

Job Report

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Population Studies of the Blue Crabs of the Lower Laguna Madre

Abstract: Blue crabs were sampled with an otter trawl, minnow seine and trammel net at various locations in the lower Laguna Madre. A net of one millimeter mesh was used to sample larval crabs in the surf.

Poor catches of juvenile blue crabs by otter trawl in the first part of the 1963 study period were probably due to an unsuccessful spawn reported in 1962.

Indications were that mating occurred from April through July, and during October, 1963. A successful spawn occurred in late fall of 1963, as evidenced by an increase of larvae in beach samples in November, and by the prevalence of small juvenile crabs in the bay in November and early December.

Objectives: To determine the seasonal abundance, growth rate, and size of crabs in the Upper Laguna Madre.

Procedures: The locations of all crab stations are shown in Figure 1. Samples were taken at Stations C-1 through C-3 with a 10-foot trawl of 1 1/4 inch stretch mesh and 1/4 inch liner. Samples were obtained monthly from January through July and twice monthly from August to December. Data were converted to standard 15 minute trawling periods when trawling time was limited by excessive vegetation. Beginning in April, samples were taken at Stations S-1 and S-2 with a 60-foot minnow seine of 3/4 inch stretch mesh. Standard drags covered 5,000 square feet. When less area was covered, data were converted to correspond to that area. Beginning in April, samples were taken monthly at Stations T-1 through T-4 with a 1,200 foot trammel net of 12 inch stretch mesh outside and 3 inch stretch mesh inside. The net was not pulled. All crabs were measured by carapace width, identified and sexed.

A bag net of one millimeter mesh, supported by a 1 foot by 3 foot metal frame at the mouth, was used periodically to sample larval crabs in the Gulf surf.

Description of Stations: All trawling was done in the bay over mud bottoms. Each station had a dense cover of shoal grass *Diplanthera wrightii* and water depths from 2 to 4 feet. At Station C-1, which is located adjacent to the Intracoastal Waterway, trawling was confined to the edge of the channel during low tides.

Station S-1 is located in the Callo Atascosa, a shallow tributary which enters the Arroyo Colorado from a system of fresh water empoundments on the Laguna Atascosa Wildlife Refuge. Aquatic vegetation is scarce. Seining was done over mud substrate in depths from 6 inches to 1 foot. Except during heavy rainfall, current was negligible. Station S-2 is located in a channel which

connects a shallow, saline lake to the Brownsville Ship Channel. The area is characterized by an absence of vegetation, a strong current with the falling tide, and moderately high salinities. Seining was done over mud bottom in water depths from 1 to 4 feet.

Station T-1 is located just north of Port Isabel Bay, between the west bank of the Intracoastal Waterway and the spoil banks. Maximum water depth is approximately four feet. The bottom is mostly sand with a cover of shoal grass and algae. Station T-2 (Three Islands area) and T-3 (Green Island) are located east of the Intracoastal Waterway. In both cases substrate is mud with shoal grass cover, and the maximum water depth is approximately three feet. Station T-4 is located approximately four miles south of Port Mansfield along the mainland shore. Maximum water depth is approximately three feet. The bottom is mud with scattered patches of shoal grass.

Findings and Discussion: The average numbers of juvenile crabs (50 mm and under) in trawl samples by month are shown in Table 1. The highest average number from January through October was 3. This scarcity of juvenile crabs was probably due to an unsuccessful spawn reported in 1962 (Osborn 1961-62). An average of 14 occurred at Station C-1 in November, and 13 occurred at that station in December. Scattered sized from 20 to 50 mm's were present in samples until November, at which time a size group from 5 to 19 mm's (11 mm average) appeared throughout the bay. Adult crabs (greater than 50 mm) were seldom taken in the trawl.

Results of sampling at Station S-1 are shown in Table 1. Catches consisted mainly of male crabs from 25 to 200 mm's and immature females from 30 to 100 mm's. Females remained at the station until ready for mating and then moved out into the bay (there was no evidence that mating occurred in the area). Many of the males remained for longer periods of time as indicated by the large size of some individuals. This was the most productive nursery area sampled, due primarily to low salinities (from 14.2 ppt to 25.8 ppt) which existed while the area was connected to the Arroyo Colorado. However, migrations into and from the area were dependent upon high tides or heavy rainfall, or a combination of both. In July, the station was isolated by low tides, and after a mortality of blue crabs and other organisms in late summer, the area was reopened by high tides and fresh water run-off in September.

Relatively few blue crabs were taken at Station S-2. This was due in part to the strong tidal currents which were probably avoided by crabs, and to the comparatively high salinities which averaged 34.7 ppt. Also, the steep slope of the channel made seining somewhat ineffective.

Of the trammel net stations, T-4 produced the largest numbers of adult blue crabs. Crabs were present in all months except November and December. The abundance of crabs at this station may be related to its proximity to the mainland shore and a source of fresh water run-off.

Occasional catches of sponge crabs and mating pairs at Stations T-1 and T-4 from April through July, and a high incidence of immature females at all stations in October, indicated periods of mating.

Large numbers of larval crabs were taken in beach samples at Boca Chica in March. Some of these were reared in aquaria and identified as the Gulf blue crab, Callinectes danae. Very few larval crabs appeared in samples until November, when approximately 100 were taken in a sample at Boca Chica. Since this increase corresponded in time to a peak of juvenile blue crabs in the bay, it was assumed that the sample was composed mainly of blue crab larvae.

The increase of larval crabs in November, and the "wave" of juvenile crabs at an average size of 11 mm which entered the bay in November and December, indicated a successful spawn during the late fall of 1963. There was evidence of only limited spawning during the spring and summer.

Comments: The addition of a larger number of stations for each sampling technique presently used should yield valuable information concerning the availability of blue crabs as related to salinity, temperature, and other conditions. Further, crab traps should be used in order that the deeper waters of the bay could be sampled effectively, and a record of catch per unit of effort could be maintained for comparison with other areas of the Texas Coast.

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Bibliography

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Project Reports, Coastal Fisheries, Texas Game and Fish Commission, 1961-62.

Table 1

Monthly Catches of Crabs Per Sample, By Station and Gear

	10 Ft. Trawl (Ave.)				60 Ft. Seine			1,200 Ft. Trammel Net				
	C-1	C-2	C-3	Total	S-1	S-2	Total	T-1	T-2	T-3	T-4	Total
January	0	0	0	0	--	--	--	--	--	--	--	--
February	0	0	3	3	--	--	--	--	--	--	--	--
March	0	0	0	0	--	--	--	--	--	--	--	--
April	0	0	0	0	3	--	3	3	5	10	12	30
May	3	0	0	3	14	2	16	3	1	1	11	16
June	2	0	0	2	32	3	35	2	0	1	7	10
July	0	0	3	3	18	0	18	0	0	0	8	8
August	1	1	2	4	19	2	21	0	0	--	4	4
September	0	0	0	0	0	3	3	1	0	0	5	6
October	1	0	0	1	--	0	0	2	8	3	8	21
November	14	4	12	30	6	0	6	0	4	0	0	4
December	13	2	0	15	--	--	--	0	0	--	0	0
Total	34	7	20	61	92	10	102	11	18	15	55	99

Figure 1

Blue Crabs -
Laguna Madre
Location of Stations

C- = Trawl Stations
S- = Seine Stations
T- = Trammel Net Stations

