

Job Report

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Project Name: A Study of Texas Shrimp Populations  
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Biological Survey of the Commercial Shrimp and Associated  
Organisms in the Inshore Gulf of Mexico

Abstract: Brown shrimp, Penaeus aztecus, were very abundant in the southern Gulf off Port Isabel in May and were predominantly undersize; this same situation existed in June in the Gulf off Port Aransas.

Significant numbers of white shrimp, P. setiferus, were found off Port Aransas in January when most were undersize.

Pink shrimp, P. duorarum, were most abundant in May off Port Isabel. Seabobs, Xiphopeneus krøyeri, were abundant in January off Port Aransas and were not taken in the southern zone.

Abundance of the various species was not noticeably different from that of 1963.

Salinity and temperature were similar to those of 1963.

Undersized brown shrimp could profitably be protected in the southern waters beginning in May and beginning in June off Port Aransas. Protection of small white shrimp in the southern waters at any time is probably unnecessary, although protection is indicated for the inshore Gulf off Port Aransas in January.

Objectives: To determine the decapod and stomatopod crustaceans present in the area, their seasonal distribution, abundance and size, with emphasis on commercial species of the family Penaeidae. To record and evaluate associated organisms sampled and hydrographic factors pertinent to the ecology of the area.

Procedures: Regular stations were set up for weekly samples in the inshore Gulf off Port Aransas, Texas, in depths of 2 to 15 fathoms, in the inshore Gulf off Port Mansfield and Port Isabel, Texas for monthly samples in 2 to 20 fathoms, and in the inshore Gulf off Galveston for samples under 10 fathoms annually.

Daytime sampling was accomplished from the 38-foot shrimp boat Goby using a standard 42-foot flat otter trawl of 2-inch stretch mesh spread by 6-foot doors. Duration of each sample was 30 minutes. Length-frequency sheets were completed for all decapods and stomatopods, both commercial and non-commercial. Detailed information sheets were used for other organisms.

Hydrographic data at time of sampling were obtained with a Kemmerer water bottle. Water temperature was taken on board with a centigrade thermometer calibrated to tenths of degrees; salinity was determined in the laboratory with hydrometers.

Findings and Discussion: Shrimp Study: Commercial Species

Brown shrimp, Penaeus aztecus, were first taken in May off both Port Aransas and off the Port Mansfield/Port Isabel area, at which time most were below a size of 100 mm in length, a size too small to be of great economic value. The number of shrimp was great enough at this time in the southern zone to warrant protection. Later in June, the abundance of shrimp under 100 mm in length off Port Aransas indicated the need for protection in that area.

Abundance of brown shrimp dropped through the remainder of the sampling period. The shrimp continued to grow while in the sampling area. The maximum modal size of 150 mm was reached in the fall.

The data were insufficient to allow estimates of brown shrimp growth rates. Male shrimp outnumbered females at the start of migration to the Gulf in May, but female shrimp were more abundant through autumn.

White shrimp, P. setiferus, were most abundant off Port Aransas in January and were mostly below a harvestable size. Very few were taken either off Port Isabel or off Galveston in January. It seems biologically unsound to try to protect the small white shrimp which are seasonally present in the inshore Gulf south of Port Mansfield or even south of Yarbrough Pass. Populations there are apparently not large. Insufficient sampling was accomplished in the northern zone during this period to determine from research if whites under 100 mm are abundant enough to need protection. Protection is indicated for the middle zone off Port Aransas.

White shrimp attained a larger size in the sampled area than did browns. The majority of large size brown shrimp are found at depths beyond the sampling capacity of the present research vessel. Sex percentages in the white shrimp populations varied monthly.

Pink shrimp, P. duorarum, were fairly abundant, mixed with the brown shrimp population off Port Isabel in May. Few pink shrimp were caught off Port Aransas and none off Galveston.

Some depth preference was found as in the past. Whites were most abundant under 10 fathoms, and pinks were scattered through all depths sampled. Browns were abundant under 10 fathoms only during migrations to deeper water.

Table 1 shows a monthly breakdown of brown, white, and pink shrimp by number, modal size, sex, and fathom distribution. Figures 1 and 2 show the average monthly sample catch.

Seabobs, Xiphopeneus krøyeri, were abundant off Port Aransas in January and October. During January this species supplied a large portion of the commercial bait catch.

Of strictly non-commercial genera, Trachypeneus and Squilla were common and at times abundant. The numbers of associated organisms caught, by month, are shown in Table 2.

Hydrography:

Table 3 presents a complete breakdown of temperatures and salinity information by sampled date. Little difference was noted between 1964 findings and those of previous years.

Comments:

This year completed the third year of sampling in the inshore Gulf off Port Aransas and the second year for limited sampling off the Port Mansfield/Port Isabel area. Findings agree with previous year's work. There is little need for further intensive sampling in the shallow water area off Port Aransas. There is need for deeper water surveys and for more sampling in the southern zone.

Future studies should include the use of electric fishing gear, the sampling of the rough trawling grounds not normally fished by the commercial fleet at present, sampling at greater depths, and an ecological charting of certian depth zones from the Cedar Bayou area to the mouth of the Rio Grande.

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Table 1: Commercial Shrimp Data

GULF OFF PORT ARANSAS	BROWN SHRIMP	WHITE SHRIMP	PINK SHRIMP	NO. SAMPLES
January:				8 trawls
Number	0	644	13	
Sex		151 ♂ 23%	4 ♂ 31%	
		493 ♀ 77%	9 ♀ 68%	
Mode Size		78-103 mm	68-128 mm	
Fathoms		4-7	6-7	
March:				2 trawls
Number	0	17	1	
Sex		10 ♂ 60%	♀	
		7 ♀ 40%		
Mode Size		153-158 mm	83 mm	
Fathoms		11	11	
April:				1 trawl
Number	0	11	0	
Sex		7 ♂ 64%		
		4 ♀ 36%		
Mode Size		158-168 mm		
Fathoms		15		
May:				2 trawls
Number	424	10	30	
Sex	266 ♂ 63%	4 ♂ 40%	14 ♂ 47%	
	158 ♀ 37%	6 ♀ 60%	16 ♀ 53%	
Mode Size	68-93 mm	138-183 mm	93-123 mm	
Fathoms	11	11	6	
June:				9 trawls
Number	4,157	26	7	
Sex	1,792 ♂ 43%	6 ♂ 23%	5 ♂ 71%	
	2,365 ♀ 57%	20 ♀ 77%	2 ♀ 29%	
Mode Size	83-98 mm	163-183 mm	103-133 ,,	
	118-123 mm			
Fathoms	14	6-8	6	
July:				3 trawls
Number	210	4		
Sex	85 ♂ 40%	2 ♂ 50%		
	125 ♀ 60%	2 ♀ 50%		
Mode Size	123-128 mm	163-193 mm		
Fathoms	13	10		
August:				4 trawls
Number	147	2	0	
Sex	74 ♂ 50%	1 ♂ 50%		
	73 ♀ 50%	1 ♀ 50%		
Mode Size	88-93 mm	133,163 mm		
	103-110 mm			
Fathoms	12	8		

Table 1 Continued:

GULF OFF PORT ARANSAS		BROWN SHRIMP	WHITE SHRIMP	PINK SHRIMP	NO. SAMPLES
September:					6 trawls
Number	50	63	1		
Sex	9 ♂ 18%	39 ♂ 62%	♀		
	41 ♀ 82%	24 ♀ 38%			
Mode Size	143-163 mm	83-113 mm	148 mm		
		133-143 mm			
Fathoms	11	4 & 11	7		
October:					6 trawls
Number	51	180	14		
Sex	28 ♂ 55%	90 ♂ 50%	4 ♂ 29%		
	23 ♀ 45%	90 ♀ 50%	10 ♀ 71%		
Mode Size	93-133 mm	153-163 mm	83-173 mm		
Fathoms	12	8	8		
November:					1 trawl
Number	16	0	0		
Sex	6 ♂ 37%				
	10 ♀ 63%				
Mode Size	153-168 mm				
Fathoms	14				
GULF OFF PORT MANSFIELD PORT ISABEL		BROWN SHRIMP	WHITE SHRIMP	PINK SHRIMP	NO. SAMPLES
May:					2 trawls
Number	1,287	2	472		
Sex	670 ♂ 52%	2 ♀	325 ♂ 69%		
	617 ♀ 48%		147 ♀ 31%		
Mode Size	63-83 mm	138,178 mm	93-113 mm		
Fathoms	4	4	6		
July:					8 trawls
Number	7	9	10		
Sex	2 ♂ 30%	5 ♂ 56%	4 ♂ 40%		
	5 ♀ 70%	4 ♀ 44%	6 ♀ 60%		
Mode Size	88-209 mm	158-178 mm	103-143 mm		
Fathoms	12	3-6	10		
August:					5 trawls
Number	119	4	2		
Sex	72 ♂ 61%	1 ♂ 25%	2 ♀		
	47 ♀ 39%	3 ♀ 75%			
Mode Size	108-118 mm	172-203 mm	74,115 mm		
Fathoms	15	3	18		

Table 1 Continued:

GULF OFF PORT MANSFIELD PORT ISABEL		BROWN SHRIMP	WHITE SHRIMP	PINK SHRIMP	NO. SAMPLES
September:					4 trawls
Number	0	14	77		
Sex		4 ♂ 29%	44 ♂ 57%		
		10 ♀ 71%	33 ♀ 43%		
Mode Size		88-173 mm	83-93 mm		
Fathoms		12	4		
October:					6 trawls
Number	215	18	63		
Sex	84 ♂ 39%	4 ♂ 22%	30 ♂ 48%		
	131 ♀ 61%	14 ♀ 78%	33 ♀ 52%		
Mode Size	102-118 mm	158-168 mm	118-163 mm		
	138-163 mm				
Fathoms	12	3	3-14		
December:					6 trawls
Number	0	32	7		
Sex		23 ♂ 72%	5 ♂ 71%		
		9 ♀ 28%	2 ♀ 29%		
Mode Size		103-158 mm	88-158 mm		
Fathoms		3-12	4-12		
GULF OFF GALVESTON		BROWN SHRIMP	WHITE SHRIMP	PINK SHRIMP	NO. SAMPLES
January:					7 trawls
Number	0	61	0		
Sex		34 ♂ 56%			
		27 ♀ 44%			
Mode Size		88-108 mm			
Fathoms		7			

Table 2: Associated Organisms

Gulf off Port Aransas: 0-15 fathoms - number of specimens per month:

ORGANISM	JAN.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.
<i>Xiphopeneus kryeri</i>	175								250	
<i>Trachypeneus similis</i>	209	67	59	3	81	6	11		26	
<i>T. constrictus</i>	20								2	
<i>Sicyonia dorsalis</i>		1	2			2	14	1	1	
<i>S. brevirostris</i>	2	5	2						1	
<i>Squilla empusa</i>	118	119	1		39	3		2	97	1
<i>S. neglecta</i>	10									
<i>S. lijdingi</i>			36							
<i>Physalia pelagica</i>	Abun. 1/2 "	Abun. Large	Abun. Large							
<i>Dactylometra quinquecirrha</i>	6	11							11	
<i>Aurelia aurita</i>	8									
<i>Stomolophus meleagris</i>	69								2	
<i>Renilla mulleri</i>	2330	5000	15		170	30	100	55	70	
<i>Calliactis tricolor</i>	15									
<i>Loligo pealei</i>	1		7	9	52	19	26	37		1
<i>Lolliguncula brevis</i>	118	41	18	21	92	18	24	152	82	3
<i>Astrospecten antillensis</i>							1			
<i>A. cingulatus</i>	11	4	300	10	26	17	31	21	3	2
<i>Luidia alternata</i>	8	2	8		2					
<i>L. clathrata</i>	2		1							
<i>Mellita quinquiesperforata</i>	8				80	7	50			
<i>Brissopsis</i> sp.	3				8					
<i>Sertularella</i>						Abun.	Abun.	Abun.		
Total:	3113	5250	449	43	550	102	257	268	545	7
Trawls:	8	2	1	2	9	3	4	6	6	1

Gulf off Port Mansfield/Port Isabel: 0-20 fathoms - number of specimens per month

ORGANISM	MAY	JULY	AUG.	SEPT.	OCT.	DEC.
<i>Trachypeneus similis</i>	9		15		3	
<i>Sicyonia dorsalis</i>			219			
<i>S. brevirostris</i>		14	13		8	

Table 2 Continued:

ORGANISM	MAY	JULY	AUG.	SEP.	OCT.	DEC.
<i>Squilla empusa</i>		1	2		4	
<i>Aurelia aurita</i>						48
<i>Renilla mulleri</i>		220				52
<i>Loligo pealei</i>	3	6	21	14	24	17
<i>Lolliguncula brevis</i>	16	20	16	89	53	90
<i>Octopus sp.</i>			3			
<i>Astrospecten cingulatus</i>	100	14	1		3	
<i>Luidia alternata</i>			2		1	
<i>L. clathrata</i>		80	92		26	
<i>Mellita quinquesperforata</i>			50			
<i>Aplesia sp.</i>		4				
Nudibranchs		4	1			
Total:	128	363	435	103	122	207
Trawls:	2	8	5	4	6	6

Gulf off Galveston: 0-10 fathoms - number of specimens per month

ORGANISM	JANUARY
<i>Xiphopeneus kroyeri</i>	3
<i>Trachypeneus similis</i>	225
<i>T. constrictus</i>	41
<i>Squilla empusa</i>	898
Total:	1167
Trawls:	7



Table 3: Temperature and Salinity

## Temperature and Salinity - Gulf off Port Aransas

DATE	FATHOMS	DEGREES C.		PARTS PER 1000	
		SURFACE	DEPTH	SURFACE	DEPTH
January					
2	5	12.2	12.9	31.82	31.81
2	7	12.5	12.9	31.62	31.47
7	3	12.5	12.6	31.49	31.92
7	6	12.7	12.8	32.06	31.67
19	6	14.5	14.1	31.63	31.97
19	12	14.3	14.0	31.06	30.91
27	4	11.7	12.0	31.91	32.63
27	11	12.7	12.3	32.9	31.91
March					
31	4	18.4	17.8	34.82	34.91
31	11	17.0	17.2	35.67	35.90
April					
15	15	19.5	18.7	34.71	34.09
May					
25	6	26.7	26.4	36.04	36.31
25	11	25.4	26.7	35.61	35.97
June					
4	6	26.7	26.7	35.21	35.68
4	11	25.6	26.1	35.91	36.0
6	3	27.1	27.3	35.81	35.77
6	6	27.0	27.0	35.82	35.61
26	3	28.7	28.7	36.1	36.16
26	8	28.6	28.6	36.1	36.1
26	14	28.0	27.2	35.67	35.89
30	6	29.8	28.6	36.02	36.8
30	13	29.4	27.0	36.71	36.91
July					
21	13	28.3	26.4	35.61	36.8
27	10	29.5	27.0	36.0	36.47
27	5	29.8	27.2	36.07	36.37
August					
3	3	31.0	31.2	35.67	35.6
3	8	30.1	29.4	35.91	36.17
3	12	30.3	28.3	36.01	36.01
4	15	29.5	27.2	36.42	36.6
September					
2	7	29.1	28.7	34.17	34.8
2	11	29.0	28.2	35.61	35.23
3	3	28.7	28.7	34.01	34.17
9	8	29.3	29.0	35.61	35.43
9	14	29.8	27.6	35.91	36.09
10	4	30.7	29.4	34.03	34.11

Table 3 Continued:

## Temperature and Salinity - Gulf off Port Aransas

DATE	FATHOMS	DEGREES C.		PARTS PER 1000	
		SURFACE	DEPTH	SURFACE	DEPTH
October					
22	3	26.6	26.0	33.68	33.24
22	8	25.3	25.1	32.43	33.62
22	12	23.6	24.1	31.61	32.59
29	6	25.1	26.0	32.9	34.63
29	12	24.1	24.6	33.78	34.32
30	5	23.1	23.6	34.08	34.62
November					
2	14	24.0	24.6	34.12	34.6

## Temperature and Salinity - Gulf off Port Mansfield and Port Isabel

May					
9	4	24.1	23.7	35.61	36.31
10	6	23.0	23.1	36.41	36.07
July					
7	3	27.3	27.4	35.81	36.2
7	8	27.3	27.0	36.71	36.81
7	16	27.8	24.1	36.87	36.91
8	12	27.8	26.1	35.63	36.46
8	15	27.4	25.3	35.97	36.34
9	3	27.3	27.1	35.62	35.89
9	11	27.4	26.2	35.83	36.97
10	6	27.8	27.1	35.61	36.01
August					
7	3	31.6	31.6	36.01	36.09
7	9	31.1	30.2	36.07	36.31
7	15	30.6	29.7	36.81	35.92
9	12	31.4	30.0	35.92	35.74
9	18	30.6	29.0	36.63	36.87
September					
16	6	27.9	26.8	35.91	34.87
16	12	26.4	25.6	35.48	35.61
17	4	27.4	27.4	35.62	35.84
18	8	27.1	27.1	35.43	35.79
October					
17	3	25.6	25.6	34.37	35.1
17	12	24.1	24.4	35.63	35.63
18	8	24.6	25.4	34.83	35.6
18	14	25.0	25.3	35.9	35.62
19	3	24.6	24.6	34.82	34.79
19	6	23.7	22.7	35.06	35.1

Table 3 Continued:

Temperature and Salinity - Gulf off Port Mansfield and Port Isabel

DATE	FATHOMS	DEGREES C.		PARTS PER 1000	
		SURFACE	DEPTH	SURFACE	DEPTH
December					
15	12	15.1	15.3	35.71	35.03
15	4	16.7	16.4	36.1	36.1
16	3	16.3	16.3	35.92	36.1
16	6.5	15.6	15.6	36.34	35.92
16	9	15.9	15.9	36.06	35.92
17	4	15.0	15.4	35.92	36.73

Temperature and Salinity - Gulf off Galveston

January					
20	3	9.1	9.0	30.47	30.68
20	6	9.0	8.9	31.62	31.98
21	5	10.0	9.5	30.54	30.36
21	7	9.7	9.2	30.74	31.69
21	9	10.1	9.9	30.53	30.27
22	4	9.7	9.2	30.67	30.19
23	4	9.8	10.7	31.42	31.8

Figure 1: Shrimp Catch per Month - Gulf off Port Aransas

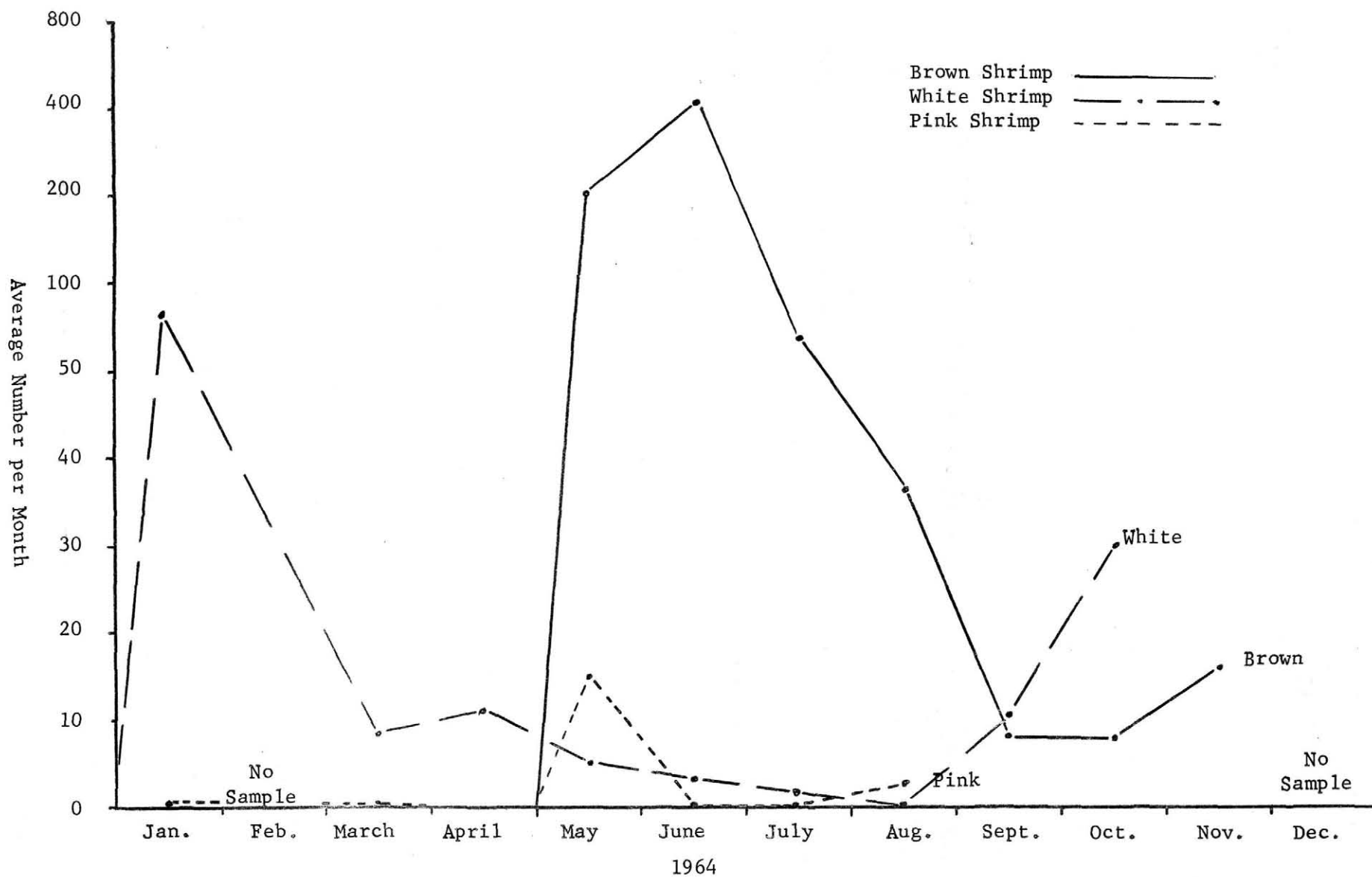


Figure 2: Shrimp catch per month - Gulf of Port Mansfield/Port Isabel

