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NON-TARGET SPECIES HAZARD OF BRODIFACOU M
USE IN ORCHARDS FOR MEADOW VOLE CONTROL

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This year we entered into our second year of non-target species hazard assessment of Brodifacoum used (BFC; ICI Americas, Inc.) as an orchard rodenticide. The primary emphasis of this work has been to investigate the effects of BFC on birds of prey through secondary poisoning. The hazard level of BFC to raptors should be dependent on the levels found in post-treatment collections of meadow voles (Microtus pennsylvanicus). Post-treatment collections of meadow voles were made during both the 1979 and 1980 field trials. The residue analysis from the 1979 collections are now available (through the courtesy of ICI Americas, Inc.) and will be discussed.

The 1979 field trial was conducted at an orchard near Front Royal in Warren County, VA. The orchard had a heavy infestation of meadow voles. Broadcast applications of VOLAK (trade name of ICI Americas, Inc.) containing 0.005% (50 ppm) BFC were made to sections of the orchard. An area of 7.4 ha was treated at a rate of 45.9 Kg/ha (approximately 40 lbs/A) and a second section was treated at 10.5 Kg/ha (approximately 10 lbs/A). It was not originally planned to treat at 2 different rates but there were difficulties with the spreader calibration. In hindsight, these rate differences led to some interesting comparisons of post-treatment body burdens found in the voles.

Meadow voles were collected by kill-trapping from the orchard treated at 10.5 Kg/ha on days 1, 2, and 5-9 post-treatment. Collection of voles from the 45.9 Kg/ha area were similarly made on days 3-7, 18, and 19 post-treatment. In general, mean residue levels from voles trapped on the 10.5 Kg/ha area were less than those from the 45.9 Kg/ha area. Daily means in voles from the 10.5 Kg/ha area ranged from 0.36-2.59 ppm. Greater than 90% of the voles sampled on day 1 post-treatment from the 10.5 Kg/ha area carried detectable burdens of BFC indicating rapid and widespread distribution of the BFC throughout the meadow vole population.

Mean daily residue levels in voles from the 45.9 Kg/ha ranged from 3.53-5.64 ppm. Residue levels from this area showed no sign of declining even 19 days post-treatment. The incidence of voles from this area with detectable BFC residues was greater than 95% of the voles sampled. This observation with a similar observation in the area treated at 10.5 Kg/ha indicated a high probability that any vole caught by a raptor in the treated area would be carrying a BFC burden.

Four cottontail rabbits (Sylvilagus floridanus) and 3 gray-eyed juncos (Junco hyemalis) were found dead in the orchard during ground searches in 1979. The mean residue level of these specimens was <1 ppm and BFC intoxication was suspected. Two opossums (Didelphis marsupialis) and 4 starlings (Sturnus vulgaris) were collected in the treated areas by shooting. These specimens contained no detectable BFC residue.

In the fall of 1980 we conducted a radiotelemetry study in the same location as the 1979 field trial. The orchard was broadcast with VOLAK (0.001% BFC) at 9.1-11.4 Kg/ha (20-25 lbs/A). Three screech owls (Otus asio), 1 barn owl (Tyto alba), and 1 American kestrel (Falco sparverius) were captured within the borders of the orchard and fitted with radio transmitters. The owls were located daily during the post-treatment period. The screech owls were collected for BFC residue analysis during the fourth week after the final section of orchard was treated.

Mortality of 1 screech owl occurred during the post-treatment period but the cause of death cannot be definitely attributed to BFC poisoning until residue analyses of the carcass are completed. The barn owl disappeared from the study area during the post-treatment period immediately after a heavy windstorm and is presumed to have left the area. The kestrel was last observed in the orchard 70 days after the last VOLAK application and apparently suffered no ill effects from the rodenticide use.

Four cottontail rabbits were found dead in the orchard during the 1980 trial as were 2 gray-eyed juncos. Residue analyses have not been completed on these specimens at this time.