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PINE VOLE CONTROL 1978-1979 EXPERIMENT

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An experiment was established to evaluate the following methods of toxicant application:

1. A 25 ft. band broadcast ground application with Lely Spreader.
2. A 25 ft. band broadcast aircraft application with Grumman Ag-Cat.
3. Hand placement in runways.
4. Hand placement in plastic tube bait stations ('Mouse-ateria').

The following toxicants and application rates were desired:

1. Brodifacoum (Volak) applied at 10.0 lb. /A.
2. Diphacinone (Ramik-Brown) applied at 10.0 lb. and 20.0 lb. /A broadcast and 10.0 lb. /A hand placement with one repeat application.

Climatic conditions following treatment applications:

Precipitation for the 24-hour period ending at 8 a.m. where amounts of 0.25" or greater occurred were recorded on December 8th (0.25"), 9th (1.02"), 10th (0.4"), 21st (0.29"), 25th (1.07"), January 1st (0.38"), 2nd (1.19"), 7th (0.32" Snow), 8th (0.44" Snow), 13th (0.39" Snow), 21st (1.70" Snow), 22nd (0.5") and 24th (0.44").

Soil temperature at the 4" level was 45°F at application time. The temperature dropped steadily to 34°F on December 26 where it remained until dropping to 33°F on January 20, 1979.

Brodifacoum

Brodifacoum was applied to 27 year old Rome trees currently planted 20 ft. by 40 ft. on December 5, 1978. The one acre plot per treatment consisted of a single row of 72 trees. The amount of toxicant applied per acre with the broadcast methods were not as easily controlled as with the hand placement method. This was evident following the aircraft application where twice as much toxicant was applied as desired, even though attempts to calibrate the equipment had been made. The width of the toxicant band was considerably wider than that made during calibration of the aircraft. Attempts were made to collect the pattern of drop using 9 ft. wide by 29 ft. long plastic sheeting placed across the row at several locations throughout the row length.

Table 1. Variation in rate of air application based upon collections from an average area of 261 sq. ft. (9' by 29') and projected rate/A based upon collections. A total of 40 lb. of toxicant was applied to the two row area.

ROW 1			ROW 3		
West Half	East Half	Rate/A	West Half	East Half	Rate/A
3.5 gms.	2.1 gms.	2.1 lb.	21.0 gms.	6.3 gms.	10.2 lb.
40.6	25.9	24.1	36.4	7.0	15.7
5.6	3.5	3.3	38.5	3.5	15.5
7.7	4.9	5.2	35.0	7.0	15.5
	Average	8.7		Average	14.2

Sum Total of Rows 1 & 3 Based upon collection 22.9 lb./A

Actual applied 40.0 lb./A

Based upon the toxicant collected during the application, row 1 acquired approximately 38% of the material and row 3 about 62% of the material.

Vole activity sites were established at 16 different trees per row treatment. Activity rating is based upon an 0 - 10 scale where 0 = no part of apple eaten, 3 = less than 50% of flesh eaten, 5 = 50 to 80% of flesh eaten, 8 = 100% of flesh eaten, 10 = 100% of apple (skin and flesh) eaten. At the start of the experiment, apples placed in the activity sites were completely eaten at all locations throughout the entire orchard area used. Readings are made 24 hours after apple placement in the site.

Vole activity ratings (Table 2) were made December 27, 1978 (22 days following treatment) and January 25, 1979 (50 days following treatment).

Table 2. Vole activity rating based upon amount of apple eaten/24 hour period. Rating scale 0 - 10. Brodifacoum treatments.

	Dec. 27, 1978 Activity Rating	Jan. 25, 1979 Activity Rating
1 Air - 11 lb./A(1)	3.5	3.2
2 Ground - 10.0 lb./A	1.2	0.17
3 Air - 29 lb./A(1)	1.3	0.06
4 Ground - 10.0 lb./A	0.3	0.2
5 Check - 0.0 lb./A	9.0	7.7
6 Hand (runs) - 10.0 lb./A	2.0	0.6
7 Hand (tubes) - 10.0 lb./A	1.4	0.8

(1) Base upon collections made of the pellets on the plastic sheeting.

Diphacinone

The first application of diphacinone was applied on December 5, 1978 to 24 year old Rome and Golden Delicious trees currently planted 20 ft. by 40 ft. Uneven application rates were observed with the two aircraft broadcast applied treatments. Instead of applying 10.0 lb. and 20.0 lb./A treatments, a total of 50.0 lb. was applied. Based upon plastic sheet collections of the pellets, the distribution would indicate one treatment acquired 12.5 lb. while the other had 37.5 lb. applied to the plot. The ground broadcast treatment received 13.0 lb./A. The three broadcast applied plots were one acre in size (three rows of 30 trees each per plot). The hand applied placement of toxicant received 8.3 lb./A on 30 trees (1/3 acre). A second application was made January 9, 1979 to all treatments except the two aircraft broadcast plots. These plots were treated January 25, 1979 using ground application equipment.

All activity sites (7 per row) selected had very high activity ratings at the start of the experiment. All apples were consumed within a 24 hour period. The results may indicate that the diphacinone treatments were applied too late in the season since control was considerably less than with brodifacoum (Table 3).

Table 3. Vole activity based upon the amount of apple eaten/24 hour period in diphacinone treatments. Scale of 0 - 10 where 0 = no activity.

Date	BROADCAST TREATMENT		
	Air 37.5 lb./A	Air 12.5 lb./A	Ground 12 lb./A
12/28/78	4.2	7.9	5.6
1/26/79	5.5	9.3	8.4

	HAND PLACEMENT TREATMENT	
	Vole Run 8.3 lb./A	Plastic Tube 8.3 lb./A
12/28/78	2.7	5.6
1/26/79	4.7	3.6