

# Control of Rodents in the Orchard

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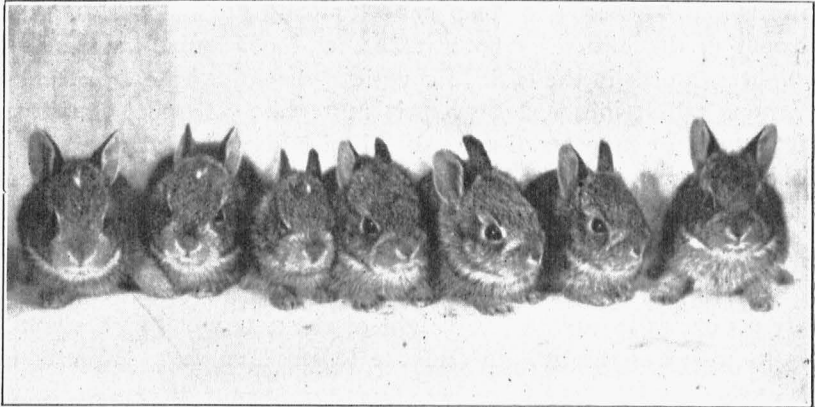


Fig. 1.—Seven little rabbits getting ready to gnaw the trunks of fruit trees during the fall and winter.

All orchard crops may in some years and in certain localities be subjected to attacks of rodents such as rabbits, field mice, and gophers. The natural enemies of these rodents are the hawk, owl, snakes, skunk, mink, fox, and other animals. With the natural enemies reduced to the minimum, producers of fruit are faced with the problem of rodent control for the protection of their fruit trees. Mechanical measures or methods of combating rodents must, therefore, be employed to prevent great losses.

Fruit trees of all kinds under Missouri conditions are subjected to more or less serious injury each year by rabbits and field mice during the winter. This injury is generally great enough to

warrant the protection of all young fruit trees against danger for at least the first six or eight years after transplanting. Such injury to young fruit trees should therefore be anticipated and guarded against. In fact the protection of young fruit trees from rabbit and mouse injury every fall should be given careful consideration and made a regular orchard practice, just as spraying is done to prevent injury by insect pests and diseases.

Rabbit injury generally occurs higher up on the tree trunks than that produced by field mice. The injury by rabbits usually ranges from a few inches to as much as 12 or 18 inches above ground, while that of field mice is generally found near the base of the tree trunks, on the trunks slightly below the ground, or on the large main roots of the trees just beneath the soil. Mouse damage is usually more severe and higher on the tree trunks during a hard winter with deep snow than during mild ones. The extent of the injury by both rabbits and field mice varies from slight scratches in the bark to complete girdling of the tree trunks. Serious rabbit injury, however, is more likely to occur on trees from one to four years of age. Field mice may girdle and kill both old and young trees if proper precautions are not adopted.

### USE WRAPPERS AGAINST RABBITS

The only safe way to prevent rabbits from gnawing the bark of the trunks of young fruit trees is to wrap the base of the tree trunks from the ground to a height of about 18 to 20 inches or the space between the ground and the lowest branches. Where the branches are less than 18 inches above the soil the wrappers should include both trunk and branches to a height of about 18 or 20 inches. Various kinds of wrapping material may be used. Some of the most common are one-inch mesh poultry wire, galvanized window screen wire, galvanized wire netting having 3 or 4 meshes to the inch, old newspapers, gunny sacks torn in strips 6 to 8 inches wide and cornstalks. Wood-veneer wrappers, patented wire wrappers, tarred paper and building paper may be bought and used.

**One-Inch Mesh Poultry Wire Wrappers.**—The wire used ranges in height from 18 to 24 inches and is cut into strips from 14 to 20 inches wide. Experiments and observations at the Missouri Agricultural Experiment Station extending over a series of years have shown that one-inch mesh poultry wire netting 18 inches high cut into strips 18 inches wide is usually best for the protection of fruit trees from rabbit injury in the average Missouri orchard. The wire wraps are bent into cylinders placed around the

tree trunks and pushed into the ground an inch or two. The laps of wire are then fastened by pushing the cut ends through meshes near the edge of the opposite side and bending the protruding ends over, forming a loop or hook. Fastening thus at the top, middle, and bottom is usually sufficient to hold the wire cylinder firmly in place. The tree trunks are therefore enclosed in a cylinder-shaped protector, the rim of which is several inches distant

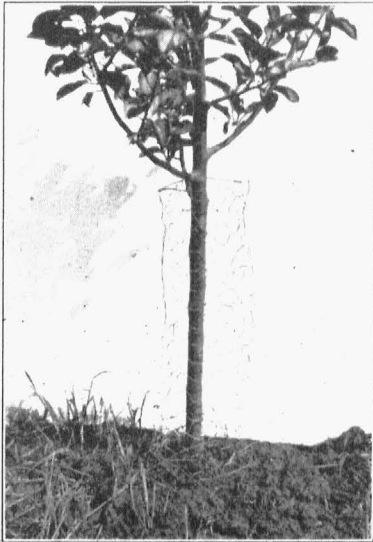


Fig. 2.—An apple tree two years after transplanting in the orchard showing one-inch mesh poultry wire used as a protector.

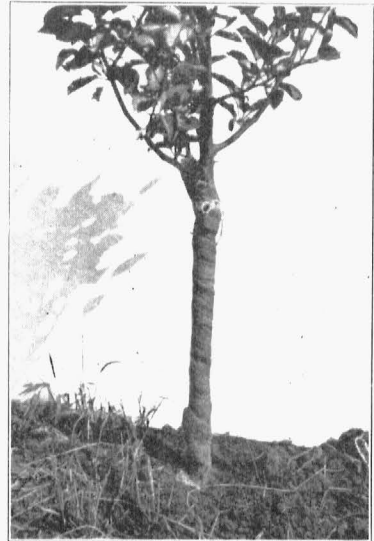


Fig. 3.—A two-year-old apple tree trunk wrapped with gunny sack strips 6 to 8 inches wide to prevent injury by rabbits.

from the tree trunk all the way around. When the protectors are so prepared and placed around the tree trunks they are wide enough to accommodate the trunks without doing injury by rubbing and peeling the bark. The only care required during the following eight or ten years is to observe the wire wrappers once or twice each year to see that they are properly in place and not pushed against the tree trunk, in which case the rabbits might be able to injure the trees through the wire meshes. The wire funnels may usually be made to stand away from the tree trunks without the use of stakes as spreaders, although stakes are sometimes employed. Rarely, however, will the one-inch mesh poultry wire

wrappers require any material expense for maintaining. They should be removed in from eight to ten years to prevent girdling.

**Gunny Sacks as Wrappers.**—Gunny sack wrappers are usually made by tearing gunny sacks into strips about 6 to 8 inches wide. To wrap the tree begin at the bottom allowing the wrap to fit closely down against the soil and wind the strip around the trunk and upward to a height of 18 or 20 inches. One tie at the top with binder-twine is sufficient. A better wrap is usually obtained if considerable pressure is employed in the wrapping process, making the strips fit closely to the tree trunk. There is no danger of field mice being able to make nests about the tree trunk from the gunny sack material if the strips are wrapped tightly and tied securely at the top.



Fig. 4.—The trunk of a two-year-old apple tree wrapped with old newspapers to prevent injury by rabbits.

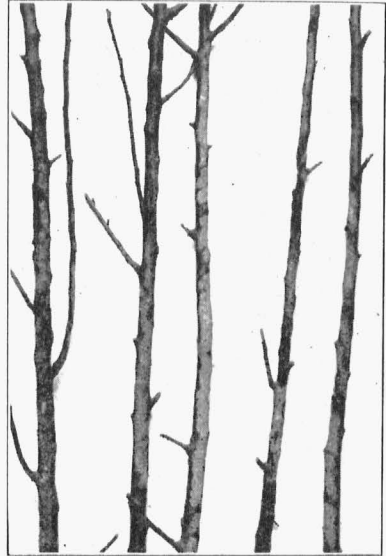


Fig. 5.—One-year-old apple trees so seriously injured by rabbits that it was necessary to cut the trees back to stumps three or four inches high in the spring as growth was starting.

**Newspapers as Wrappers.**—Old newspapers are frequently used as protectors against rabbits. The paper strips consisting of two or three thicknesses should be 18 to 20 inches high and about the same number of inches in width. Allow the paper to come down in close contact with the soil and wrap it snugly around



the tree trunk, causing the paper to fold over and around the tree trunk in a smooth and closely fitting manner. Three ties with binder-twine, one at the top, one in the middle, and one at the bottom are sufficient to hold the paper wrap securely. Tarred paper and building paper are also sometimes used; but tarred paper should not be used as it may do injury to the tree trunks.

**Wood Veneer Wrappers.**—Wood-veneer wrappers are bent into a cylinder-shape, placed around the tree trunks and pushed into the soil an inch or so as in the case of the poultry wire protector. As a rule, ties with bindertwine or baling wire at the top in the middle and at the bottom are sufficient.

**Corn Stalks as Wrappers.**—Corn stalks cut into lengths about 18 or 20 inches long may be placed around the trunks of the trees in sufficient numbers to afford protection against rabbits. Two or three ties are made similar to that described for old newspaper. It is more difficult to perform the wrapping work in the case of corn stalks than with the other wrappers. Since newspapers wrap with less difficulty and can usually be obtained cheaply at print shops or offices, if not available at home, they are preferable to corn stalks.

### COST OF WRAPPERS

**One-Inch Mesh Poultry Wire.**—The cost of wire wrappers consisting of one-inch poultry wire 18 inches high and 18 inches wide is approximately \$2.25 per hundred wrappers. The labor cost for wrapping will average about 83 cents per hundred trees. The total cost for wrapping 100 trees, therefore, with one-inch mesh poultry wire 18 x 18 including labor and wire is about \$3.08.

**Gunny Sacks.**—The original cost of gunny sacks to wrap 100 trees is about 97 cents and the labor cost for making the strips and wrapping is about 83 cents, making a total of about \$1.80. The unwrapping in the spring will cost about 50 cents per hundred. The entire cost, therefore, when gunny sacks are used would, for the first year be about \$2.30 per hundred trees. The gunny sack strips will last about 2 or 3 years if properly handled and stored when not in use. Since the cost of wrapping and unwrapping amounts to about \$1.33 each year the grower would spend, in three years, \$4.96 for labor and wrappers which is \$1.88 cents more than the cost of poultry wire wrappers including labor. The poultry wire wrappers also have the advantage in that they will last 8 or more years without additional cost for material or labor and they also furnish protection throughout the year. This is an important

consideration, as trees are sometimes injured by rabbits during the summer or early fall.

**Cost of Other Wrappers.**—With the other types of wrappers such as newspapers and cornstalks the labor involved is all the cost that need be considered. As with the cost of gunny sack wrappers the labor expense per year, including wrapping in the fall and unwrapping in the spring, will amount to approximately \$1.33 per hundred trees.

Wood veneer wrappers will usually cost more than one-inch poultry wire. The expense for the labor of wrapping in the fall and unwrapping in the spring will amount to approximately that given for corn stalks.

### WHEN TO WRAP AND UNWRAP

The wrappers should be placed around the tree trunks about the time the leaves drop in the fall. All the wrappers except wire should be removed early in the spring as growth starts. Wrappers like newspapers, gunny sacks, cornstalks, building paper, wood veneer, etc. wrapped around the tree trunks may form a harbor for insects and diseases if left on the trees during the spring and summer. The bark of the tree trunks when so inclosed will not develop normally. The permanent wire wrappers do not have these disadvantages and may remain around the tree trunks without attention except to see that they remain in place until the trees are six to eight years old. The permanency of wire wrappers and the saving of labor in wrapping and unwrapping each year makes them the cheapest in the long run. Protection to the tree trunks is also afforded all the year round. This is important because rabbits may do injury even in the summer time. Wire wrappers should be removed as soon as they begin to bind, otherwise they may girdle the trees and kill them. This will be especially true if the wrappers are neglected or forgotten.

### REPELLENT WASHES NOT ALWAYS EFFECTIVE

Many repellent washes like blood from a hog or rabbit, white-wash, undiluted lime-sulphur solution, home-made and laundry soap suds, coal tar, gas tar, axle grease, paint, various oils, and other substances are often recommended as washes or paints for fruit trees to prevent injury by rabbits, field mice, and fruit tree borers. All of these materials may work well during mild winters and when the rabbits and mice are not very numerous or hungry. If snow has been on the ground, however, for a week or more and

the rabbits or mice need food badly, serious injury may be done to the trees where washes of the above character have been applied.

### INJURIOUS REPELLENTS

Investigations and observations carried on at the Missouri Experiment Station for many years have shown that such substances as paint, coal tar, gas tar, axle grease, concentrated oils and combinations of such materials may do serious injury to the tree trunks and even cause the trees to die. A great many factors may be involved in the amount or degree of injury which may be done to the trunks of fruit trees. Most of these substances vary greatly in their chemical composition or makeup. The vigor of the trees may cause a difference, and the season of the year or time of application as well as the method of application and the quantity applied may explain the great variations in the severity of damage done to fruit trees. To be on the safe side, therefore, the grower should not use such substances, as there are others which may be used with as good results without danger of harm.

### WASHES WHICH ARE NOT HARMFUL

If a repellent and poisonous wash is desired, use whitewash, soap-suds or dormant strength lime-sulphur and add lead arsenate at the rate of about 2 pounds to 50 gallons. These washes may be applied with a sprayer which facilitates the work. Greater concentrations may be made and the repellent applied by means of an ordinary paint brush. There is no danger of these washes doing injury to the tree trunks, no matter when or how applied.

**Government Whitewash.**—A thick, heavy whitewash made according to the so-called Government formula has been employed with more or less success on fruit trees to prevent sun scald, attack by rabbits, field mice, and fruit tree borers. The ingredients and method of preparation are as follows:

Stone lime .....	½ bushel	Spanish whiting (plaster of
Salt .....	1 peck	Paris) .....
Ground rice .....	3 pounds	Glue .....
Water .....	5 gallons	1 pound

First slake the lime with warm water and then strain it through a fine sieve or strainer. Dissolve the salt in warm water, boil the rice flour to a thin paste, and dissolve the glue in boiling water. Mix the ingredients in the following order and stir well;

Pour the salt solution into the lime, then the rice paste, and next stir in, boiling hot, the Spanish whiting and glue, and finally add 5 gallons of hot water. Stir thoroughly and let it stand for a few days. It should be applied hot with a brush.

### PRUNED BRANCHES PREVENT RABBIT AND MOUSE INJURY

When the apple trees reach an age of from eight to ten years they are not likely to be seriously injured by rabbits. The same holds true with other fruit trees such as peaches, cherries and plums. To minimize the liability of injury, however, the grower should continue to keep the trees wrapped which may grow near fence rows, ravines or other quarters of the rabbit. For the parts

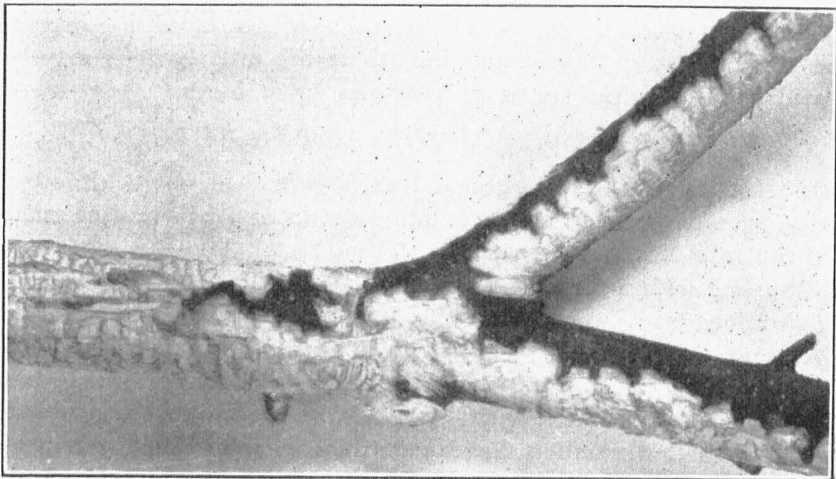


Fig. 6.—These apple branches were cut in November and allowed to remain on the ground beneath the trees thus supplying food for the rabbits and preventing injury to the tree trunks.

of the bearing orchard located more distant from the haunts frequented by the common cotton-tail rabbits serious injury may often be prevented by commencing the regular pruning work shortly after the leaves begin to drop in the fall, leaving on the ground near the trees the branches removed. These furnish food for both rabbits and field mice and they may be fonder of the tender bark on the pruned branches and shoots than that on the tree trunks, which is thicker and tougher. As a result the rabbits and mice do

little or no injury to trees eight or more years old when a sufficient supply of fresh pruned branches may be found on the ground near the bearing fruit trees. To prevent mouse injury it is also necessary to keep dead grass and weeds cleared away from the tree trunks during the fall and winter particularly.

**Injury Prevented by Feeding.**—During heavy snowfalls and when a crust or hardened layer of the snow forms on top, rabbits may occasionally do injury to trees above the wraps. To prevent such damage, alfalfa, clover, cowpea or vetch hay may be scattered between the rows for the purpose of feeding the rabbits.

### ENCOURAGE HUNTERS

During the fall and early winter hunters may be encouraged to destroy the rabbits. They may often lessen the injury to a great extent. Where the work of hunters is very thorough, practically all of the rabbits may be destroyed although they are likely at any time to come into the orchard from distant woodland thickets and other places which furnish food and protection from their natural enemies. Hunters should, however, be warned to guard against starting fires in dead grass and weeds and injuring the trees with gun shot wounds.

### DESTROY HARBORS

Rabbits may also be largely prevented from doing serious injury to fruit trees by burning or otherwise destroying near orchards, as completely as possible, harbors along fence rows, ravines, in wood lots and rank growing bunch grass on waste land. The destruction of such harbors may prevent depredation by rabbits and at the same time mean much to the fruit grower by enabling him to combat insects and diseases more effectively.

### CONTROL OF FIELD MICE

**Cultivate and Remove Rubbish From Near Tree Trunks.**—Good cultivation of both young and old orchards, from early spring until about the middle of July or August first, will not only tend to prevent serious injury by field mice but will generally do much toward making the trees more vigorous and healthy and consequently be more profitable. Trash, litter, and dead grass and weeds which may form a harbor for the meadow mouse should be kept away from the tree trunks. Sod orchards generally suffer

worse from mouse injury because more mice are likely to be present and better nesting places are usually found near the tree trunks. Where cultivation cannot be practiced on account of soil washing or for other reasons, hoeing a strip a few feet wide around the tree trunks to keep the space cleared of weeds, litter and mulch will help materially in preventing injury.

**Mound Soil Around the Tree Trunks.**—After cleaning away dead grass and mulch material from the base of the tree trunks in the fall before freezing weather, the soil may be mounded about them to a height of from 4 to 6 inches. While mounding is not absolute proof against injury, generally there is much less on mounded than unmounded trees. This will be especially true during winters of light snow fall when the mounded soil extends above the snow. The mounded soil should be removed early in the spring and level cultivation maintained if possible during the growing season. On account of the labor involved mounding is not generally practiced, but it may be employed on a small scale with good results.

**Use Mechanical Protectors and Sanitation.**—Galvanized window screen wire, hardware cloth, and other types of wire screen having meshes small enough to prevent the mice from passing through them, if cut in strips and placed around the tree trunks as previously described to prevent injury by rabbits, will also protect the trees against injury by mice. Wire protectors, therefore, serve a double purpose.

Injury by field mice is not as noticeable as rabbit injury, but many trees are destroyed by mice without the grower knowing the cause. This is true as the mice usually work at the base of the tree trunk or slightly beneath the soil and the injury is not observed. Sod orchards generally show much worse damage than orchards receiving clean cultivation. Hence the necessity of guarding sod orchards against mouse injury.

Brush and rock piles, weed and grass grown ravines and fence rows often make ideal mouse harbors. These should be eliminated, together with leaves, trash and rubbish from about the crown or base of the tree trunks. Such clean-up practices are especially important in sod orchards. Moreover, the late fall and early winter seasons usually afford the best opportunities for such sanitation work.

**Poison the Mice.**—In commercial bearing orchards maintained in sod where mice are abundant and a real factor to contend with in preventing injury, poisoning is believed to be the most effective and satisfactory method of control. This will be particularly true when all sanitation methods have failed. There are various formulas recommended. Most of these, however, have been developed and recommended by the Bureau of Biological Survey of the United States Department of Agriculture. The following preparation has met the requirements for use as a permanent poison bait in stations or caches placed in the orchard and also for general use:

“To mix large quantities of poison bait, use in the proportion of 1 ounce of strychnine, 1 ounce of soda, 8 quarts of rolled oats, and  $1\frac{1}{4}$  pints of the beef-fat-paraffin mixture. In applying the coating it is very important that the beef-fat-paraffin mixture be hot and the poisoned rolled oats thoroughly warm, otherwise it will not be possible to obtain an even coating.

“Teaspoonful quantities of the poisoned rolled oats should be placed in the small containers or stations described, and well distributed over the infested area. The poisoned bait may also be scattered along runways and within entrance burrows a teaspoon at a place. In orchards where mice are abundant it is advisable to place one ‘poison station’ under each tree.”

**Poison Stations or Containers.**—These may consist of glass jars, wide-mouthed bottles, tin cans or prepared small wooden receptacles made especially for the poison. The object is to allow the mice free access, keep the poison bait from falling out, and yet prevent rain or standing water from entering. The containers should be set close to the base of the tree trunks and covered lightly with brush, hay or straw. Such coverings will tend to keep the bait in place and at the same time afford some shelter for the mice.

If each station is placed in a fairly well drained place and where there may be some circulation of the air, the poison bait is likely to be kept dry and in better condition for attracting the mice. Timely care and attention at least in the fall and spring will help materially in giving protection to the trees at a low cost for labor and materials.

**General Precautions.**—All the substances used for poisoning rodents are dangerous to human beings and to domestic animals. It is important, therefore, that they be handled with care.

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