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COMMENTS ON THE PINE VOLE IN ORCHARDS AND ITS CONTROL

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First, we should be grateful to Dr. Ross E. Byers, Horticulturist, Virginia Polytechnic Institute and State University, for initiating a symposium on a very serious problem of the orchard industry. It is well past time that such a meeting is called and a concerted effort is made on the problem.

Many other orchard problems are present, most of them seasonal in nature, but few cause the serious losses that extensive vole injury does. Voles do their damage by feeding on the bark of the roots and at the crown of the trunk causing partial or complete girdling which weakens or kills the tree. Vole damage is feared because it means the loss of a tree or a group of trees as a maximum producing unit which takes several years to replace. Partially girdled trees may survive for years with low production. The lack of mouse control is often blamed on the lack of effective poisoning materials. It is also a reflection on the job done to protect the trees from mouse feeding. However, in recent years we have not had a variety of poisons to prevent the development of resistance or to insure a high kill of vole populations in the orchard.

The pine vole, Pitymys pinetorum, is the major species causing damage to orchard trees in West Virginia. The meadow vole, Microtus sp., is present but seldom is found to be a problem in orchards. Feeding injury by pine voles has been observed on all types of fruit trees grown in this area. Voles feed on many types of herbaceous plants growing on the orchard floor. Usually, it is when these plants become in too low a supply to support the existing vole population that voles feed upon the trees. The herbaceous plant population is reduced during summer time drought and the winter months when high vole populations can cause extensive damage rapidly. Random feeding on fruit trees also occurs in the late summer when young mice are searching for a new nesting site. However, the winter months are the times of greatest injury to trees.

Ground cover or cover crops as a habitat in the orchard have an influence on the development of vole populations. In some orchards it has been observed that close mowing of the grass cover crop mixture reduces the shelter for the animals and repels them—a procedure of control widely used in Europe. This, coupled with wide herbicidal treated areas along the tree row, appears to be effective in restricting vole development. It has been noted that a fescue cover with frequent mowing appears to prevent excessive vole build-up.

One recommendation has been to encourage the growth of many forbs or a variety of herbaceous plants in the orchard to offer food for vole populations. While this does deter the voles from feeding on the

trees, it appears to provide too favorable a habitat for the development and continuing populations of mice. This was more effective before the use of herbicides, when the voles congregated in the tree row and an effective ground spray to control mice could be used.

This approach appears to have less value where wide herbicidal applications are made along the tree row. The voles congregate in the row middles where the food supply is and where ground sprays are not applied and the population persists. This change in cultural procedures has presented a problem with ground spray applications to control voles.

During the past twenty years, most orchardists have used ground sprays with endrin to control pine and meadow voles. The ground spray method of control had the advantage of being more rapid and more effective than hand baiting with zinc phosphide poisoned baits. The limitation to one material—endrin—has been a disadvantage because the voles developed resistance to it after several years of use. During the past few years it has been necessary to follow the early winter application of endrin ground sprays with hand baiting to insure that orchard mice were brought under control. The newly introduced ground spray material, chlorophacinone, appears to be effective and should be accepted once it receives registration approval by the Environmental Protection Agency. The ground spray method greatly reduced the amount of labor needed to control vole populations. It is the best method yet for controlling voles.

The introduction of herbicides has been a great step forward in the prevention of vole damage. Herbicide applications reduce grass and weed growth in the vicinity of the trees, removing the herbaceous food supply and reducing the surface shelter for the mice The wider the treated area, the more effective the treatment is in keeping the mice away from the trees. The pine vole is subterranean and occasionally burrows beneath the treated area to reach the tree roots and trunk. But the overall effect of a herbicidal treatment has been to present an unfavorable habitat where voles do not congregate. The herbicide treatment, however, has reduced the effectiveness of ground spray applications for the control of mice.

Since voles developed resistance to endrin ground sprays, the orchardist returned to hand baiting and cultivation to reduce mouse populations. Zinc phosphide poison, coated on the surface of the bait had the advantage of being inexpensive, required only a small amount of bait material and gave a rapid kill. Mice became resistant to it. The newer prepared bait materials, chlorophacinone and diphacinone, are more expensive, require more bait per placement site, are slower to act, but are more effective than zinc phosphide at the present time.

The best results with poisoned baits are obtained by placing bait in a high proportion of the runways and breather holes beneath the trees. Where herbicidal treatment has reduced the ground cover it is well to bait the adjacent ground cover growth in the row middles. This hand

baiting operation may be speeded up by using the baiting station system. Squares of asphalt tile, wood slabs or other covering agents are placed under every other tree and offer protection to the vole while feeding and preserve the bait for a longer period. This is effective as long as the baiting stations are maintained and replenished over an active runway. Vole cannisters in which the animals feed are handy modifications of this system.

Hand hoeing around young trees prevents mice from becoming established where even light feeding will girdle the tree. In an older orchard, hoeing around the base of the tree to prevent voles from nesting in the trashy plant growth is our first recommendation in the control of orchard mice. Cultivation beneath the tree limbs with a disk harrow roughens the ground and disrupts the vole runway system, but deep disking is injurious to tree roots. The Smitty Tree Hoe cultivator prepares a smooth cultivated area and reveals the breather holes and runways as they are reestablished by the mice. Hand baiting a day or so later is easy and rapid.

A major part of vole control in orchards is a monitoring system. The potential hazard from sudden increases in vole populations is great and must be taken seriously. It is evident that a seasonal program with regular monthly inspection and a record kept of the vole activity in the orchard offers the best means of keeping track of them. Orchardists who use such procedure avoid sudden girdling injury by applying poison baits when vole populations increase. Baiting can be well regulated and ground sprays can be well timed after harvest.

The orchardist uses many of the above procedures. He is hampered by not having enough chemical weapons to offer a variety of poisons to prevent the development of resistance and to kill mice. Only in the past few years have effective new materials been available to aid him in the control of orchard voles. It is hoped that new materials and methods will continue to be developed to aid with this problem.