

Vertebrate Pest Management

By Dave Pehling, Extension analyst, Snohomish County, Washington State University. Adapted for Kentucky by Thomas G. Barnes, Extension wildlife professor and wildlife Extension specialist, University of Kentucky. Revised by Matthew T. Springer, assistant Extension professor and wildlife Extension specialist, University of Kentucky.

In this chapter:

Problems with Home Remedies.....	01
Prevention is the Best Solution	02
Moles.....	03
Voles.....	03
Chipmunks	04
Cottontail Rabbit	04
Deer and Elk.....	05
Black Bear.....	05
Skunks	05
Raccoons and Opossums	05
Tree Squirrels	06
Birds.....	07
For More Information.....	08

Most people enjoy watching wildlife around the home, whether it is birds at a feeder, butterflies on flowers, or the occasional deer or turkey wandering through the yard. In some instances, wildlife come into contact with humans and are in the wrong place at the wrong time. For the gardening enthusiast, this encounter can create conflict. With weeds, insects, and other types of garden pests, you can just spray a chemical and solve the problem, but vertebrate pests are considerably more difficult to deal with. Few poisons or repellents are available for use. Also, vertebrate pests share similar physiology with humans, so chemicals designed to kill mammals can potentially also harm us and our pets. Consequently, there is no standard approach to dealing with wildlife problems. Each situation must be examined in terms of:

- species of animal causing the damage
- severity of damage
- season and duration of damage
- legal status of the animal
- biological and ecological considerations
- wildlife value
- available types of prevention and control methods (non-lethal and lethal)
- economic considerations

These factors can help you evaluate the situation. Not every conflict between humans and wildlife requires action—the goal is to solve a problem, not kill animals. Often, a bit more human tolerance is all that’s needed; the situation may resolve itself, evident in the old saying, “Plant four seeds; one for the mouse, one for the crow, one to rot, and one to grow.” Even if you tried to kill all the wildlife in the group causing the problem, it would be almost impossible to control the entire population. The types of wildlife you are dealing with have very high reproductive rates, live short lives, and have high death rates. They are usually adaptable and opportunistic in their general habitat requirements, and we often create excellent habitat for them around our homes and in our gardens. For example, rabbits like nothing better than to eat from a well-tended, fertilized bean patch rather than eat grass and clovers.

Problems with Home Remedies

People are ever-resourceful, so when it comes to wildlife conflicts we attempt to make our lives easier by designing and developing new products, sometimes based on sound information and sometimes not. A perfect example of these new products is deer or wildlife “whistles” meant to keep deer or other creatures away from cars or structures by using high-pitched sound. Research conducted in Europe has shown these whistles have little effect.

In some cases, gardeners and homeowners take matters into their own hands and develop their own “home remedies.” Most such inventions may work for a short time, but be aware that laws govern the types of chemicals you can put out to control wildlife. For example, many people will use mothballs to move bats from a structure or from part of a building, such as an attic. Most of them do not realize that mothballs are carcinogenic to humans and that to obtain a concentration strong enough to repel bats would probably create a hazard for the human occupants as well. Consequently, mothballs are not labeled for use as a bat repellent.

Many states are becoming serious about the use of such home remedies due to the toxic chemicals they contain and the harm they can do to the environment, people, and pets. Some states interpret using a home remedy as an illegal use of a pesticide. Some will also invoke animal cruelty laws if wildlife show signs of suffering and that suffering can be traced back to an individual homeowner. For example, most homeowners recognize that antifreeze attracts wildlife and that if wildlife drink it, it will kill them. What they do not realize is that an animal dying as a result of this activity mimics an animal dying of rabies.

It takes time for the animal to die and it wanders around the neighborhood. Someone will most likely discover this animal and make efforts to help it. While this is most probably a case of cruelty to animals, it is most definitely a violation of federal and state pesticide laws. If the homeowner who enticed the animal to the antifreeze were caught, the case would be treated quite seriously by the legal system.

It is better to use a product that has been tested and undergone scrutiny than to use something you or your neighbor heard of through the grapevine. Unfortunately, many of the chemicals that are labeled for wildlife control are “restricted use” products, which mean you must have a specific license to use them. You must also realize that the directions on the product’s label are the law, and failure to follow the label is illegal.

Prevention is the Best Solution

The best long-term solution to solving conflicts between humans and wildlife is to prevent them in the first place. The second-best solution is to keep the animals from the site and to minimize any damage they might do. The solution of last resort may be to capture and remove or kill the offending animal.

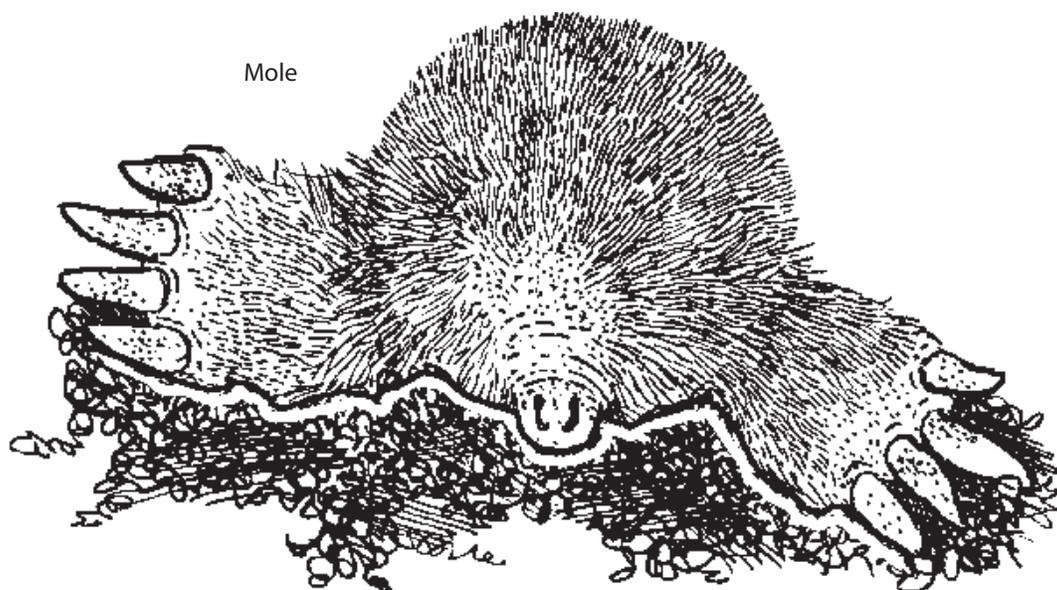
A homeowner or gardener should first take stock of his or her property and at a minimum take some common-sense precautions, like making sure the trash cans have lids that fit tightly; not keeping dog or cat food out at night; inspecting the home to ensure that all holes and entrance routes are sealed; not putting wildlife-attracting meat or fat scraps in the compost; and picking up boards, debris, and other items from the ground to minimize use by snakes, skunks, or other burrowing creatures. Clean up at the bird feeder—excess seed attracts not only birds, but also chipmunks, squirrels, and rabbits. Finally, look at your perimeter fences and check for signs of where animals are moving from surrounding properties. Seek to make these travel routes uninhabitable.

The next step in preventing damage is to examine your garden and landscape to see where barriers can be erected around the vegetable garden or over the grape arbor/berry patches, which is where netting would be appropriate. You can also look to see if you have favorite perches where birds roost (trees or structures) and net them off. Or, you can use some other type of structural deterrent (like porcupine wire or angled boards) to keep the birds from perching near the gardens.

If you are determined to live-trap and release wildlife from the garden, consider the following:

- You can’t release them on public land such as a park, wildlife management area, forest, nature preserve, or any other public land.
- You must obtain written permission from the landowner to release wildlife onto private land.
- It is not necessarily more humane to release the animal, as they are often at a disadvantage when released. Members of the same species may be aggressive to them or they may become easy prey. Released animals may be injured in confrontations with these newly encountered individuals in the area they were released. The injuries may not be limited to the animal that was released, as those individuals that were present are just as likely to be injured in a confrontation. On top of that, you do not know if the animal you are relocating is potentially carrying a disease. Unnatural movement by relocation can help diseases like rabies to be quickly spread across the landscape, causing substantially more harm to the species you are trying to protect.
- Wildlife have incredible homing instincts. Unless an animal is taken many miles from the point of capture, it will return to its original habitat.

Given these general guidelines, specific animal groups and potential control options are presented in this publication.



Moles

The much-maligned mole may be the greatest source of stress among homeowners. It is probably the number one lawn pest that people complain about. While moles do little actual economic damage except to golf courses and other expensive turf areas, many people consider it to be a significant problem. Moles are insectivores, not rodents, so they do not eat plant material. Their primary diet is earthworms and grubs. If you have a problem with grubs in your lawn, it is not wise to spray an insecticide to kill them, because the moles could switch their prey to something else and actually cause more damage.

Ninety percent or more of a mole diet is earthworms, and the remaining 10 percent is other soil insects. If you have a grub problem, treat that problem, and if you have a mole problem, treat that problem.

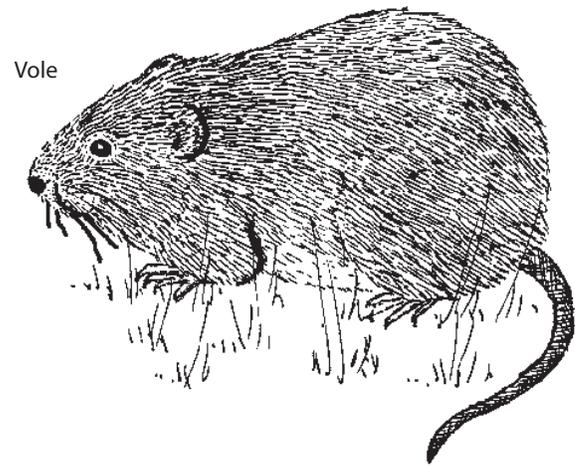
Most damage occurs when moles' shallow burrowing activity, which is generally in the spring and fall, creates ridges or hills of fine dirt in the lawn. It isn't necessarily true that moles are difficult to control. The key, whether trapping or using the poison earthworm baits, is to find the active tunnels that moles use most often. These tunnels are usually long and straight, not branched. If you place your foot over a section of the burrow, it will usually be pushed up the next day.

The best time of year to use either baits or to trap is spring and fall, when moles are more active in surface runs rather than deep runs and chemicals do not break down as quickly as in summer heat. (The chemicals in the earthworm baits are very heat sensitive.) Fumigation or gas cartridges are also available for control, but they are generally not effective. The mole runs are so extensive that it is difficult to get enough gas into all areas of the burrow system to kill the animals. More information on using traps to control moles can be found in the UK Cooperative Extension publication *Managing Mole Problems in Kentucky* (FOR-42) at <http://www2.ca.uky.edu/agcomm/pubs/for/for42/for42.pdf>.

The final option is to use a castor oil-based repellent. These repellents have been shown to be somewhat effective; however, they must be continually reapplied because they disperse into the soil. Also, they do not solve the problem; they only delay dealing with the long-term issue of actually controlling the animals. Furthermore, these products can be quite expensive. In the long run it will be more cost effective to remove the offending animals.

Voles

Often damage by voles is mistaken as mole damage, because meadow voles can create extensive burrow systems, particularly in lush, thick grass lawns. Voles, or meadow mice, are small, compact mammals with stocky bodies; small, rounded ears; short legs; and short tails. When fully grown, voles are four to five inches long. Their long, coarse hair can be blackish, grizzled, or reddish, and they spend most of their lives just below the



soil surface. Voles are plant eaters, so if you find bulbs, tubers, shrubs, or other plants gnawed on at ground level or just below it, the culprit is likely a vole, not a mole. You might find one-inch diameter holes in the turf, indicating the entrance to a burrow system. Prairie and meadow voles feed on tree bark, primarily during the fall and winter. However, pine voles characteristically attack trees of all sizes in all seasons. Most pine vole damage occurs belowground, where the animals feed on rootlets and the bark of larger roots. Voles breed from January through October in Kentucky and can produce an entirely new generation in about 60 days. Vole numbers fluctuate from year to year; under favorable conditions, populations can increase rapidly. Voles often experience population booms and busts on about a four-year cycle. It is during the boom years that lawn and shrub damage is usually the worst.

Vegetation management is the key to managing vole populations. Because voles like thick, heavy mulch and grass, the key is to not provide this type of habitat. However, limiting this habitat can conflict with other objectives, such as applying mulch around landscape plants. To reduce the potential for vole damage, mulch should be pulled away at least 36 inches from the base of the plant material, and if possible, the ground should be kept clear of any vegetation or mulch, because bare ground minimizes vole activity around plants. A thick, lush lawn, particularly with fescue as the grass species, creates ideal habitat for prairie or meadow voles. Lawns should be dethatched to reduce potential vole problems.

To protect individual landscape plants, place hardware cloth cylinders (quarter-inch mesh) around the lower trunks and bury the cylinder's lower edge six inches deep. Tree guards that control rabbit damage do not discourage voles, since voles feed mostly underground. In fact, voles have been known to nest under loose-fitting guards! For very small vole populations, trapping may be sufficient control. Use ordinary mousetraps baited with peanut butter or apple. The traps must be placed in the runs and then covered with boards. Check traps daily and reset as needed. This method is very time-consuming but is often the only solution, as there are no chemicals labeled for vole control in the landscape.

Chipmunks

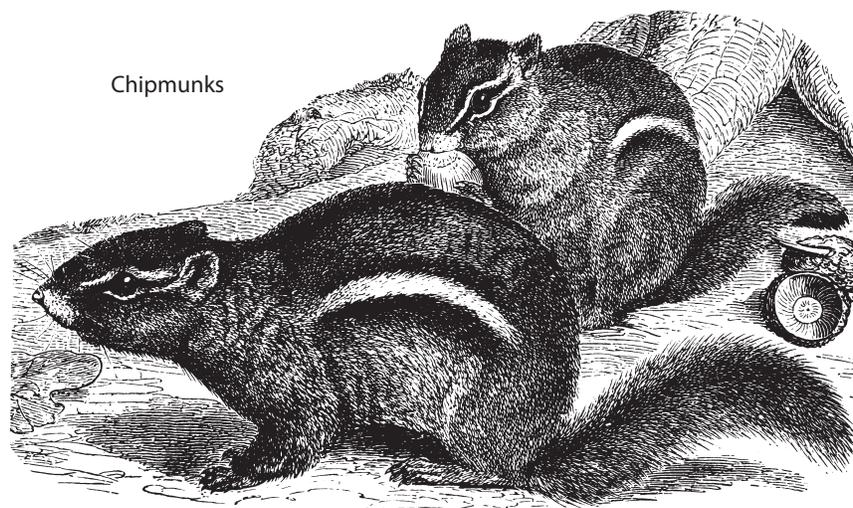
These small squirrels are not ground squirrels, although that is a name commonly used for them. Kentucky has no ground squirrels. Chemicals sold in Kentucky that are labeled for use on ground squirrels are illegal to use for chipmunks. While chipmunks are avid climbers, they spend most of their time on the ground or in underground burrows that can be up to six feet long and two to three feet deep. The entrance is typically a hole from one inch to one-and-a-half inches in diameter. No soil is mounded around it, and it closely resembles the entrance hole for a vole. Chipmunk entrance holes are often around or at the base of structures like a rock fence, a concrete wall, or sidewalk, and often the entrance is concealed with leaves or other debris.

No chemicals are labeled for chipmunk control in Kentucky, and homeowners are left with either excluding the animals or trapping them. The best material to exclude chipmunks is quarter-inch hardware cloth. It should be buried at least six inches deep to prevent the animals from burrowing under it. The most common trapping method involves using rat snap traps (which are much like a common mousetrap) or small live traps. Live trapping is usually an all-encompassing activity, because homeowners trap and release not only the animals from their yards but from surrounding yards as well. Therefore, snap trapping is the preferred alternative. To be successful, two traps should be used per entrance hole. The traps should be placed adjacent to one another and perpendicular to the hole, and they should be buried so they are level with the surrounding environment. There is no need to bait the traps at the entrance hole. Once in place, some sort of structure should be placed over the top so that birds, pets, and other animals do not inadvertently step in the traps. Another viable alternative is to use PVC pipe six inches in diameter. Cut it into one foot sections and place a trap in each pipe. Bait the trap with a mixture of peanut butter, oatmeal, and apple. For more information on chipmunk control, see the UK Cooperative Extension publication *Managing Chipmunk Problems in Kentucky* at <https://www2.ca.uky.edu/agcomm/pubs/for/for41/for41.pdf>.

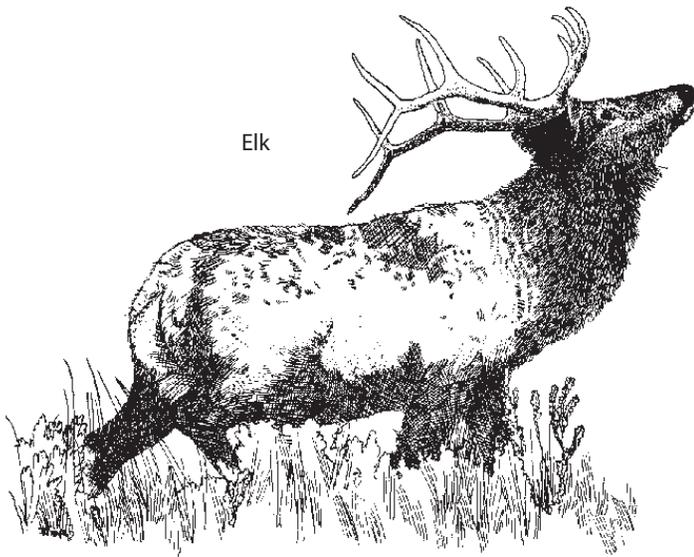
Cottontail Rabbit

A well-fertilized garden and lawn is a buffet for cottontail rabbits. They love flowers, vegetables, and shrubs or trees that provide ample nutrition. They often feed on bark and stems during winter, when they cause a lot of damage to gardens and orchards, especially in peak population years. In spring and summer, they develop an appetite for flowers (particularly tulips) and vegetables. Rabbit-damaged trees and shrubs are easily identified by characteristic tooth marks. Rabbits clip tender young shoots and terminal buds as well as gnaw on the trunk. The gnawing marks are larger than vole marks and appear as clean, knifelike cuts at a 45° angle.

Because rabbits can't climb and jump more than several inches, the best method of solving rabbit problems is to place a mesh two-foot fence buried six inches deep around gardens and flower beds where rabbits have been observed. Individual trees and shrubs can be protected with hardware cloth cylinders that are at least two feet tall and buried six inches deep. Rabbits can also be deterred using a single high-tensile electric fence with the wire placed four inches above the ground. Make sure the system is well grounded and the vegetation under the wire has been removed to ensure good contact between the wire and animal. If the rabbits jump this fence, a second wire can be placed two inches above the lower wire. Live-trapping rabbits is not all that easy in the garden because there is such an abundance of food, and it is generally ineffective. There are a number of commercially available chemical repellents for rabbits that are labeled for homeowner use. The only two available for use on human edible crops are Hinder and those made with capsaicin (hot pepper). Generally speaking, repellents that make the plant taste bad are more effective than those that repel by making the area smell bad. To be effective, these repellents must be reapplied after a rain or heavy dew, and they are expensive and labor-intensive to use. Always be sure to read and follow the label when using any chemical repellent.



Chipmunks



Deer and Elk

Kentucky has abundant deer and elk populations in both urban and suburban environments. They are difficult for homeowners to deal with, because hunting is usually not a control option in these environments. These two large mammals can cause considerable damage, not only from their browsing of plant material, but also from their movements and behavior. Furthermore, since fencing is really the only viable management option that works, homeowners need to determine if they can deal with potentially unsightly fences around trees, shrubs, gardens, and other plantings. While repellents can provide some temporary relief, they are not viable management options in the long run. One potential solution is to select deer-resistant landscape material. However, if a deer or elk population is stressed and hungry, it will devour these plants as well. More detailed information on managing deer problems is available in the UK Cooperative Extension publication *Managing White-Tailed Deer Problems in Kentucky* (FOR-57) at <http://www2.ca.uky.edu/agcomm/pubs/for/for57/for57.htm>.

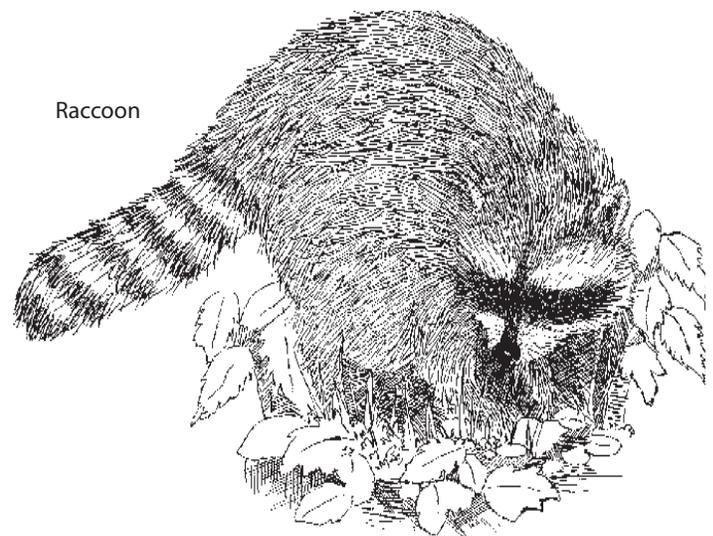
Black Bear

Bears are the largest omnivore within Kentucky, and their range and population is currently expanding. Found mostly in the southeast and eastern counties, they can cause large amounts of damage quickly within your garden or other landscaping. Bee hives, sweet corn, all types of berries, and orchard trees are especially attractive to bears. Because these species are quite adept at climbing, the best control is to use electric fencing around any areas you want to protect. The wires should start at six inches from the ground and be spaced about every eight to 10 inches up to four feet off the ground. To ensure this method is effective, you need a power source capable of providing an adequate shock to the animal; it is suggested to be between 6,000 and 10,000 volts. In addition, all vegetation must be kept clear

of the fences to prevent the wires from grounding. These can be temporary fences that can be removed once the crop has been harvested or permanent versions. Other types of fences, such as a chain-link fence, may help deter bears, but they become much more effective by adding a single strand of electric wire on the top. Hinder and hot pepper-type repellents are labeled for use on human edible crops, but no research has shown them to be effective at keeping bears from consuming crops.

Skunks

Skunks are another small omnivore common within Kentucky that can be problematic when maintaining gardens and landscaping. Skunks will feed on many types of produce within gardens, including corn and various types of berries. Fencing is a feasible option to help keep them out of gardens, as they are not adept at climbing. A chicken fence that is two to three feet high should suffice in keeping them from entering specific areas. One of the major problems skunks can cause has to do with their diet, specifically their love of larvae. They will dig up larvae from the soil, usually creating numerous holes from three to four inches deep within flower beds or lawns. This behavior is not all bad, as they are removing species that are often viewed as pests. One of the easiest ways to deal with this type of skunk damage is to treat your lawns to control the pest species itself. If there are no larvae present, the skunks will not dig to find them.



Raccoons and Opossums

These two mid-sized omnivore mammals cause most problems when they get into the garden and raid fresh produce just before it is ready to be picked. Sweet corn is especially attractive. Because these species are quite adept at climbing, the best control is to use a two-strand electric fence around the garden. The wires should be at six and 12 inches from the ground. To make sure this method is effective, you must have a charger that

supplies sufficient electricity to provide an adequate shock, and all vegetation must be kept clear of the fences to prevent the wires from grounding. These temporary fences can be removed once the crop has been harvested. Other types of fences, such as a chain-link fence, can work, but adding a single strand of electric wire on top makes them more effective. Hinder and hot pepper-type repellents are labeled for use on human edible crops and may deter the animals long enough for the vegetables to be harvested. If using hot pepper-type repellents, remember that they should not be sprayed on the actual vegetable you will be eating but on the surrounding vegetation.

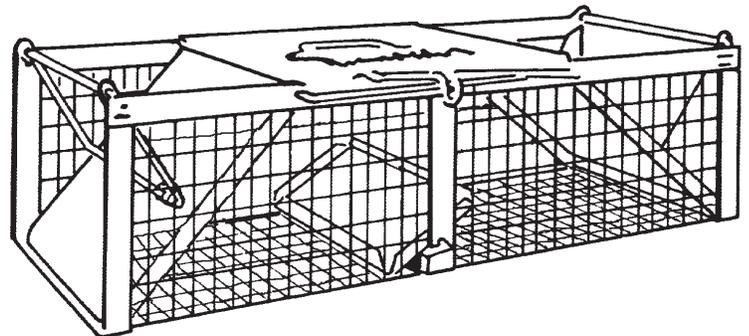
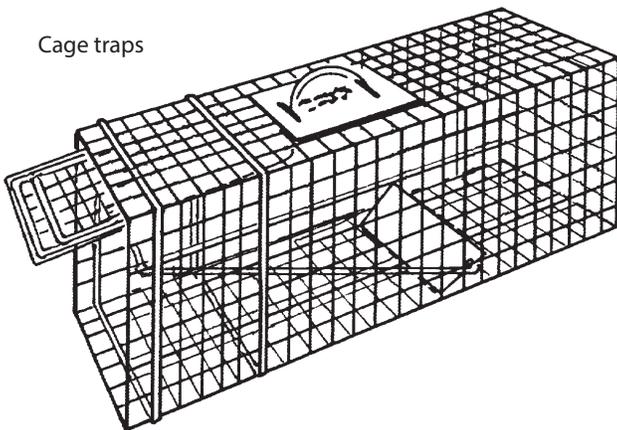
Gray squirrel



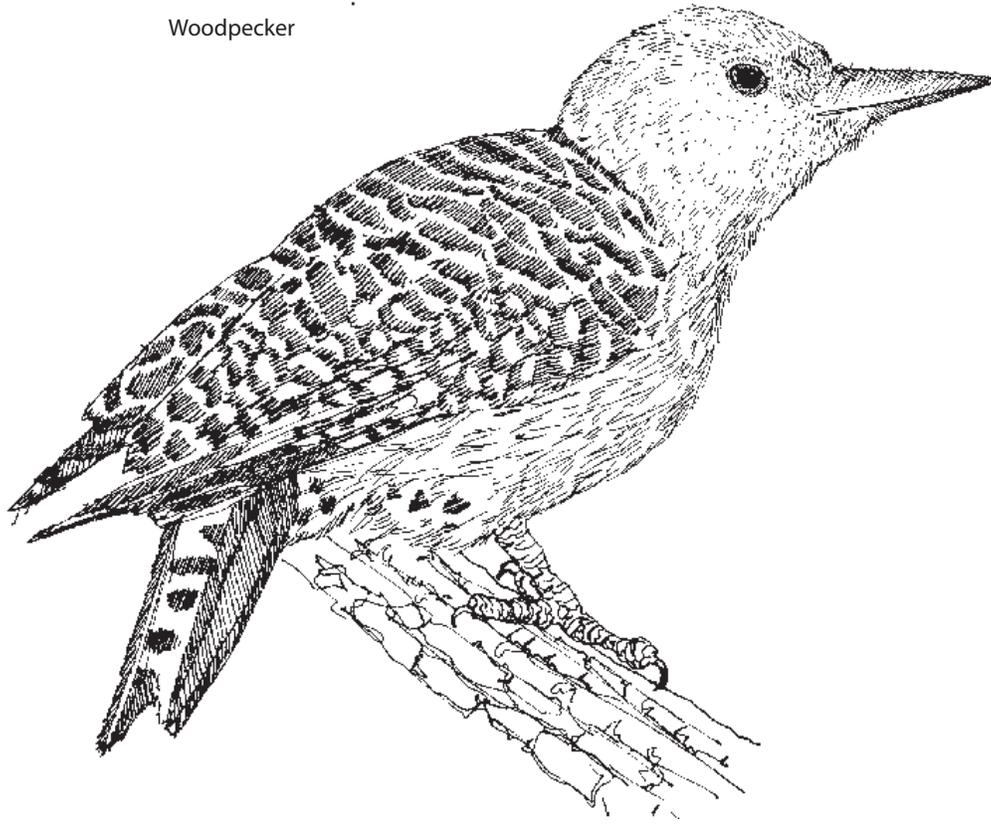
Tree Squirrels

Both the fox and eastern gray squirrel are common in Kentucky, and both can cause problems for gardeners by digging up plants, bulbs, or seeds; eating from fresh vegetables; gnawing off small branches and twigs; stripping bark; and raiding bird feeders. If they get into a house or another structure, they can cause significant property damage. Squirrels are easy to live trap if the traps are baited with sunflower seeds, corn, peanut butter and oatmeal, or other fruit-nut material. However, once squirrels are trapped, they are vicious. Dealing with them in a live trap can be troublesome and even hazardous. Furthermore, you may have many more squirrels than you first realize. Twenty-four squirrels were trapped in a single week at a residence in Lexington, Kentucky, and the population was still not depleted. If you do want to catch and release the animals, pay strict attention to the laws and regulations outlined previously. To more humanely move the animals, cover the trap in heavy canvas while transporting them (this method might also save one of your fingers!). If you have squirrels digging up bulbs, plants, or seeds, the best method is to place hardware cloth just under the soil so they can't dig through the cloth and access the plant material that is underground. The cloth should be staked firmly, and it should be much larger than the immediate area to prevent the squirrels from getting at the edges and tearing the cloth out of the ground. Electric fencing, as discussed for raccoons and opossums, will also work to deter squirrels from a vegetable garden, and commercial repellents are available as well. If you want to treat birdseed to deter squirrels, a hot pepper-type repellent is available that can be placed on the birdseed. If you do feed birds, make sure you clean up any and all extra food that drops so that you discourage other animals. Squirrels can be kept out of fruit trees and other trees by placing six-foot sheet metal or plastic barriers at the base of the tree. At certain times of the year, squirrels will clip twigs and branches of trees for no apparent reason other than to sharpen their teeth. Don't worry about this damage; it generally doesn't harm the tree.

Cage traps



Woodpecker



Birds

Birds, primarily crows, starlings, woodpeckers, pigeons, house (“English”) sparrows, and robins, can cause problems in gardens by their roosting, nesting, and feeding habits. Bird management may present special issues, because woodpeckers, robins, and songbirds are protected by law. Because of where Kentucky is located geographically, the state has tremendous control issues with populations of both summer- and winter-roosting birds. The first step in dealing with this problem is to select proper tree species for the landscape. For example, species with much branching, like the Callery pear, white pine, pin oak, and those of *Zelkova*, attract roosting species in the winter because the birds can congregate closer and keep warm. For these species, the first line of attack is to trim up to 30 percent of the canopy and “open” it so that branches do not overlap and more air moves through the canopy. Another option is to place bird netting over the tree. The final method would be to disperse the roost by using a bird distress tape call along with pyrotechnics. For more detailed information on dispersing a roost, see UK Cooperative Extension publication *Managing Urban Pest Bird Problems in Kentucky* (FOR-62) at <http://www2.ca.uky.edu/agcomm/pubs/FOR/FOR62/FOR62.pdf>.

If you have woodpeckers tapping on siding or trees in the spring, it is usually a result of courtship. Cedar siding is

especially attractive and prone to damage. It is illegal to harm these birds. The best method is to place another material in the areas where they are drumming or cover the area with bird netting to create a different sound. If this method doesn't work, a special sticky repellent available at hardware and lawn/garden stores can be applied to deter them. Sometimes an infestation of carpenter ants or solitary bees can attract woodpeckers. If this is the case, take care of the insect problem and the woodpecker problem will also disappear.

Perhaps the biggest threat to home gardens from birds is the damage to strawberries, cherries, blueberries, apples, grapes, and hazelnuts. If you want any of these crops for harvest, you will most certainly have to place bird netting over them. It is the cheapest, most environmentally friendly, and most effective method of keeping birds from crops. Another alternative is to use the chemical repellent methyl anthranilate, which is derived from grape skins, to deter the birds. However, using this repellent is very expensive, and, as with all repellents, you must reapply it after dew or rain.

Various scare devices, including but not limited to fake snakes and owls, scarecrows, hanging flashers, balloons, loud noise, and ultrasonic or subsonic devices, may work for a day or two, but the birds quickly become accustomed to them and quickly return to their habitual behavior.

For More Information

A list of UK Cooperative Extension publications on managing vertebrates follows:

Managing Muskrat Problems in Kentucky (FOR-51)
Managing Beaver Problems in Kentucky (FOR-50)
Managing Skunk Problems in Kentucky (FOR-49)
Bats: Information for Kentucky Homeowners (FOR-48)
Snakes: Information for Kentucky Homeowners (FOR-46)
Managing Tree Squirrel Problems in Kentucky (FOR-45)
Managing Woodchuck Problems in Kentucky (FOR-44)
Managing Rabbit and Vole Problems in Kentucky Orchards
(FOR-43)
Managing Mole Problems in Kentucky (FOR-42)
Managing Chipmunk Problems in Kentucky (FOR-41)
Controlling Woodpecker Damage (FOR-38)
Coyote Managing Coyote Problems in Kentucky (FOR-37)
Managing Urban Pest Bird Problems (FOR-62)
Managing Commensal Rodent Problems in Kentucky (ID-115)
Kentucky's Endangered and Threatened Species (ID-103)

Cooperative Extension Service

Agriculture and Natural Resources
Family and Consumer Sciences
4-H Youth Development
Community and Economic Development

MARTIN-GATTON COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity. Reasonable accommodation of disability may be available with prior notice. Program information may be made available in languages other than English. University of Kentucky, Kentucky State University, U.S. Department of Agriculture, and Kentucky Counties, Cooperating.
Lexington, KY 40506 Revised 01-2024



Disabilities
accommodated
with prior notification.