Further Observations on *Astyanax fasciatus* and *Menidia audens* in Lake Texoma

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Astyanax fasciatus mexicanus, Mexican banded tetra. The first known specimen of *Astyanax* from Lake Texoma was taken by Riggs in 1953 (1). This was the only specimen in all of the 13 collections made in that year by methods suitable for collecting small fishes. Riggs attributed the presence of this species in Texoma to bait-bucket introductions, and suggested that environmental conditions in Texoma and other Oklahoma lakes might not be suitable for its survival. This conjecture was based upon opinions of biologists who were better acquainted with the habits and requirements of this fish, and who felt that winter water temperatures were too cold for survival through the winter or for sufficient development of the gonads to permit reproduction. Riggs and Dowell (2) stated that these opinions were not substantiated by their Lake Texoma collections, similarly made in 1954, which included 33 specimens of this tetra (50 to 95 mm., total-length), but they offered no evidence indicating that the fish was actually spawning in the lake. There is such evidence in our collections of 1955.

From the Buncombe Creek arm of Lake Texoma Dowell collected an *Astyanax* with a total-length of 22 mm. on June 2, 1955, and a 19-mm. specimen on June 11. Seven specimens, with total-lengths ranging from 24 to 34 mm., were collected on June 27. Scales from each of these fish were examined and none had an annulus. All were presumably young-of-year.

Because it seemed doubtful to us that fish of this species as small as one inch in length would be sold for bait, we asked Mr. Kermit Sneed, then managing biologist for the Sulphur Fish Hatchery, who was acquainted with most of the wholesale and retail bait dealers in the vicinity of Lake Texoma, if he knew of any bait dealers selling *Astyanax* as small as these. He did not. He informed us that the total-lengths of most of the tetras sold were between two and four inches, usually greater than three inches, and that he had never seen any shorter than 1.5 inches. Other bait dealers were questioned and gave the same answer.

Up to the present time we have taken 49 *Astyanax* from Lake Texoma without any special effort to collect this species. Of these, 39 have been taken in the Buncombe Creek arm, where most of the collections of small fishes have been made, and 37 of the 39 were taken either from pools in the creek channel, temporarily isolated from the lake and from one another because of low water, or from the inundated but narrowed creek channel. Repeating an idea suggested in a previous paper (2), it is not probable that sufficient numbers of *Astyanax* would have escaped or have been discarded from fishermen's bait buckets to establish a population of sufficient size to provide the 49 specimens in our collections. This, along with the occurrence of small, young-of-year fish, strongly indicates that reproduction is occurring in the lake, and that there is some survival throughout the winter.

Menidia audens, Mississippi silversides. The explosive appearance of *Menidia* in Lake Texoma has been mentioned (2). Our collections of 1955 further indicate that the population of this species within the lake is increasing, and at the same time, that the population of the brook silversides, *Labidesthes sicculus*, is decreasing. *Labidesthes* was the only member of the family Atherinidae present in our collections prior to 1954. Atherinids were in 82 per cent (27) of the 33 collections made in 1954 with small-mesh seines. Of these, 25 collections (76%) contained 308 *Labidesthes*, and 19 collections (58%) contained 630 *Menidia*. Of the 31 collections made in 1955 by comparable methods, 61 per cent (19) included atherinids—16 collections (52%) contained 2,088 *Menidia* and 5 (16%) contained only 22 *Labidesthes*.

The fact that the percentage of the collections which included atherinids was smaller in 1955 than in 1954 is probably due to the greater number of collections made in 1955 in Buncombe Creek upstream from the inundated portion, (12 in 1955; 5 in 1954). With this exception, the collections of 1954 and 1955 were made in the same localities and by the same methods. Mr. Ed. Bonn, of the Texas Game and Fish Commission, who collects regularly in Lake Texoma, has noticed a similar change in the populations of *Labidesthes* and *Menidia*... Of the total of 18 collections made during 1954-55 that did not include atherinids, only one was made in the wide, inundated area of the Buncombe Creek arm or in the main body of Lake Texoma. The remaining 17 were made upstream in the narrow creek channel and most of these in isolated pools above the region subject to inundation. Of the 22 *Labidesthes* collected in 1955, 17 were taken above this region. No *Menidia* have been taken here.

If the present trend of population change continues, it appears that *Labidesthes* will be confined to the tributary streams upstream from the upper limits of inundation, and that *Menidia* will completely take over the areas of the main body of the lake previously occupied by *Labidesthes*. It is possible, of course, that this sudden population change is only temporary. We do not know the reason why *Menidia* is so much more successful in the lake environment. We do know that *Labidesthes* is still one of the most abundant species in many southwestern impoundments that are much older than Lake Texoma and where *Menidia* is not present.

LITERATURE CITED

1. Riggs, Carl D. 1954. The occurrence of *Astyanax fasciatus mexicanus* in Lake Texoma, Oklahoma. Proc. Oklahoma Acad. Sci., 33(1952) :141.
2. Riggs, Carl D. and Virgil E. Dowell 1956. Some recent changes in the fish fauna of Lake Texoma. Proc. Oklahoma Acad. Sci., 35(1954) : p. 87.