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Abstract: The results obtained so far in this 3 year study have shown that the plots with poisoned bait feeder stations suffered significantly less tree girdling than the plots treated with the fall broadcast application of 2% zinc phosphide. Similar findings were also observed in number of voles per plot, however, the vole population was much lower than the previous year. Considerable interest has been shown by apple growers in adopting this method of vole control at a commercial level.

Introduction, Methods and Materials: The importance of vole damage and a lack of significant research on vole control in Ontario were described in the proceedings of the Sixth Eastern Pine and Meadow Vole Symposium (Siddiqi and Blaine, 1982). The methods and materials used were also mentioned in this publication.

During the course of this study, so far the following observations have been made at all the four locations.

1. Estimation of the meadow vole population by mark and release method: in the fall 1981 before installing the bait stations; in the spring and the fall of 1982.
2. Estimating number of the meadow voles per site by exhaustive snap trapping 30 days after bait station and broadcast application.
3. Percentage of trees girdles by the meadow voles was recorded in the spring 1982. Extent of girdling was not measured.

After initial installation of the bait stations in the fall of 1981, the stations were cleaned and refilled in the spring 1982 and again in the fall 1982. The formulation of brodifacoum (0.005%) was replaced by a newer formulation containing 0.001% of the toxicant (Volid, from ICI Americas Inc).

Results and Discussion: Number of meadow voles per plot, as estimated by the Schnabel index, for fall 1981, and spring and fall 1982 are presented in Table 1 for Orono, in Table 2 for Norval, and in Table 3 for Milton locations. No meadow voles were captured at Belwood, the fourth location. It is obvious from these tables that the vole population declined greatly from fall 1981 to fall 1982. The number of voles per plot were significantly more in the zinc phosphide broadcast treatment as compared to the other rodenticides in the bait stations at Orono in fall, 1982 (Table 1). No similar differences were observed at any other locations (Table 2 and 3).

TABLE 1. Number of Microtus pennsylvanicus per plot at Orono, Ont.

| | Treatments | % a.i. | Fall 1981 | Spring 1982 | Fall** 1982 |
|---|---|---|---|---|---|
| 1. | Zinc Phosphide* | 2 | 67 | 0 | 1 a |
| 2. | Encapsulated ZP | 2 | 51 | 0 | 0 b |
| 3. | Brodifacoum | 0.001 | 40 | 1 | 0.3 b |
| 4. | Bromadiolone | 0.005 | 36 | 0 | 0.3 b |
| 5. | Chlorophacinone | 0.005 | 57 | 1 | 0 b |

* Broadcast application in the fall only.
**Numbers not followed by same letter are significantly different at 5% level according to DMR test.

TABLE 2. Number of Microtus pennsylvanicus per plot at Norval, Ont.

| | Treatments | % a.i. | Fall 1981 | Spring 1982 | Fall 1982 |
|---|---|---|---|---|---|
| 1. | Zinc Phosphide* | 2 | 26 | 53 | 0.7 a |
| 2. | Zinc Phosphide | 2 | 83 | 0 | 0.3 a |
| 3. | Brodifacoum | 0.001 | 76 | 1.3 | 0 a |
| 4. | Bromadiolone | 0.005 | 80 | 0 | 0 a |
| 5. | Chlorophacinone | 0.005 | 69 | 0 | 0 a |

* Broadcast application in the fall only.
**Numbers not followed by same letter are significantly different at 5% level according to DMR test.

TABLE 3. Number of Microtus pennsylvanicus per plot at Milton, Ont.

| | Treatments | % a.i. | Fall 1981 | Spring 1982 | Fall** 1982 |
|---|---|---|---|---|---|
| 1. | Zinc Phosphide* | 2 | 52 | 0.6 | 16 a |
| 2. | Zinc Phosphide | 2 | 36 | 1.0 | 6 a |
| 3. | Encapsulated ZP | 2 | 50 | 0.6 | 5 a |
| 4. | Bromadiolone | 0.005 | 28 | 0 | 10 a |

* Broadcast application in the fall only.
**Numbers not followed by same letter are significantly different at 5% level according to DMR test.

TABLE 4. Percentage tree girdled by Microtus pennsylvanicus, Spring, 1982.

| | Treatments | LOCATION ** | | | |
|---|---|---|---|---|---|
| | | Orono | Norval | Milton | Belwood |
| 1. | Zinc Phosphide* | 14.4 b | 81.4a | 3.5a | 12.6 a |
| 2. | Zinc Phosphide | - | 26.1b | 2.3a | 5.9 b |
| 3. | Encapsulated ZP | 7.2ab | - | 1.5a | - |
| 4. | Brodifacoum | 3.4a | 20.0b | - | 3.4 b |
| 5. | Bromadiolone | 10.9ab | 23.3b | 1.7a | 4.2 b |
| 6. | Chlorophacinone | 8.9 b | 21.7b | - | 5.9 b |

*Broadcast application in the fall only. **Numbers not followed by same letter are significantly different at 5% level according to DMR test.

The damage done by the meadow voles was observed by recording the percentage of trees girdled in the spring 1982 and the data is presented in Table 4. The plots with rodenticide application in bait stations suffered significantly less tree gridling in most situations. However, no such significant difference was found at the location in Milton. At Orono, the broadcast application of zinc phosphide was only significantly different than brodifacoum in the bait stations. Although the live trappings did not catch meadow voles at Belwood location, but the trees in the experimental plots showed girdling which was significantly more in the zinc phosphide broadcast treatment as compared to all other rodenticides in the bait stations.

This is a 3-year study and no conclusions are drawn at this point in time. The bait stations will be cleaned and refilled, and the vole population will be estimated in the spring and fall 1983. The tree girdling records will also be taken in the spring 1983. The 1982-83 winter was an exceptionally mild winter in the past many years and its effects may be noticed in the vole activity and subsequent tree damage.

The apple growers in Ontario have shown considerable interest in this method of meadow vole control and several growers are using the bait stations, which are commercially available, in part of their orchards.

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