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WITH ROTENONE

by

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During the last five years Kentucky biologists have noticed and discussed the extreme sensitivity of gizzard shad, Dorosoma cepedianum, to rotenone. In population studies on Kentucky, Cumberland, Herrington, and Dewey Lakes it was noted that shad were nearly always the first to show distress after rotenone application, and that other shad swimming into the area days later would continue to die long after the toxicity of the water had fallen below the lethal point for other species of fish.

Rotenone treatment to kill shad without harming other fishes was first attempted in Kentucky on Kentucky Lake in the summer of 1950. In this experiment the idea was to use rotenone at standard concentrations directly upon the surfacing schools of shad. It was reasoned that one pound of rotenone per surface acre in pelagic areas would form a lethal concentration in the top few feet of water, where the shad were observed; and would dilute to a non-lethal concentration as it sank into deeper water where the other species would normally be found. This work was done in the middle of the day during the summer, when shad were at the surface in large schools.

Although this experiment was successful in that practically no other fishes were killed, the time consumed and the effort expended spraying individual schools of shad was not justified considering the relatively small num-

bers of the total shad population killed. It was thought that aerial spraying of surface-feeding shad was feasible, however, this possibility was not followed up at that time.

In the summer of 1954 a serious shad problem was found to exist in Carpenter Lake, a seventy-acre state-owned impoundment located nine miles northeast of Owensboro, Kentucky. It was decided to attempt to selectively poison shad with a low concentration of rotenone. If a large portion of the shad population could be eliminated, it was reasoned that better living conditions might be created for the other species in the lake. These species included largemouth bass, bluegill, black and white crappie, green sunfish, longear sunfish, warmouth, bullhead, drum and several species of minnows.

Final plans were made to treat the lake in October, 1954. At the time of treatment the water was 65° F., had a pH of 7.4 and a total alkalinity of 60 ppm. The depth averaged 5 feet with a maximum of 11 feet.

It was decided to treat the area at a concentration of one-tenth part per million, and add more rotenone, if needed, until a shad kill was achieved. A mixture of 5% powdered rotenone was sprayed over the lake surface with a gasoline powered centrifugal pump from an outboard motor boat. An attempt was made to control the spray so as to get not more than 0.10 ppm in the shallow areas and at least 0.10 ppm in the deeper areas.

Shad began showing signs of distress within fifteen minutes after each area was sprayed. No additional rotenone was needed.

The shad died within an hour after treatment except for a few individuals which were still surfacing at nightfall. All activity was over by the next morning.

Shad did not float to the surface in great numbers until the second day after treatment. Twenty-seven homes on the lake shore made removal of the shad mandatory.

Since about fifty pounds of shad per acre were expected, only two men, the biologist and assistant, were present. Two laborers had to be hired when it became apparent that shad were present in much greater numbers than had been anticipated.

The containers used to hold the recovered shad were filled and weighed at the beginning of the removal program. After that the containers were counted as the shad were dumped into the burial holes.

In seven days fourteen thousand and fifty pounds of shad were picked up and buried, and an estimated six thousand pounds decomposed and sank before being picked up. Nine 8 to 10-inch bass, and one hundred and thirty 5 to 6-inch bass were killed. Thirty-five 6 to 7-inch bluegill, one thousand 1 to 4-inch bluegill, and four 6 to 8-inch bullheads were also killed. No minnows, drum or crappie were recovered. It is believed the bass, bluegill and bullheads killed were in shallow areas where the concentration of rotenone became too high in spite of the precautions taken.

One area was resprayed three days later to determine if any shad had survived the original treatment. No further shad kill was observed, however, time alone will tell whether the total population of shad was eliminated.

Within three days a definite increase in fishing success was noted, with bass activity around the bank quite noticeable.

Two hundred and eighty-five pounds of shad per acre were removed from

this lake with the loss of less than one pound of game and pan fish per acre. The project met with approval and enthusiasm of the local fishermen and residents around the lake, most of whom are fishermen.

Kentucky is at present planning selective poisoning of shad in a nine hundred acre lake in eastern Kentucky and possibly one or two more smaller lakes.