

## Managing Rabbit Damage

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This NebGuide describes how to identify rabbit damage and recommends proper methods of control, such as fencing, habitat modification, repellents, trapping, and shooting to reduce damage to tolerable levels.

Cottontail rabbits (*Sylvilagus* spp.) (Figure 1) are found in most of Nebraska. The eastern cottontail (*S. floridanus*) lives throughout the state while the desert cottontail (*S. audubonii*) lives only in western Nebraska.



Figure 1. Eastern cottontail rabbit (*Sylvilagus floridanus*).

Cottontails flourish in much of Nebraska and can very quickly multiply if weather, habitat, or lack of predators allow (Figure 2).

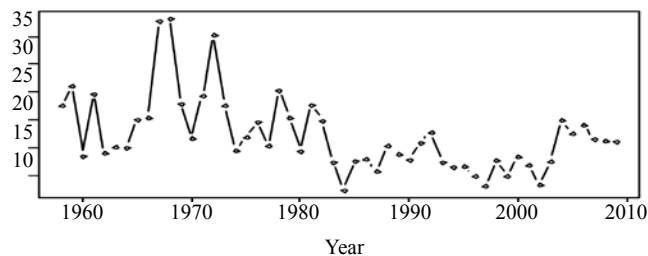


Figure 2. Number of cottontails observed per 100 miles during the annual July Rural Mail Carrier Survey.

In contrast, Nebraska’s two species of jackrabbit — black-tailed (*Lepus californicus*) (Figure 3); and white-tailed (*Lepus townsendii*) — have suffered serious population declines in recent decades. Hunting is prohibited east of U.S. Highway 81.



Figure 3. Black-tailed jackrabbit (*Lepus californicus*).

Since cottontails and jackrabbits may be commonly known as “rabbits,” this NebGuide will use the same term for both.

Rabbits have large incisors similar to those of squirrels, rats, and mice. These incisors, coupled with the tendency to gnaw, lead many to think of rabbits as rodents. Rabbits are actually classified as lagomorphs because they have two pairs of upper and lower incisors, one behind the other, whereas rodents only have one.

### Rabbit Facts

#### Cottontails

- Breed: February through August
- Gestation period: 28 days
- Litter size: 3 to 5 young
- Young: born naked, helpless, and with eyes closed
- Young: remain in the nest up to 14 days
- Adult size: 2 to 4 pounds
- Habitat: woody and dense vegetation in rural and urban areas

#### Jackrabbits

- Breed: February through August
- Gestation period: 43 days
- Litter size: 3 to 5 young
- Young: born well-furred and with eyes open
- Young: remain in the maternal nest only 1 day
- Adult size: 3 to 8 pounds
- Habitat: open rangelands or cultivated fields

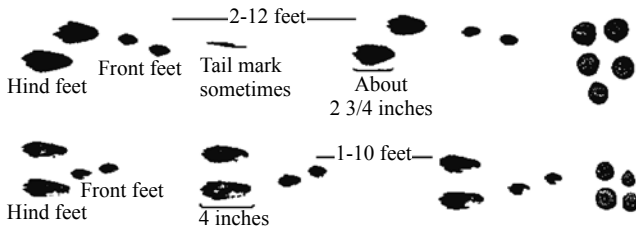
Rabbits can bear two to six litters per year because females can breed immediately after giving birth and because breeding stimulates ovulation. Cottontail nests, called forms, are shallow, cup-shaped depressions lined with fur. The mother places fur over the young to help protect them. The young and their nests remain well hidden, even in closely-mowed turf.

Avoid disturbing nests of young rabbits as the mother will return to care for them at a safe time. If you suspect a rabbit has been abandoned, leave it there but keep people and domestic animals away.

Cottontails seek shelter under piles of brush, in dense shrubs, under buildings, and in holes. When danger is spotted, they remain motionless, trying not to be spotted. If a threat comes too close, cottontails accelerate quickly, with large bounds to gain distance and run a zig-zag course to escape. Jackrabbits run away from danger in a straight line, relying on their speed (up to 40 miles per hour) to outrun predators.

Cottontails in rural areas spend their entire lives on a few acres; in urban areas they may not venture far from a single backyard. Since jackrabbits reside in open rangelands, they may need to travel several miles from their dens to areas containing their preferred food.

Rabbits have a simple digestive system with an enlarged caecum (appendix in human terms) used to extract nutrients from their herbivorous diet. To get the most nourishment from their diet, especially during winter, rabbits exhibit a behavior known as coprophagy, or the eating of their own feces. Rabbits produce two types of feces, a soft pellet that is re-ingested and which results in a hard pellet that is not re-ingested.



**Figure 4.** Tracks and droppings of jackrabbit (above) and cottontail (below).

### Ecological Importance

Rabbits fill an ecological role as medium-sized herbivores and the base of the food chain. In rural and remote areas, rabbits are prey for coyotes, bobcats, foxes, badgers, mountain lions, eagles, and hawks.

### Recreational and Economic Importance

Rabbits can cause damage any time of the year. During spring, rabbits prefer young, growing vegetation, like tulips, garden vegetables (carrots, peas, beans, lettuce, beets), clover and turfgrass. In winter, rabbits gnaw through the tender bark of young trees and shrubs to eat the green, inner bark.

Jackrabbits also can cause damage to agricultural fields by “mowing” travel paths through crop fields and eating new shoots. Woody plants tend to receive significantly more damage from rabbits during winters with substantial snow. On open rangelands, the greatest damage can occur during years of drought, synchronous with high populations of jackrabbits.

Rabbits also provide recreational and economic benefits to Nebraskans. In the 2008-2009 hunting season, an estimated 7,200 hunters harvested around 2,700 jackrabbits and 44,000 cottontails in Nebraska. About 10 percent of those purchasing a small game license in 2008 hunted cottontails, but fewer than 1 percent hunted jackrabbits. Revenue raised through these hunting fees alone amounted to \$216,000. Others enjoy watching rabbits or following their trails in the winter snow.

### Disease Significance

Tularemia is the most significant disease associated with rabbits. Tularemia is caused by a bacteria that can be contracted by humans through the bite of a rabbit, tick, or flea, or by handling the carcass of an infected animal.

Tularemia symptoms in humans include fever, swollen lymph nodes, and swelling around the bite, typically appearing within 3 to 14 days of exposure. The infection is rarely fatal to humans provided victims receive antibiotics quickly.

To reduce the risk of contracting tularemia, avoid direct contact with rabbits that are found dead, emaciated, or exhibit abnormal behavior, such as lethargy, uncoordination, and lameness. Take precautions against ectoparasites (ticks and fleas) and wear latex or vinyl gloves when handling and butchering rabbits. Discard any rabbits with livers covered with small white spots. Finally, in case of illness, inform medical personnel of any contact with rabbits, because the symptoms of tularemia are easily confused with the flu.

Rabbits infected with the Shope’s fibroma virus have fleshy finger-like growths protruding from various parts of their body. These growths occasionally make rabbits look like they have antlers and led early Europeans to believe that infected rabbits were a different species. This may have given rise to the mythical “jackalope.” Whereas rabbits afflicted with the Shope’s fibroma virus can raise concern among onlookers, it mostly affects cottontail rabbits and is not contagious to humans.

Rabbits, like most mammals, can carry ticks infected with other tick-borne diseases, such as Lyme disease. Since these diseases typically manifest themselves with flu-like symptoms, consider a tick-borne illness if anyone has symptoms within three weeks of being outdoors or handling rabbits.

### Signs of Rabbits and Identification of Damage

Rabbits are active year-round, and can be active day or night during summer or the warmer periods of the day during winter. You can identify the presence of rabbits or damage they cause by their tracks, droppings, and markings.

Tracks made by their hind feet are much longer than the front feet and are placed as pairs ahead of the slightly staggered front feet in the snow or soft earth (*Figure 4*). Toe prints are indistinct because the toes are well-furred.

Tree squirrel tracks are similar but smaller, not staggered, and often end at the base of trees. Rabbit droppings are pea-sized individual pellets. Gnaw marks of rabbits are irregularly placed on the trunks of trees and shrubs a few inches aboveground and occasionally on exposed roots. Rabbits will eat young bark on trunks and stems higher than 3 feet, especially in deep snow. A mark left by cottontail incisors is about 1/4 to 3/8 inches wide. Tree squirrels leave similar size marks on the upper surface of low branches of trees. Birds tend to shred plants and leave small pieces of the plants on the ground. Rabbits will nip pencil-sized stems cleanly at a 45-degree angle, while deer leave a jagged torn edge on stems of this size or larger.

### Prevention and Control of Damage

The presence of rabbits does not always result in economic damage to plants. Most 2- to 3-foot high shrubs can survive having most of the 1- and 2-year-old twigs removed. However, the desirable bud, flower, or fruit development may be impaired. The key to effective and economical rabbit control is being able to predict and intercept damage with methods that are relative to the predicted loss in value.

### Exclusion

A 1-inch mesh fence of poultry netting (chicken wire) works well to protect gardens and perennial flower beds from rabbit damage. Bury the bottom edge of the fence about 4 inches below the ground to prevent rabbits, particularly jackrabbits, from digging under it. The buried portion should be flared outward from the protected area to better prevent digging.

Install a 2-foot high fence to protect against cottontails and a 3-foot high fence against jackrabbits. Consider building the fence higher to exclude rabbits when snow cover is high or predicted to be high. A 2-foot high fence made of poultry netting (galvanized after the weave or weld will last longer) and 4-foot, 3/8-inch fiberglass fence rods spaced 3 feet apart can protect a 25- x 50-foot garden space for as little as \$168.37 at 2010 prices (\$1.13 per linear foot).

Reduce the cost by purchasing non-galvanized chicken wire and wood posts. Extend fence life by removing it each fall and storing it out of the weather. Plastic poultry netting is available in neutral colors but it is more expensive than wire mesh and can sustain damage from gnawing.

To exclude rabbits from an entire backyard, fences can be easily installed as additions to existing structures (*Figure 5*). Perimeter fences of welded wire mesh of 1-inch x 2-inch or 1-inch (hardware cloth, hail screen) excludes young rabbits, but a 2- x 3-inch mesh or chain link fence will exclude adults provided the fencing is anchored properly.

For small flower beds, construct a lightweight frame of



Figure 5. A rabbit fence added to an existing fence.

fiberglass or metal rods at the anticipated height of the flower blossoms and shape plastic mesh netting over it. Use plastic mesh colors that blend into the background environment.

Nurseries, tree farms, and other large areas, can be protected with a double-strand electric fence or electrified plastic-net fence. Place electric wires at 3 to 4 inches and at 8 to 12 inches above the ground. **Consult local regulations before installing electric fences.**

To protect individual trees, place cylinders of black plastic drain tile, cut to length and slit down one side, around the trunks. Poultry netting supported by stakes can be placed around the trunks of young trees and shrubs. (Figure 6). Shrub stems growing through the netting will become susceptible to damage by rabbits.

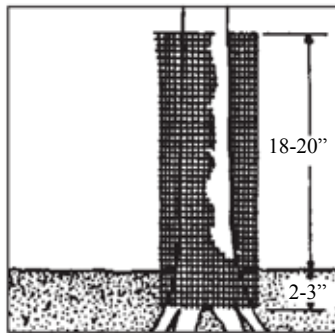


Figure 6 A cylinder of hardware cloth or other wire mesh can protect trees from rabbit damage.

Secure spaces under sheds and decks with 1/4 inch wire mesh to prevent rabbits from using the space for shelter. Instructions on proper exclusion techniques can be found at the Internet Center for Wildlife Damage Management's website: <http://ICWDM.org>. When properly done, the exclusion will also prevent skunks from taking up residence.

### Habitat Modification and Plant Selection

Reduce harborage for rabbits by removing brush piles and tall weeds, particularly those located near new windbreaks. Mow or spray to remove vegetation within 3 to 4 feet of recently planted trees and shrubs. Some trees and shrubs may need protection for as long as 10 years before they become mature enough to discourage rabbit feeding. Conversely, to guard against jackrabbit damage, you should encourage taller and denser vegetation.

We do not recommend supplying alternate foods for rabbits to reduce damage to desirable plants. In rare cases, feeding rabbits to save highly-valued plants may be a short-term solution until other control methods are implemented.

Rabbits are selective in their plant preferences and will inexplicably switch to other food sources. Supplementing with other food, such as clover and alfalfa, may attract more rabbits and lead to further damage.

Although rabbits eat most plants, especially when food is in short supply, some seem to be preferred. Trees and shrubs are at particular risk when they are young and their bark is thin. Among herbaceous plants, preferred species within the

rose and lily families are preferred. Nebraska horticulturists and others have compiled the following partial list of species most often eaten by rabbits:

### Most Often Eaten:

#### Annuals and Perennials

Aster  
Coneflower  
Hosta  
Hybrid lily—Asiatic, Oriental  
Impatiens—young flowers on young plants  
Pansy  
Phlox  
Rudbeckia  
Tulip

#### Shrubs and Young Trees

*Acer* spp. (maples)  
*Amelanchier* spp. (serviceberry, juneberry)  
*Aronia* spp. (black chokeberry, red chokeberry)  
*Carpinus* spp. (ironwood)  
*Cornus* spp. (dogwood)  
*Euonymus* spp. (burning bush, wahoo)  
*Gleditsia* spp. (honeylocust)  
*Hydrangea quercifolia* (oakleaf hydrangea)  
*Tilia* spp. (linden)  
*Malus* spp., (apples, flowering crabapples)  
*Rubus* spp. (raspberries and related brambles)  
*Sorbus* spp. (mountain ash)  
*Spiraea* spp. (spirea)  
*Pinus strobus*, (Eastern white pine)  
*Populus* spp. (willow, poplar, cottowood)  
*Prunus* spp. (plum, cherry, almond, peach)  
*Rhus* spp. (sumac)  
*Rosa* spp. (rose)  
*Quercus* spp. (oaks)  
*Taxodium distichum*, (baldcypress)

Plants with strong aromas and/or dense hair are typically avoided by rabbits. Some tree species rarely damaged by rabbits include black walnut, juniper, spruce, and fir. Be aware that you cannot depend on rabbit-resistant plants if winter conditions are severe and food sources are limited.

### Frightening Devices

Scarecrows, owl or snake effigies, spinning aluminum pie pans, and glass jars of water have been used to frighten rabbits. Commercial, water-driven scarecrows with motion detectors which spray water when movement occurs near them are available. Dogs confined by fences, tethers, or long leashes may help frighten rabbits away. In general, frightening devices may be limited in range to a few feet and provide short-lived protection because rabbits become used to them.

### Repellents

Most rabbit repellents aren't registered for use on plants destined for human consumption. Repellents fall into two categories: taste and odor.

Taste repellents attempt to make the plant less palatable for rabbits and are typically applied directly to the plant. Examples are those containing capsaicin or hot pepper extract (Deer-off™, Get Away™, Scoot™, Shotgun™). Their effectiveness tends to be short-lived and requires reapplication after sprinkler irrigation, rain, or new growth occurs. The duration and effectiveness of some repellents can be extended by mixing them with an anti-transpirant, such as VaporGuard™ or Wiltpruf™.

Odor repellents keep rabbits away from an area by fear or foul smell. A wide variety of active ingredients are used, including: ammonium or potassium salts of soaps (M-pede™; RoPel™), eggs (DeFence®), thiram (Spotrete™), zinc dimethyldithiocarbamate (Earl May® Rabbit Scat), predator urine (Shake-Away™), or garlic (Sweeny's® Deer & Rabbit Repellent). They are typically applied to soil in the perimeter area and/or on plant foliage to repel rabbits.

Some odor and taste repellents contain more than one active ingredient. Check the label for proper application rate, method, and site before applying any repellent.

Naphthalene is another ingredient of commercial repellents (Dr. T's™, Enoz Skat™) but the alternative chemical, paradichlorobenzene, is illegal for use outdoors. Some concern exists over naphthalene product's safety. Evidence for the effectiveness of hanging bars of Irish Spring™ or Dial™ soaps is weak. Any repellent's value can be effectively reduced by wind, water, plant growth, and animal pressure. Even the best repellents must be reapplied according to label directions.

Because daffodils are poisonous to rabbits, plant them in place of tulips to ensure reliable, spring-blooming bulbs.

### Toxicants

No toxicants are registered for rabbits in Nebraska.

### Trapping or Shooting

Both trapping and shooting can temporarily reduce local rabbit populations. Reducing rabbit numbers in fall may, in turn, reduce winter damage to trees and shrubs. Trapping generally takes more time and removes fewer animals than shooting, and is generally not effective for jackrabbits.

Many types of cage traps are available for cottontails, including single-door and double-door styles. Select traps that have at least a 7-inch-tall door.

Trapping is most effective during the winter and early spring when food is scarce. Good cold-weather baits include cabbage, ear corn, dried apples, and dried alfalfa or clover. Warm weather baits include carrots, lettuce, apples, and fresh flowers such as pansies or tulips. Replace with fresh baits and check traps daily.

Always place traps in sheltered areas and cover half of their length with heavy canvas or cloth to guard the captured animal against the elements, predators, and domestic animals. Wear gloves whenever using traps to reduce the risk of injury.

Consider placing boards or 1-foot high fences alongside traps to help funnel rabbits into the doors. Approach a trapped rabbit slowly and quietly to keep it from injuring itself. Translocation of rabbits beyond 100 yards is illegal in Nebraska. Visit the Wildlife Damage website, *ICWDM.org*, for information on how to humanly euthanize rabbits. Municipalities may further restrict the use of traps within city limits, so consult local law enforcement prior to trapping.

In general, release rabbits safely in areas with suitable habitat and where they are not likely to cause future problems. Since skunks may be captured in these traps, consult *ICWDM.org* for tips on handling skunk captures before trapping is initiated.

Cottontails and jackrabbits are hunted in Nebraska. Consult the Nebraska Game and Parks Commission for more information. Nebraska code allows removal of rabbits, within municipalities, causing damage to personal property during hunting season.

Outside of regular hunting season, or in municipalities where the use of traps is restricted or prohibited, an individual with a Wildlife Damage Control Permit or local animal control authorities must be employed to trap, shoot, remove and/or euthanize cottontails. Firearms, including air rifles, cannot be discharged legally within most municipalities. Consult local ordinances before trapping or shooting rabbits.

When rabbits threaten agriculture, the Nebraska Game and Parks Commission (NGPC) may grant permission to cage-trap and or shoot rabbits outside of the hunting season, but only if other methods, such as exclusion, have been tried and have failed. Consult with NGPC, check their website at <http://www.outdoornebraska.org> or municipal officials for details.

A Nebraska hunting permit can be obtained online from the NGPC website, NGPC offices, and many retail locations throughout the state. Wildlife Damage Control Permits are provided through NGPC district offices.

### Integrated Pest Management

A combination of methods usually best controls rabbit damage and the methods selected depend on the situation. For a windbreak in a rural area, the best combination of methods may be to plant older, less-browsed species of trees, to add a different species each year, and then apply a commercial repellent with a spreader-sticker. A spreader-sticker is a product added to the repellent to increase duration and effectiveness of the repellent. Anti-transpirants (mentioned earlier) are excellent spreader-stickers. Ivory Liquid™ (add 1 teaspoon per gallon of mixed repellent) also acts as a spreader-sticker. Apply repellents several times during the winter during the first few years of tree growth.

For the gardener, the best approach may be to build a rabbit-proof fence to guard young sprouting plants. For perennial flower beds, the best approach may be to use motion-activated water sprays or a vigilant dog to scare rabbits. Homeowners might also resort to a low, aesthetic plastic-mesh fence as flower blossoms emerge.

For young trees and shrubs in a backyard, methods of control include low fences around clusters of plants, individual tree guards, or tree guards incorporated with chemical repellents.

### Acknowledgments

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**This publication has been peer reviewed.**

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