
Collecting Fish by Combined Use of a Seine and an Electric Shocker¹

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The electric shocker has received extensive use in recent years as a method of collecting fishes. Descriptions of various types of these devices, and of the most effective methods of employing them, can be found in several of the many recent publications on the electric shocker (1-6). The usual methods of recovering the stunned fishes are to dip them out with long-handled dip nets (5, 6), or in swift water, to stretch a seine across the portion of the stream immediately below the shocker and thus catch them as they drift downstream with the swift current (6).

Although the electrical method of collecting fishes is generally superior to seining and many other methods (1-3), common criticisms of this method are that it is difficult to use effectively in turbid water, and that stunned fish tend to collect under rocks, logs, undercut banks, in dense vegetation, etc., and are not recovered.

On March 31, 1951, while my Fishery Biology class and I were studying stream fishes and the various methods of collecting them, a method of combining the electric shocker and seine methods of collecting was used which produced unusual results in turbid water.

We had been using a shocker in the conventional way for quiet water (i.e., following the shocker with long-handled dip nets and recovering stunned fishes) in a small, unnamed lake in the Salt Plains National Wildlife Refuge, Alfalfa County, Oklahoma. The stream which was dammed to impound the lake was small (two to four feet wide in most places), but just below the dam was a pool approximately 19 feet long, 5 to 12 feet wide, and from one to four feet deep. It had been cut out by recent high water and was actually off to the side of the normal course of the stream, but some water flowed through it. It was clear before we started seining, and its banks were undermined and perpendicular with dense mats of roots of Bermuda grass and other small plants projecting into the water. Numerous tree and bush roots also protruded outward and downward from the eroded banks.

We began seining with a 6- by 25-foot bag seine, but found it too large and the bottom too full of roots and trash for efficient use. We then used a 4- by 6-foot, common-sense minnow seine, $\frac{1}{4}$ -inch mesh, and found it much better. Within twenty minutes we had collected 27 fish, including six

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TABLE I
 Kind, Number, and Size Range of Fishes Collected by Seine, Electric Shocker,
 and Seine and Electric Shocker Combined.

SPECIES OF FISH	TOTAL- LENGTH RANGE (MM.)	TOTAL NUMBER OF FISH	SEINE	ELECTRIC SHOCKER	SEINE AND ELECTRIC SHOCKER
Carp (<i>Cyprinus carpio</i>)	383-446	2		1	1
Emerald shiner (<i>Notropis atherinoides</i>)	39	1			1
Red shiner (<i>Notropis lutrensis</i>)	45-47	2			2
Fathead minnow (<i>Pimephales promelas</i>)	47-49	31	4	6	21
Black bullhead (<i>Ameiurus melas</i>)	51-156	65	5	2	58
Mosquitofish (<i>Gambusia affinis</i>)	39-62	17	11	3	3
Largemouth bass (<i>Micropterus salmoides</i>)	96-291	3	2	1	
Green sunfish (<i>Lepomis cyanellus</i>)	40-189	39	12	7	20
Orangespotted sunfish (<i>Lepomis humilis</i>)	38-66	9			9
Bluegill (<i>Lepomis macrochirus</i>)	37-147	31	3	11	17
Black crappie (<i>Pomoxis nigromaculatus</i>)	205	1			1
Total and grand total		201	37	31	133
Number of species		11	6	7	10

species (Table I). The last 11 consecutive seine-hauls caught no fish. Most of the specimens had been taken in the first five or six hauls. By this time the water was very turbid.

Although the shocker already had been put away, we decided to use it again to see if the pond was as empty as the seining indicated. As soon as the generator was started, fishes began to appear at the surface and were picked up with the long-handled dip nets. Seven species (24 individuals) were quickly taken, including the six taken by seining and one addition, the carp (Table I).

When another large carp appeared at the surface, sank, and failed to re-appear, the generator was turned off and the area was dragged with the 6-foot seine. Although the first haul was no longer than six feet, 11 fish, including seven species, were taken. Two of these species, the orangespotted sunfish and the black crappie, had not previously been taken. Additional hauls continued to recover additional specimens, but the numbers quickly declined. We started the generator again, moved the electrodes along the length of the pond, turned off the generator, and seined again. This time the first seine haul took 16 individuals and another species new to our collection. This process was repeated for 45 minutes, until the returns became too small to be worth the effort. (During this time seven additional specimens were dipped from the surface with the dip nets.) Altogether, 10 species (133 individuals) were collected by this combined shocker-seine method (Table I), including all species taken, except the largemouth bass. This was after the seine alone, and the shocker alone had each been used until it failed to produce.

Combined data for the three methods are presented in Table I. Undoubtedly the shocker alone would have taken more fishes had we not seined first, and had we waited until the fishes again became active and repeated the shocking technique.

During June, 1951, the shocker-seine method was used, with similar results, near the University of Oklahoma Biological Station, Lake Texoma, in a very turbid pool in Limestone Creek where the bottom was strewn with large boulders. Here again we had used a 4- by 6-foot seine alone with poor success, and the same shocker with only limited success. During employment of the shocker-seine method, the seine was pulled rapidly through the water and above the tops of the boulders. The current and turbulence so produced apparently kept the stunned fishes moving about in these currents, not allowing them to sink down among the boulders, and one of the subsequent seine hauls collected them.

Additional evidence, particularly from controlled collecting where the number of fish present is known, is needed to prove the indicated superiority of this method in turbid water. However, since this method combines the use of the electric shocker and seine in a way considerably different from any which I have found described in the literature, and since it was far more successful in collecting fishes from turbid water than the commonly described methods employing the shocker. I feel that the method should be described so that others might utilize it and experiment further with it.

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