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REPORT ON A FISH KILL IN LAROSE FOREST

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ABSTRACT

A fish kill was investigated on 26 June, 1975, in a small pond in Larose Forest just south of an area treated with the organophosphate insecticide Orthene[®]. An inspection of the pond using scuba gear found that brook trout *Salvelinus fontinalis* (Mitchill) in the pond were very sluggish and a number were found dead or dying on the bottom. Newts, aquatic insects and zooplankton in the pond appeared normal. Collection and analysis of temperature, dissolved oxygen and Orthene[®] residue data showed conclusively that the fish mortality in the pond was caused by lethal high water temperatures and was unrelated to the nearby Orthene[®] treatment.

REPORT ON A FISH KILL IN LAROSE FOREST

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Chemical Control Research Institute

On 26 June, 1975, members of the ecological impact team of the Chemical Control Research Institute investigated a fish kill in the Larose Forest on the property of Mon. R. Charbonneau. The kill occurred in a small pond which had been dug out of a sandpit and stocked with 500 fingerling brook trout *Salvelinus fontinalis* (Mitchill) in May of 1974. The brook trout in the pond were reported to have started dying in large numbers on the day a 1600 hectare (4000 acre) block of land just south of the pond was aerielly treated with an application of 560 grams active ingredient/hectare (8 oz AI/acre) of the organophosphate insecticide Orthene[®]. The pond was outside the boundary of the spray plot but the spray plane passed nearby at the end of one of its passes. Mon Charbonneau's wife was watching the plane and reported that it was not emitting spray as it passed by the pond. The insecticide formulation is dyed with a rhodamine red dye which makes the spray readily visible to an observer on the ground.

An inspection of the pond was made with the use of scuba gear. The pond is approximately 45 by 12 meters (150' x 40') with a pure sand bottom sloping gradually to a maximum depth of 2.3 meters (7.5 feet). Some leaf debris has accumulated on portions of the bottom. A search of the entire pond showed that about 50 to 80 brook trout remained alive with another 15 being found dead on the bottom. All of the live fish showed signs of sluggishness and some could be caught by hand, even by reaching

from the shore. Fungal growth was apparent on many of the fish. Other aquatic life seen in the pond included numerous adult red-spotted newts *Triturus viridescens*, several larval salamanders, water boatmen (Hemiptera, Fam. Corixidae) and several types of water beetles. There was also an abundance of zooplankton near the bottom of the pond and large numbers of cladocerans were observed.

The temperature profile of the pond was checked with a thermistor. The pond was essentially unstratified with a surface temperature of 26.8°C (80°F) and a bottom (2.3 m) temperature of 26.0°C (79°F). The dissolved oxygen content of the pondwater from all depths was 8 mg/l as determined using a Hach kit.

Samples of fish and sediment were collected from the pond for analysis for residues of Orthene[®] and its degradation product Monitor[®]. Neither compound could be detected in the samples, nor could either compound be found in samples of sand collected from the edge of the pond. Red pine foliage collected approximately 90 meters (300 feet) from the pond contained average total residues of 1.05 parts per million. This indicates that a small amount of insecticide drift from the spray block occurred but the amount of insecticide deposited in the area of the pond was negligible.

DISCUSSION

The upper lethal temperature limit for brook trout as established by Fry et al (1946) is 25.3°C (77.5°F) for fully acclimated fish. MacKay (1963) states that in Ontario, brook trout do not thrive in water warmer than 20°C (68°F) and that this is close to the upper limit of water

temperature for all stages in native brook trout's life history. The temperature of the pond water on the day the fish kill was investigated exceeded these published figures for upper lethal temperatures for brook trout and weather data from the area indicate that the pond water probably reached these temperatures on the day fish mortality was first observed as the maximum air temperature that day was 29°C (84°F).

Unpublished data indicates that Orthene[®] is extremely non-toxic to salmonid fish with a lethal threshold in the range of 500 ppm. The high water temperatures of the pond water coupled with the absence of Orthene[®] residues in the affected fish and Orthene's[®] extremely low toxicity to fish clearly show that the fish mortality in the pond was caused by lethal water temperatures and was unrelated to the nearby Orthene[®] treatment.

REFERENCE

- FRY, F.E.J., J.S. HART and E.F. WALKER, 1946. Lethal temperature relations for a sample of young speckled trout, *Salvelinus fontinalis*. Univ. Toronto Stud. Biol. Serv. 54. Pub. Ont. Fish. Res. Lab. 66, pp 1-35.
- MACKAY, H.H., 1963. Fishes of Ontario. Ontario Dept. Lands and Forests, 1963.