

THE EFFECT OF DDT EMULSIONS ON TROUT FRY

L. C. CURTIS
Victoria, B.C.

During the past year, the staff of the Dominion Livestock Insect Laboratory at Kamloops achieved success in the control of *Simuliid* larvae in running water by the addition of a DDT emulsion. The material used was a stock solution of 10% DDT, 10% Triton X100*, and 80% Xylene, which was added to the running water at a controlled rate. Effective control of the pest was obtained by a final dilution of one part DDT to 20,000,000 parts water.

As always in work of this nature, there arose the question of the effect of this treatment upon other fresh water life, particularly game fish, and this the writer attempted to determine during a brief visit to Kamloops.

The apparatus used consisted of a sheet metal trough, divided by a partition into two parallel channels, provided with a flow of running water from Cold Creek. At the upper end of the trough was situated the dropping apparatus which delivered the DDT solution beneath the surface of the water at a controlled rate. Below this, the water passed through a series of baffles to ensure thorough mixing of water and larvicide, while further down the trough, removable screens of fine mesh formed pens in which were held the fish under test. The reserve supply of fish was held in screened troughs in the nearby bed of the creek, which also served as the source of an unlimited supply of *Simuliid* larvae. The fish were one-inch trout fry, obtained from the Provincial Hatchery at Pinantan Lake.

TEST No. 1

A batch of 100 fish was penned in the trough, together with a stone covered with *Simuliid* larvae, and subjected to a flow of water containing one part DDT to 30,000,000 of water.

After twenty minutes, the larvae showed signs of distress, and in less than an hour they had all become detached from the substratum and carried away. The fish appeared to be unaffected, but were removed to a trough in the stream bed for observation. After twenty-four hours they still showed no sign of distress.

TEST No. 2

The strength of the emulsion was increased to one part DDT in 5,500,000 of water. All other conditions were as before. Ninety-five percent of the larvae became detached at the end of one hour, and 100 percent after 1½ hours. The fish remained lively, and showed no mortality after a period of 48 hours, when placed in the creek.

TEST No. 3

A one percent DDT emulsion was used, giving a final dilution of one part DDT in 2,700,000 of water. The effect upon the larvae was as before, and the fish showed no immediate effect. However, they showed a mortality of ten percent after 24 hours in clear water, and fifteen percent after 48 hours.

TEST No. 4

A dilution of one part DDT in 5,500,000 was maintained for three hours. At the end of that time, all the fish were active. After 24 hours, however, there was a mortality of 50 percent.

TEST No. 5

In this test, a 5 percent DDT emulsion was added, to bring about a concentration of one part DDT in 550,000 of water. This was sufficient to bring about a marked cloudiness. After fifteen minutes, fifty percent of the fish were in distress, and were held by the current against the lower net. After one hour, all the fish were rendered helpless. The emulsion was turned off, and clear water allowed to run over the fish. After thirty minutes, eigh-

*Triton X100 is an emulsifier, product of P. N. Soden & Co., Montreal and Toronto.

ty percent of them were again active, but at the end of 24 hours, all were dead.

TEST NO. 6

The appearance of the fish used in the previous test, particularly during their temporary recovery, suggested mechanical clogging of the gills rather than DDT poisoning as the immediate cause of their stupefaction. To test this theory, equal batches of fry were placed in parallel troughs. Group A were treated with the same concentration of DDT as in Test No. 5, while Group B were subjected to a straight Xylene-Triton mixture without DDT, at the same rate. At the end of one hour both groups were rendered senseless, although the DDT emulsion appeared to act a little more slowly. After the dropping of the emulsion had been discontinued, Group A showed the more rapid recovery, eighty percent of them being active after thirty minutes, compared with sixty percent for Group B. Both groups were left in clear water overnight. After 24 hours, all of Group A were dead,

while ninety percent of Group B were alive and active.

SUMMARY:

It has been found that DDT is effective for the control of *Simuliid* larvae at a concentration of one part in 20,000,000, and it was demonstrated that small trout are able to withstand the effect of a dosage nearly four times as strong without harmful effect and one nearly eight times as strong with but slight mortality.

A very heavy concentration of Xylene causes immediate distress, which is relieved by prompt return of clear water conditions. Actual DDT poisoning occurs at higher concentrations, but is slower in its action than the Xylene.

In conclusion, I very much appreciate the courtesy of Mr. J. D. Gregson of the Dominion Livestock Insect Laboratory, Kamloops, who made available the facilities for carrying out this series of tests, and that of the officer in charge of the Pinantan hatchery, who supplied the trout fry used in the experiment.

In Memoriam

L. E. MARMONT, 1860-1949

Lindsay Edgar Marmont, a native of Gloucestershire, England, came to Canada when 20 years old, and farmed in Manitoba for a number of years.

In 1907 he came to British Columbia, taking up residence at Maillardville, serving that community as a justice of the peace, and reeve of Coquitlam for many years. He was a life member of the Westminster Club, and a prominent Elk.

As an entomologist, Marmont specialized in lepidoptera including the so-called "micros." He was a member of our parent body in Ontario around the turn of

the century, and transferred his membership to this society upon its resuscitation in 1911, and took a keen and steady interest in its welfare, as can be realized by reading his "Presidential Addresses" in years gone by. President from 1921 until 1925, he filled the chair with distinction, dry humour, sound advice, and tolerance of other members' opinions.

He was the last of the old brigade—the Aurelians of B.C.—who did so much for the society in its early days, and the gap will not now be filled.

R. GLENDENNING, Agassiz, B.C.