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AN EXPERIMENTAL MONITORING AND ADVISORY SERVICE
IN ORCHARD VOLE CONTROL

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The North Carolina integrated pest and orchard management project (IPOMS) has moved from the data-gathering phase into an experimental information delivery system. We present here for possible comment the written directions for vole monitoring that we prepared for use by the orchard specialists who will implement the monitoring and advisory system.

IPOMS started in 1976 as a joint effort of a number of subject matter departments under the North Carolina Agricultural Research Service. A brief description of this cooperative effort of horticulturists, entomologists, plant pathologists, economists, zoologists and soil and weed scientists has been presented to this group (Hayne 1978). Data on all these aspects of apple production were gathered from 1976 through 1979; they are now being analyzed. According to plan, the project moved into the information delivery phase in a preliminary way in 1979, and now an experimental monitoring and advisory service will be offered to all IPOMS cooperators who are interested; for this trial the service will be restricted to those orchard blocks used in the IPOMS study.

To facilitate this study, the IPOMS scientists assembled a booklet for use of the scouts and the cooperators. This booklet includes sections on monitoring, and on management and control, for each pest species. This is as yet an internal document only, and will not be available in its present experimental form to anyone except a project investigator or a cooperator.

We present here the section on monitoring voles in the hope that we will receive comment and criticism, either at this meeting or later by correspondence. We have found that specification of practical monitoring procedures is quite different from planning a scientific investigation. The methods suggested here are experimental in the sense that they are untested in this particular form. We will appreciate comment.

We hope that with systematic monitoring of orchards, rodenticide applications will be made only when really needed; this should reduce both the total volume used and the average cost of rodenticides. This should not only benefit the grower but also reduce the stress on non-target species.

At this time, this information delivery is seen as a one-year experimental trial to explore the problems of such a system, with the thought that in the future this system may be carried out under some other direction. There is no good reason, however, why a grower should

not use these instructions and monitor the vole populations in his orchards and then generate his own advice about treatment. Perhaps, on the other hand, there is room here for a specialist to do this work as a public employee, or as an employee of a cooperative, or on a custom basis.

PEST MONITORING GUIDE - VOLES

Voles are monitored by inspection for signs of their activity. While voles reproduce at a high rate compared to other mammals, they do not increase rapidly from week to week in the manner of insects and therefore they may be monitored at no more than three times per year, as follows:

- A. Examine soon after harvest is completed to determine whether rodenticide treatment is needed.
- B. Examine in midwinter, to assure that treatment was successful (if it was used) or that there has not been a population increase such as to require treatment.
- C. Examine in early spring to determine overwinter survival or possible increase, and as a basis for comparison the following fall.

Methods of examination for signs:^{1/}

1. Examine 2 trees in every acre.
2. Choose for examination trees in the most likely places for voles (with vigorous vegetative ground cover). Record on map approximate location of each tree.
3. Using a modified rake, examine ground under both sides of a tree (in the row, between this tree and those next), searching for runways, holes, cuttings, damage. Where ground is bare beneath trees, examine orchard floor vegetation along edges of middles.
4. Where signs are found at a tree, even apparently old signs, flag the tree and use the apple sign test, returning the next day to read this.
5. If no signs are found at a tree, do not use the apple sign test at that tree.

^{1/} Maps are mentioned throughout this section. Rough sketch maps made with the grower's assistance on the first visit to the orchard will be adequate, although the best available map should be used. Maps should be made on 8½ x 11 inch paper in a form to be photocopied so that a clean copy can be used for notes on each visit to a particular orchard. Essential information on each map should include name of owner or grower, identification of the block, acreage and some indication of scale (as length of one side of block), with other information as desired. Label blanks for Date, Vole Species, Treatment Recommended, Treatment Reported (with date) and Other Notes.

6. Record trees examined in approximate location on map, with plus (+) for presence of signs and minus (-) for no signs, using a numerical score (0-4) to record results of apple sign test.
7. Record on map judgement whether signs indicate pine vole or meadow vole activity (or possibly both).
8. Trapping to be used only to confirm judgement concerning the species present.

Directions for Apple Sign Test

On the first day, a slice of apple is laid out at a burrow entrance or in a runway, and covered with a "shingle" (a piece of asphalt roofing about 12 inches square). On the second day this piece of apple is "read", that is, examined and scored on the following scale:

0. No signs of having been cut into.
1. One or two bites have been removed.
2. Substantial amount of the apple eaten, but with area that of a dime or less.
3. Area of consumed portion more than a dime but less than a quarter (coin).
4. Area consumed more than a quarter, or apple piece is missing.

Interpretation of Monitoring Results

Not knowing the economic threshold for vole signs, no score can be stated as a threshold for treatment. A conservative decision is to treat with any positive sign-test reading. Monitoring can show when only part of an orchard needs treatment.

LITERATURE CITED

Hayne, D. W. 1978. 1976 IPOMS vole results. pp 40-48 in Proceedings Second Eastern Pine and Meadow Vole Symposium, Beltsville, MD.