°05.9'W	91	18.9	36.39
74111	32°52.2'N	77°47.9'W	232	10.6	35.37
74112	32°59.7'N	77°21.0'W	287	9.1	35.38
74113	33°09.5'N	77°31.5'W	93	18.4	36.42
74114	33°18.0'N	77°32.5'W	29	20.2	36.35
74115	33°17.5'N	77°08.5'W	168	15.3	36.18
74116	33°20.7'N	77°13.0'W	66	20.6	36.34
74118	33°31.1'N	77°12.2'W	37	20.5	36.35
74120	33°50.0'N	77°34.0'W	26	18.5	35.85

74121	32 59.5'N	78 55.4'W	15	18.7	34.90
74122	32 52.0'N	79 27.0'W	9	18.5	34.42
74123	32 41.5'N	79 37.0'W	11	18.5	34.17
74132	32 30.0'N	79 00.0'W	33	18.6	36.28
74133	32 21.3'N	78 52.2'W	132	12.9	35.70
74134	32 30.0'N	78 44.2'W	101	16.3	36.48
74135	32 30.0'N	78 33.0'W	252	10.1	35.34
74137	32 46.4'N	78 28.1'W	42	19.1	36.61
74138	32 39.0'N	78 28.5'W	161	16.1	36.47

APPENDIX II. Catches of demersal fish by numbers and weight (kg) for individual depth zones for the Spring 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.
Carcharhinidae	Rhizoprionodon terraenovae			1	5.9	4	15.9			1	7.3		
Triakidae	Mustelus canis	3	20.9	1	6.8								
Rhinobatidae	Rhinobatos lentiginosus	1	0.5										
Rajidae	Raja eglentaria	61	29.5	14	6.5	5	2.0						
	Raja garmani									4	0.4		
	Breviraja plutonia											2	0.1
	Breviraja sp.									3	0.5		
Dasyatidae	Dasyatis centroura	7	557.9	4	560.2	5	511.7	6	721.2	1	117.9		
Myliobatidae	Myliobatis fremenvillei	73	401.4	5	31.7								
Muraenidae	Gymnothorax saxicola			8	1.0	1	0.1	1	0.1	1	0.1		
Muraenesocidae	Hoplunnis sp.									15	0.2		
Congridae	Ariosoma balearicum			1	0.1	1	0.1	2	0.1				
	Gnathophis sp.							7	0.1				
	Conger sp.							1	0.1				
	Congridae							1	0.1				
Ophichthidae	Bascanichthys sp.			1	0.1								
	Myrophis sp.							5	0.1				
	Ophichthus gomesi							1	0.1	1	0.1		
	Ophichthus ocellatus							3	0.2				
	Ophichthus melanoporus			1	0.1			1	0.1	2	0.1		
Argentinidae	Glossanodon pygmaeus									59	0.4	26	0.4
	Argentina striata											1	0.1
Synodontidae	Synodus foetens	305	16.5	155	22.6	73	11.4	165	32.2	4	0.9		
	Synodus intermedius					2	0.5	8	0.8				
	Synodus poeyi			3	0.1	99	1.3	288	2.7	42	0.4	9	0.1
	Trachinocephalus myops	2	0.2	11	0.7	32	1.7	19	1.5				
	Saurida brasiliensis			1	0.1	1	0.1	3	0.2	21	0.2	1	0.1
	Saurida caribbaea									1	0.1		
	Saurida normani									44	0.3		
	Synodontidae	1	0.1										
Chlorophthalmidae	Chlorophthalmus agassizi											31	0.5
Ariidae	Arius felis	16	2.3										
Batrachoididae	Porichthys porosissimus	1	0.1	2	0.2	1	0.1	14	0.5	14	0.4	1	0.1
Lophiidae	Lophius americanus									1	0.1		
Antennaridae	Antennaridae							1	0.1				
Ogcocephalidae	Dibranchus atlanticus									1	0.1		
	Halieuthichthys aculeatus					5	0.3	14	0.4	52	0.4		
	Ogcocephalus nasutus									1	0.1		
	Ogcocephalus parvus			1	0.1	2	0.2	18	0.5				
	Ogcocephalus radiatus					1	0.1	2	0.2	16	0.7		
Gadidae	Urophycis regius	283	3.0	20	0.3	20	0.7	191	6.2	432	12.4	135	8.3
	Urophycis floridanus	1	0.1					1	0.1			1	0.5
Merluccidae	Merluccius albidus											2	0.1
	Merluccius sp.			1	0.1							1	0.1
Moridae	Laemonema barbatulum											20	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.
Ophidiidae	Otophidium omostigmum			37	0.7	30	0.4	1	0.1				
	Ophidion holbrooki	4	0.4	24	1.9	12	1.2	19	0.6	1	0.1		
	Ophidion beani	14	0.4	19	0.8	9	0.7	2	0.1	1	0.1		
	Ophidion selenops	2	0.1	12	0.2	1	0.1	1	0.1				
	Ophidion grayi	6	0.4	7	0.5								
	Lepophidium cervinum									26	1.2	3	0.1
	Rissola marginata	2	0.2										
Polymixiidae	Polymyxia lowei							1	0.1	47	0.5	28	1.6
Zeidae	Zenopsis ocellata									4	0.3		
Caproidae	Antigonia capros							1	0.1	4	0.1		
	Antigonia combatia											1	0.1
Centriscidae	Macrorhamposus scolopax											3	0.1
Syngnathidae	Syngnathus springeri					2	0.1						
Percichthyidae	Synagrops bella									38	0.7	37	0.5
	Synagrops spinosa											1	0.1
Serranidae	Centropristis philadelphica			1	0.1								
	Centropristis ocyurus	2	0.1	7	0.4	10	0.8	21	0.9	3	0.2		
	Centropristis striata	14	2.9	18	4.5								
	Diplectrum formosum	83	6.4	211	31.9	162	23.0						
	Serranus notospilus							52	0.7	24	0.2		
	Serranus phoebe							48	3.7				
	Serraniculus pumilio	1	0.1										
	Anthias asperlinguis									1	0.1		
Priacanthidae	Priacanthidae					1	0.1						
Apogonidae	Apogon sp.									1	0.1		
Rachycentridae	Rachycentron canadum	2	1.4	1	8.6	2	10.0						
Lutjanidae	Rhomboplites aurorubens			14	0.8	13	1.1	174	22.1				
	Lutjanus campechanus			5	0.1								
Haemulidae	Haemulon aurolineatum	2	0.1	97	9.1	40	2.0	20	0.9				
	Haemulon striatum							1	0.1				
	Orthopristis chrysoptera	2	0.2	4	0.2	2	0.1						
Sparidae	Stenotomus aculeatus	16924	123.2	3825	169.8	2074	169.5	168	18.2	271	10.4		
	Pagrus pagrus	2	0.2	39	0.1	5	8.6	25	3.3				
	Lagodon rhomboides	9	0.5	1	0.1			36	4.5				
	Calamus leucosteus			11	3.7	1	0.9	4	4.1				
Sciaenidae	Leiostomus xanthurus	239	28.1										
	Larimus fasciatus	4	0.5										
	Menticirrhus americanus	16	3.4										
	Micropagonias undulatus	38	4.5										
	Pareques umbrosus							62	3.6				
	Equetus sp.							3	0.6				
Mullidae	Mullus auratus	2	0.1	3	0.2	3	0.2	81	7.7	35	2.4		
	Mullidae	1	0.1										
Ephippidae	Chaetodipterus faber	12	5.4	67	4.1	26	1.9						
Labridae	Hemipteronotus novacula			1	0.1	4	0.7						
Dactyloscopidae	Dectyloscopus sp.	1	0.1										
Uranoscopidae	Kathetostoma albigutta			3	0.2	1	0.1	2	0.2	14	1.0		
Scorpaenidae	Scorpaena calcarata			2	1.0	68	2.9	13	0.6	1	0.1		
	Scorpaena agassizi							24	0.7				
	Scorpaena brasiliensis			3	1.0	3	0.3						
	Scorpaena sp.							2	0.2				
	Helicolenus dactylopterus									13	0.6		
	Pontius longispinus									3	0.2		
	Scorpaenidae							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.
Triglidae	Prionotus alatus							1	0.1	17	0.5		
	Prionotus carolinus	1	0.1	6	0.7	260	20.2	5	0.2				
	Prionotus evolans	1	0.5	1	0.5	1	0.1	6	0.9				
	Prionotus ophryas					4	0.6	7	0.3				
	Priontus roseus			1	0.1	4	0.3	6	0.3				
	Prionotus salmonicolor	3	0.7	3	0.9	10	1.6	12	1.5				
	Prionotus scitulus	6	0.4	7	0.4	2	0.2						
	Prionotus stearnsi					2	0.1	1	0.1	1	0.1		
	Prionotus sp.	1	0.1										
	Prionotus tribulus	1	0.1										
	Bellator egretta									3	0.1		
	Bellator militaris					11	0.3						
	Bellator sp.							1	0.1				
	Peristedion gracile							1	0.1	125	2.7		
	Peristedion miniatum											1	0.1
	Peristedion thompsoni									6	0.1	1	0.1
	Peristedion sp.											57	1.8
Bothidae	Ancylopsetta quadrocellata	11	2.3	1	0.5	3	0.3	1	0.1				
	Citharichthys arctifrons					1	0.1			200	1.4	272	2.1
	Citharichthys dinoceros									12	0.1		
	Citharichthys gymnorhinus							1	0.1				
	Citharichthys macrops	1	0.1			2	0.2						
	Citharichthys sp.	2	0.2										
	Bothus ocellatus			2	0.1	49	2.5	16	0.9				
	Bothus robinsi			6	0.6	23	1.4	2	0.2				
	Bothus sp.					2	0.1						
	Cyclopsetta fimbriata			2	0.5	6	0.5	3	0.5				
	Etropus microstomus	1	0.1					12	0.4				
	Etropus rimosus							1	0.1				
	Etropus sp.	1	0.1										
	Gastropsetta fontinalis							7	0.6	6	0.5		
	Hippoglossina oblonga									1	0.1	5	0.2
	Monolene sessilicauda											2	0.1
	Paralichthys albigutta	1	0.5	1	0.5								
	Paralichthys dentatus	3	1.4	2	0.5	3	0.6	1	0.5				
	Paralichthys lethostigma			1	0.5								
	Poecilopsetta sp.											1	0.1
	Scophthalmus aquosus	1	0.1										
	Syacium papillosum	3	0.7	32	3.0	109	18.3	191	15.1	7	0.5		
Soleidae	Gymnachirus melas	1	0.1										
Cynoglossidae	Symphurus diomedianus	1	0.1	1	0.1	6	0.2						
	Symphurus parvus					1	0.1						
	Symphurus sp.	2	0.1			1	0.1						
Balistidae	Aluterus heudeloti					3	0.7						
	Aluterus monoceros			1	3.2								
	Aluterus scriptus			1	0.1	1	0.1						
	Aluterus schoepfi	50	50.3	156	178.7	31	34.5						
	Balistis capriscus	2	0.5	8	3.1	9	2.2						
	Monocanthus ciliatus					4	0.3	1	0.1				
	Stephanolepis hispidus	5	0.5	113	7.0	300	13.9	90	3.8				
Ostraciidae	Lactophrys quadricornis	2	0.2	5	1.5								

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.
Tetraodontidae	Sphoeroides dorsalis					14	1.8	2	0.2				
	Sphoeroides maculatus			4	0.7	2	0.2						
	Sphoeroides pachygaster									2	0.2		
	Sphoeroides spengleri			4	0.6	1	0.1	1	0.1				
Diodontidae	Chilomycterus schoepfi	2	0.2	4	0.9	1	0.1						

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

Family	Species	Collection Numbers For Each Occurrence		
Carcharhinidae	Rhizoprionodon terraenovae	74089	74096	74098
		74108	74118	
Triakidae	Mustelus canis	74094	74095	74102
		74122		
Rhinobatidae	Rhinobatos lentiginosus	74051		
Rajidae	Raja eglanteria	74036	74037	74039
		74040	74043	74050
		74051	74055	74057
		74058	74060	74061
		74065	74069	74070
		74078	74094	74095
		74102	74103	74106
		74121	74122	74123
	Raja garmani	74081	74087	74089
		74133		
	Breviraja plutonia	74082		
	Breviraja sp.	74083		
Dasyatidae	Dasyatis centroura	74040	74045	74046
		74048	74053	74054
		74062	74063	74066
		74067	74071	74084
		74087	74088	74102
		74103	74121	
Myliobatidae	Myliobatis freminvillei	74098	74099	74105
		74122		
Muraenidae	Gymnothorax saxicola	74060	74062	74064
		74081	74116	
Muraenesocidae	Hoplunnis sp.	74075	74083	
Congridae	Ariosoma balearicum	74049	74060	74116
	Gnathophis sp.	74116		
	Conger sp.	74084		
	Congridae	74038		
Ophichthidae	Bascanichthys sp.	74063		
	Myrophis sp.	74088		
	Ophichthus gomesi	74087	74109	
	Ophichthus ocellatus	74088	74091	
	Ophichthus melanoporus	74060	74087	74091
Clupeidae	Etrumeus teres	74040	74050	74056
		74058	74066	74085
		74087	74088	74104
		74105	74106	74107
		74113	74118	74133
	Opisthonema oglinum	74066	74071	

Family	Species	Collection Numbers For Each Occurrence		
Clupeidae (cont.)	Sardinella anchovia	74046	74047	74050
		74064	74065	74066
		74067	74070	74092
		74104	74105	74108
Engraulidae	Anchoa cubana	74065	74066	74071
		74105		
	Anchoa hepsetus	74102	74104	74122
	Anchoa lyolepis	74065	74066	74122
	Anchoviella perfasciata	74107		
	Engraulis estauquae	74066		
Argentinidae	Argentina striata	74077		
	Glossanodon pygmaeus	74073	74081	74083
		74085	74086	74111
		74133	74138	
Synodontidae	Synodus foetens	74036	74037	74038
		74039	74041	74043
		74044	74045	74046
		74047	74048	74049
		74050	74051	74052
		74053	74054	74055
		74056	74057	74058
		74060	74061	74062
		74063	74064	74065
		74066	74067	74068
		74069	74070	74071
		74078	74087	74088
		74089	74090	74091
		74092	74093	74094
		74095	74096	74097
		74098	74099	74102
		74103	74104	74106
		74107	74108	74114
		74118	74120	74121
		74122	74123	
	Synodus intermedius	74088	74090	74091
		74092	74116	
	Synodus poeyi	74036	74041	74048
		74056	74074	74084
		74087	74088	74089
		74090	74091	74092
		74093	74096	74108
		74113	74114	74115
		74118	74133	74134
		74135		
	Trachinocephalus myops	74036	74041	74048
		74053	74063	74090
		74091	74092	74093
		74094	74098	74109
		74114	74118	74121
		74132	74137	
	Saurida brasiliensis	74036	74070	74113
		74115	74133	74134
		74135		
	Saurida caribbaea	74115		
	Saurida normani	74081	74089	74133
	Synodontidae	74123		

Family	Species	Collection Numbers For Each Occurrence		
Chlorophthalmidae	Chlorophthalmus agassizi	74073	74077	74082
		74085	74112	
Ariidae	Arius felis	74066	74071	
Batrachoididae	Porichthys porosissimus	74060	74076	74083
		74084	74089	74090
		74091	74093	74094
		74109	74111	74116
		74118	74138	
Lophiidae	Lophius americanus	74075		
Antennariidae	Antennariidae	74116		
Ogcocephalidae	Dibranchus atlanticus	74115		
	Halieutichthys aculeatus	74049	74069	74075
		74087	74089	74091
		74109	74116	74118
		74134	74138	
	Ogcocephalus nasutus	74075		
	Ogcocephalus parvus	74047	74061	74088
		74090	74091	74109
		74116	74137	
	Ogcocephalus radiatus	74056	74075	74076
		74083	74088	74091
Gadidae	Urophycis floridanus	74051	74073	74116
	Urophycis regius	74036	74041	74045
		74046	74051	74052
		74062	74065	74075
		74076	74077	74081
		74082	74083	74084
		74085	74086	74087
		74088	74089	74090
		74091	74092	74093
		74094	74095	74102
		74103	74109	74112
		74116	74118	74121
		74122	74123	74132
		74137	74138	
Merluccidae	Merluccius albidus	74073	74112	
	Merluccius sp.	74077	74093	
Moridae	Laemonema barbatulum	74082	74111	
Ophidiidae	Otophidium omostigmum	74047	74053	74060
		74061	74062	74091
		74093	74118	
	Ophidion holbrooki	74060	74061	74062
		74068	74069	74070
		74075	74084	74092
		74093	74094	74102
		74116	74121	74122
		74137		
	Ophidion beani	74036	74045	74052
		74061	74062	74068
		74069	74075	74084
		74093	74094	74095
		74102	74118	74121
		74132	74137	
	Ophidion selenops	74060	74062	74093
		74116	74122	

Family	Species	Collection Numbers For Each Occurrence		
Ophidiidae (cont.)	Ophidion grayi	74070	74075	74094
		74102	74103	74122
	Lepophidium cervinum	74075	74076	74081
		74083	74085	74089
	Rissola marginata	74051	74102	
Polymyxiidae	Polymixia lowei	74077	74082	74083
		74084	74086	
Zeidae	Zenopsis ocellata	74087	74089	74133
Caproidae	Antigonia capros	74089	74134	
	Antigonia combatia	74111		
Fistulariidae	Fistularia villosa	74054		
Centriscidae	Macrorhamphosus scolopax	74085		
Syngnathidae	Syngnathus springeri	74061		
Percichthyidae	Synagrops bella	74073	74075	74081
		74083	74085	74086
		74087	74111	74112
		74115	74133	74138
	Synagrops spinosa	74082		
Serranidae	Centropristis philadelphica	74070		
	Centropristis ocyurus	74045	74060	74061
		74062	74069	74070
		74074	74081	74084
		74088	74089	74091
		74092	74093	74094
		74116	74118	
	Centropristis striata	74046	74047	74093
		74094	74102	74103
		74123		
	Diplectrum formosum	74036	74037	74039
		74040	74044	74045
		74046	74047	74048
		74049	74050	74051
		74052	74053	74054
		74055	74056	74057
		74058	74060	74061
		74062	74063	74064
		74066	74067	74068
		74069	74070	74071
		74078	74092	74093
		74094	74095	74096
		74097	74098	74099
		74107	74108	74114
		74118	74120	74122
		74132		
	Serranus notospilus	74074	74084	74089
		74115	74116	
	Serranus phoebe	74084	74116	
	Serraniculus pumilio	74122		
	Anthias asperilinguis	74115		
Priacanthidae	Priacanthidae	74132		
Apogonidae	Apogon sp.	74133		

Family	Species	Collection Numbers For Each Occurrence
Pomatomidae	Pomatomus saltatrix	74051 74122
Rachycentridae	Rachycentron canadum	74048 74054 74070 74071
Echeneidae	Echeneis naucrates	74043 74045 74054 74062 74063 74066 74067 74070 74071
Carangidae	Caranx crysos	74065 74066 74071
	Chloroscombrus chrysurus	74065 74066 74071
	Decapterus punctatus	74036 74039 74041 74045 74046 74047 74048 74050 74051 74052 74060 74064 74065 74066 74067 74069 74070 74091 74092 74093 74094 74098 74099 74102 74103 74105 74108 74109 74121 74137
	Seriola dumerili	74063 74088
	Seriola rivoliana	74067
	Seriola zonata	74067
	Trachurus lathami	74039 74043 74067 74078 74087 74088 74099 74106 74107 74108 74122
	Vomer setapinnis	74071
Lutjanidae	Lutjanus campechanus	74093
	Rhomboplites aurorubens	74060 74062 74068 74074 74084 74088 74092 74093 74098 74108 74109
Haemulidae	Haemulon striatum	74116
	Haemulon aurolineatum	74060 74069 74092 74093 74102 74108 74116 74120 74137
	Orthopristis chrysoptera	74046 74047 74048 74093 74102
Sparidae	Calamus leucosteus	74037 74047 74084 74093 74108 74120
	Lagodon rhomboides	74046 74085 74088 74093
	Pagrus pagrus	74038 74088 74108 74116 74118 74122 74123
	Stenotomus aculeatus	74037 74038 74039 74040 74041 74043 74044 74045 74046 74047 74048 74060 74062 74068 74069 74087 74088 74092 74093 74094 74095 74098 74099 74102 74103 74105 74106 74107 74108 74109 74120 74121 74122 74123

Family	Species	Collection Numbers For Each Occurrence		
Sciaenidae	Leiostomus xanthurus	74071		
	Menticirrhus americanus	74051	74052	74065
		74071	74104	74122
	Micropogias undulatus	74071		
	Equetus umbrosus	74116		
	Equetus sp.	74084	74116	
	Larimus fasciatus	74071		
Mullidae	Mullus auratus	74047	74048	74066
		74069	74070	74087
		74088	74089	74109
	Mullidae	74065		
Ephippidae	Chaetodipterus faber	74046	74047	74048
		74049	74052	74071
Sphyraenidae	Sphyraena borealis	74047	74088	
Labridae	Hemipteronotus novacula	74054	74055	74056
		74120		
Uranoscopidae	Kathetostoma albigutta	74060	74061	74075
		74084	74087	74089
		74090	74093	
Scombridae	Scomber japonicus	74050	74066	74088
	Scomber scombrus	74040		
	Scombridae	74039		
Scorpaenidae	Helicolenus dactylopterus	74111	74112	
	Pontinus longispinus	74073	74111	
	Scorpaena agassizi	74084	74088	74116
	Scorpaena brasiliensis	74060	74061	74062
		74069	74093	
	Scorpaena calcarata	74041	74045	74047
		74048	74060	74061
		74062	74068	74069
		74070	74089	74091
		74092	74093	74116
		74118	74137	
	Scorpaena sp.	74074	74109	
	Scorpaenidae	74075		
Stromateidae	Peprilus triacanthus	74037	74038	74039
		74040	74041	74045
		74046	74050	74052
		74058	74066	74071
		74075	74076	74077
		74081	74082	74083
		74084	74085	74087
		74088	74089	74094
		74102	74103	74104
		74105	74106	74107
		74122		
Ariommidae	Ariomma bondi	74087	74112	
	Ariomma regulus	74061	74065	74073

Family	Species	Collection Numbers For Each Occurrence		
Triglidae	Bellator egretta	74075		
	Bellator militaris	74084	74109	74116
	Bellator sp.	74109		
	Prionotus alatus	74075	74081	74087
		74089	74090	74133
	Prionotus carolinus	74041	74048	74060
		74061	74062	74069
		74084	7488	74092
		74093	74095	74118
		74123		
	Prionotus evolans	74090	74096	74107
		74109	74123	
	Prionotus ophryas	74061	74078	74088
		74090	74091	
	Prionotus roseus	74062	74068	74069
		74074	74088	74091
		74092		
	Prionotus salmonicolor	74041	74058	74061
		74064	74066	74068
		74071	74078	74091
		74092	74109	
	Prionotus scitulus	74036	74045	74051
		74071	74092	74093
		74094	74095	74103
		74107	74123	
	Prionotus tribulus	74123		
	Prionotus stearnsi	74062	74075	74090
	Prionotus sp.	74102		
	Peristedion gracile	74083	74134	
	Peristedion miniatum	74073		
	Peristedion thompsoni	74076	74077	
	Peristedion sp.	74085		
Dactylopteridae	Dactyloscopus sp.	74046		
Bothidae	Ancylopsetta quadrocellata	74049	74054	74058
		74060	74065	74066
		74090	74092	74094
		74102	74103	74122
		74123		
	Bothus ocellatus	74041	74048	74049
		74054	74061	74062
		74069	74070	74091
		74114	74118	74137
	Bothus robinsi	74036	74048	74056
		74060	74064	74078
		74091	74092	74116
		74118		
	Bothus sp.	74062		
	Citharichthys arctifrons	74061	74073	74075
		74076	74077	74081
		74082	74083	74085
		74115	74138	
	Citharichthys dinoceros	74089		

Family	Species	Collection Numbers For Each Occurrence		
Bothidae (cont.)	Citharichthys gymnorhinus	74074		
	Citharichthys macrops	74053	74078	74094
	Citharichthys sp.	74102	74121	
	Cyclopsetta fimbriata	74041	74060	74061
		74062	74090	74092
		74118		
	Etropus microstomus	74091	74109	74113
		74116	74123	
	Etropus rimosus	74074		
	Etropus sp.	74123		
	Gastropsetta frontalis	74089	74090	74091
	Monolene sessilicauda	74073		
	Paralichthys albigutta	74046	47093	
	Paralichthys dentatus	74036	74051	74084
		74092	74093	74121
		74122		
	Paralichthys lethostigma	74038		
	Hippoglossina oblonga	74073	74076	74082
	Poecilopsetta sp.	74086		
	Scophthalmus aquosus	74122		
	Syacium papillosum	74036	74041	74047
		74048	74055	74056
		74058	74060	74061
		74062	74067	74068
		74069	74070	74071
		74074	74078	74084
		74088	74089	74090
		74091	74092	74093
		74096	74109	74114
		74116	74118	74137
Soleidae	Gymnachirus melas	74047	74090	
Cynoglossidae	Symphurus diomedianus	74060	74109	74116
		74137		
	Symphurus parvus	74084		
	Symphurus sp.	74090	74093	
Balistidae	Aluterus heudeloti	74041	74048	74096
	Aluterus monoceros	74070		
	Aluterus schoepfi	74036	74037	74038
		74039	74040	74043
		74044	74045	74046
		74047	74048	74050
		74051	74052	74053
		74057	74058	74060
		74061	74062	74063
		74064	74065	74067
		74068	74070	74071
		74093	74094	74095
		74096	74097	74103
		74106	74107	74120
		74121	74122	
	Aluterus scriptus	74062	74093	

Family	Species	Collection Numbers For Each Occurrence		
Balistidae (cont.)	Balistes capriscus	74036	74041	74046
		74047	74053	74056
		74061	74063	74064
		74067	74095	
	Monacanthus ciliatus	74114	74116	74118
		74137		
	Stephanolepis hispidus	74036	74037	74041
		74045	74046	74047
		74048	74049	74050
		74053	74055	74056
		74060	74061	74062
		74063	74064	74065
		74067	74068	74069
		74070	74078	74088
		74089	74090	74091
		74092	74093	74094
		74098	74111	74118
		74120	74121	74135
Ostraciidae	Lactophrys quadricornis	74037	74045	74046
		74058	74060	
Tetraodontidae	Sphoeroides dorsalis	74041	74061	74069
		74078	74090	74091
		74092	74114	74118
	Sphoeroides maculatus	74036	74038	74048
		74093	74095	
	Sphoeroides pachygaster	74081	74115	
	Sphoeroides spengleri	74070	74097	74116
		74118		
Diodontidae	Chilomycterus schoepfi	74037	74046	74058
		74092		

APPENDIX IV. Diversity values by depth zones for successful sand bottom trawls in the South Atlantic Bight during Spring, 1974.

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness
9-18	74039	16	5	13837	0.008	0.003	0.419
	74043	15	4	16	1.749	0.874	1.082
	74044	18	4	57	1.531	0.765	0.742
	74046	18	16	1714	0.248	0.062	2.014
	74050	18	5	22	1.610	0.693	1.294
	74051	13	11	56	2.431	0.702	2.484
	74052	18	7	32	2.246	0.800	1.731
	74058	16	9	49	1.866	0.588	2.055
	74065	13	8	18	2.362	0.787	2.421
	74066	18	7	31	2.246	0.800	1.747
	74071	16	14	308	1.297	0.340	2.268
	74094	16	18	151	2.814	0.674	3.388
	74102	13	16	147	1.772	0.443	3.005
	74103	13	10	143	1.577	0.475	1.813
	74104	10	2	3	0.918	0.918	0.910
	74105	13	2	78	0.391	0.391	0.229
	74106	13	4	37	1.390	0.695	0.830
	74121	15	12	1273	0.210	0.058	1.538
	74122	9	17	122	2.354	0.576	3.330
	74123	11	14	140	2.213	0.581	2.630
19-27	74037	20	9	1110	0.353	0.111	1.140
	74038	20	6	56	1.390	0.537	1.242
	74040	27	5	93	0.405	0.174	0.882
	74045	20	12	21	3.268	0.911	3.613
	74047	26	16	279	1.680	0.420	2.663
	74057	22	4	19	1.578	0.789	1.018
	74060	27	26	238	3.482	0.740	4.568
	74063	27	8	43	2.314	0.771	1.861
	74064	24	8	42	2.261	0.753	1.872
	74067	20	7	121	1.229	0.437	1.251
	74068	22	12	59	2.906	0.810	2.697
	74070	22	17	87	3.216	0.787	3.582
	74093	26	33	2281	0.775	0.153	4.138
	74095	22	12	49	2.839	0.792	2.826
	74097	27	4	19	1.192	0.596	1.018
	74098	26	8	187	1.222	0.407	1.338
	74099	27	4	215	0.669	0.334	0.558
	74107	22	6	19	1.973	0.763	1.698
	74120	26	8	79	1.429	0.476	1.602
28-55	74036	38	16	40	3.404	0.851	4.066
	74041	40	15	107	2.672	0.684	2.996
	74048	37	19	77	3.092	0.728	4.143
	74049	46	8	15	2.463	0.821	2.584
	74053	31	9	56	2.570	0.810	1.987
	74054	38	7	10	2.646	0.942	2.605
	74055	36	6	13	2.411	0.932	1.949
	74056	33	9	85	1.316	0.415	1.800
	74061	31	23	208	3.113	0.688	4.121
	74062	31	24	202	2.695	0.587	4.332
	74069	37	18	112	3.271	0.784	3.602
	74078	38	10	39	2.790	0.839	2.456
	74092	40	24	2122	0.488	0.106	3.002
	74096	29	8	31	1.720	0.573	2.038
	74108	29	9	81	2.235	0.705	1.820
	74114	29	8	20	2.181	0.727	2.336
	74118	37	22	294	2.290	0.513	3.694
	74132	33	5	6	2.251	0.969	2.232
	74137	42	11	51	2.468	0.713	2.543

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness
56-110	74074	71	9	39	2.159	0.681	2.183
	74084	73	21	145	3.331	0.758	4.018
	74088	80	22	923	3.306	0.741	3.075
	74090	82	20	207	2.579	0.596	3.562
	74091	60	24	163	3.554	0.775	4.515
	74109	91	17	113	2.992	0.732	3.384
	74113	93	3	31	0.409	0.258	0.582
	74116	66	29	201	3.417	0.703	5.279
	74134	101	5	80	0.457	0.197	0.912
111-183	74075	119	17	135	2.939	0.719	3.261
	74076	126	7	131	1.282	0.456	1.230
	74081	134	11	123	2.503	0.723	2.078
	74083	144	11	464	2.034	0.588	1.628
	74087	124	14	452	1.712	0.449	2.126
	74089	124	21	173	3.470	0.790	3.881
	74115	168	9	34	2.263	0.714	2.268
	74133	132	9	34	2.136	0.674	2.268
	74138	161	6	27	2.022	0.782	1.517
184-366	74073	219	10	260	0.980	0.295	1.618
	74077	223	7	21	2.106	0.750	1.970
	74082	214	9	158	1.654	0.521	1.580
	74085	201	9	115	2.310	0.728	1.686
	74086	232	5	37	1.410	0.607	1.107
	74111	232	7	31	2.049	0.730	1.747
	74112	287	5	32	1.614	0.695	1.154
	74135	252	2	10	0.469	0.469	0.434

APPENDIX V. Groundfish weights for otter trawls in the South Atlantic Bight during Spring 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	74039	16	29.631	0.400	0.454	0	28.777
	74043	15	6.297	0.200	2.268	0.100	3.729
	74044	18	9.999	0	0	1.380	8.619
	74046	18	195.521	1.007	99.792	2.294	92.328
	74050	18	67.933	58.461	0.907	0.200	8.365
	74051	13	7.305	0.908	1.361	0.907	4.129
	74052	18	19.552	0.200	0	2.722	16.630
	74058	16	5.690	0.200	0.454	0	5.036
	74065	13	10.272	5.036	1.814	0.554	2.868
	74066	18	216.307	93.730	117.940	1.361	3.276
	74071	16	116.369	10.733	63.504	0	42.132
	74094	16	19.003	0.200	10.433	1.120	7.250
	74102	13	67.972	0.300	63.051	0.454	4.167
	74103	13	115.811	0.200	110.229	0.907	4.475
	74104	10	1.861	0.754	0	0.907	0.200
	74105	13	417.971	16.987	400.530	0	0.454
	74106	13	5.389	1.560	0.907	0.654	2.268
	74121	15	130.490	0.100	119.300	0.454	10.636
	74122	9	23.225	4.434	12.701	0.100	5.990
	74123	11	12.894	0	4.536	0.100	8.258
19-27	74037	20	121.058	0.100	1.814	0	119.144
	74038	20	1.508	0.100	0	0.100	1.308
	74040	27	105.024	0.300	102.514	0.200	2.010
	74045	20	104.875	0.300	99.792	0.907	3.876
	74047	26	17.635	0.300	0	0.460	16.875
	74057	22	4.988	0	0.907	0	4.081
	74060	27	26.603	0.100	1.814	0	24.689
	74063	27	216.865	2.822	199.580	0.100	14.363
	74064	24	10.679	0.200	0	0.100	10.379
	74067	20	282.641	2.568	158.760	0.907	120.406
	74068	22	13.501	0	0	0.907	12.594
	74070	22	43.819	4.182	1.361	3.201	35.075
	74093	26	40.459	0.100	0	0.907	39.452
	74095	22	20.064	0	6.904	1.420	11.740
	74097	27	5.776	0	0	2.500	3.276
	74098	26	37.924	0.100	19.051	0.884	17.889
	74099	27	40.484	0.200	18.498	0.920	20.866
	74107	22	5.385	0.760	0	1.250	3.375
	74120	26	9.286	0	0	0.920	8.366
28-55	74036	38	5.750	0.100	0.907	0.920	3.823
	74041	40	9.373	0.200	0	0.920	8.253
	74048	37	77.959	0.100	68.040	0.454	9.365
	74049	46	1.594	0	0	0.440	1.154
	74053	31	122.774	0	97.978	0.454	24.342
	74054	38	248.609	10.079	227.710	0.440	10.380
	74055	38	3.690	0	0.454	1.320	1.916
	74056	33	3.521	0.100	0	0.100	3.321
	74061	31	21.514	0.454	0.100	0	20.960
	74062	31	139.486	2.722	117.940	0.440	18.384
	74069	37	7.498	0.100	0.100	0.300	6.998
	74078	38	7.051	0.100	0.454	1.914	4.583
	74092	40	188.646	10.079	0	1.014	177.553
	74096	29	12.381	0	3.629	2.200	6.552
	74108	29	35.352	11.540	5.897	1.840	16.075
	74114	29	2.534	0	0	1.380	1.154
	74118	37	30.431	0.100	6.350	0.654	23.327
	74132	33	1.520	0	0	1.020	0.500
	74137	42	3.621	0.100	0	0	3.521

Depth Zone (m)	Collection Number	Depth (m)	Total Weight (kg)	Pelagic Weight (kg)	Elasmobranch Weight (kg)	Squid Weight (kg)	Demersal Bony Fish Weight (kg)
56-110	74074	71	1.100	0	0	0.200	0.900
	74084	73	625.659	0.454	616.900	0.454	7.851
	74088	80	218.386	19.051	104.340	0.907	94.088
	74090	82	11.281	0	0	0	11.281
	74091	60	10.419	0.100	0	0.454	9.865
	74109	91	8.757	0.100	0	0.200	8.457
	74113	93	0.400	0.100	0	0	0.300
	74116	66	12.381	0	0	0.200	12.181
	74134	100	1.407	0	0	0.100	1.307
111-183	74075	119	6.944	4.082	0	0.100	2.762
	74076	126	10.017	7.249	0	0	2.768
	74081	134	10.322	1.361	0.100	7.507	1.354
	74083	144	32.354	21.773	0.454	0	10.127
	74087	124	191.871	53.625	118.040	4.083	16.123
	74089	124	13.042	0.100	7.358	0	5.584
	74115	168	1.000	0	0	0.100	0.900
	74133	132	2.814	0.100	0.100	1.814	0.800
	74138	161	0.600	0	0	0	0.600
184-366	74073	219	3.722	0.100	0	0.554	3.068
	74077	223	2.415	1.361	0	0	1.054
	74082	214	6.697	0.100	0.100	0.100	6.597
	74085	201	14.794	9.072	0	2.400	3.322
	74086	232	1.761	0	0	0	1.761
	74111	232	1.154	0	0	0	1.154
	74112	287	3.221	0.100	0	0.554	2.567
	74135	252	0.300	0	0	0	0.300