

Crecimiento de Una Sub-población de Lisa (*Mugil cephalus*) en la Costa Occidental de la Florida

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Abstracto

Muestras comerciales extensivas tomadas en 1950, 1951, 1952 y 1953 no dejan lugar a duda de que lisas desembarcadas en la costa Occidental de la Florida se convirtieron progresivamente más pequeñas hacia el Norte y el Oeste del estado. Estudios subsecuentes sobre las lisas juveniles, muestras comerciales, marcas regresadas y análisis de las escamas revelaron le siguiente información acerca del crecimiento de este pez en la costa Occidental de la Florida.

1. La lisa joven llega a un tamaño promedio de 110 mm en Pensacola, 115 mm on Apalachicola, y 148 mm en Cedar Key durante septiembre del primer año de vida. El desove toma lugar durante octubre, noviembre y diciembre.

2. El período de máximo crecimiento de los peces marcados fué durante mayo, junio, julio y agosto. Hubieron indicaciones de que las marcas tuvieron un efecto perjudicial en el crecimiento de los peces.

3. Las escamas tuvieron éxito en obtener la edad y crecimiento de los peces. Sesiones de los radios de las aletas, huesos operculares y vértebras fueron de menos uso, aunque también exhibían marcas anuales.

4. Análisis de las escamas indicó que lisas de Pensacola y Apalachicola crecieron considerablemente más despacio que los mismos peces de Cedar Key y Homosassa.

Seasonal Movements and Growth of the Atlantic Croaker (*Micropogon undulatus*) Along the East Louisiana Coast¹

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The material reported in this paper concerning the biology of the Atlantic croaker was only a part of that gained from an intensive biological study of Lake Pontchartrain. The full-scale sampling program was started in July, 1953 and has continued to date. The croaker and the southern bay anchovy (*Anchoa mitchilli diaphana*) were the two most abundant species in the estuarine areas sampled in this study. Croakers appeared in 83 per cent of the trawl catches and 76 per cent of the seine catches during a one year period of sampling in Lake Pontchartrain.

¹ Most of the material was obtained during a Biological Study of Lake Pontchartrain, a cooperative investigation by the Zoology Department, Tulane Universtiy, and the Commercial Seafoods Division, Louisiana Wildlife and Fisheries Commission.

Materials and Methods

Table I is based upon 25,081 specimens taken from Lake Pontchartrain during July, 1953 to October, 1954. These fish were obtained by trawling and seining. A sock of $\frac{1}{4}$ inch bar mesh was used over the tail of various sized trawls in order to catch large quantities of small young. Monthly collections were made at fifteen selected localities (Fig. 1). Of these fifteen, ten were designated as trawl stations and five as seine stations. Beside the regular monthly station collections, many supplementary collections were made in various parts of the lake. The data on several thousand croakers captured from the Louisiana marshes and from the Gulf of Mexico were used in the interpretation of growth and seasonal movements, although not included in Table I or Figures 2 and 3. Some of the samples from the Gulf of Mexico were furnished by Mr. Stewart Springer, Chief of Gulf Fisheries Exploration and Gear Research for the United States Fish and Wildlife Service, whom the author wishes to thank.

The fish were measured and scale samples removed in the field whenever possible; otherwise, the process was completed upon return to the laboratory. Both total and standard length measurements were taken for a period of a year, after which standard length measurements were discontinued except when scale samples were removed. All total length measurements were made from the anterior tip of the snout to the tip of the center lobe of the caudal fin. This lobe is greatly produced in the young and is the most posterior element. In the large adults the upper tip of the caudal fin is usually longer than the center lobe but was not considered in the measurements. Impressions of selected scales from each sample were made in cellulose acetate with a screw-type press. This apparatus necessitated using acetone to soften the plastic strips before the pressure was applied. A microprojector was used to facilitate viewing of impressions.

Seasonal Movements

In 1953 the croakers migrated from Lake Pontchartrain during September, October and November. By the end of November only the smallest of the young-of-the-year group remained in the lake. The drop in water temperature was directly correlated with this movement of fishes out of the lake and was possibly the controlling factor. The length-frequencies in Table I indicated that the larger individuals of the remaining young-of-the-year group continually straggled out of the lake during November, December, and January. Thus the samples taken during those four months showed a decrease in average length (Figure 2). This, however, was evidently only a reflection of the decreasingly smaller individuals to be sampled, because of the smaller and smaller individuals leaving as the winter progressed. Apparently the migration from the lake stopped during February, or if it continued it was equalled by recruitment, because February and March samples showed progressive increases in length over January samples.

The first young of the 1953-1954 spawning were taken from Lake Pontchartrain in November, 1953. Because the fine meshed trawls and the sock adaptation were not employed until after November, the few young captured during that month probably did not indicate their true abundance. No young less than 10 millimeters in total length were taken at any time during the course of the investigation. The catches in December, January and February contained specimens which measured between 10 and 20 millimeters. Since

TABLE 1

LENGTH FREQUENCY DISTRIBUTION OF CROAKERS (*Micropogon undulatus*) TAKEN FROM LAKE PONTCHARTRAIN, LOUISIANA, JULY, 1953 TO OCTOBER, 1954

mm.	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
0- 9																
10- 19						19	24	12								
20- 29					2	105	65	58	88	8						
30- 39						23	26	245	251	138	10					
40- 49						5	18	244	542	363	572	4				
50- 59					1		9	54	363	405	1346	363	2	1		
60- 69	1					16	11	212	377	993	1001	20	4			
70- 79	15	1				1	8	5	126	445	1094	1481	232	150		
80- 89	77	5						2	30	320	644	1042	309	1089	33	
90- 99	123	82							19	109	174	282	201	880	88	3
100-109	138	344	13						10	38	33	76	63	722	56	101
110-119	165	609	88	5					1	19	12	14	17	339	46	373
120-129	22	526	176	61		1	1		1	4	4	13	3	14	41	225
130-139	3	125	123	126	11	1	28	5	1	3	1		4	1	6	46
140-149	1	26	25	169	31	23	98	37	32	50	2		6	2		10
150-159	1	6	8	103	41	15	58	36	89	220	3	3	1			3
160-169		14	1	52	14	4	14	23	82	283	22	31	4	2		
170-179	3	43		25	9	2	5	8	56	150	21	96	7	1	1	
180-189	9	67		5	1		5		11	60	10	101	26	7	1	1
190-199	10	73		3					10	15	8	78	36	8	1	
200-209	10	53		4	1				3	15	6	55	29	11	4	
210-219	4	26		11					1	7	3	21	19	10	1	1
220-229	7	17	2	13		1				3	2	8	10	5		
230-339	6	11	2	10								8	6	4	2	
240-249	1	4		2						1		8		1	1	
250-259	1	5		3					1	2	1	2	1	4	1	
260-269		3										4		1	2	
270-279	1	4		2								2				
280-289		4		1						1	1	7		1		
290-299	1	1	1		1					1		3		2		
300-309		2		1						1		3				
310-319		1								1	1	1			1	
320-329		2										1			2	
330-339		4								1			2	1		
340-349		3		1									2			
350-359		1														
360-369		3										1	2			
370-379																
380-389													1			
390-399																
400 409																
TOTAL	599	2065	439	597	112	200	375	740	1929	3040	4963	4709	1003	3262	285	763

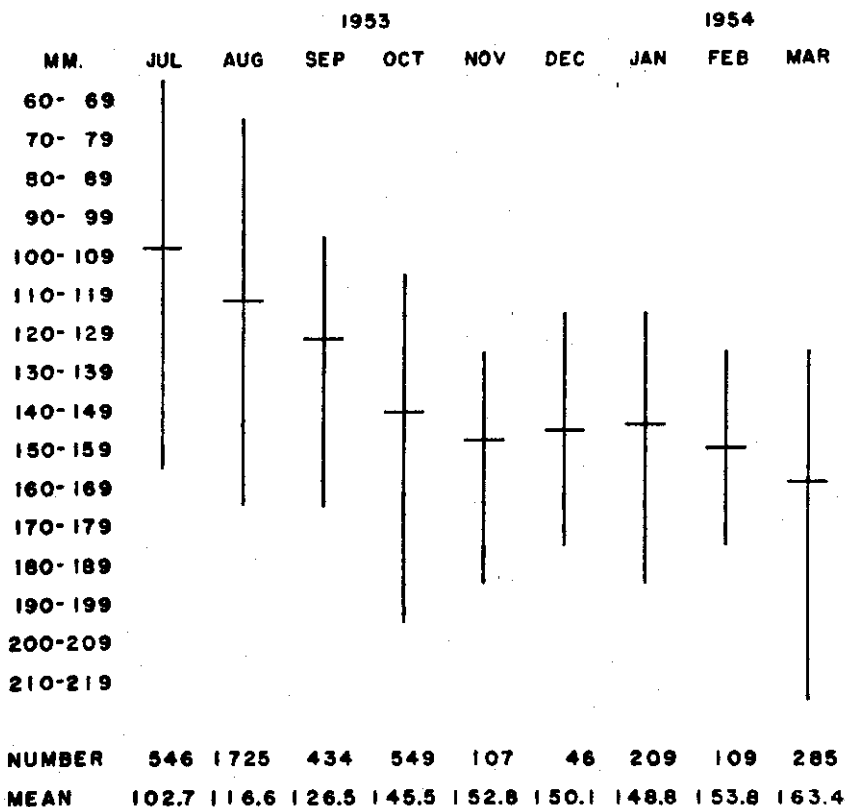


FIGURE 2.—Variation in total length of the 1952-53 spawned croakers taken from Lake Pontchartrain. Vertical lines represent approximate range and cross bars show the means.

no specimens less than 20 millimeters in total length were taken after February, it is assumed that the bulk of spawning occurred during the latter part of October, November, December and January. This assumption is substantiated by extrapolation of the length-frequency pattern in Table 1.

In addition to the above, some information on spawning was gained from an analysis of a series of trawl catches made on November 5 and 6, 1954. Sixteen large specimens were taken from the east end of Lake Pontchartrain. These specimens ranged from 208 to 388 millimeters in total length and their gonads were in various stages of enlargement. There were 14 females and two males. In the smallest male, 208 millimeters, and the smallest female, 260 millimeters, the gonads were greatly enlarged. Out of the 14 females, the gonads of six were greatly enlarged, were not enlarged in three others, and were in various intermediate stages in the rest. These limited data indicate that both sexes spawn at the end of their second year of life.

Wallace (1941) pointed out that young croakers were only found in the deep channel waters of Chesapeake Bay during their movements into the

estuarine areas. He also showed that these bottom waters were more saline and cited Cowles' (1930) work in reference to currents. Cowles reported current measurements and showed a tendency for these bottom waters to move up the bay. Of course, this would make a convenient explanation for the movement of the young fishes to the heads of bays. Other workers have attributed the transportation of young fish to the tidal currents. No specific effort was made to determine the exact nature of the mode of transportation in the Lake Pontchartrain area, but the disposition of the young was similar to that described by Wallace. Young croakers were taken only by trawl during November and December, although many attempts were made by seines in the adjoining shallow marginal waters. Furthermore, greater numbers were trawled from the deep channels than from the shallow trawlable areas. Young individuals were taken by seines from January on, and there were noticeable increases in catch per unit of effort for several months thereafter.

Figure 3 is a comparison of the monthly station samples of croakers for April, May and June, 1953. There was a more or less consistent difference between the mean lengths for the specimens taken from the various stations. One of the most outstanding examples was the comparison between the Bayou St. John and Tangipahoa River specimens. The Bayou St. John specimens averaged considerably smaller, although taken on or about the same date, with the same kind of gear. Data were available for these two stations for several other months not included in the table, and the difference was about the same. Another example, where the stations were relatively close together rather than on opposite sides of the lake, was afforded by comparison of the samples from the Northwest Triangulation Station, Pass Manchac and Tangipahoa River. The specimens from the former consistently averaged smaller than those from the Pass Manchac and Tangipahoa stations. In the samples compared, the Pass Manchac croakers averaged smaller than the Tangipahoa material, although here the difference was within the range of variation found when samples taken from the same locality with the same kind of gear at approximately the same time were compared.

In general the specimens taken from along the north shore averaged larger than those taken from the south shore area. Apparently the young croakers group in the lake after they enter and remain in more or less discrete populations throughout the spring and summer.

Age and Growth

The bulk of the croaker population in eastern Louisiana is composed of two age groups, and in agreement with Gunter (1945) individuals seldom become more than two years old. The croakers taken from Lake Pontchartrain and contiguous waters ranged from 10 to 388 millimeters in total length. By October of 1953 the young-of-the-year ranged from 110 to 200 millimeters in total length. The young-of-the-year of 1954 ranged from 90 to 160 millimeters and thus averaged somewhat less than the 1953 group. On the basis of the October catches for the two successive years the croakers attained a total length of from 90 to 200 millimeters in their first year.

Age determination by the scale method was found to be very difficult because of the extended spawning season and the compounding of the sculpturing on the scales due to the change in habitat, i.e. from cold brackish water, to the relatively warm saline water of the Gulf. Apparently some individuals

spend the entire first year and a half in the lake while others leave at the end of the first year, and so in a sample of two year olds there may be quite a variety of configurations on the scales which reflect these changes in habits and habitats. However, by careful comparison of scale readings, length of

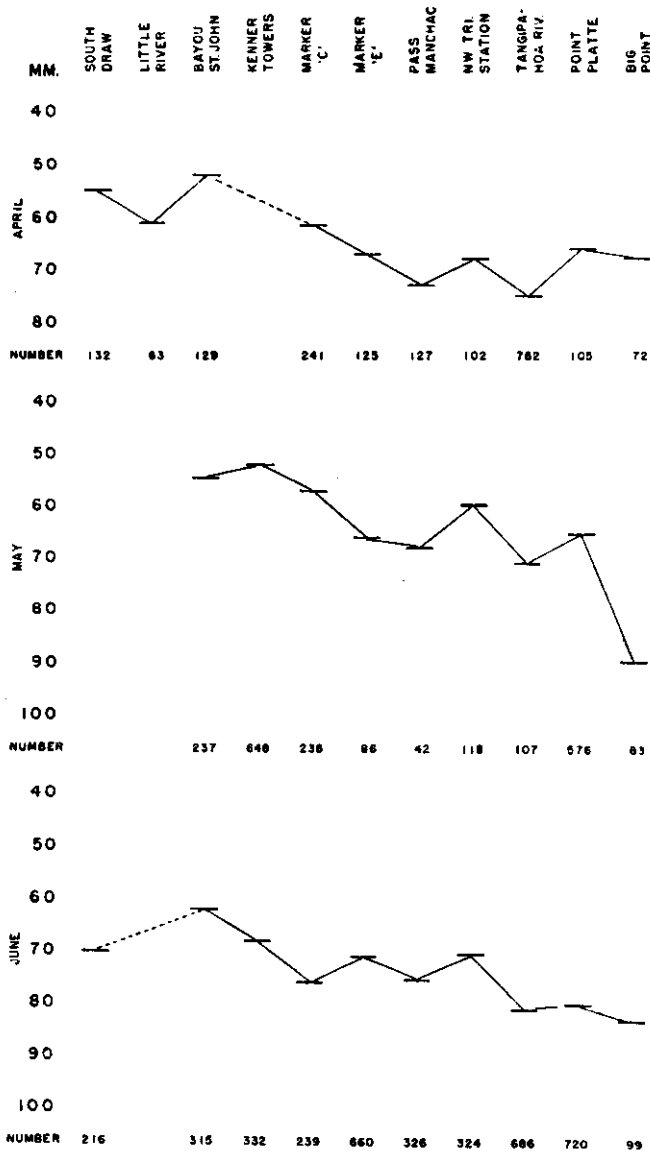


FIGURE 3.—Mean lengths of croakers (*Micropogon undulatus*) taken at monthly stations in Lake Pontchartrain.

specimens, date of samples, and the length-frequency tabulations it was determined that only a few of the specimens collected in the entire course of the study had attained the age of three years.

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Movimientos Estacionales y Crecimiento de la Corbina del Atlántico (*Micropogon undulatus*) a la Largo de la Costa Oriental de Louisiana

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Abstracto

Se recogieron datos de aproximadamente 25,000 corbina las cuales fueron tomadas del lago Pontchartrain y aguas cercanas, de julio de 1953 a septiembre de 1954. Se tomaron muestras de escamas de más de 1,000 especímenes. Un microproyector se usa para facilitar la lectura de las escamas.

Estudios muestran que la mayor parte de la población de corbinas se compone de los grupos de diferentes edades. Estadísticas de las pescas indican que las corbinas adultas se mudan del lago durante septiembre, octubre y noviembre y desovan de octubre a febrero. Sin embargo, el desove en masa ocurre intermitentemente durante el período mencionado anteriormente. Los peces jóvenes entran el lago durante noviembre y continúan moviéndose en el lago hasta marzo del siguiente año. El pez joven más pequeño que se tomó del lago midió de 10 a 14 mm de longitud total.

Una comparación de las pescas de julio, agosto y septiembre de 1953 y 1954 demuestra que los jóvenes del año de 1954 fueron considerablemente más pequeños en longitud total.
