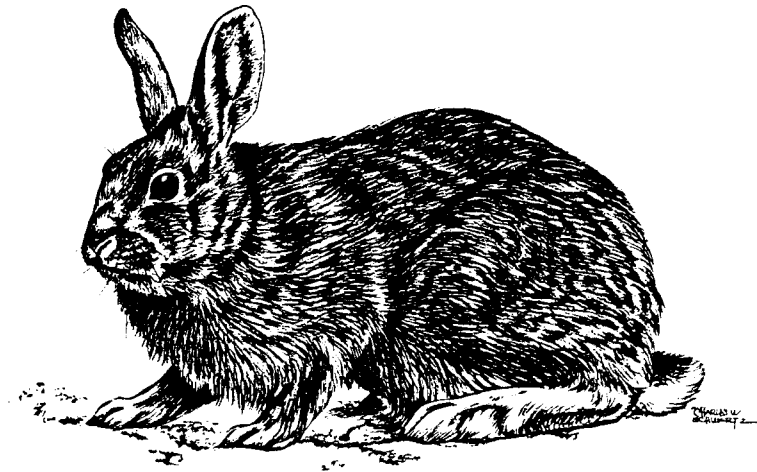


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COTTONTAIL RABBITS

Fig. 1. Eastern cottontail rabbit, *Sylvilagus floridanus*



Damage Prevention and Control Methods*

Exclusion

Low fences are very effective around gardens or shrubs.

Hardware cloth cylinders will protect fruit trees and ornamental plants.

Habitat Modification

Removal of brush piles, debris, dumps, and other cover makes an area less suitable for rabbits.

Frightening

Several methods are available but none are reliable.

Repellents

A wide variety of commercial formulations is available; most are taste repellents based on the fungicide thiram. Home-remedy types may provide some relief.

Toxicants

None are registered.

Trapping

Commercial live traps or homemade box traps are effective, particularly during winter in northern states.

Shooting

Sport hunting and/or routine shooting of problem individuals are very effective methods.

Other Methods

Many "gimmick" solutions are available but unreliable. For example, sections of garden hose to simulate snakes, water-filled jugs to create frightening, distorted reflections.

**Most methods apply to all rabbit and hare species.*

Introduction

Rabbits mean different things to different people. For hunters, the cottontail rabbit is an abundant, sporting, and tasty game animal. However, vegetable and flower gardeners, farmers, and homeowners who are suffering damage may have very little to say in favor of cottontails. They can do considerable damage to flowers, vegetables, trees, and shrubs any time of the year and in places ranging from suburban yards to rural fields and tree plantations. Control is often necessary to reduce damage, but complete extermination is not necessary, desirable, or even possible.

Rabbits usually can be accepted as interesting additions to the backyard or rural landscape if control techniques are applied correctly. Under some unusual circumstances, control of damage may be difficult.



PREVENTION AND CONTROL OF WILDLIFE DAMAGE — 1994

Cooperative Extension Division
Institute of Agriculture and Natural Resources
University of Nebraska - Lincoln

United States Department of Agriculture
Animal and Plant Health Inspection Service
Animal Damage Control

Great Plains Agricultural Council
Wildlife Committee

Damage control methods include removal by live trapping or hunting, exclusion, and chemical repellents. In general, no toxicants or fumigants are registered for rabbit control; however, state regulations may vary. Frightening devices may provide a sense of security for the property owner, but they rarely diminish rabbit damage.

Identification

There are 13 species of cottontail rabbits (genus *Sylvilagus*), nine of which are found in various sections of North America north of Mexico. All nine are similar in general appearance and behavior, but differ in size, range, and habitat. Such differences result in a wide variation of damage problems, or lack of problems. The pygmy rabbit (*S. idahoensis*), found in the Pacific Northwest, weighs only 1 pound (0.4 kg), while the swamp rabbit (*S. aquaticus*), found in the southeastern states as far north as southern Illinois, may weigh up to 5 pounds (2.3 kg). Most species prefer open, brushy, or cultivated areas but some frequent marshes, swamps, or deserts. The swamp rabbit and the marsh rabbit (*S. palustris*) are strong swimmers. The eastern cottontail (*S. floridanus*) is the most abundant and widespread species. For the purposes of the discussion here about damage control and biology, the eastern cottontail (Fig. 1) will be considered representative of the genus. Cottontail rabbits must be distinguished from jackrabbits and other hares, which are generally larger in size and have longer ears. Jackrabbits are discussed in another chapter of this book.

The eastern cottontail rabbit is approximately 15 to 19 inches (37 to 48 cm) in length and weighs 2 to 4 pounds (0.9 to 1.8 kg). Males and females are basically the same size and color. Cottontails appear gray or brownish gray in the field. Closer examination reveals a grizzled blend of white, gray, brown, and black guard hairs over a soft grayish or brownish underfur, with a characteristic rusty brown spot on the nape of the neck. Rabbits molt twice each year, but remain the same general

color. They have large ears, though smaller than those of jackrabbits, and the hind feet are much larger than the forefeet. The tail is short and white on the undersurface, and its similarity to a cotton ball resulted in the rabbit's common name.

Range

The eastern cottontail's range includes the entire United States east of the Rocky Mountains and introductions further west. It extends from southern New England along the Canadian border west to eastern Montana and south into Mexico and South America (Fig. 2). The most common species of the western United States include the desert cottontail (*S. auduboni*, Fig. 3), and mountain cottontail (*S. muttalli*, Fig. 4). Refer to a field guide or suggested readings if other species of the genus *Sylvilagus* are of interest.

Habitat

Cottontails do not distribute themselves evenly across the landscape. They tend to concentrate in favorable habitat such as brushy fence rows or field edges, gullies filled with debris, brush piles, or landscaped backyards where food and cover are suitable. They are rarely found in dense forests or open grasslands, but fallow crop fields, such as those in the Conservation Reserve Program, may provide suitable habitat.

Cottontails generally spend their entire lives in an area of 10 acres or less. Occasionally they may move a mile or so from summer range to winter cover or to a new food supply. Lack of food or cover is usually the motivation for a rabbit to relocate. In suburban areas, rabbits are numerous and mobile enough to fill any "empty" habitat created when other rabbits are removed. Population density varies with habitat quality, but one rabbit per acre is a reasonable average.

Contrary to popular belief, cottontails do not dig their own burrows, as the European rabbit does. Cottontails use natural cavities or burrows excavated by woodchucks or other animals.

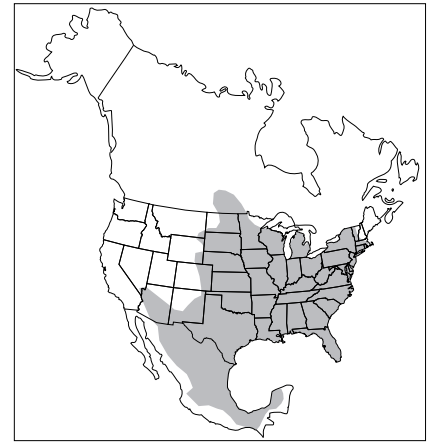


Fig. 2. Range of the eastern cottontail in North America.

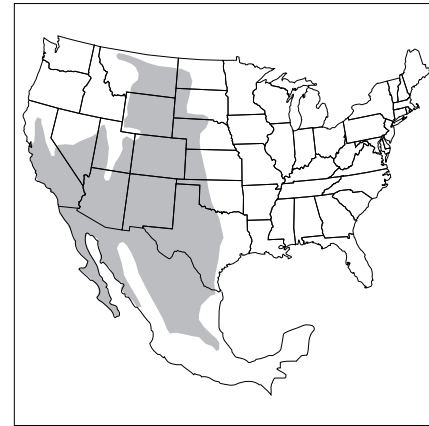


Fig. 3. Range of the desert cottontail in North America.

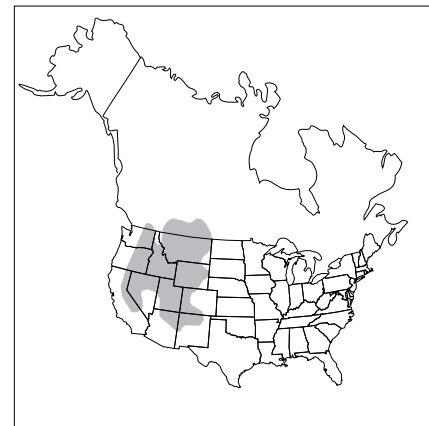


Fig. 4. Range of the mountain cottontail in North America.

Underground dens are used primarily in extremely cold or wet weather and to escape pursuit. Brush piles and other areas of cover are often adequate alternatives to burrows.

In spring and fall, rabbits use a grass or weed shelter called a “form.” The form is a nestlike cavity on the surface of the ground, usually made in dense cover. It gives the rabbit some protection from weather, but is largely used for concealment. In summer, lush green growth provides both food and shelter, so there is little need for a form.

General Biology and Reproduction

Rabbits live only 12 to 15 months, and probably only one rabbit in 100 lives to see its third fall, yet they make the most of the time available to them. Cottontails can raise as many as 6 litters in a year. Typically, there are 2 to 3 litters per year in northern parts of the cottontail range and up to 5 to 6 in southern areas. In the north (Wisconsin), first litters are born as early as late March or April. In the south (Texas), litters may be born year-round. Litter size also varies with latitude; rabbits produce 5 to 6 young per litter in the north, 2 to 3 in the south. The rabbit’s gestation period is only 28 or 29 days, and a female is usually bred again within a few hours of giving birth. Rabbits give birth in a shallow nest depression in the ground. Young cottontails are born nearly furless with their eyes closed. Their eyes open in 7 to 8 days, and they leave the nest in 2 to 3 weeks.

Under good conditions, each pair of rabbits could produce approximately 18 young during the breeding season. Fortunately, this potential is rarely reached. Weather, disease, predators, encounters with cars and hunters, and other mortality factors combine to keep a lid on the rabbit population.

Because of the cottontail’s reproductive potential, no lethal control is effective for more than a limited period. Control measures are most effective when used against the breeding population during the winter. Habitat modification and exclusion techniques provide long-term, nonlethal control.

Food Habits, Damage, and Damage Identification

The appetite of a rabbit can cause problems every season of the year. Rabbits eat flowers and vegetables in spring and summer. In fall and winter, they damage and kill valuable woody plants.

Rabbits will devour a wide variety of flowers. The one most commonly damaged is the tulip; they especially like the first shoots that appear in early spring.

The proverbial carrot certainly is not the only vegetable that cottontails eat. Anyone who has had a row of peas, beans, or beets pruned to ground level knows how rabbits like these plants. Only a few crops—corn, squash, cucumbers, tomatoes, potatoes, and some peppers—seem to be immune from rabbit problems.

Equally annoying, and much more serious, is the damage rabbits do to woody plants by gnawing bark or clipping off branches, stems, and buds. In winter in northern states, when the ground is covered with snow for long periods, rabbits often severely damage expensive home landscape plants, orchards, forest plantations, and park trees and shrubs. Some young plants are clipped off at snow height, and large trees and shrubs may be completely girdled. When the latter happens, only sprouting from beneath the damage or a delicate bridge graft around the damage will save the plant.

A rabbit’s tastes in food can vary considerably by region and season. In general, cottontails seem to prefer plants of the rose family. Apple trees, black and red raspberries, and blackberries are the most frequently damaged food-producing woody plants, although cherry, plum, and nut trees are also damaged.

Among shade and ornamental trees, the hardest hit are mountain ash, basswood, red maple, sugar maple, honey locust, ironwood, red and white oak, and willow. Sumac, rose, Japanese barberry, dogwood, and some woody

members of the pea family are among the shrubs damaged.

Evergreens seem to be more susceptible to rabbit damage in some areas than in others. Young trees may be clipped off, and older trees may be deformed or killed.

The character of the bark on woody plants also influences rabbit browsing. Most young trees have smooth, thin bark with green food material just beneath it. Such bark provides an easy-to-get food source for rabbits. The thick, rough bark of older trees often discourages gnawing. Even on the same plant, rabbits avoid the rough bark but girdle the young sprouts that have smooth bark.

Rabbit damage can be identified by the characteristic appearance of gnawing on older woody growth and the clean-cut, angled clipping of young stems. Distinctive round droppings in the immediate area are a good sign of their presence too.

Rabbit damage rarely reaches economic significance in commercial fields or plantations, but there are exceptions. For example, marsh rabbits have been implicated in sugarcane damage in Florida. Growers should always be alert to the potential problems caused by locally high rabbit populations.

Legal Status

In most states, rabbits are classified as game animals and are protected as such at all times except during the legal hunting season. Some state regulations may grant exceptions to property owners, allowing them to trap or shoot rabbits outside the normal hunting season on their own property.

Damage Prevention and Control Methods

Exclusion

One of the best ways to protect a backyard garden or berry patch is to put up a fence. It does not have to be tall or especially sturdy. A fence of 2-foot (60-cm) chicken wire with the bottom tight

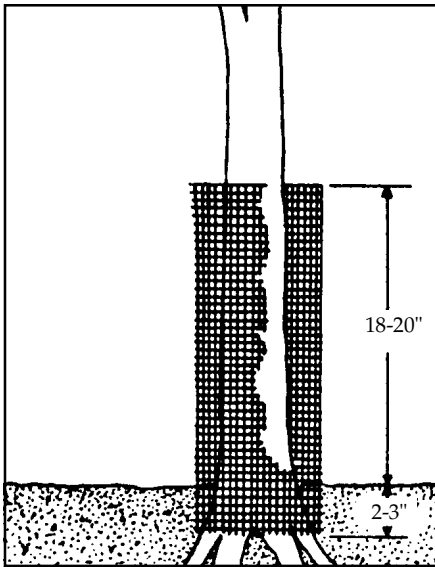


Fig. 5. A cylinder of hardware cloth or other wire mesh can protect trees from rabbit damage.

to the ground or buried a few inches is sufficient. Be sure the mesh is 1 inch (2.5 cm) or smaller so that young rabbits will not be able to go through it. A more substantial fence of welded wire, chain link, or hog wire will keep rabbits, pets, and children out of the garden and can be used to trellis vine crops. The lower 1 1/2 to 2 feet (45 to 60 cm) should be covered with small mesh wire. A fence may seem costly, but with proper care it will last many years and provide relief from the constant aggravation of rabbit damage. Inexpensive chicken wire can be replaced every few years.

Cylinders of 1/4-inch (0.6-cm) wire hardware cloth will protect valuable young orchard trees or landscape plants (Fig. 5). The cylinders should extend higher than a rabbit's reach while standing on the expected snow depth, and stand 1 to 2 inches (2.5 to 5 cm) out from the tree trunk. Larger mesh sizes, 1/2- to 3/4-inch (1.2- to 1.8-cm), can be used to reduce cost, but be sure the cylinder stands far enough away from the tree trunk that rabbits cannot eat through the holes. Commercial tree guards or tree wrap are another alternative. Several types of paper wrap are available, but they are designed for protection from sun or other damage. Check with your local garden center for advice. When

rabbits are abundant and food is in short supply, only hardware cloth will guarantee protection. Small mesh (1/4-inch [0.6-cm]) hardware cloth also protects against mouse damage.

A dome or cage of chicken wire secured over a small flower bed will allow vulnerable plants such as tulips to get a good start before they are left unprotected.

Habitat Modification

One form of natural control is manipulation of the rabbits' habitat. Although frequently overlooked, removing brush piles, weed patches, dumps, stone piles, and other debris where rabbits live and hide can be an excellent way to manage rabbits. It is especially effective in suburban areas where fewer suitable habitats are likely to be available. Vegetation control along ditch banks or fence rows will eliminate rabbit habitat in agricultural settings but is likely to have detrimental effects on other species such as pheasants. Always weigh the consequences before carrying out any form of habitat management.

Repellents

Several chemical repellents discourage rabbit browsing. Always follow exactly the directions for application on the container. Remember that some repellents are poisonous and require safe storage and use. For best results, use repellents and other damage control methods at the first sign of damage.

Most repellents can be applied, like paint, with a brush or sprayer. Many commercially available repellents contain the fungicide thiram and can be purchased in a ready-to-use form (see **Supplies and Materials**).

Some formerly recommended repellents are no longer available. Most repellents are not designed to be used on plants or plant parts destined for human consumption. Most rabbit repellents are contact or taste repellents that render the treated plant parts distasteful. Mothballs are an example of an area or odor repellent that repels by creating a noxious odor around the

plants to be protected. Taste repellents protect only the parts of the plant they contact; new growth that emerges after application is not protected. Heavy rains may necessitate reapplication of some repellents.

Mothballs or dried blood meal sometimes keeps rabbits from damaging small flower beds or garden plots. Place these substances among the plants. Blood meal does not weather well, however.

Taste repellents are usually more effective than odor repellents. The degree of efficacy, however, is highly variable, depending on the behavior and number of rabbits, and alternative foods available. When rabbits are abundant and hungry, use other control techniques along with chemical repellents.

Toxicants

There are no toxicants or fumigants registered for use against rabbits. Poisoning rabbits is not recommended. Since state pesticide registrations vary, check with your local Cooperative Extension Service or USDA-APHIS-ADC office for information on repellents or other new products available for use in your area.

Trapping

Trapping is the best way to remove rabbits in cities, parks, and suburban areas. The first step is to get a well-built and well-designed live trap. Several excellent styles of commercial live traps are available from garden centers, hardware stores, and seed catalogs. Most commercial traps are wire and last indefinitely with proper care. Average cost is about \$20 to \$30. Live traps can often be rented from animal control offices or pest control companies.

An effective wooden box trap (Fig. 6) can be made. This type of trap has proven itself in the field and has been used in rabbit research by biologists. For best results, follow the plan to the letter because each detail has been carefully worked out.

Place traps where you know rabbits feed or rest. Keep traps near cover so

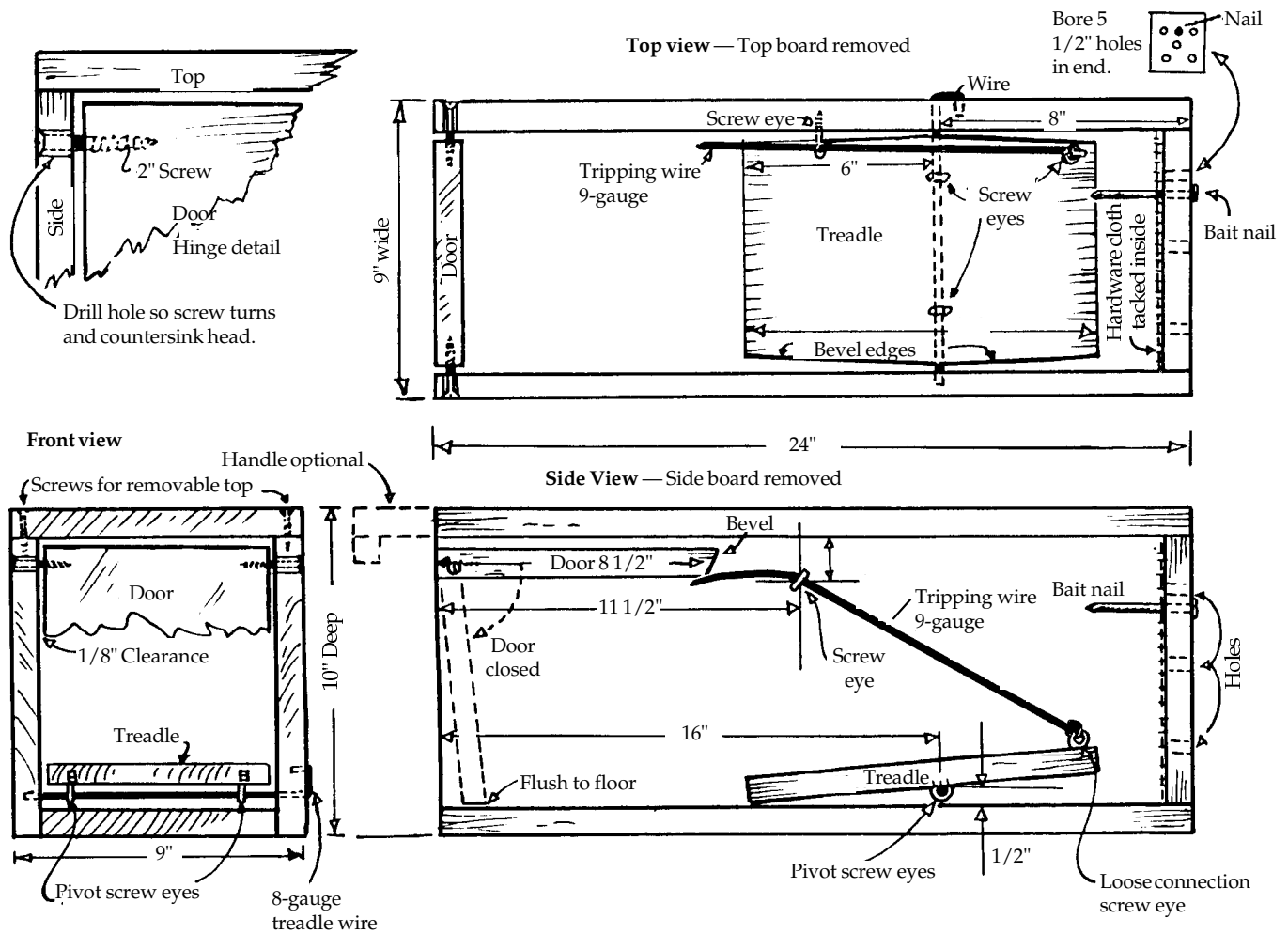


Fig. 6. Plans for the Tom Butzen wooden box trap for rabbits.

that rabbits won't have to cross large open areas to get to them. In winter, face traps away from prevailing winds to keep snow and dry leaves from plugging the entrance or interfering with the door. Check traps daily to replenish bait or remove the catch—daily checks are essential for effective control and for humane treatment of the animals. Move traps if they fail to make a catch within a week.

Finding bait is not a problem, even in winter, because cob corn (dry ear corn) or dried apples make very good bait. Impale the bait on the nail or simply position it at the rear of the trap (commercial traps may not have a nail). When using cob corn, use half a cob and push the nail into the pith of the cob; this keeps the cob off the floor and visible from the open door. Dried leafy alfalfa and clover are also good cold-weather baits.

Apples, carrots, cabbage, and other fresh green vegetables are good baits in warmer weather or climates. These soft baits become mushy and ineffective once frozen. A good summer bait for garden traps is a cabbage leaf rolled tightly and held together by a toothpick. For best results, use baits that are similar to what the target rabbits are feeding on.

A commercial wire trap can be made more effective (especially in winter) by covering it with canvas or some other dark material. Be sure the cover does not interfere with the trap's mechanism.

Release rabbits in rural areas several miles from where they have been trapped if local regulations allow relocation. Do not release them where they may create a problem for someone else.

Shooting

Shooting is a quick, easy, and effective method of control, but make sure that local firearms laws allow it and that it is done safely. In some states, the owner or occupant of a parcel of land may hunt rabbits all year on that land, except for a short time before the firearm deer season. Consult your state wildlife agency for regulations. You must be persistent if shooting is the only technique you rely on. Removing rabbits in one year never guarantees that the rabbit population will be low the next year (this is also true for trapping).

Other Methods

Encouraging the rabbit's natural enemies—or at least not interfering with them—may aid in reducing rabbit damage. Hawks, owls, foxes,

mink, weasels, and snakes all help the farmer, gardener, homeowner, and forester control rabbits. These animals should never be needlessly destroyed. In fact, it is against the law to kill hawks and owls; foxes, mink, and weasels are protected during certain seasons as valuable furbearers. Even the family cat can be a very effective predator on young nestling rabbits, but cats are likely to kill other wildlife as well.

Many people have a favorite rabbit remedy. A piece of rubber hose on the ground may look enough like a snake to scare rabbits away. Another remedy calls for placing large, clear glass jars of water in a garden. Supposedly, rabbits are terrified by their distorted reflections. Most home remedies, unfortunately, are not very effective. Inflatable owls and snakes, eyespot balloons, and other commercial prod-

ucts are readily available in garden centers and through mail order catalogues. Feeding rabbits during the winter in much the same way as feeding wild birds might divert their attention from trees and shrubs and thus reduce damage in some areas. There is always the risk that this tactic can backfire by drawing in greater numbers of rabbits or increasing the survival of those present.

Acknowledgments

I thank R. A. McCabe for reviewing this manuscript and providing the trap design.

Figure 1 from Schwartz and Schwartz (1981).

Figures 2 and 3 adapted from Burt and Grossenheider (1976) by Dave Thornhill, University of Nebraska-Lincoln.

Figures 4 and 5 courtesy of the Department of Agricultural Journalism, University of Wisconsin-Madison.

For Additional Information

- Burt, W. H., and R. P. Grossenheider. 1976. A field guide to the mammals, 3d ed. Houghton Mifflin Co., Boston. 289 pp.
- Chapman, J. A., J. G. Hockman, and W. R. Edwards. 1982. Cottontails. Pages 83-123 in J. A. Chapman and G. A. Feldhamer, eds. Wild mammals of North America: biology, management and economics. The Johns Hopkins Univ. Press, Baltimore.
- Chapman, J. A., J. G. Hockman, and Magaly M. Ojeda C. 1980. *Sylvilagus floridanus*. Mammal. Sp. 136:1-8.
- Jackson, H. H. T. 1961. The mammals of Wisconsin. Univ. Wisconsin Press, Madison. 504 pp.
- McDonald, D. 1984. Lagomorphs. Pages 714-721 in D. McDonald, ed. The encyclopedia of mammals. Facts on File Publications, New York.

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