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# TOXICITY OF GRANULAR MALATHION TO WALLEYED PIKE FINGERLINGS [1]

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INTRODUCTION. Darsie and Corriden (1959) indicated a wide variation in the susceptibility of different fish species to malathion poisoning. The effect of malathion on the walleyed pike, *Stizostedion vitreum* (Mitchill), an important game fish in Wisconsin, has not been previously reported. A laboratory study of malathion toxicity to this species was initiated because of the possible use of malathion for the control of aquatic midges (Diptera; Tendipedidae).

MATERIALS AND METHODS. Batteries of five slate-bottomed aquaria, 10 x 20 x 16 inches, were placed in large water baths at 14.5° C. A 2½-inch layer of mud from Lake Winnebago, Wisconsin, was placed in the bottom of each aquarium, and Madison city water was circulated through the aquaria until 12 inches of clear water remained above the mud. The water was oxygenated by bubbling compressed air through a porous stone just above the surface of the mud.

Two tests were undertaken, each employing a completely random design, with five different treatments and four replicates of each treatment. Commercially prepared 10 percent, 30/60 mesh, AAC RVM malathion granules were used in both tests. In the first test, treatments with granular malathion at 50.0, 20.0, 10.0, and 5.0 pounds actual per acre were compared with a control. Twenty-five walleyed pike fingerlings, 4 to 6 inches long, were placed in each aquarium after the introduction of the insecticide. The number of healthy fish surviving after 24 hours was tabulated. In the second test, application rates of 2.0, 1.0, 0.5, and 0.2 pounds per acre were compared with a control. The procedure used was the same as in the first test, except 16 fish were used in each replicate.

RESULTS AND DISCUSSION. The results are recorded as percentages, and an angular transformation (arc sin $(\%)^{1/2}$) of the data was made prior to statistical analysis

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TABLE 1.—The effect of 10 percent, 30/60 mesh, AA-RVM granular malathion on 4 to 6 inch walleyed pike fingerlings exposed 24 hours at 14.5° C

| | Actual malathion lbs./acre | Malathion p.p.m. (1 ft. water) | Percent surviving | |
|---|---|---|---|---|
| | | | Mean | Mean Angle |
| Test 1 | 50.0 | 18.39 | 0.0 | 0.00* |
| | 20.0 | 7.36 | 0.0 | 0.00* |
| | 10.0 | 3.68 | 0.0 | 0.00* |
| | 5.0 | 1.84 | 5.0 | 11.07* |
| | None | None | 97.0 | 81.37 |
| Standard deviation of samples (Angle)=4.31. | | | | |
| Least significant difference at the 5 percent level (Angle)=6.50. | | | | |
| * Significantly different from the control at the 5 percent level. | | | | |
| Test 2 | 2.0 | 0.74 | 100.0 | 90.00 |
| | 1.0 | 0.37 | 98.4 | 86.38 |
| | 0.5 | 0.18 | 100.0 | 90.00 |
| | 0.2 | 0.07 | 96.9 | 82.75 |
| | None | None | 98.4 | 86.38 |
| Standard deviation of samples (Angle)=6.36. | | | | |
| No significant difference at the 5 percent level. | | | | |

Table 1 shows that no toxicity to walleyed pike occurred at applications of 2.0 pounds of malathion per acre, while severe toxicity occurred at 5.0 pounds. This is 1/20 the rate needed to cause severe toxicity to fathead minnows, *Pimephales promelas* Rafinesque (Hilsenhoff, 1959), showing that walleyed pike fingerlings are considerably more sensitive to malathion poisoning. The walleyed pike were tested at a lower temperature than the fathead minnows, but this is not considered important.

Work by Henderson and Pickering (1958) indicates that malathion emulsions are more toxic to fish than are granular formulations. Incomplete release of the malathion from the granules, and possible detoxification by the mud used in tests with granules could account for the lower toxicity of granular formulations of malathion. The effect of mud in these tests will probably be similar to that encountered in field applications of malathion to aquatic habitats. In spite of a comparatively high toxicity to walleyed pike, malathion granules should provide no hazard to this species when applied at dosages normally used for insect control.

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## POSITION WANTED

Late in 1961 we learned that as a result of reorganization in one of the larger Districts, a highly trained and experienced entomologist on the staff would soon be seeking another position. He has impressive credentials which we have on file, and which we would be glad to place at the disposal of prospective employers. Any one interested may obtain full information from the Editor.