

# KENTUCKY CHRISTMAS TREE PRODUCTION WORKBOOK

FOR-27



## Pest Control Animals

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The most common 4-footed animals likely to become pests in Christmas tree plantations are voles (*Microtus* spp.), cottontail rabbits (*Sylvilagus* spp.), and white-tailed deer (*Odocoileus virginianus*). The amount and extent of damage to the plantations varies as populations of these species vary and the number of tree plantations increases.

### Animal Identification and Biology

**Voles.** Often referred to as meadow mice or field mice, voles are compact small mammals with stocky bodies, short legs and a short tail (Fig. 1). Voles should not be confused with white-footed mice (*Peromyscus* spp.) or other small rodents which, because they eat seeds, do not cause extensive gnawing damage to trees. Three of the four species of voles found in Kentucky are responsible for tree damage.

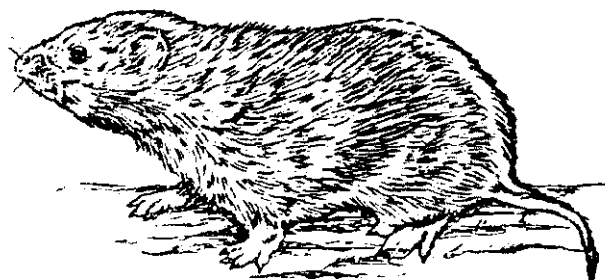


Figure 1. — Pine vole (*Microtus pinetorum*)

Voles eat a wide variety of plants and other small animals or insects. Pine voles characteristically attack trees of all sizes during all seasons, in contrast to other voles which usually damage bark of trees in winter. Most pine vole damage occurs below ground

where they feed on rootlets and the bark of larger roots.

Voles do not hibernate and are most active during the day. Areas of activity are small ( $\frac{1}{4}$  acre) and depend on population number, food supply, habitat and season. Voles construct many tunnels and runways in the dense vegetation. A single burrow system may contain several adults and young.

Voles breed from January through October in Kentucky and can produce an entirely new generation within about 60 days. Although voles have a high reproductive rate, they also are a mainstay in the diet of hawks, owls, foxes, coyotes and other meat-eating animals. The life span of a vole is short, ranging from two to 16 months. Up to 80 percent of the young die in their first month of life.

**Rabbits.** People often place the cottontail rabbit in the same group as the rodents (mice, squirrels, rats) because of their large prominent front teeth. However, careful inspection reveals that rabbits have a second, smaller, peglike set of incisor teeth directly behind the first set. Rabbits are therefore placed into the group called "lagomorphs".

Our most abundant and common rabbit is the eastern cottontail (*Sylvilagus floridanus*) (Fig. 2). Typical eastern cottontail rabbits weigh between two and four pounds and are 15 to 19 inches long. Cottontails appear gray to brownish gray in the field with a short tail and big ears. The underside of the tail is white and looks like a cotton ball. Hence the name cottontail.

The life span of a cottontail is short (12 to 15 months); however, cottontails may have three to eight young per litter and up to four litters per year in Kentucky. The first litter usually appears in March.

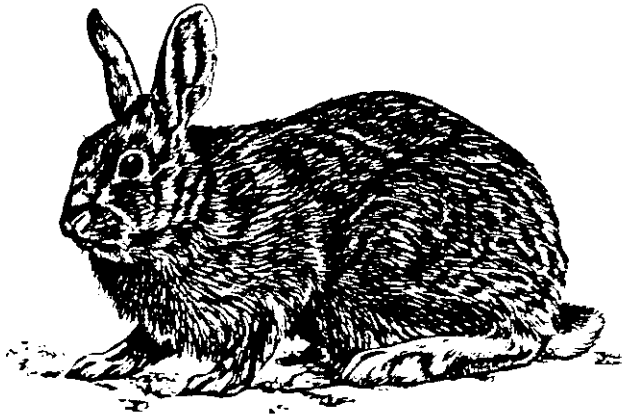


Figure 2. — Eastern cottontail rabbit (*Sylvilagus floridanus*)

Up to 35 percent of the young die within the first month and 65 percent of the remaining animals die over winter. Cottontails are eaten by a variety of predators. The cottontail also is one of Kentucky's most popular small game animals avidly pursued by hunters.

**Deer.** The white-tailed deer is the only native ungulate occurring in Kentucky. Their general appearance, tan color in summer with large antlers and conspicuous white flag (tail), is well known (Fig. 3).

Contrasted to the previous animals, deer have a very long gestation period (196 days) and give birth to one or two fawns, usually in May. Deer breed once a year during November and December and can live up to 10 years in the wild.



Figure 3. — White-tailed deer (*Odocoileus virginianus*)

### Damage Identification

Animal browsing on trees can result in tree death due to complete girdling of the trunk or roots.

Even if browsing does not kill the tree, its shape can be disfigured by extensive browsing (especially at terminal buds), rendering the tree unsalable.

Before attempting to prevent or control wildlife damage, be sure to identify correctly the culprits responsible. Correct identification is relatively easy based upon evidence at the site of damage.

**Voles.** Typical vole damage can be differentiated from rabbit damage by the lack of uniformity of gnawing marks (Fig. 4) and the area of the tree damaged. In addition, gnawing and possible tree girdling usually occur near the base of the tree. Presence of tracks, droppings and burrow systems should verify initial assessments.

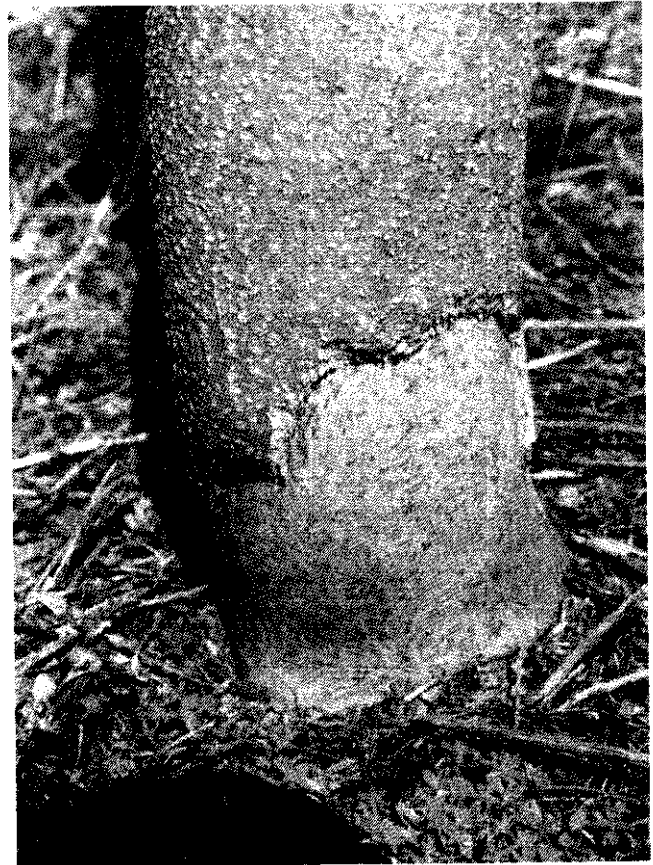


Figure 4. — Typical vole damage occurring at the base of the tree. Note the absence of uniform gnawing marks contrasted to cottontail rabbits.

**Rabbits.** Characteristic rabbit damage may occur as girdling near the base of the tree (tooth marks usually visible) or clipping of terminal buds or twigs. Rabbits clip young tender shoots cleanly producing wounds similar in appearance to a knife cut at a 45 degree angle (Fig. 5). Presence of tracks and small round droppings usually verify initial observations.

**Deer.** Damage by deer is quite distinctive because deer lack upper incisors necessary to produce the sharp, oblique cuts of rabbits or voles.

Deer browsing often leaves a jagged or torn surface on terminal twigs, stems, and buds (Fig. 6). In addition, the height of the damage often rules out any other mammal and deer tracks are very distinctive.

Deer also may damage Christmas trees by rubbing against tree bark. During late summer and early fall, buck deer exhibit unique behavioral pat-



Figure 5. — Typical cottontail rabbit damage. — Note the 45 degree cut which looks similar to a knife cut.



Figure 6. — Typical white-tailed deer damage. Note the jagged or torn edge.

terns associated with courtship. Male deer vigorously "rub" small trees (often less than 5 years old) at this time to remove the velvet from hardened antlers, practice combat with potential rival bucks, provide a visual display signalling dominance over other deer, and scent signposts. Trees may have branches torn off or be effectively girdled by this action rendering the tree unsalable.

### Options for Preventing and Controlling Damage

There are many preventive and control techniques available for addressing animal damage problems in tree plantations. Not every one will work in every situation. Each situation must be evaluated individually and various treatments may have to be tried to determine the best technique for the particular situation. Often a combination of techniques produces the best results. For example, in an Oregon study, the best protection for growing conifers was a combination of a deer/rabbit repellent and plastic flagging.

The various damage prevention and control techniques may be grouped as (1) biological, (2) mechanical or (3) chemical. Each technique has particular advantages and disadvantages depending on location, problem animal species and expense.

### Biological

The most effective, long term solution to controlling deer and rabbit problems in tree plantations is to reduce populations through hunting. This method of control is not effective for voles. Hunting has several advantages over other methods. It is more economical (may be income-generating), does not place harmful chemicals into the environment, and is a long-term solution to the problem, not a quick fix.

Deer and cottontail rabbits are legal game animals in the Commonwealth of Kentucky and can be harvested only during hunting seasons. If damage is severe enough and a variety of other techniques have failed, contact your local conservation officer and obtain a permit to harvest the problem animals at times other than the hunting season. It is unfortunate to harvest deer or rabbits with a special permit when many eager hunters would gladly do it, and possibly pay for the privilege during the hunting season. By permitting hunting, landowners provide public access to a public resource and at the same time reduce their damage problems.

Deer will travel over several miles during the course of a normal day or season. As a result, one landowner rarely controls all the land a deer uses and neighboring landowners should be contacted and asked to cooperate. The Kentucky Department

of Fish and Wildlife Resources district wildlife biologist should be contacted so that desirable populations may be reached within state guidelines. Harvest strategies for population reduction should be directed at removing excess female animals. The Kentucky Department of Fish and Wildlife Resources or your county Extension agriculture agent may be able to provide names of hunters willing to pay for the privilege of hunting. Hunting is the preferred *method of control in most cases*.

Another type of biological control that may work for all three target species is habitat alteration or modification. This may be as simple as planting clovers or lespedezas between rows to provide an alternative forage source for deer or rabbits. However, this may provide optimal habitat for voles. It also can be as simple as mowing close to the ground or cultivating between rows (eliminating ground cover) and thereby removing or destroying habitat including burrows, runways, and other food sources for small animals and rabbits. This method usually does not work for deer. Another technique to reduce rabbit populations is to remove brush piles or junk dumps located close to the plantation.

A final biological method of reducing small mammal populations is to install raptor perches (Fig. 7). These structures provide hawks and other birds of prey an elevated "overlook" where they stand waiting to catch small animals. To build a raptor perch, you need 10 feet of 1.5- to 2-inch diameter scrap pipe. Attach a house plumbing flange to the top of the pipe. Attach a 1-foot piece of 2x4 onto the flange perpendicular to the pipe. Set the pipe firmly into the ground stabilizing it with a fence spacer bar. Predators will come and sit on the perch and catch their lunch from there. Only one perch per acre or two is necessary; locate on higher ground to give a better overlook.

## Mechanical

**Exclusion.** This method of control prevents animals from entering the general area (fencing) or preventing individual trees from being clipped (tree guard tubes or plastic netting). It is equally effective in controlling small mammals, cottontail rabbits and deer.

No one fencing design will control damage from all three species. While fencing is the only sure way to eliminate animal damage, the cost of constructing effective fences often is prohibitive and, therefore, not practical. Look at costs and benefits carefully before investing in this option.

A 5- or 6-wire high tensile electric fence should keep deer out (Fig. 8). If traditional mesh wire is to be

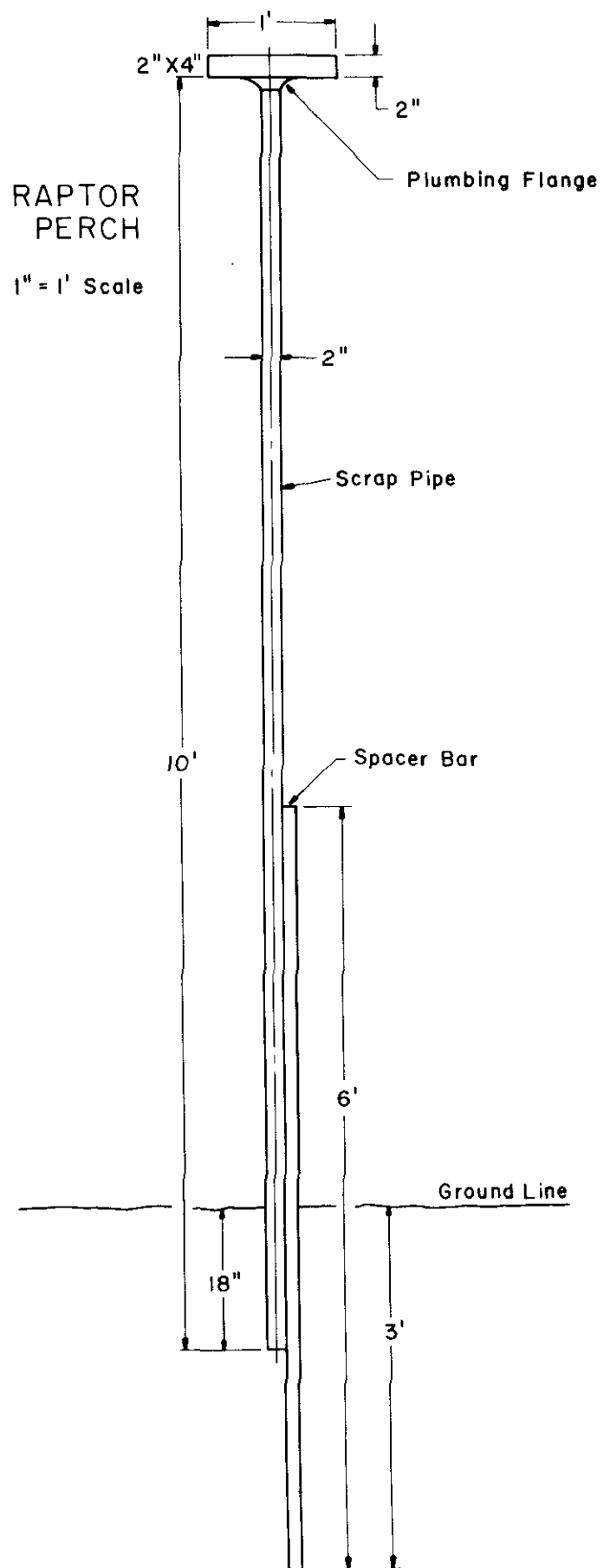


Figure 7. — Raptor perch designed to attract hawks and owls as a method of reducing small animal populations.

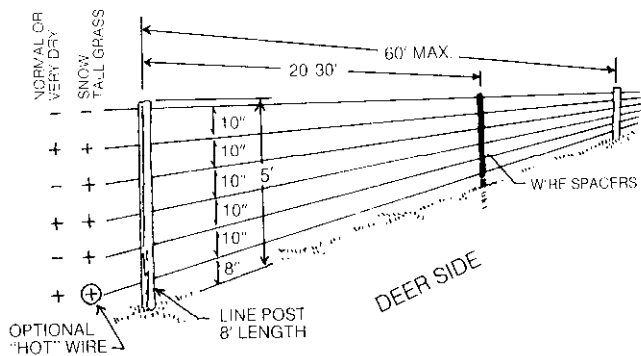


Figure 8. — A 6-wire high tensile electric fence used to exclude deer.

used, it must be at least eight feet tall and can be constructed of two hog wire panels joined together and supported with 12-foot wooden posts (Fig. 9). Materials may be saved with this design (or the electric fence) by slanting the fence at a 45-degree angle (Fig. 10). The high end of this fence should be six feet from the ground and slanted so that deer can walk under it without being able to jump over the wire strands. Be sure to keep the vegetation around the fence cut. These fences will not be effective in excluding rabbits and small mammals.

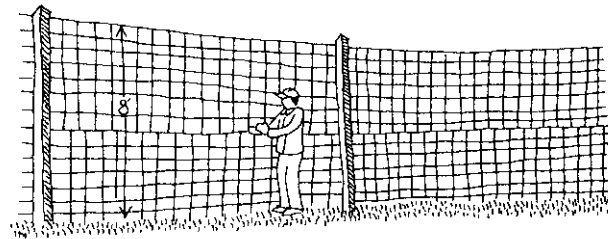


Figure 9. — Traditional fencing design using 8-foot standard hog panels tied together and attached to 12-foot posts.

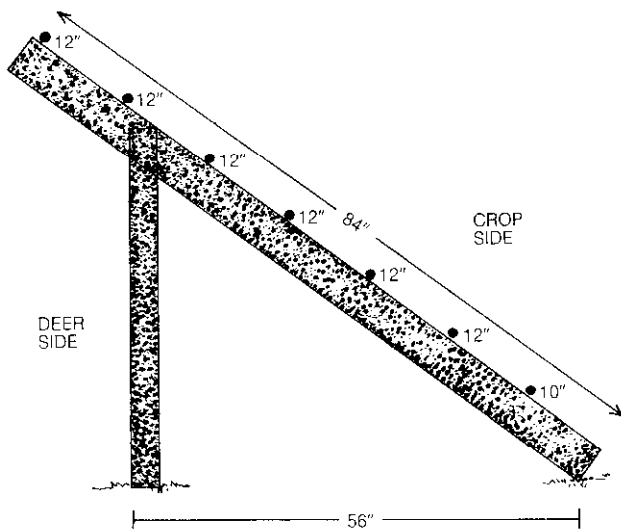


Figure 10. — Traditional or electric fence slanted to exclude deer.

Traditional fencing designs can be modified easily to exclude rabbits and small mammals by placing a 2-foot strip of ¼-inch hardware cloth at the bottom of the fence. Be sure to keep six inches of the fence below ground. This will prevent voles from burrowing under it. Inexpensive chicken wire may be placed around the plantation to keep out rabbits, but it needs periodic replacement.

Another type of exclusion device is a plastic tree guard tube or mesh netting (plastic or ¼-inch hardware cloth). Each individual tree is covered or enclosed by a plastic device designed to prevent deer from browsing on the young seedlings (Fig. 11).

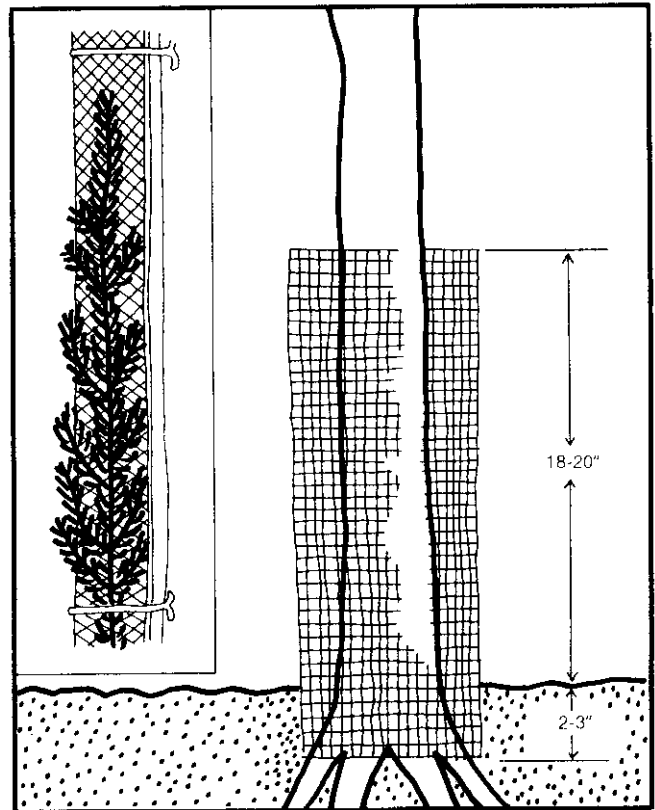


Figure 11. — Individual tree guards constructed of ¼-inch hardware cloth, plastic or fencing material.

The Europeans have cleverly designed a physical deterrent preventing deer from rubbing their antlers against small trees. This structure can be made from a 3- to 4-foot length of steel rebar (a common construction material). Weld several 12- to 18-inch crosspieces in a spiral arrangement on the original rod (Fig. 12). Drive the completed structure into the ground next to the trunk of a small tree. The crosspieces discourage deer from rubbing their antlers on the tree trunk.

**Trapping.** Small mammal and rabbit populations can be reduced using live or snap traps. Live trapping is the most effective way to remove cotton-

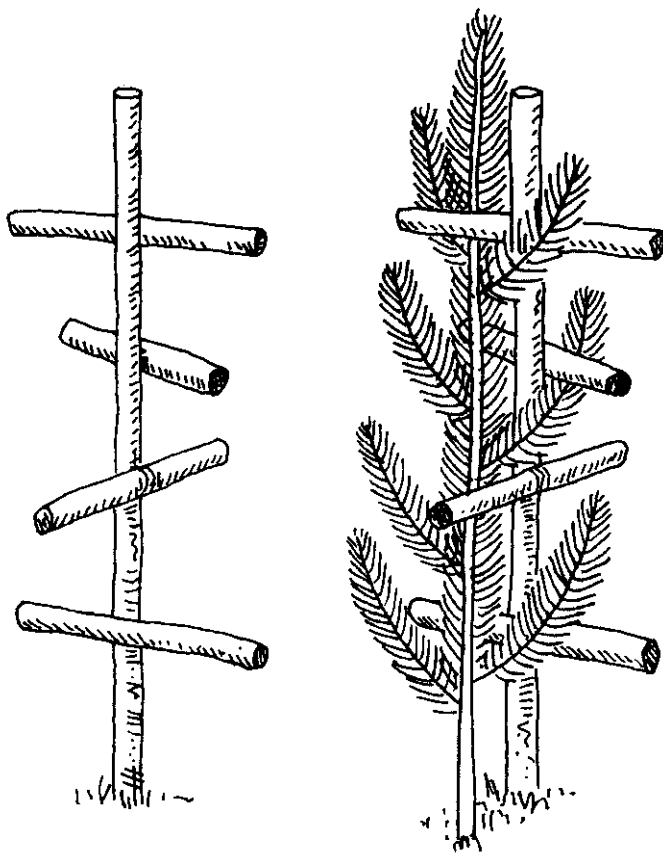


Figure 12. — Metal rod structure to prevent deer from rubbing their antlers against small trees.

tail rabbits. There are a variety of commercial live traps available at hardware, agricultural supply or sporting goods stores (Fig. 13). Live traps are more effective if you cover them with canvas or some other dark material.

Bait the traps with cob corn, oats, or dried apples during the fall or winter and carrots, apples, or cabbage in the summer. Place the traps in areas where rabbits have been feeding or resting close to suitable cover. You must check the traps every day and remove captured animals and replace baits. If the traps fail to capture any rabbits within a week, move them to a different location.

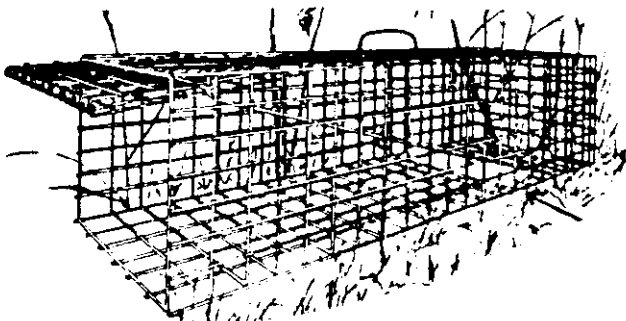


Figure 13. — Live trap.

If you have an exceptionally large population of small mammals, trapping may not be a solution. Small populations can be controlled using snap traps or Sherman live traps (Fig. 14). Bait the traps with a mixture of peanut butter and oatmeal or dried apples. Place the traps perpendicular to the runway with the trigger end in the runway.

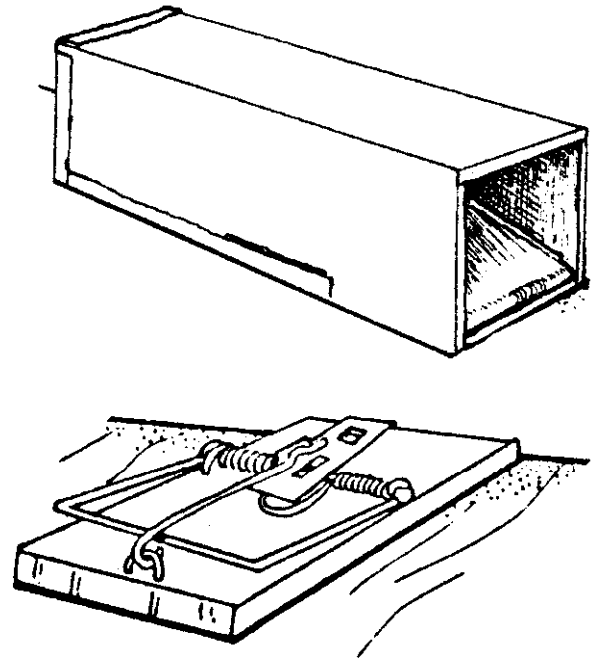


Figure 14. — Sherman live trap and snap trap.

**Repellents.** Repellents are classified as visual, auditory (sound) and chemical. Visual repellents include placing brightly colored or shiny materials around the perimeter of the plantation.

**Frightening Devices.** Noise devices have not proven effective or reliable in preventing or controlling damage from small mammals or cottontail rabbits. They can be used to provide temporary relief from deer browsing. The key to using frightening devices (propane cannons or gas exploders, whistlers, screamers, and fuse ropes) is to take action at the first sign of a problem and be persistent continuing use for a minimum of three to five days. It is difficult to break a deer's behavior pattern once it has been established. Frightening devices may be most effective in the short term until a long-term solution is decided upon.

## Chemical

Chemical repellents are classified as either contact or area. These chemicals are equally effective for all three groups of animals. Contact repellents are applied directly to the plants and repel by unpleasant taste; whereas area repellents are applied next to the plants and repel by smell alone. Area repellents may be slightly less effective than contact repellents. It is important to recognize that repellents will not stop the damage. They only reduce the amount of browsing.

There are a variety of commercially available chemical repellents on the market today. During the dormant season, apply contact repellents when temperatures are above freezing. During the growing season, apply contact repellents at about half the recommended concentration. Be sure to follow manufacturer's guidelines because some repellents do not weather well and must be reapplied after a rainfall.

Commercially available repellents can be found under a variety of trade names and the active ingredient is usually Bone Tar Oil (Magic Circle®), Thiram (Hopkins Thiram 42-S®, Chaperone®, Science Deer and Rabbit Repellent®, Bonide Rabbit-Deer Repellent®, Nott Chew-Nott®, and Gustafson 42-S®), Fermented Egg Solids (Deer-Away®, MGK-BGR®) or ammonium soaps of fatty acids (Hinder®).

Be imaginative in your approach in using repellents. For example, placing several handfuls of human hair in a mesh bag and allowing them to blow in the breeze may be effective. Or, attaching aluminum pie tins to a string around the plantation's perimeter also may work. Some people have had success using hot pepper sauce in making trees distasteful to animals.\*

**Toxicants.** A variety of poisons are registered for use in controlling vole populations. Contact your local county Extension agriculture agent for this information. Never use a pesticide (poison) in a manner inconsistent with its labeling. Failure to comply with directions provided may subject you to severe sanctions and penalties provided by State and/or Federal laws.

## Human Pests

**Vandalism.** Vandalism, most commonly thievery, is a constant problem for Christmas tree growers. Generally growers write off the loss of a few trees per year. The danger to be aware of is large scale tree removal when trees are big enough to harvest. Constant monitoring of your plantation from Thanksgiving to Christmas is your best protection. Notify and ask neighbors and police to assist you. (Provide them with free trees as added incentive; good public relations never hurt anyone!) Some growers enclose their plantations with barbed wire or electric fences. Some use video cameras as a deterrent. These are displayed prominently along an electric fence. If the circuit is broken whoever or whatever breaks the circuit is captured on film or tape.

Another alternative is to spray your trees with a product resembling flocking, making them highly visible and identifiable. This product washes off easily when you are ready to market your trees. A bizarre solution is to get vials of methyl mercaptan (skunk essence) from a scientific supply house. Carefully attach open vials to several trees. They probably will cause the whole area to have a distinctive odor deterring prospective thieves.

At this date, the laws are not clear on crop insurance for Christmas trees. This insurance, when available, also would be a protection against crop loss by theft.

A good dose of common sense and constant vigilance are still the best protection against any type of pest in your Christmas tree plantation.

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\*Mix 1 tablespoon of hot sauce with 1 gallon of water. To help it stick better, add 2 tablespoons of Vapor-Guard+ antidesiccant per gallon. Spray foliage and bark thoroughly when temperature is above 40 degree F. Sticker is more helpful in winter than summer. During growing season, foliage will require spraying every 10 to 14 days to maintain control.

*Where trade names are used, no endorsement is intended, nor is criticism implied of similar products not named.*

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