The Occurrence of *Signalosa petenensis* in Lake Texoma[1]

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The first specimens of the threadfin, *Signalosa petenensis*, recorded from Oklahoma were collected in May, 1953 (Miller, 1955) from the Red River below Denison Dam, Bryan County. Since then the species has been taken several times in the same general locality by one or the other of the authors; the largest collection included 68 specimens taken by Riggs in June, 1956, from the draft tube of one of the service generators of the Denison Dam, which impounds Lake Texoma. Recalling the local history of the Mississippi silversides, *Menidia audens*,—first collected in the Red River below Denison Dam in 1951 where it was very abundant; first collected (one specimen) in Lake Texoma in 1953, and collected in great abundance in Texoma in 1954 (Riggs and Dowell, 1956)—we predicted that *Signalosa* would appear in Texoma within three years.

The first recognized specimen taken from Lake Texoma was caught in a gill net on July 4, 1957, and was easily identified by the yellow in the fins and the projecting lower jaw. Later this same day more than 50 were taken in a six by four-foot minow seine. Collections made with seines and rotenone throughout June, July, and early August included thousands of threadfin. (It is ironical that the first record was a single specimen, a yearling, taken in a gill net with mesh large enough, 1½-inch bar mesh, to allow the fish to swim through easily without touching the thread.) After it became evident that the species was so abundant, collections made in 1956 and earlier in 1957 were re-examined. No *Signalosa* was found in the 1956 collections, but a collection which included 395 clupeids taken from the Hickory Creek arm of Lake Texoma on June 14, 1957, contained 51 yearling *Signalosa* and 344 gizzard shad, *Dorosoma cepedianum* (Table

[1] Contribution of the University of Oklahoma Biological Station, Lake Texoma.

I). This collection was made by personnel of the Oklahoma Fishery Research Laboratory who applied rotenone to a small cove. They returned on August 6, 7, and 8 and applied rotenone to three coves along the Oklahoma side of the Red River arm of Lake Texoma. These coves were about equally spaced along 12 miles of shore; two were off tributary bays, and one was on the east side of Island II (see Riggs and Smithpeter, 1954) in the main body of the lake. A total of 5,732 threadfin were taken in these three collections—4,829 young-of-year (84.2 percent), and 903 (15.8 per cent) yearlings (Table I).

Each year since Lake Texoma was filled (1945) the gizzard shad has apparently been the most abundant fish in the lake. It was quite surprising, therefore, to find that 63.9 per cent of the clupeids collected, in these samples obtained by the use of rotenone, were threadfin, especially since none was present in the collections of the previous year. The fact that large numbers were taken at four widely separated localities certainly indicates that a large population of the species is already established in the lake. The source of this population is not definitely known, but three methods of entry are credible, and any one or all of them could be involved. The possibility that the threadfin was introduced from bait-buckets was quickly eliminated since it is a very difficult species to transport alive. The large population appeared too suddenly.

Since the level of Lake Texoma reached an unprecedented height (643 feet above sea level) during May and June, 1957, and water flowed over the spillway at a depth of three feet, it is quite possible that a large number of adult threadfin were able to swim up over the spillway into the lake. Threadfin are reported to spawn in the fall of their first year of life and as yearlings (Berry *et al.*, 1956); therefore, all of the threadfin which might have entered the lake over the spillway could have been capable of spawning.

It is also quite possible that the Lake Texoma threadfin population came from escapees from the U. S. Fish Cultural Station near Tishomingo, Oklahoma. This hatchery gets its water from Pennington Creek, one of Lake Texoma's larger tributaries, and all of the hatchery ponds drain into Pennington Creek. Mr. C. E. Cozort, superintendent of the Tishomingo hatchery, has informed us (correspondence) that he obtained a small number of threadfin from Wheeler Reservoir, Alabama, in the spring of 1954. They were propagated successfully, and many fry could have escaped into Pennington Creek. Those kept at the hatchery died during the first cold weather of December and there has been no further propagation of the species at this hatchery.

In November, 1954, about 2000 of the threadfin propagated at the Tishomingo hatchery were introduced into Mountain Lake, a small impoundment on a tributary of the Washita River, Carter County. There was no evidence that the species spawned in this lake . It was drained in October, 1956, and no threadfin were taken. The lake was at low level during the period between stocking and draining, and it is quite doubtful that any threadfin escaped into Lake Texoma below. Responsible officials in both Oklahoma and Texas professed no knowledge of the introduction of the threadfin into other lakes or ponds on the Red River drainage above Denison Dam.

We intend to sample the population of the threadfin in Lake Texoma during the next few years in order to determine its success. It has done well in some of the T. V. A. reservoirs. It is said to be an excellent forage fish (Kimsey, 1954; Parsons and Kimsey, 1954). It is prolific, spawns at an early age, rarely lives as long as three years, and its maximum size rarely exceeds seven inches. It is not tolerant of low temperatures or sudden temperature decreases (Hubbs, 1951; Berry *et al.*, 1956). This

TABLE I

Numbers and pounds of threadfin and gizzard shad taken by the application of rotenone to three coves in Lake Texoma, 1957.

Locality and Date	Threadfin				Gizzard Shad				Total both Species
	Yearlings		Young-of-year		Adults		Young-of-year		
	Number	Weight (lbs)	Number	Weight (lbs)	Number	Weight (lbs)	Number	Weight (lbs)	
Limestone Creek August 6	850	29.8	1,222	3.5	85	15.6	759	8.6	2,916
Island 2 Cove August 7	53	1.9	1,547	4.3	278	65.7	1,164	10.1	3,042
"West Neck Cove"* August 8	0	0.0	2,060	5.7	71	16.4	570	5.7	2,701
Sub-totals	903	31.7	4,829	13.5	434	97.7	2,493	24.4	8,659
Hickory Creek June 14	51	1.4	0	0.0	208	36.5	136	0.3	395
Totals	954	33.1	4,829	13.5	642	134.2	2,629	24.7	9,054
Total number each species			5,783				3,271		
Total weight each species			46.6				158.9		
Per cent total number			63.9				36.1		
Per cent total weight			22.7				77.3		
Per cent total young-of-year			64.7				35.3		

* Located in upper end of small bay about four miles west of Biological Station.

may limit its success in Lake Texoma, since, during the winter, ice occasionally forms in the very shallow water and the temperature drops at least as low as 40°F. in deeper water (Dowell, 1956).

One apparent effect of the presence of a large population of *Signalosa* in Lake Texoma, at least during the first year of its occurrence, was the seasonal prolongation of vigorous surface feeding of the white bass, *Roccus chrysops*. For the past nine years we have noticed that this species feeds voraciously and extensively at the surface on young gizzard shad from late May through mid-July, but only sporadically from mid-July through September. This year, however, extensive surface feeding continued through the end of August. Stomachs examined from white bass caught from surface-feeding schools in August contained mostly threadfin. It is possible that the presence of the threadfin, a considerably smaller fish than the gizzard shad, might result in an annual extension of this phenomenally productive sport fishery.

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