

Job Report

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Project No. M-8-R-3

Date April 2, 1962

Project Name: Biological Survey of Area M-8, Upper Laguna Madre

Period Covered: September 1, 1960 to July 31, 1961

Job No. B-4

Shrimp Investigation

Abstract: A 15-minute trawl was made at each of four shrimp stations twice monthly from September 1960 to July 1961. The white shrimp, Penaeus setiferus, was most abundant from September through November, with the largest catches being in November. These white shrimp entered the lagoon one month later in the fall of 1960 than they did in 1959. Grooved shrimp, Penaeus aztecus and P. duorarum, appeared in the fall and spring trawls of 1960-61 and at corresponding times in the 1959-60 season. However, grooved shrimp did not stay in the lagoon as long in 1960-61 as they did in the previous year. Sharp changes in salinity may account for the shorter grooved shrimp runs this year.

Objective: To investigate the life history of shrimp in the upper Laguna Madre.

Procedures: Four shrimp trawl stations were established in the upper Laguna Madre in September 1959. Two of these are 12-foot deep mud bottom stations located in the Intercoastal Canal. One is just south of the Padre Island Causeway, and the other is Marker 201 at the north end of the land cut. The other two stations are three to three and one-half feet deep, and the substrate in each is covered by marine Angiosperms, Ruppia maritima and Diplanthera wrightii. One of these shallow stations is located southeast of Pita Island, and the other is north of Little Bird Island. A 15-minute trawl sample was taken at each station twice monthly from September 1960 to July 1961, except when prohibited by equipment breakdowns, or where physical bottom conditions prevented the use of a trawl. An otter trawl with a 10-foot lead line and a 1-1/4 inch stretch mesh were used. A 1/2-inch stretch mesh liner was placed inside the trawl to pick up the smaller shrimp.

Shrimp were also collected with a bag seine and a push net for length frequency measurements. Shrimp were measured from the rostrum tip to the tip of the telson.

Salinities, taken each time a shrimp station was sampled, were analyzed with specific gravity hydrometers.

Findings: Figure 1 presents a summary of data collected for Penaeus setiferus, P. aztecus, and P. duorarum.

Figure 2 compares the number of Penaeus setiferus caught per 15-minute trawl in the 1960-61 season with similar trawls made in 1959-60.

Figure 3 compares the number of grooved shrimp caught per 15-minute trawl in the 1960-61 season with similar trawls made in 1959-60.

Figure 4 is a graph comparing the major size groups of white shrimp and grooved shrimp caught in the seasons of 1960-61 and 1959-60.

Figure 5 is a chart showing the number of shrimp caught per 15-minute trawl over the past two seasons compared to the monthly salinity averages during the same periods of time.

Penaeus setiferus - Most Penaeus setiferus collected this year were found near the causeway, where salinities are usually lowest due to the influx of Corpus Christi Bay water. White shrimp were caught in large numbers only from September through November, although scattered whites were caught throughout the year except in December, January, and February. November was the peak month for this species, when the major size peak was between 110-115 mm.

The 1960-1961 population of white shrimp was of slightly less magnitude than that of the 1959-60 population. November 1960 was the peak month for whites, whereas the 1959 peak was reached in September. This shows that the whites came into the lagoon more than one month later than they did in 1959-60. Comparison of salinity data for the past two years (see Figure 5) does not explain the later season in 1960-61. However, salinity average for July 1961 was about 17 ppt. lower than it was in July 1960; therefore, an early fall run of whites is predicted for the area in 1961.

Grooved Shrimp - Both Penaeus aztecus and P. duorarum are grouped as grooved shrimp in this paper. Samples of grooved shrimp collected in April and May, 1961, were examined by personnel of the Marine Laboratory. Specimens under 50 mm. could not be identified to species. Males examined had the distoventral lobe of the petasma armed with two to many spinules as in P. duorarum, but in several instances also had the internal lobe with spinules in a compact patch as in P. aztecus. The anteromedian corners of the lateral plates of the female thelycum ranged from moderately gaping, as in P. duorarum, to widely gaping, as in P. aztecus. A possibility of crossbreeding in the southern range should not be discounted. After these shrimp have attained a length of around 50 mm., the two species can be more accurately distinguished.

Grooved shrimp appear mainly in the fall and spring trawls. There were two peaks, one in November 1960 and the other in May 1961. The major size class in November was 55-60 mm. and 60-70 mm. in May. These two peaks occurred in the same times of the year as in 1959-60, but they were sharper and covered a shorter period of time (see Figures 3 & 4). P. aztecus accounted for over 90 percent of the November 1960 peak and nearly 95 percent of the peak in May 1961. P. duorarum were caught only in the April 1959 trawls, but pink shrimp were taken from November through June 1961 with a population peak in November and another in April and May. The major size class in each of these peaks was 85-90 mm.

The grooved shrimp population peaked at about the same time each year, with the 1960-61 peak being sharper and higher. The 7 ppt. drop in salinity in November 1960 (see Figure 5) may account for the sharp rise in shrimp population for that month. Similarly, the increase in salinity from 33 ppt. in May to 42 ppt. in June 1961 might have caused the sharp drop in the June shrimp population.

Figure 4 shows little difference in the major size groups of grooved shrimp in the 1960-61 months compared to the same months of 1959-60. Blank columns in the graph indicate no major size group could be determined for those months.

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Figure 1. A Summary of Shrimp Data Collected from September 1960 through July 1961

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July
No. of Trawls	5	7	8	4	8	8	6	3	5	5	6
Shrimp/Trawl	7.2	2.0	52.0	0	2.5	3.0	1.5	5.3	78.8	12.8	3.2
% Whites	92	29	30	-	-	-	11	6	-	2	-
% Browns	8	71	63	-	-	21	-	-	94	96	100
% Pinks	-	-	7	-	100	79	89	94	6	2	-

Whites											
Total	33	4	124	0	0	0	1	1	0	1	0
Size Range	50-80	-	45-160	-	-	-	113	125	-	171	-
Peak	-	-	110-115	-	-	-	-	-	-	-	-

Browns											
Total	3	10	258	0	0	5	0	0	369	62	19
Size Range	-	60-90	33-95	-	-	-	-	36-82	31-90	41-135	42-120
Peak	-	-	55-60	-	-	-	-	45-50	60-70	95-100	90-95

Pinks											
Total	0	0	29	0	20	19	8	15	25	1	0
Size Range	-	-	40-105	-	41-91	41-82	49-97	53-113	56-107	93	-
Peak	-	-	85-90	-	-	-	-	85-90	-	-	-

Note: Size range and peak for some months was obtained from shrimp caught by push nets and seines.
All measurements are in mm.

Figure 2. *P. setiferus* caught per 15-minute trawl in 1959-60 & 1960-61

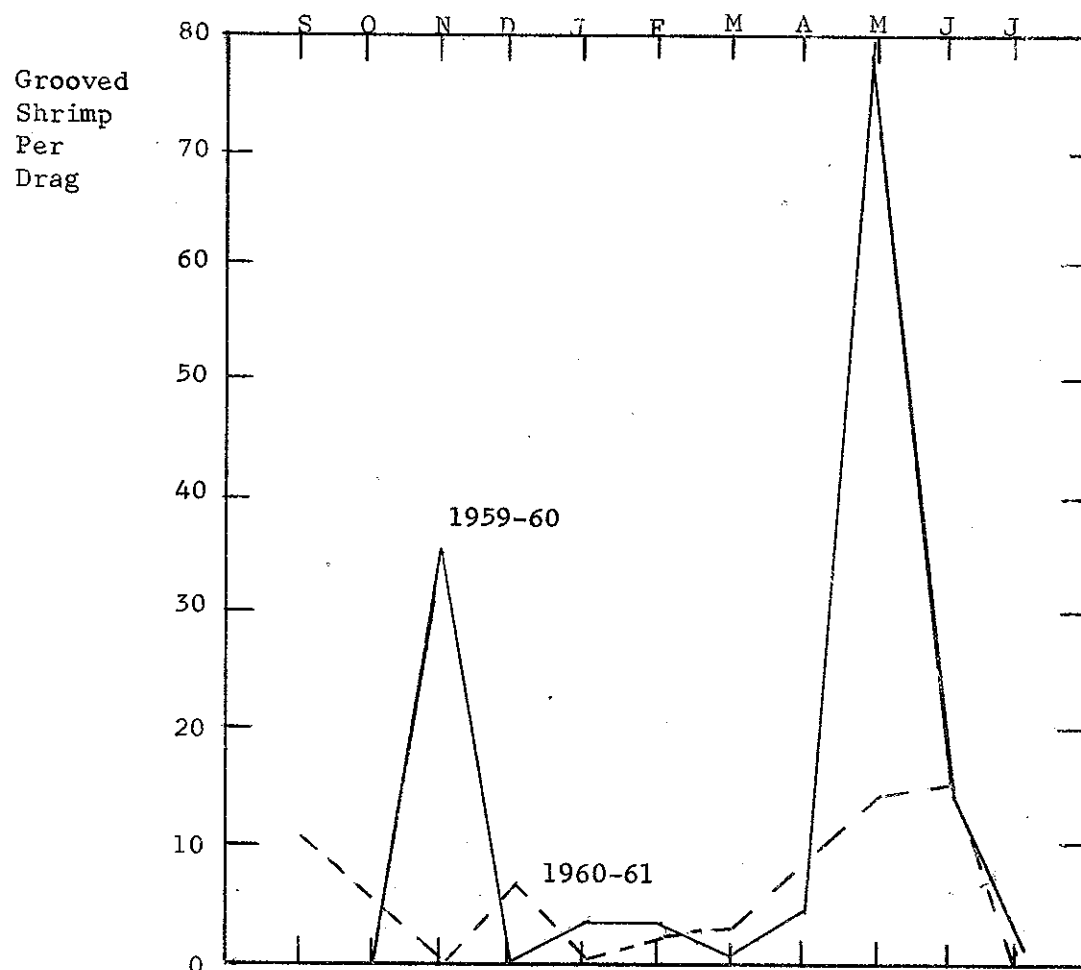
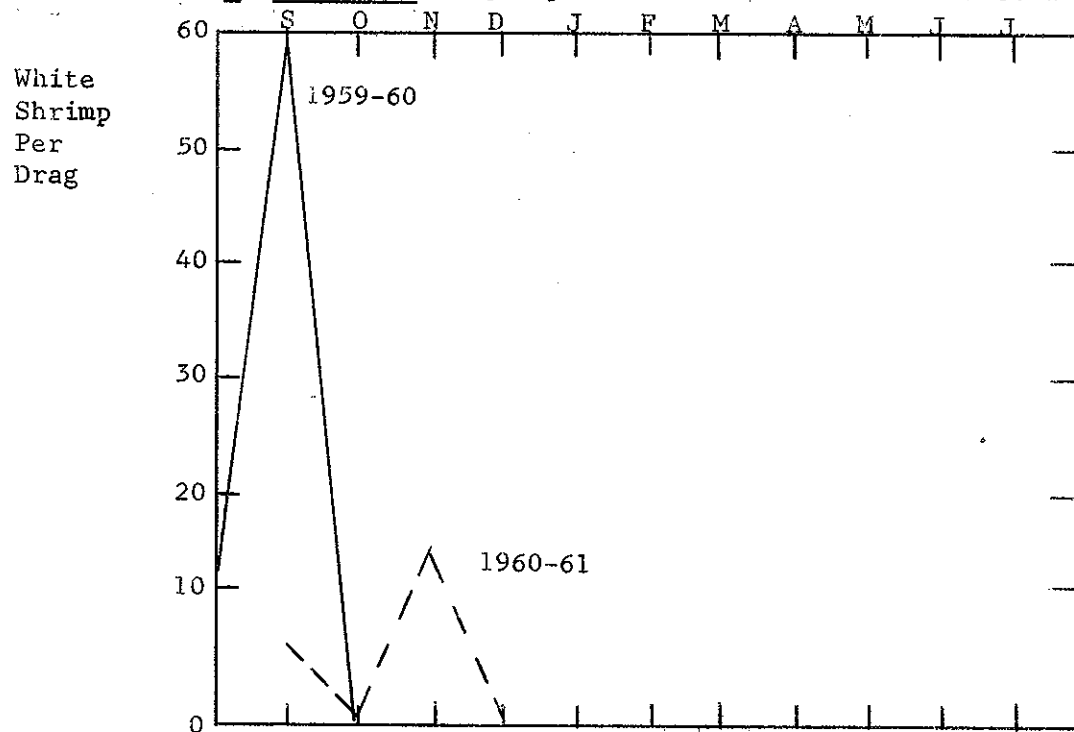


Figure 3. Grooved Shrimp per 15-minute trawl in 1959-60 & 1960-61

Figure 4. Major size peaks of P. setiferus and grooved shrimp each month of the 1959-60 & 1960-61 seasons

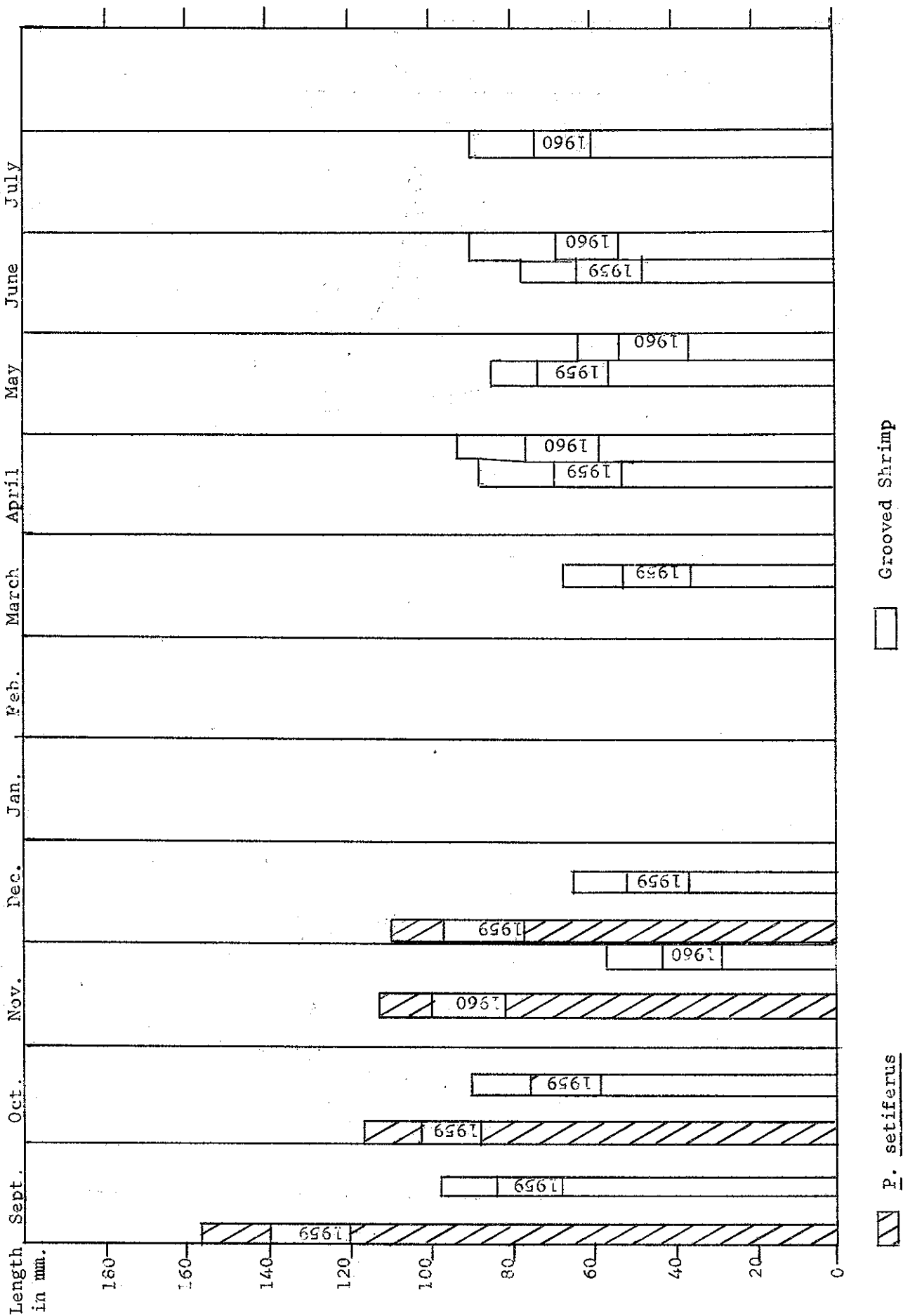


Figure 5. Number of shrimp caught per trawl and average monthly salinities for the 1959-60 & 1960-61 seasons

