
**Menidia audens (Pisces: Atherinidae) in Boomer Lake,
Oklahoma, and its Possible Spread in the
Arkansas River System¹**

MORGAN E. SISK and ROBERT R. STEPHENS

Department of Zoology, Oklahoma State University

The first record of the Mississippi silversides (*Menidia audens* Hay) from the Arkansas River system in Oklahoma was taken from Boomer Lake, Stillwater, Payne County, on 14 February 1964. Two specimens, one male (86 mm S.L.) and one female (80 mm S.L.), were taken from the lake proper and on the following day a single specimen was collected from a small pool in Boomer Creek about 100 meters south of the lake

¹Contribution from the Research Foundation and Number 395, Department of Zoology, Oklahoma State University, supported by the National Science Foundation Grant No. G16157.

dam. Within two weeks from the initial collection date, a series of 47 was collected from the lake and a single fish from Fair Park pool, Stillwater, about two miles downstream from the dam. These records represent a northern range extension in Oklahoma of approximately 150 air miles.

Moore and Cross (1950) published the first Oklahoma record of the Mississippi silversides. Three specimens were taken from harpits flooded by waters of the Red River in Bryan County. Moore (1954) indicated that the species is restricted to the Red River system in Oklahoma.

Boomer Creek flows into Stillwater Creek immediately southeast of Stillwater, thus the possibility of the species occurring in Stillwater Creek, both above and below the mouth of Boomer Creek, exists. However, neither Moore and Mizelle (1939) nor Cross (1950) collected *M. audens* in their surveys of the Stillwater Creek drainage system, suggesting a recent introduction of the species into Boomer Lake. This was confirmed by Dr. W. H. Irwin, formerly of Oklahoma State University, in reply to a letter of inquiry. Dr. Irwin and party collected and transported many *M. audens* from Lake Texoma to Stillwater for use in bioassay tests July, 1961. After termination of the tests in September, 1961, the remaining specimens, numbering less than one hundred, were placed in Boomer Lake by Dr. Irwin.

The species has obviously fared well in Boomer Lake. Successful reproduction is attested to by the presence of yearling fish in our recent collections. Gonad examination indicates they will spawn again this year. An attempt will be made to verify this later in the spring by collecting eggs and fry.

It is probable that *M. audens* will not remain restricted to Boomer Lake. The species has escaped at least once from the lake and may soon be expected in the Cimarron River, unless the polluted condition of lower Stillwater Creek provides a sufficient barrier. With the filling of Keystone Reservoir on the Arkansas River, this population may provide the stock to populate the reservoir above Keystone Dam. Should this condition prevail, an interesting succession might result paralleling a similar situation observed in Lake Texoma concerning *M. audens* and another atherinid, the brook silversides, *Labidesthes sicculus* (Cope). It appears that the two are not compatible where they occur together and *M. audens* tends to replace *Labidesthes sicculus* (Riggs and Bonn, 1959).

Prior to impounding the Red River, *L. sicculus* was common in tributaries to the river in southeastern Oklahoma and presumably maintained itself in the resulting Lake Texoma for a number of years. Following the report of Moore and Cross (1950) of *M. audens* in the Red River System, a rapid, almost explosive, increase in numbers of this species in the lake was noticed (Riggs and Dowell, 1956). It now appears that this increase occurred at the expense of *L. sicculus*, for *Menidia* has become, within a few years, one of the most common species in the fauna, while records of *Labidesthes* from the impoundment over the same period have become extremely rare (Riggs and Bonn, 1959; Dowell and Riggs, 1958). In contrast, Dowell and Riggs (1958) reported that *Labidesthes* remains abundant in other southwestern impoundments where *Menidia audens* is not present. *Labidesthes* may, however, remain extant in southeastern tributaries of the lake not invaded by *M. audens*. From these observations one suspects that *M. audens* is better adapted for survival in impoundments when in competition with *L. sicculus*.

It is known that *L. sicculus* presently occurs in Sand, Mission, Black Bear, Lagoon, Hellroaring and Salt creeks, all tributaries to either the Arkansas or Cimarron rivers and eventually Keystone Reservoir. These

and similar streams could provide an adequate population of the brook silversides for the new impoundment. Whether *M. audens* will invade Keystone Reservoir from upstream via the Boomer Lake population or from the Arkansas River by some unknown route of entry (similar to the course the species may have taken into Lake Texoma) may never be known. Should both species eventually become established in Keystone Reservoir, and this is quite possible, careful observations pertaining to their abundance will provide valuable information in determining whether or not one species supersedes the other as the dominant atherinid in the lake. The Arkansas River below the dam warrants periodical examination for, with the closing of Keystone Dam, the lower portion of the stream may change enough to permit invasion from downstream by *M. audens*.

It will be most interesting to observe whether or not the history of the two species in Lake Texoma will be repeated in Keystone Reservoir.

LITERATURE CITED

- Cross, Frank B. 1950. Effects of sewage and of a headwaters impoundment on the fishes of Stillwater Creek in Payne County, Oklahoma. Amer. Midl. Nat., 43(1):128-145.
- Dowell, Virgil E. and Carl D. Riggs. 1958. Further observations on *Astyanax fasciatus* and *Menidia audens* in Lake Texoma. Proc. Okla. Acad. Sci., 36 (1955):52-53.
- Moore, George A. 1954. Oklahoma fishes with distributional notes and keys. Mimeographed by Okla. A. & M. College, Stillwater.
- and Frank B. Cross. 1950. Additional Oklahoma fishes with validation of *Poeciliichthys parvipinnis* (Gilbert and Swain). Copeia, 2:139-148.
- and John D. Mizelle. 1939. A fall survey of the fishes of the Stillwater Creek drainage system. Proc. Okla. Acad. Sci., 19:43-44.
- Riggs, Carl D. and Edward W. Bonn. 1959. An annotated list of the fishes of Lake Texoma, Oklahoma and Texas. Southwestern Nat., 4(4):169-175.
- and Virgil E. Dowell. 1956. Some recent changes in the fish fauna of Lake Texoma. Proc. Okla. Acad. Sci., 35(1954):37-39.