

U. S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Center  
P. O. Drawer 1207  
Pascagoula, Miss. 39568-1207

OREGON II Cruise 90-05 (189)  
06/11-07/14/90

INTRODUCTION

The NOAA Ship OREGON II departed Pascagoula, Miss. on June 13, 1990 to conduct a 32-day Southeast Area Monitoring and Assessment Program survey (SEAMAP) in the northern and U.S. western Gulf of Mexico. This survey also included additional nearshore sampling by the states of Florida, Alabama, Mississippi, Louisiana and Texas. Major objectives were to monitor size and distribution of penaeid shrimp and provide information on shrimp and groundfish stocks across the northern Gulf of Mexico in 5 to 60 fathoms (fm).

The OREGON II sailed on June 13, instead of June 11th, because both outriggers required attachment modifications to make them safe for trawling. We were unable to complete the east delta stations and missed one day of the Airborne Ocean Color Imagery (AOCI) Remote Sensing Field Activities due to these delays.

The NOAA Ship OREGON II returned to Pascagoula, Miss. on July 14, 1990, terminating the cruise.

OBJECTIVES

- 1) Determine size distribution of penaeid shrimp by depth across the U. S. northern and western Gulf of Mexico.
- 2) Obtain samples of brown, pink and white shrimp to determine length-weight relationships.
- 3) Collect finfish catch data.
- 4) Collect hydrographic and environmental data at each station.
- 5) Collect ichthyoplankton samples throughout the survey area.
- 6) Compare catch rates between the OREGON II and the R/V PELICAN.

- 7) Survey and sample the Corps of Engineers berm site containing dredge spoil material from the Mobile ship channel.
- 8) Conduct ground truthing for AOCI overflight.

#### SURVEY METHODOLOGY

The OREGON II ran a four (4) hour north-south transect (ground truthing for AOCI overflight) across the Mississippi River plume. The transect begin with a full channel light array CTD cast, followed by continuous flow fluorometer and thermosalinograph monitoring of surface fluorescence, temperature and salinity throughout the transect. Intermediate CTD casts were taken along the transect at preselected times.

Ten sample sites were randomly selected for day and night replicate sampling around the Corps of Engineers berm site off Mobile Bay, Ala. Ten-minute tows were made at each site using a 40-ft shrimp trawl and a 65-ft fish trawl.

The SEAMAP shrimp assessment survey samples were taken with a 40-ft shrimp trawl with mud rollers and 8' x 40" wooden chain doors. All sample sites were randomly selected from Mobile Bay, Ala. to the Texas-Mexico border in 5 to 60 fm (Fig. 1). Sample sites encompassed 1 to 3 fm depth strata between 5 and 25 fm and 5 fm depth strata between 30 and 60 fm. Tows were perpendicular to depth contours with tow duration from 10 to 60 minutes. Several stations required multiple tows to sample the entire depth strata.

Total weight of each catch was recorded, after which all Penaeus shrimp and other predefined invertebrates and finfish were separated. Weight and number of each species were then recorded from each sample. A random selection of 200 shrimp of each species (when available) was removed for data on sex, maturation, and length frequency.

Ten stations were sampled simultaneously by the OREGON II and the R/V PELICAN from Louisiana, to compare catch rates between the two vessels. Trawl and door sizes along with fishing time and speed were identical for both vessels. Catches from both vessels were worked up the same as any other SEAMAP station.

Four stations off the coast of Louisiana were dropped because of bad bottom.

#### HYDROGRAPHIC AND ENVIRONMENTAL DATA

Selected hydrographic data were taken before the start of each station. A conductivity, temperature and depth (CTD) unit was used to collect salinity, temperature, depth, dissolved oxygen and turbidity data. Daily water samples were saved to validate the CTD salinity readings. XBT traces were used for validation of

temperature and a Hache Kit for validation of dissolved oxygen. Regular dissolved oxygen samples were run on a YSI meter. Surface chlorophyll samples (3 replicates) were taken at each station and filtered with a GF/C filter. Chlorophyll samples were fixed with magnesium carbonate, frozen in petri dishes for analysis at the Pascagoula lab. All samples were taken from the surface except those stations less than 20 fm off Louisiana, which also included bottom samples.

A large hypoxic area (app. 250 nautical miles long and 60 nautical miles wide) was found off the Louisiana coast in 5 to 20 fm. Bottom dissolve oxygen in this area ranged from a low of .7 ppm to a high of 3.3 ppm, little or no catch occurred on the twenty-one stations sampled in the area.

#### ICHTHYOPLANKTON

Bongo and neuston samples were taken at preselected stations integrated into the cruise track. Samples were initially held in buffered formalin for 24 hours. Formalin was then removed and samples were preserved in 95% ethanol.

#### REAL TIME DATA

A data communication terminal aboard the NOAA Ship OREGON II was used to transmit environmental data and catch rates to the Mississippi laboratories. These transmissions provided information for a weekly report on shrimp and finfish catch rates and location. This information was passed on to shrimpers and other personnel in the fishing industry.

#### OBSERVATIONS AND RESULTS

A total of twenty tows were completed around the berm site off Mobile Bay, Ala.; results were not available for incorporation in this cruise report.

Two hundred and thirty tows (Fig. 1) were made on the SEAMAP portion of the cruise with dominant faunal components listed in Table 1 for east delta, Table 2 for west delta, Table 3 for Texas and Table 4 for an overall view of the catch rates. In the east delta swimming crabs, Portunus gibbesii were dominant by number and croaker, Micropogonias undulatus by weight. In the west delta off Louisiana gulf butterfish, Peprilus burti, were dominant by weight and longspine porgy, Stenotomus caprinus, by number (Table 2). In the area off the Texas coast croaker, Micropogonias undulatus, were dominant by weight and brown shrimp, Penaeus aztecus, were caught at more stations and in higher numbers than any other organisms (Table 3). In all areas combined croaker were dominant by both weight and number (Table 4).

Mean finfish catch rates in the east delta were higher during the day (31.98 kgs/hr) than at night (21.13 kgs/hr) with the highest rates occurring between 40-49 fm. Finfish catch rates off west Louisiana were similar to east delta catch rates with 31.27 kgs/hr for day and 26.86 kgs/hr for night with the highest catch rates taken in 50-60 fm.

Areas off the Texas coast had a daytime mean total catch rate for finfish of 35.21 kgs/hr and for night time 28.10 kgs/hr with the highest catch rate of finfish taken in 5-9 fm.

Over all mean catch rate of finfish was 33.13 kgs/hr during the day and 26.65 kgs/hr at night with the highest catch rate for all areas taken in 5-9 fm.

Mean day/night catch rates of red snapper adjusted to kgs/hr are seen in Table 5 for east delta, Table 6 for west delta, Table 7 for Texas and Table 8 for an over view of the entire area. East delta mean red snapper catch rates were higher at night (.20 kgs/hr in 10-19 fm) than during the day (.15 kgs/hr in 30-39 fm). Night time mean red snapper catch rates for the west delta off Louisiana were five times higher (6.73 kgs/hr in 10-19 fm) than the day (1.21 kgs/hr in 10-19 fm). Areas off the Texas coast had a slightly higher daytime mean red snapper catch rate (2.66 kgs/hr in 40-49 fm) than night (2.07 kgs/hr in 20-29 fm). When all areas were combined the highest mean catch rate of red snapper was 3.60 kgs/hr in 10-19 fm at night. The highest day time rate was 1.06 kgs/hr in 40-49 fm.

Length frequency results for six species of finfish of recreational or commercial interest are shown on Figures 2 to 7. Croaker and spot were measured in total length; butterflyfish, mackerels and red snapper were measured in fork length.

Shrimp catches were best off Texas (Fig. 8), with brown shrimp, Penaeus aztecus being most dominant by number (Table 3). Brown shrimp was second by number and fourth by weight in all areas combined (Table 4). Pink shrimp, Penaeus duorarum and white shrimp Penaeus setiferus were less abundant throughout the survey.

Length frequency of shrimp by species is shown in Figures 9-11. All shrimp were measured from the tip of the rostrum to the tip of the tail. Broken shrimp were discarded.

One loggerhead sea turtle Caretta caretta was caught, tagged, measured, and returned to sea alive. Length, weight and tag number were reported to the NMFS Miami Laboratory.

### COMPARATIVE TRAWLING

Results of comparative tows between the NOAA Ship OREGON II and the R/V PELICAN were not available for incorporation in this cruise report. Results may have only limited use due to the large hypoxic zone in the test area. Both vessels made only small catches.

### ICHTHYOPLANKTON

Nineteen bongo and neuston samples were obtained during the cruise (Fig. 12). Right bongo samples were sent to the NMFS, Miami Laboratory for processing, with the left bongo and neuston samples sent to the Gulf Coast Research Laboratory for housing.

### CRUISE PARTICIPANTS

6/13-15/90

NAME	TITLE	ORGANIZATION
Nathaniel Sanders, Jr.	Field Party Chief	NMFS Pascagoula, Miss.
Gladys Reese	Watch Leader	NMFS Pascagoula, Miss.
Warren Stuntz	Watch Leader	NMFS Pascagoula, Miss.
Ardetha Hollis Hayes	Student Trainee	NMFS Pascagoula, Miss.
Connie Webb	Student Aide	NMFS Pascagoula, Miss.
Alonzo Hamilton, Jr.	Fishery Bio.	NMFS Pascagoula, Miss.
Dan Gregg	Biological Tech.	NMFS Pascagoula, Miss.
John Wells	Cooperator	New Orleans, La.

6/16-29/90

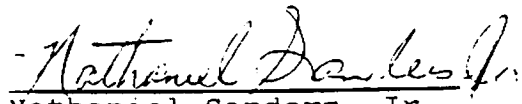
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Gilmore Pellegrin, Jr.	Watch Leader	NMFS Pascagoula, Miss.
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Carrie Alley	Cooperator	Perryville, Ark.
John Wells	Cooperator	New Orleans, La.

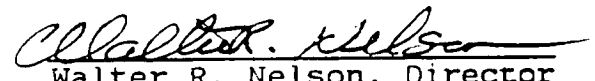
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NAME	TITLE	ORGANIZATION
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Approved By:

  
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Field Party Chief

  
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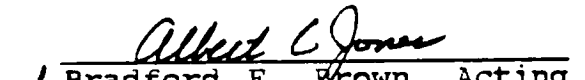
  
Bradford E. Brown, Acting  
Southeast Science & Research  
Director

Table 1. East delta 40-ft shrimp net catches adjusted to 60-min tows. The twenty most numerous species caught plus red snapper are listed in descending order. Total number of stations 28.

Genus	Species	Number	Weight kgs	Frequency of occurrence
<u>Portunus</u>	<u>gibbesii</u>	10,414	68.87	10
<u>Loligo</u>	<u>pealei</u>	6,799	88.41	19
<u>Trachypenaeus</u>	<u>similis</u>	6,700	21.50	13
<u>Loligo</u>	sp.	5,829	46.55	6
<u>Serranus</u>	<u>atrobranchus</u>	5,702	69.36	13
<u>Stenotomous</u>	<u>caprinus</u>	5,237	85.36	17
<u>Micropogonias</u>	<u>undulatus</u>	4,185	244.39	6
<u>Steindachneria</u>	<u>argentea</u>	3,985	25.19	7
<u>Etrumeus</u>	<u>teres</u>	3,544	44.39	5
<u>Callinectes</u>	<u>similis</u>	3,228	39.04	14
<u>Saurida</u>	<u>brasiliensis</u>	3,152	22.20	14
<u>Parapenaeus</u>	<u>politus</u>	3,119	6.77	4
<u>Peprilus</u>	<u>burti</u>	2,966	61.60	13
<u>Loliguncula</u>	<u>brevis</u>	2,958	17.14	10
<u>Diplectrum</u>	<u>bivittatum</u>	2,920	42.05	16
<u>Sicyonia</u>	<u>dorsalis</u>	2,831	4.19	9
<u>Squilla</u>	<u>empusa</u>	2,796	26.34	12
<u>Portunus</u>	<u>spinicarpus</u>	2,588	17.29	15
<u>Trachypenaeus</u>	<u>constrictus</u>	2,448	9.13	4
<u>Trachypenaeus</u>	sp.	2,184	7.80	1
<u>Lutjanus</u>	<u>campechanus</u>	25	1.68	5
Total		111,540	2,337.33	28

Table 2. West delta 40-ft shrimp net catches adjusted to 60-min tows. The twenty most numerous species caught plus red snapper are listed in descending order. Total number of stations 92.

Genus	Species	Number	Weight kgs	Frequency of occurrence
	<u>Stenotomous caprinus</u>	30,068	485.55	59
	<u>Micropogonias undulatus</u>	25,307	704.89	33
	<u>Trachypenaeus similis</u>	18,464	76.80	23
	<u>Peprilus burti</u>	15,279	815.08	54
	<u>Engraulis eurystole</u>	13,153	27.13	9
	<u>Cynoscion nothus</u>	10,414	511.15	20
	<u>Loligo pealei</u>	8,987	144.87	39
	<u>Prionotus rubio</u>	8,374	45.69	29
	<u>Squilla empusa</u>	7,788	67.43	42
	<u>Trichiurus lepturus</u>	6,077	341.82	29
	<u>Centropristis philadelphica</u>	5,468	120.98	42
	<u>Penaeus aztecus</u>	5,132	129.57	67
	<u>Sicyonia brevirostris</u>	4,898	59.34	31
	<u>Etrumeus teres</u>	4,239	43.61	7
	<u>Chloroscombrus chrysurus</u>	3,913	198.03	28
	<u>Serranus atrobranchus</u>	3,784	30.55	22
	<u>Diplectrum bivittatum</u>	3,530	83.93	39
	<u>Steindachneria argentea</u>	3,413	12.81	2
	<u>Callinectes similis</u>	3,332	47.62	47
	<u>Trachurus lathami</u>	2,450	61.74	28
	<u>Lutjanus campechanus</u>	1,702	191.46	39
Total		234,052	5,820.76	92



Table 3. Texas 40-ft shrimp net catches adjusted to 60-min tows. The twenty most numerous species caught plus red snapper are listed in descending order. Total number of stations 93.

Genus	Species	Number	Weight kgs	Frequency of occurrence
<u>Penaeus</u>	<u>aztecus</u>	60,903	807.99	83
<u>Micropogonias</u>	<u>undulatus</u>	39,225	1,124.83	26
<u>Upeneus</u>	<u>parvus</u>	34,212	341.88	71
<u>Leiostomus</u>	<u>xanthurus</u>	30,082	905.79	26
<u>Peprilus</u>	<u>burti</u>	28,169	799.59	59
<u>Trahanus</u>	<u>lathami</u>	21,280	257.83	50
<u>Chloroscombrus</u>	<u>chrysurus</u>	20,566	505.28	34
<u>Trachypenaeus</u>	sp.	20,148	59.54	31
<u>Callinectes</u>	<u>simili</u>	15,471	174.15	68
<u>Loligo</u>	<u>pealei</u>	10,702	217.64	42
<u>Cynoscion</u>	sp.	9,908	75.41	22
<u>Stenotomus</u>	<u>caprinus</u>	9,072	252.95	62
<u>Anchoviella</u>	sp.	8,377	30.11	9
<u>Loligo</u>	sp.	8,130	125.69	29
<u>Anchoa</u>	<u>hepsetus</u>	7,321	107.62	25
<u>Sardinella</u>	<u>aurita</u>	7,082	55.39	18
<u>Trichiurus</u>	<u>lepturus</u>	4,831	120.66	32
<u>Cynoscion</u>	<u>nothus</u>	4,725	210.54	18
<u>Etrumeus</u>	<u>teres</u>	4,718	22.23	13
<u>Polydactylus</u>	<u>octonemus</u>	4,614	100.95	17
<u>Lutjanus</u>	<u>campechanus</u>	950	70.86	46
Total		417,110	7,922.96	93

Table 4. All areas combined for 40-ft shrimp net catches adjusted to 60-min tows. The twenty most numerous species caught plus red snapper are listed in descending order. Total number of stations 213.

Genus	Species	Number	Weight kgs	Frequency of occurrence
	<u>Micropogonias undulatus</u>	68,717	2,074.11	65
	<u>Penaeus aztecus</u>	67,363	962.07	169
	<u>Peprilus burti</u>	46,414	1,676.26	126
	<u>Stenotomus caprinus</u>	44,377	823.86	138
	<u>Upeneus parvus</u>	34,896	357.19	101
	<u>Leiostomus xanthurus</u>	33,107	1,198.58	46
	<u>Loligo pealei</u>	26,488	450.92	100
	<u>Trachypenaeus similis</u>	25,164	98.29	36
	<u>Chloroscombrus chrysurus</u>	24,624	710.52	66
	<u>Trachypenaeus sp.</u>	24,177	75.28	40
	<u>Trachurus lathamii</u>	23,849	323.56	81
	<u>Callinectes similis</u>	22,031	260.81	129
	<u>Cynoscion nothus</u>	15,139	721.69	38
	<u>Loligo sp.</u>	14,624	178.41	46
	<u>Prionotus rubio</u>	13,879	104.70	73
	<u>Engraulis eurystole</u>	13,376	28.28	13
	<u>Etrumeus teres</u>	12,501	110.24	25
	<u>Squilla empusa</u>	12,442	120.24	79
	<u>Portunus gibbesii</u>	11,844	80.36	57
	<u>Trichiurus lepturus</u>	11,251	469.99	66
	<u>Lutjanus campechanus</u>	2,677	263.99	90
Total		762,702	16,081.05	213

## CATCH RATES ADJUSTED TO 1 HOUR/60 MIN TOW

AREA: EAST DELTA  
AND GEAR TYPE: SHRIMP TRAWL

DEPTH	DIURNAL PERIOD					
	DAY		NIGHT		DAY/NIGHT COMBINED	
	RED SNAPPER		RED SNAPPER		RED SNAPPER	
	N	MEAN	N	MEAN	N	MEAN
5-9	2.00	0.00	4.00	0.00	6.00	0.00
10-19	5.00	0.05	3.00	0.00	8.00	0.11
20-29	1.00	0.00	3.00	0.00	4.00	0.00
30-39	3.00	0.15	2.00	0.00	5.00	0.07
40-49	2.00	0.00	1.00	0.00	3.00	0.00
50-60	1.00	0.00	1.00	0.00	2.00	0.00
ALL DEPTHS	14.00	0.05	14.00	0.07	28.00	0.06

Table 5. East delta shrimp trawl catch rates for red snapper, adjusted to kg per 60-min tows.

CATCH RATES, ADJUSTED TO KILOGRAMS PER 60-MIN

AREA: WEST DELTA  
 AND GEAR TYPE: SHRIMP TRAWL

	DIURNAL PERIOD					
	DAY		NIGHT		DAY/NIGHT COMBINED	
	RED SNAPPER		RED SNAPPER		RED SNAPPER	
	N	MEAN	N	MEAN	N	MEAN
DEPTH						
5-9	9.00	0.00	7.00	0.00	16.00	0.00
10-19	20.00	1.21	23.00	2.73	43.00	4.16
20-29	6.00	0.41	7.00	1.45	13.00	0.97
30-39	5.00	0.00	5.00	0.00	10.00	0.00
40-49	4.00	0.00	3.00	0.00	7.00	0.00
50-59	1.00	0.00	2.00	0.00	3.00	0.00
ALL DEPTHS	45.00	0.52	47.00	2.51	92.00	2.00

Table 6. West delta shrimp trawl catch rates for red snapper, adjusted to kg per 60-min tows.

CATCH RATES ADJUSTED TO 60-MIN TOWS PER HOUR

AREA: TEXAS  
AND GEAR TYPE: SHRIMP TRAWL

DEPTH	DIURNAL PERIOD					
	DAY		NIGHT		DAY/NIGHT COMBINED	
	RED SNAPPER		RED SNAPPER		RED SNAPPER	
	N	MEAN	N	MEAN	N	MEAN
5-9	10.00	0.55	9.00	0.50	19.00	0.59
10-19	19.00	0.83	20.00	0.51	39.00	0.67
20-29	8.00	0.62	10.00	2.07	18.00	1.43
30-39	4.00	0.23	4.00	0.04	8.00	0.13
40-49	4.00	2.53	3.00	0.00	7.00	1.52
50-59	2.00	0.00	.	.	2.00	0.00
ALL DEPTHS	47.00	0.69	45.00	0.72	92.00	0.76

Table 7. Texas shrimp trawl catch rates for red snapper, adjusted to kg per 60-min tows.

CATCH RATES ADJUSTED TO KILOGRAMS PER 60-MIN

ALL AREAS  
AND GEAR TYPE: SHRIMP TRAWL

DEPTH	DIURNAL PERIOD				DAY/NIGHT COMBINED	
	DAY		NIGHT		RED SNAPPER	
	RED SNAPPER		RED SNAPPER		RED SNAPPER	
	N	MEAN	N	MEAN	N	MEAN
5-9	21.00	0.25	20.00	0.12	41.00	0.19
10-19	44.00	0.91	45.00	3.60	90.00	2.20
20-29	15.00	0.49	20.00	1.55	35.00	1.09
30-39	12.00	0.12	11.00	0.01	23.00	0.07
40-49	10.00	1.06	7.00	0.00	17.00	0.63
50-60	4.00	0.00	3.00	0.00	7.00	0.00
ALL DEPTHS	105.00	0.51	107.00	1.05	213.00	1.24

Table 8. All areas shrimp trawl catch rates for red snapper, adjusted to kg per 60-min tows.

OREGON II CRUISE 189  
ALL STATIONS

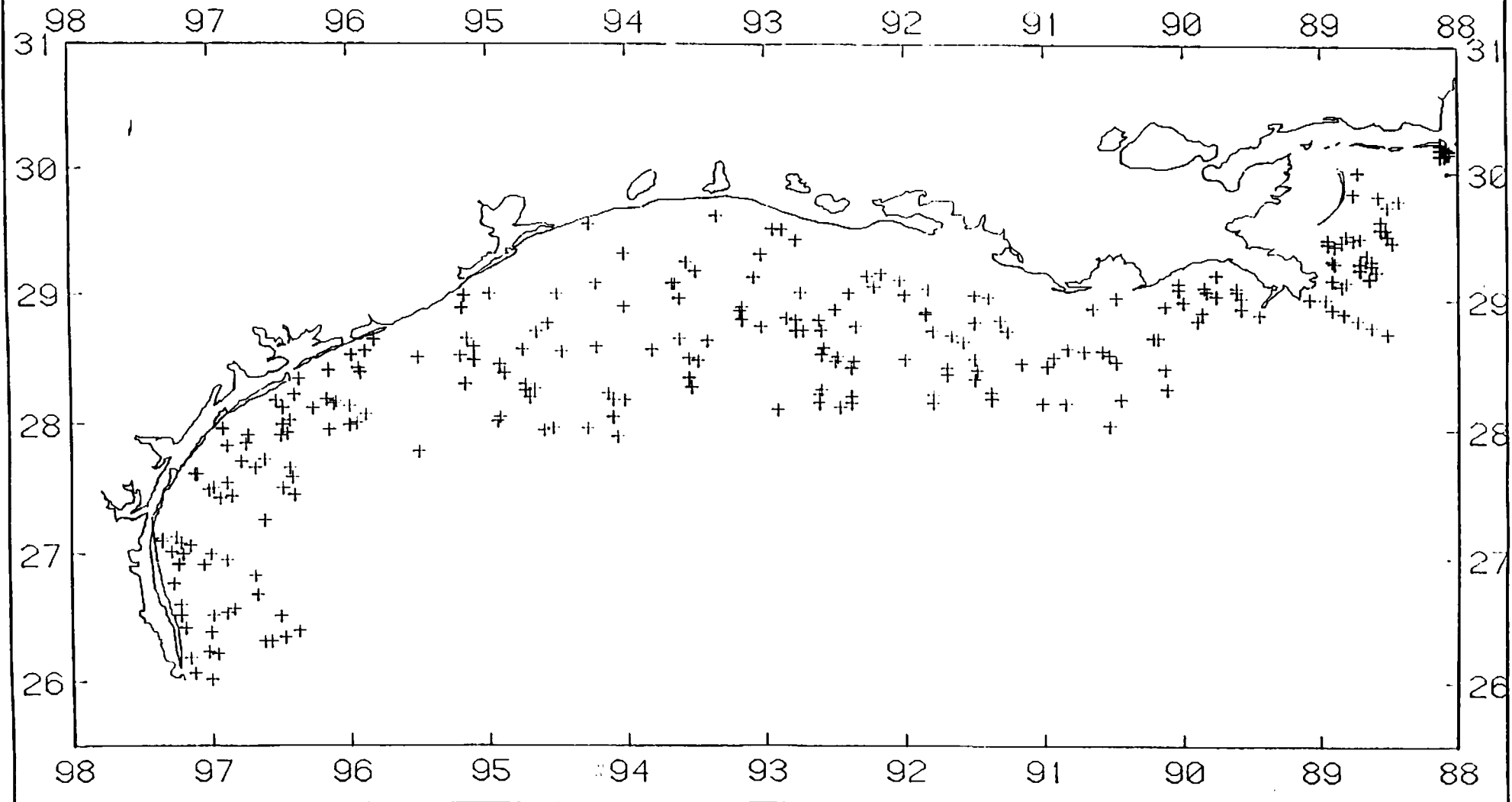


Figure 1. Trawl sample sites.

SOUTH AFRICAN FISHERIES  
 DEPARTMENT OF FISHERIES (n=686)

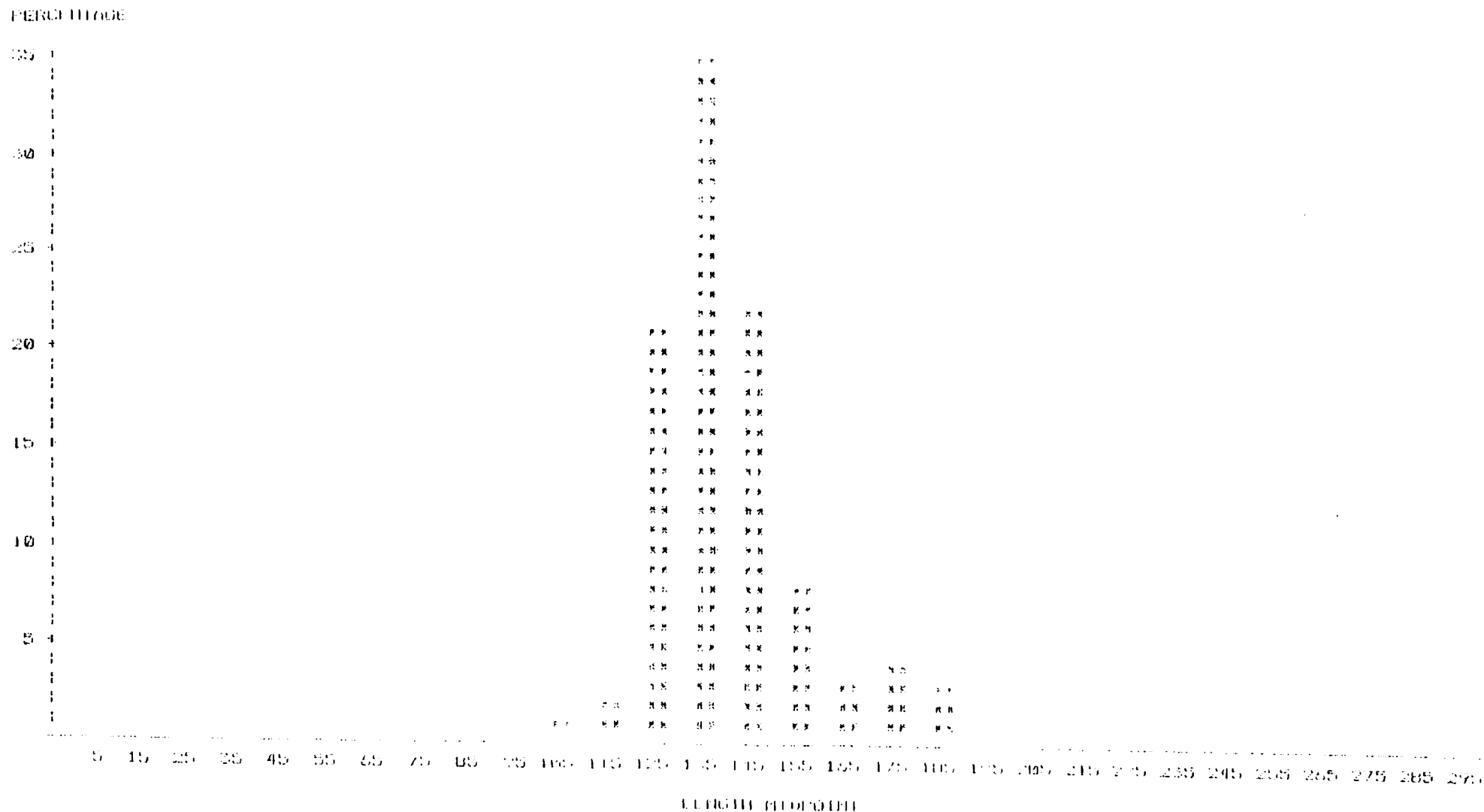


Figure 2. Croaker length frequency.



SPOT

PERCENTAGE OF LENGTH (n=481)

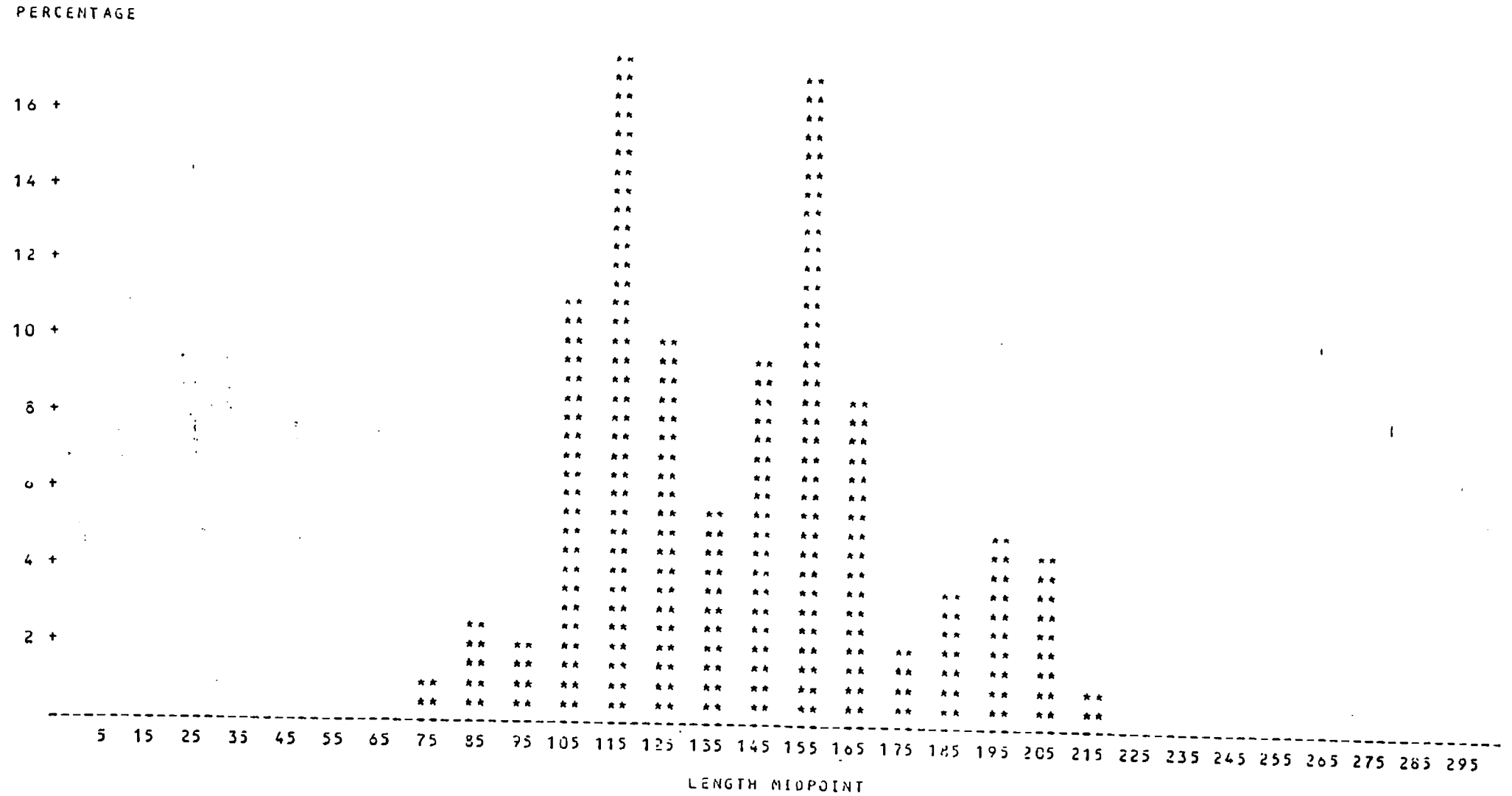


Figure 3. Spot length frequency.

BUTTERFISH,  
 PERCENTAGE OF LENGTH (n=1,480)

PERCENTAGE

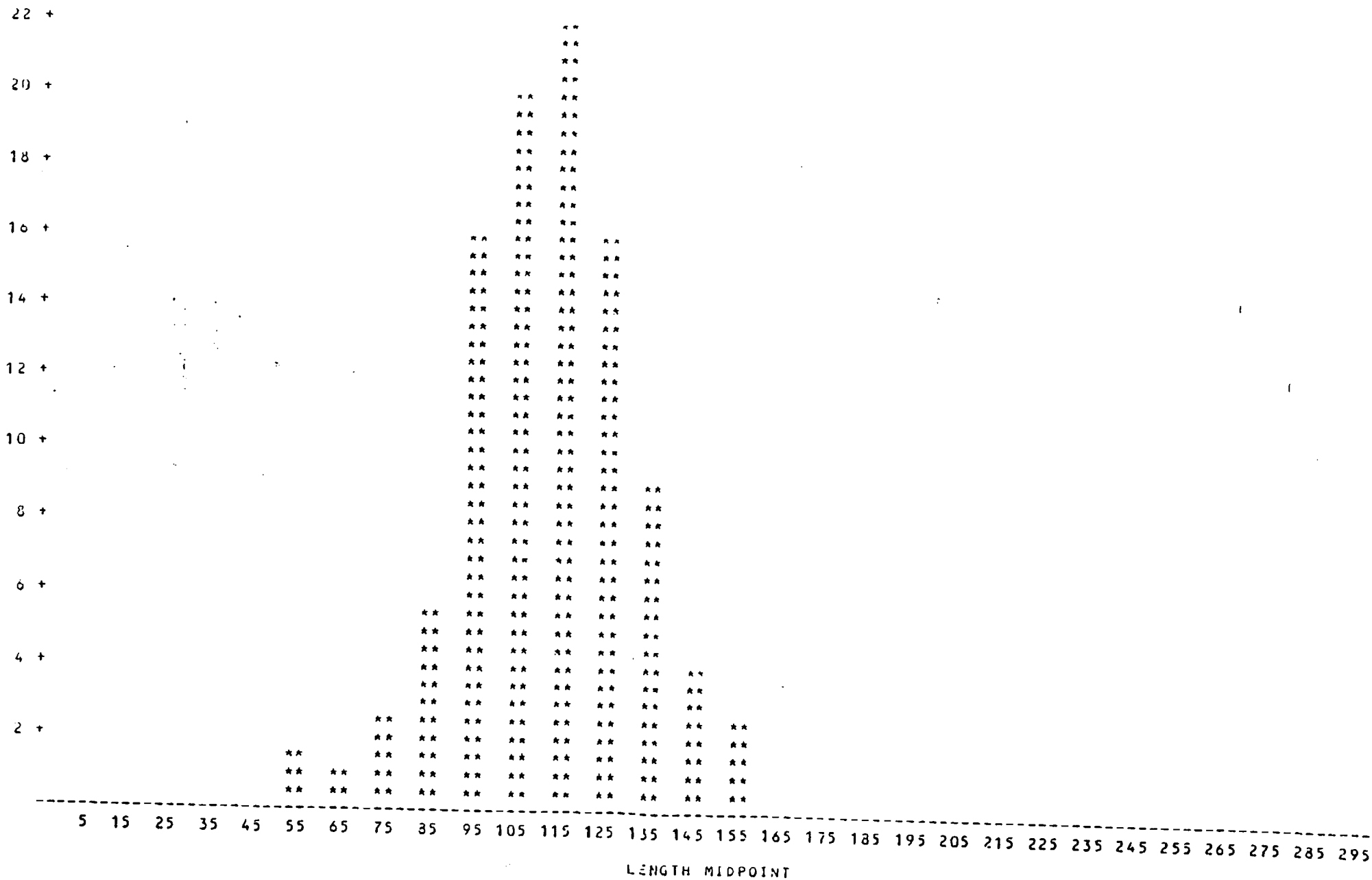


Figure 7 Butterflyfish length frequency.

SPANISH MACKEREL  
 PERCENTAGE OF LENGTH (n=77)

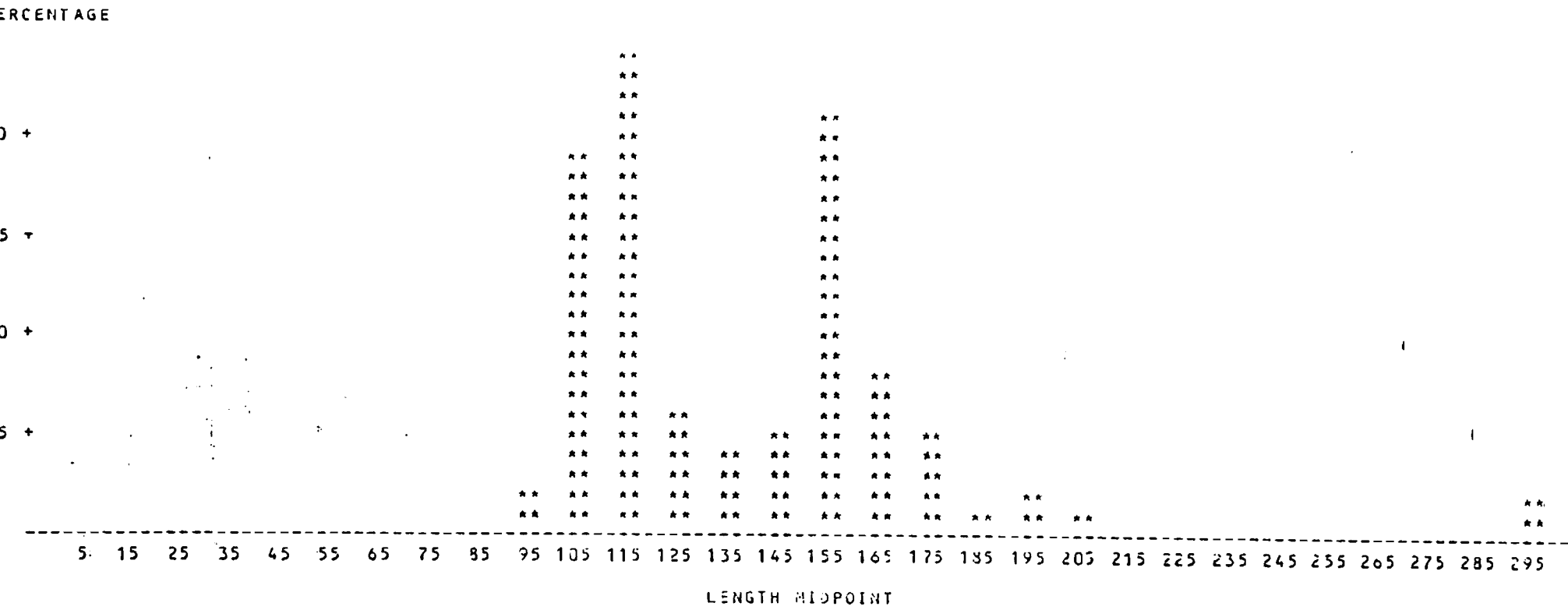


Figure 5. Spanish mackerel length frequency.

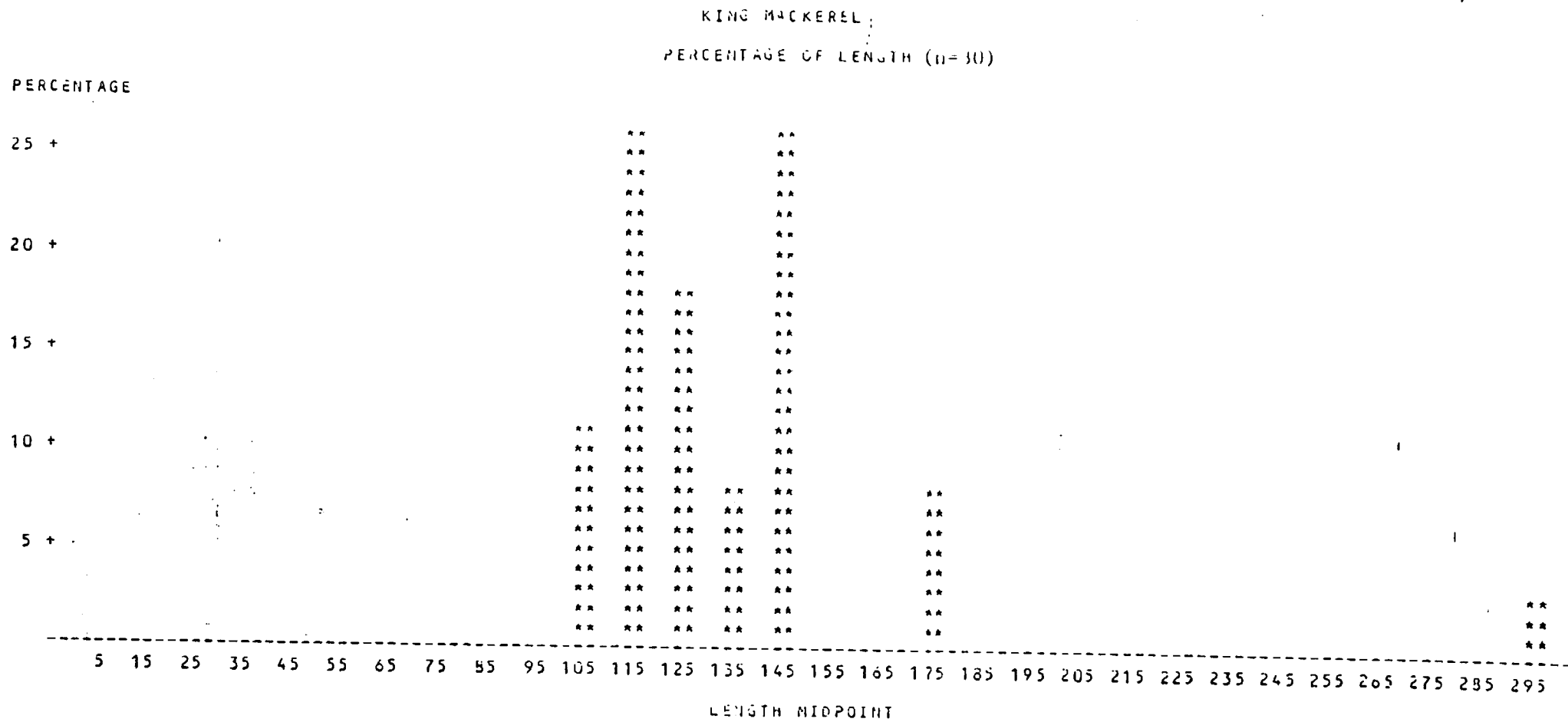


Figure 6. King mackerel length frequency.

RED SNAPPER

PERCENTAGE OF LENGTH (n=692)

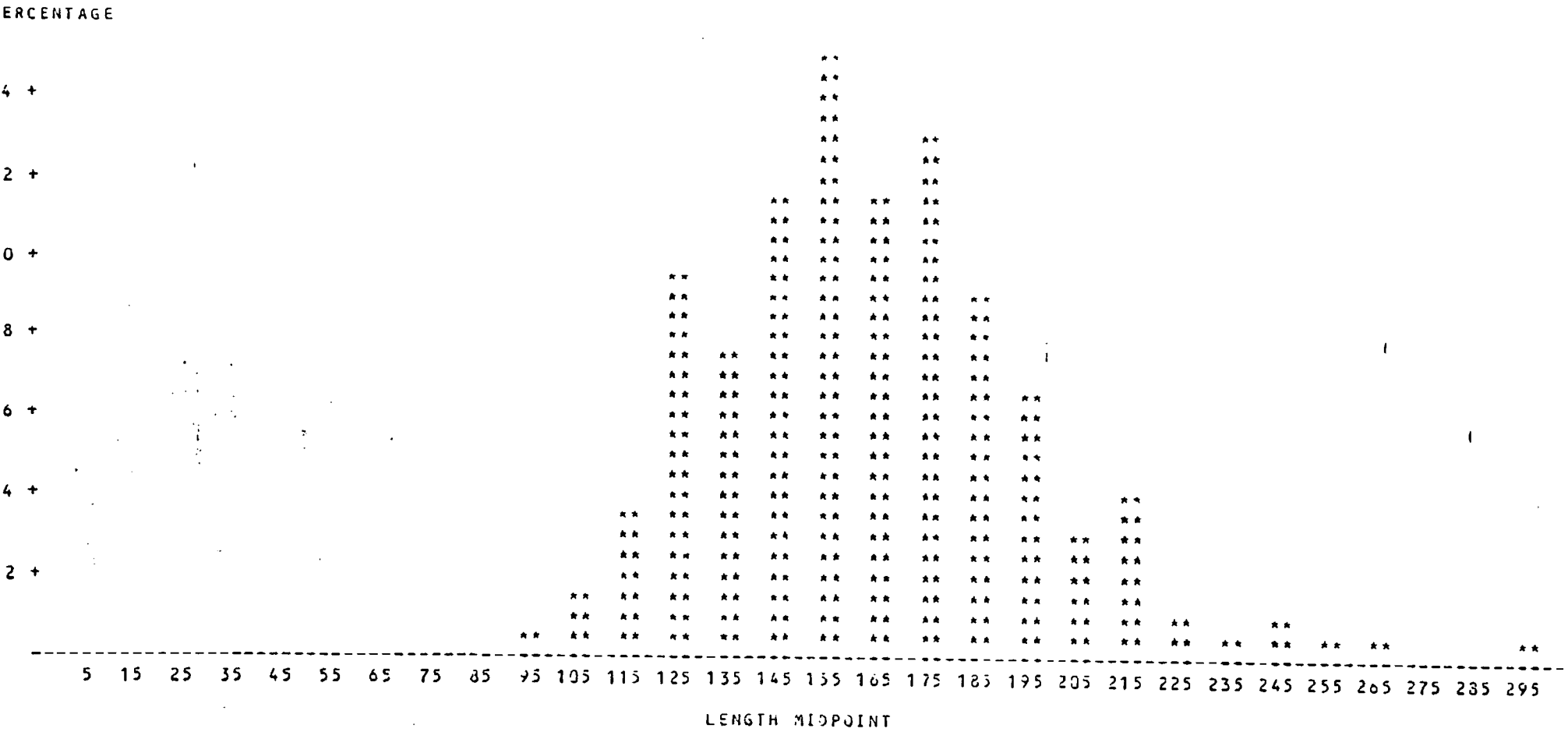


Figure 7. Red snapper length frequency.

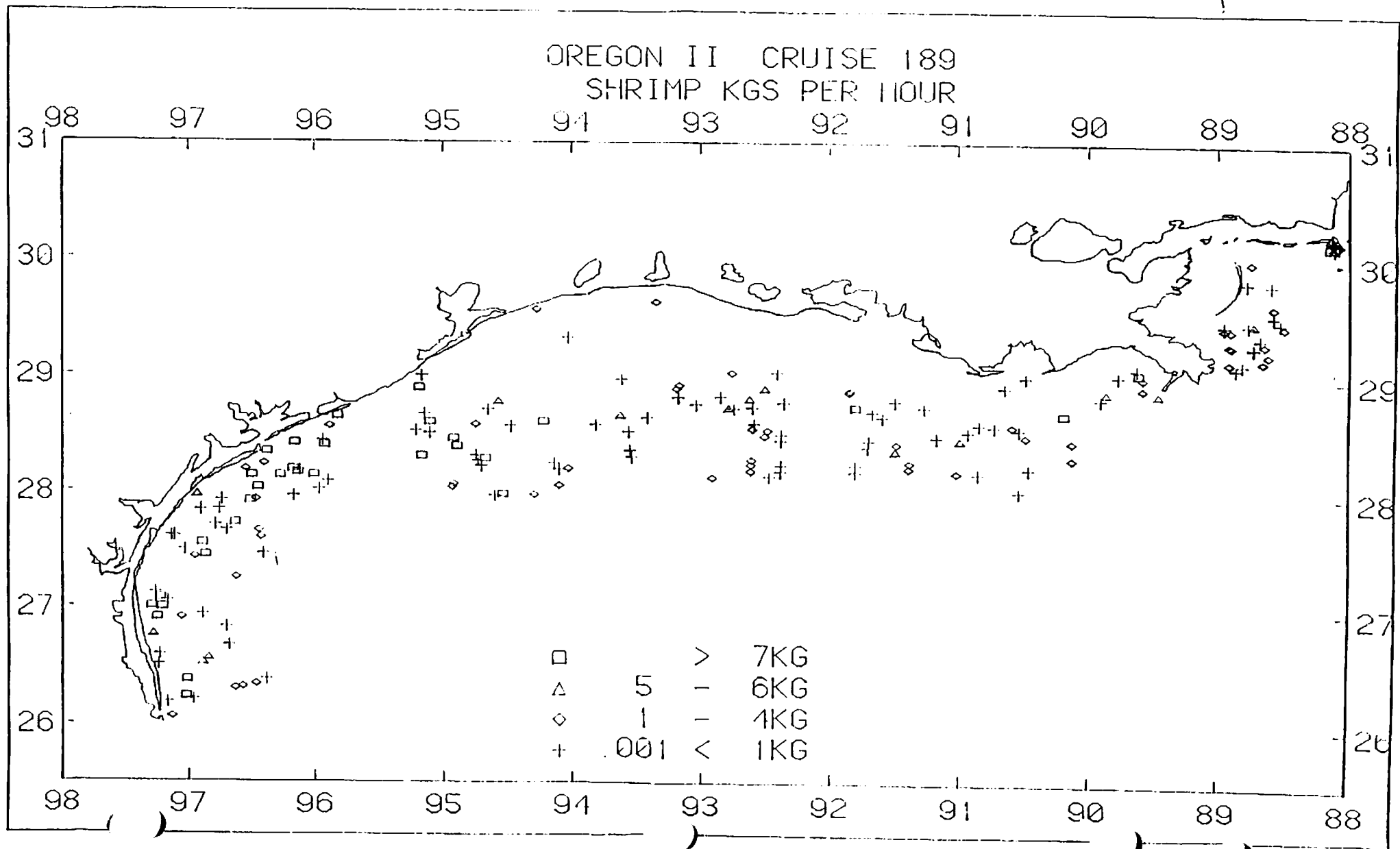


Figure 8. OREGON II Cruise 189 shrimp catch rates kgs per hour.

BROWN SHRIMP

LENGTH FREQUENCY (n=4,980)

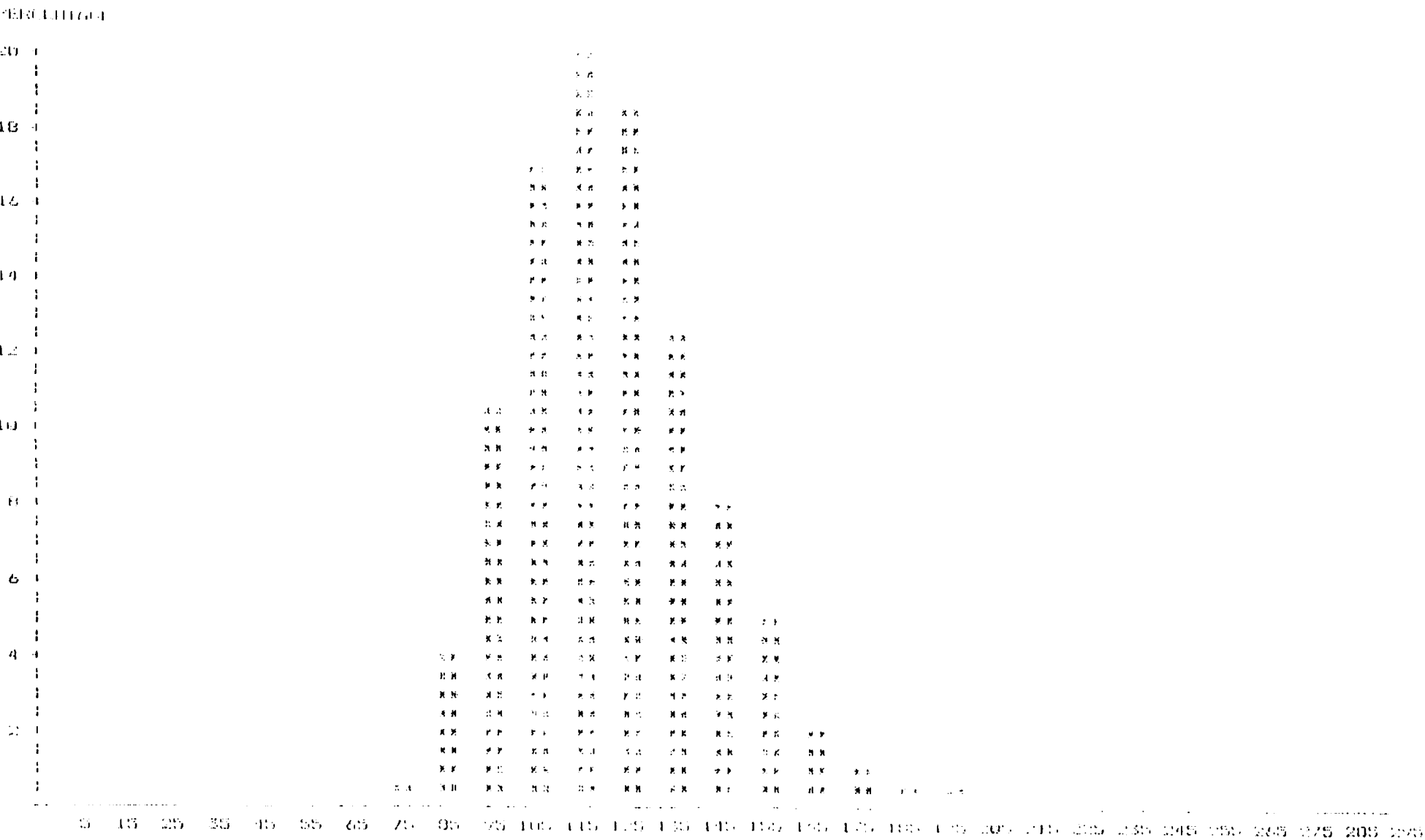


Figure 9. Brown shrimp length frequency.

WHITE SHRIMP  
 PERCENTAGE OF LENGTH (n=225)

PERCENTAGE

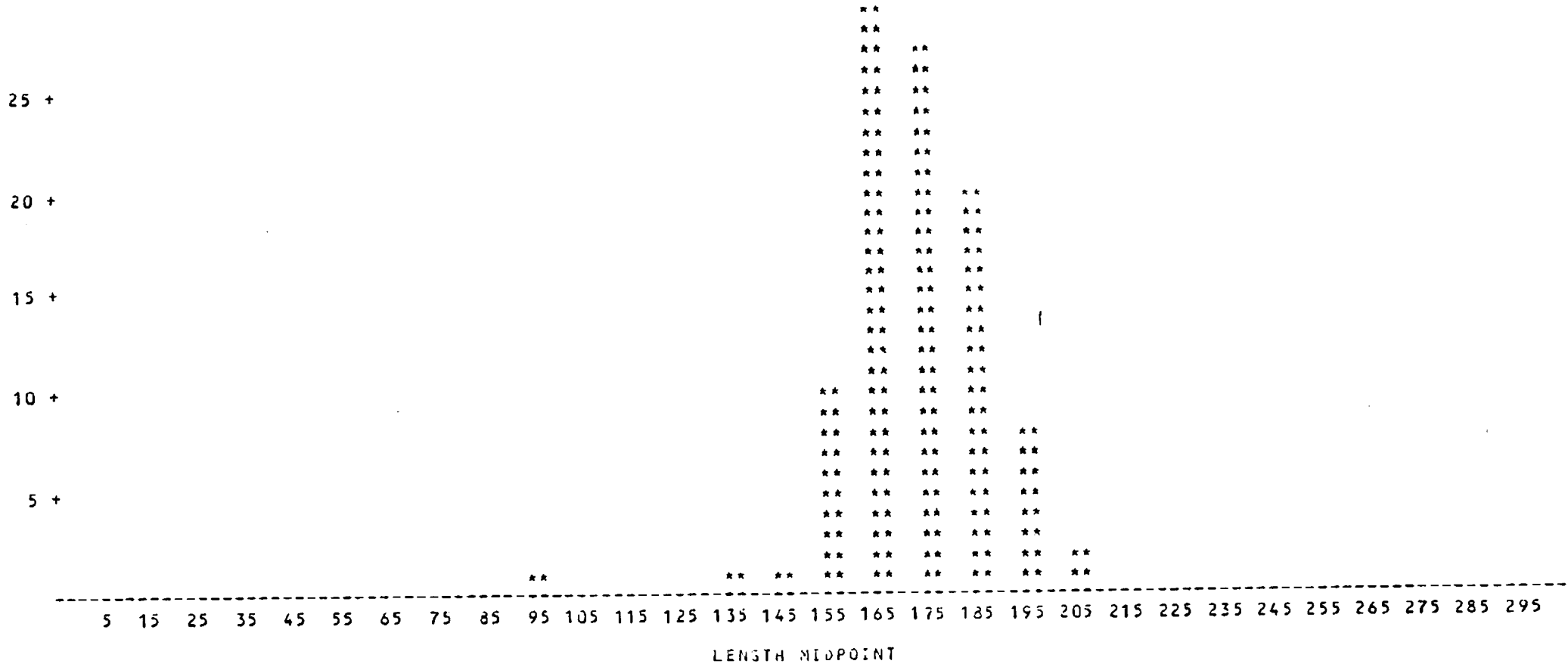


Figure 10. White shrimp length frequency.



PINK SHRIMP  
 PERCENTAGE OF LENGTH (n=236)

PERCENTAGE

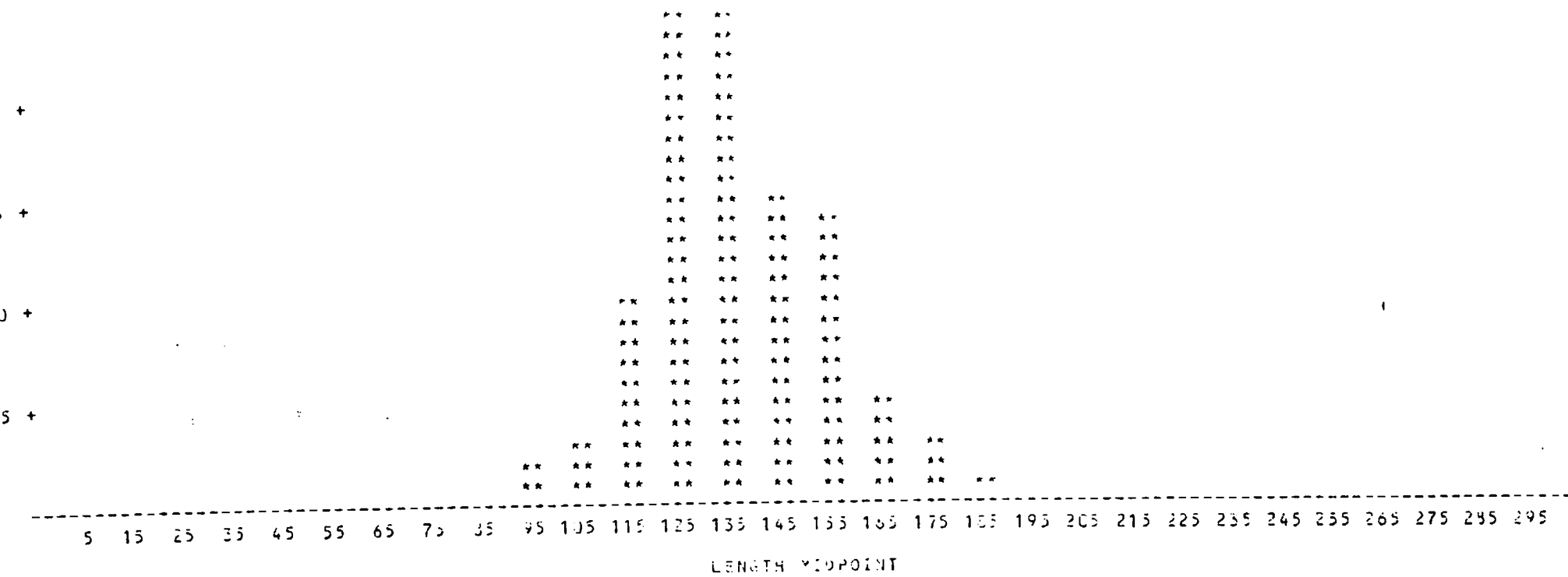


Figure 11. Pink shrimp length frequency.

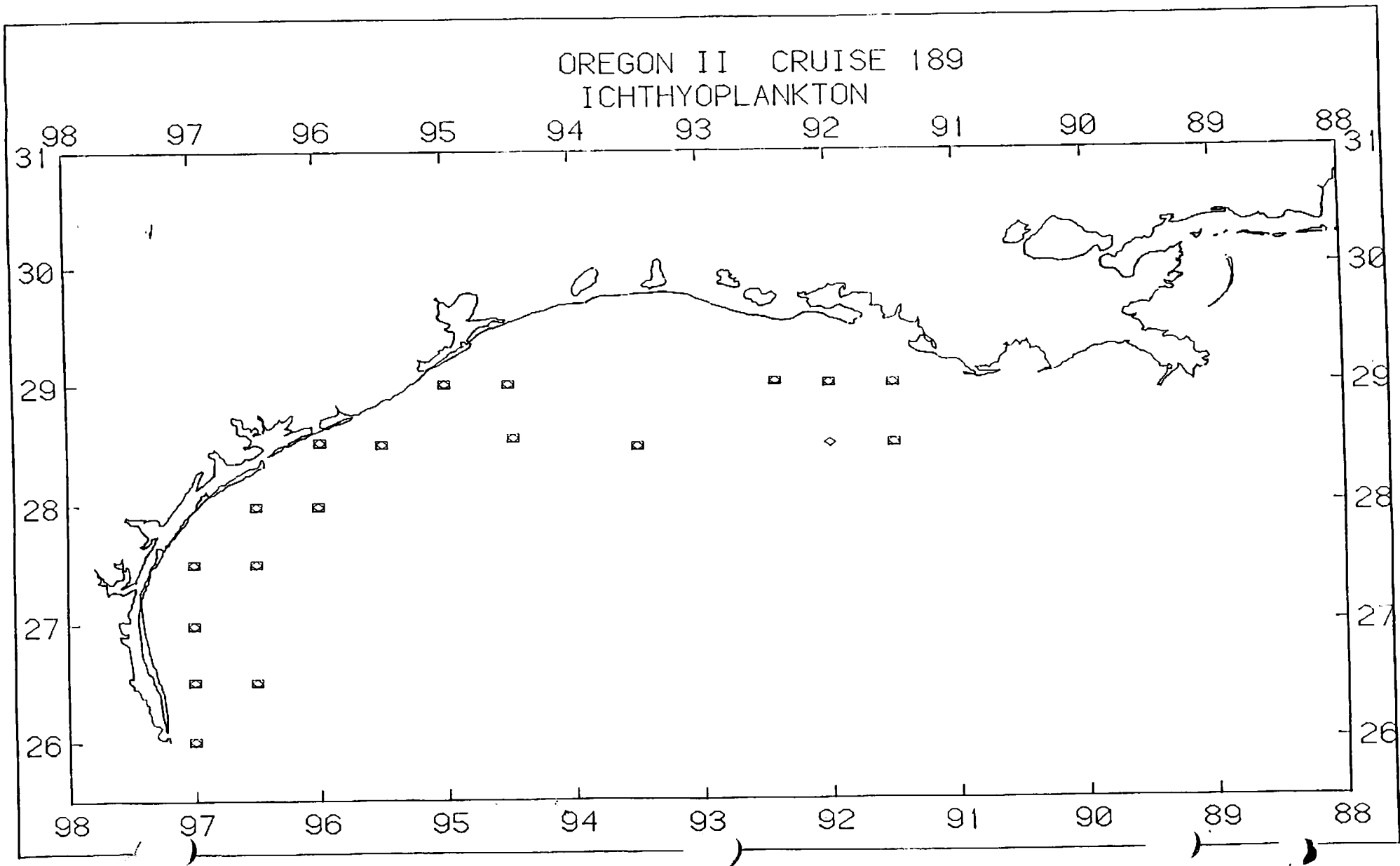


Figure 12. Ichthyoplankton sample sites.