ALTERNARIA BLIGHT

also called Alternaria leaf spot

It pays to act quickly if leaf spots appear on blight-susceptible crops because the Alternaria fungi that cause blight can spread rapidly in warm to hot, wet weather. A light infection won't do much damage, but if leaves end up blighted and dead, you may lose some of the harvest of roots, flowerheads, or fruits.

Alternaria solani causes early blight of potatoes and tomatoes; see page 188 for the description and control recommendations for this disease.

RANGE: United States; southern Canada. Rarely a problem in dry regions

CROPS AT RISK: Carrots, parsley, squash-family crops (especially muskmelons and watermelons), cabbage-family crops (including horseradish), beans

DESCRIPTION: Symptoms vary from crop to crop, but many crops develop targetlike spots that enlarge and merge. In carrots, leaf spots are dark brown or black and irregularly shaped. Elongated spots on leaf stems look like dark streaks. The disease develops rapidly in carrots, and most of the foliage may end up looking burned, collapsing to the ground.

In squash crops, small spots appear on older leaves. As the spots enlarge on muskmelon leaves, the pattern of concentric rings becomes clear. Infected leaves may curl and shrivel up. Often, fruits aren't directly infected but suffer from sunscald due to lack of shading after leaves die. Summer squash may develop moldy spots due to direct infection by the blight fungus.

In cabbage-family crops, spots mainly appear on older leaves, so damage is not serious. Spots may start as specks and grow quite large, showing concentric rings. Spores also can germinate on broccoli and cauliflower heads, creating dark lesions. Also, the spots can penetrate several layers deep in sprouts on Brussels sprout plants, ruining the harvest. Turnip leaves can be severely infected, and the roots of infected plants may develop symptoms in storage.

In warm conditions, Alternaria fungi can cause damping-off of seedlings (see page 163). However, infected seedlings often develop normally, showing no symptoms until warm, wet conditions prevail.

FIGHTING INFECTION: Remove leaves and stems that show symptoms, or pull out infected plants. Start a spray regimen of *Bacillus subtilis*, baking soda solution, or compost tea, but apply sprays early in the day so foliage will dry quickly. Stop using sprinkler irrigation.

Although symptoms spread rapidly through a carrot planting, the infection often doesn't occur until later in the season. Even if carrot tops die back suddenly, dig up the crop. Roots probably will be salvageable.

GARDEN CLEANUP: The fungus survives winter on seeds and in crop debris. After harvest, remove and discard noticeably diseased

crop debris; compost or turn under the rest. Also uproot and remove weeds that belong to the same plant families as susceptible crops.

NEXT TIME YOU PLANT: Add compost to bolster beneficial soil microorganisms. Space carrot- and cabbage-family crop rows widely. Sow carrot seed in raised soil ridges. Plant clean seed; choose resistant varieties when possible. Spray *B. subtilis* or compost tea before symptoms appear.

CROP ROTATION: Different species of Alternaria cause blight in different crop families, and in general, Alternaria fungi can't survive more than 2 years in the soil. A simple 3-year rotation by crop family may break the disease cycle.

ANGULAR LEAF SPOT

Cucumbers and their cousins are the only crops affected by this bacterial disease. Angular leaf spot spreads during wet conditions: Splashing rain or people handling wet plants spread the bacteria, which enters through wounds or pores in leaves, stems, and fruits.

In home gardens, even if leaves and stems show symptoms, fruits may escape infection. If the foliage is badly infected, though, yields will be poor.

RANGE: United States; southern Canada

CROPS AT RISK: All squash-family crops

DESCRIPTION: Water-soaked spots appear on leaves and stems. The spots don't enlarge past the leaf veins, so they end up with irregular geometric outlines. On wet mornings, small drops of bacterial ooze form on these areas (usually on leaf undersides), leaving a trace of white when they dry. The spots turn yellow and crisp and may tear out of the leaves, leaving ragged holes. White spots form on fruits, and the tissue underneath can rot, especially if soft rot sets in.

FIGHTING INFECTION: Prune off infected leaves and stems. If plants are small, uproot and discard them; start another planting elsewhere in your garden. Stop using sprinkler irrigation. Harvest fruits on the young side from infected plants. If the disease has been a severe problem in the past, spray with copper during wet weather to slow the spread of the disease. Stop spraying when dry weather returns.

GARDEN CLEANUP: The bacteria survive winter in seeds and plant debris.

After harvest, remove and discard any noticeably diseased plant debris. Compost or turn under the rest.

NEXT TIME YOU PLANT: Improve soil drainage before planting. Plant clean seed. Choose one of the many resistant cucumber varieties available.

CROP ROTATION: The bacteria persist up to 2 years in the soil in crop debris. A 2-year (or longer) rotation of squash-family plants should break the disease cycle.

ANIMAL PESTS

There's no simple solution for animal pest problems because furry marauders are much more complex creatures than insects are. Animals will behave differently depending on the weather, the amount of food available, the population level, and other factors. Our vegetable gardens are tempting targets because so much of the plant growth is young and tender, and because we water the plants during dry periods.

To cope with animal pests, start by deciding if you will protect only your vegetable garden or if you also want to protect flower gardens, trees, and shrubs. Note that if you take steps to stop animal pests from eating your vegetable crops, they may cause even more damage to your landscape plantings. Once you make the decision, act boldly. While insect pests or diseases can reduce yield of one crop or another, it's rare that they wipe out an entire crop overnight. With animal pests, on the other hand, such a scenario is increasingly common.

ASSESSING THE PROBLEM

The most common furry creatures that bother vegetable gardens from coast to coast are rabbits, woodchucks, deer, and raccoons. Rabbits, woodchucks, and deer eat a variety of crops. Raccoons are corn specialists but also will dig into ripening melons to feast on the sweet flesh. Several other kinds of wildlife, from armadillos to voles, sometimes feed in vegetable gardens in certain regions.

If you're new to gardening, ask your gardening neighbors or your Cooperative Extension office what animal pests raid gardens in your area. Keep a watchful eye out around your yard and your neighborhood, especially in the early morning and as dusk approaches. You'll probably spot rabbits and woodchucks if they're local residents, and in many areas, deer feed in full view of roads and houses.

DIAGNOSING DAMAGE

In your garden itself, look for rabbit droppings—small piles of brown pellets the size of peas. Rabbits clip off branches neatly. You may find a few wilted branch tips on the ground around damaged plants, leftovers that the rabbit didn't finish.

Deer droppings are larger than those of rabbits. Deer also tend to trample crops, and they feed roughly, tearing at plants.

You may never see a raccoon in your neighborhood, but if you grow corn and don't protect it, the raccoon will find it just as it ripens. If raccoons are reported as pests in your area, make the assumption that you'll need to protect your corn and melon patch from them. Otherwise, you'll wake one morning to find corn ears ripped open and stalks toppled over, as well as gaping holes in ripening melons.

Birds are garden helpers because they eat large quantities of pest insects, but birds can also

be garden pests. To learn about the damage birds cause and how to deal with it, consult Birds. See "More Pests" on page 20 for signs of damage by small rodents and regional animal pests.

SOLUTIONS TO ANIMAL PEST PROBLEMS

Coping with animal pests can include four categories of action: Scare them away, repel them with repugnant odors and flavors, plant crops especially for them to eat, or fence them out.

A fence is the most secure option. If you decide against a fence, plan on launching a campaign with multiple products and gimmicks, and be prepared to switch them frequently. There's no magic repellent or scare tactic that works all the time every time. In fact, you'll find amazingly contradictory claims about animal repellents and scare devices. One gardener will swear that spraying plants with a hot pepper spray protected them from animals beautifully, while another will scoff that spraying hot pepper seemed to attract wildlife to the garden. Both could be telling the truth. Perhaps one gardener sprayed the repellent faithfully every 3 days, and it kept away the rabbits from her town garden. The other gardener may live at the edge of a wooded area overfilled with deer.

Unfortunately, the simple animal repellents devised from household items that protected our grandparents' and parents' gardens may no longer work for us. Decades ago, animals simply had more wild places in which to forage for food. Higher populations of animals that are less wary of feeding near our homes and roads make our gardens prime targets, and the ani-

THE PRESSURE FACTOR

"Wildlife pressure" and "deer pressure" are terms that refer to the density of the wildlife population in an area relative to amount of food and natural habitat available. If there are lots of wild animals in your neighborhood but also lots of appropriate habitat and food sources, wildlife may not visit your yard often—you live in a "low pressure" area. Using repellents and scare devices may be enough to prevent any significant damage.

Unfortunately, more and more gardeners find that wildlife pressure—especially deer pressure—in their area is high and getting higher as development encroaches on wildlife habitat. If you live in a high pressure area, a sturdy fence designed especially to keep out the pests that frequent your area will be your only hope of having a successful vegetable garden.

As you assess the wildlife pressure in your area, gather as much information as you can. Are new large developments planned nearby? Are any of your neighbors fencing their yards? Either of these factors could increase the pressure on your yard and garden. Also, keep in mind that pressure one year may be worse than another due to weather conditions (droughts will increase wildlife pressure) and cycles in local wildlife populations.

mals are learning faster that scare devices and repellents don't have to deter them from a nighttime garden feast.

WHEN YOU NEED AN INSTANT DEFENSE

It's happened to most of us—you head out to your garden one fine spring morning and find unmistakable signs that animal pests have been chewing on young seedlings and transplants. There's no time to put up a fence until the weekend. What can you do until then? Try some or all of the following quick fixes. None are guaranteed, but with luck, they'll protect your plants until Saturday arrives.

APPLY A REPELLENT. Apply an odor-based repellent, such as a product made with rotten eggs, around the perimeter of your garden, and sprinkle or spray a taste-based repellent, such as hot pepper spray, directly on crops that were attacked.

SPREAD ROW COVERS. If you have it on hand, cover plants with floating row cover and fasten it down tightly along all sides. See Row Covers for tips on securing row covers.

Before you cover your plants, though, inspect them for insect pests. If young caterpillars, grubs, aphids, or flea beetles have found the plants, row covers won't work. You may lose your crop to the insects as they thrive in the protective space of the row cover.

BARRICADE PLANTS. Cloches used for protecting plants from cold will serve to keep out animal pests for a few days. See Season Extension for suggested cloches. Don't use cloches if temperatures are predicted to reach 80°F or more, or you'll cook your plants.

For an instant any-season animal barricade, check your shed for extra pieces of wire mesh fencing. Use wire cutters to cut sections just long enough to make arches over your crop rows, as shown on page 166. These barriers can be effective all season to protect crops from deer as long as the plants don't outgrow the arches. Caution: Animal pests that dig, such as woodchucks and rabbits, can tunnel under these kinds of barriers.

SCARE DEVICES

Items that move, make noise, resemble predators, or otherwise disturb the peaceful setting of your garden can spook animal pests for one day or several, but probably not all season. To get the best from scare devices, keep swapping one for another, and put them in different places around your garden.

FAKE SNAKES AND OWLS

Commercial versions of these decoys vary in design. Some are quite lifelike; others are more abstract, with surfaces that catch and reflect light. You can make your own "snakes" by cutting 4- to 6-foot sections of old garden hose and positioning them in the pathways of your garden, where they're easily seen. These may scare birds, rabbits, and some other small animals.

WEIRD SURFACES

Laying chicken wire on the ground around a corn patch could discourage raccoons because they won't like trying to walk across the wire. Planting corn as an island in a sea of prickly

To scare rabbits, birds, and other animals, hang aluminum pie pans and CDs on strings tied to sturdy twine stretched taut between stakes along garden rows. Drape shiny Christmas garland on tomato cages or trellises.

pumpkin or winter squash vines is another approach.

The chicken-wire tactic may deter deer, too, but they could jump across it—and it's awkward to try to surround a whole garden with a barrier of chicken wire "carpeting."

For rabbits, try surrounding crop rows or individual plants with spiny plant materials such as sweet gum balls or spiny holly trimmings.

SPRINKLERS

Motion-activated sprinklers send out a jet of drenching water when a marauding animal comes close enough to trip a heat sensor in the sprinkler unit. If you want to try a sprinkler like this, keep in mind that it needs to be attached to a hose at all times. It takes more than one for full coverage because the motion detector has a range of only about 100 degrees (a full circle is 360 degrees). Thus, if animals can sneak into your garden from any direction, you'd need three sprinklers (and thus three hoses or a system of hose splitters to supply the three units). The units cost $50 to $75 each, and they include batteries that need to be replaced occasionally.

SHINY ITEMS

The flashes of light cast by aluminum pie pans, CDs, and metallic Christmas garland alarm animals and prevent them from investigating your

garden. Arrange them as shown in the illustration on the opposite page.

NOISE

Commercial devices that make loud noises at random intervals work well for keeping pests out of farm fields, but if you have neighbors nearby, using one of these is a good way to ruin a friendship. One tolerable source of noise that's reputed to work well is a portable radio for scaring raccoons. Set it to an all-talk station and put it in the garden as corn approaches ripeness.

REPELLENTS

A foolproof animal repellent has yet to be invented. However, there are some repellents that work a majority of the time, especially if the animal pest pressure in your area isn't severe. Don't be disappointed if you see a little damage, because the animals may eat a bit here and there until they become turned off by the taste or smell.

Common odor-based repellents include bloodmeal (dried blood), predator urine, garlic, human or animal hair, rotten eggs, or synthetic chemicals. Taste-based repellents use capsaicin (the substance that makes hot peppers hot), essential oils, garlic oil, or various synthetic substances. Many studies show that overall, odor-based repellents work better than taste-based repellents. As with every general rule about repellents, though, there are exceptions.

Repellents may smell bad to you, too, at the time you apply them. You won't want to get them on your skin or inhale them. If they contain capsaicin, hot peppers, or garlic, it's important to protect your eyes while applying them. Wear goggles and a mask and gloves. Wash your hands thoroughly after applying.

COMMERCIAL REPELLENTS

Garden centers, nurseries, and mail-order suppliers offer a wide range of animal repellent products. Check the label to find one with the active ingredient of your choice. Avoid products that use synthetic substances as the repellent. When shopping for repellents, keep these tips in mind.

START SMALL. When you first try a repellent, buy the smallest container you can. This is more expensive on a per-unit basis but can be the least costly approach because it's impossible to predict the effectiveness of a particular repellent until you've tested it in your yard. After you find a product that works well, then invest in the larger container. And if you have success with more than one, buy both. Use one for a while, and then switch to the other.

DON'T DUPLICATE. Some companies package one repellent for deer, another for rabbits and woodchucks, and still another for pets. Ask a salesperson or check product labels to learn whether the products are significantly different. Common repellent ingredients such as putrefied egg solids, garlic juice, and capsaicin are repellent to all of these animal pests, so there may not be any significant differences in the formulations. If there isn't, then buy only one type.

CHECK THE SHELF LIFE. Some product labels state that one application will continue repelling pests up to 2 months. But in practice, most

gardeners find that repellents work best when reapplied every 10 to 14 days and even more often when it is rainy or animal pressure is very high.

Check product expiration dates carefully. Some of the natural products have a limited shelf life and won't be as effective once they start to break down.

REPELLENTS FROM THE HOUSE AND GARAGE

Items from around your house or garage sometimes work as deterrents, but limit your expectations. Sometimes the best use for these repellents is as a supplement to a garden fence. Spray the repellents around the perimeter of the fence or hang them from the fence wire or posts. This may be enough to keep animals from challenging the fence.

EGG SPRAY. Beat two eggs and add to 1 gallon water in a backpack sprayer (be sure no eggshell goes into the sprayer—it will block the spray hose). Mix well and spray on the ground around the perimeter of your garden.

CAYENNE PEPPER. Capsaicin extracted from hot peppers is the active ingredient in some commercial pest repellents, and cayenne pepper off the spice shelf may have the same power. Sprinkle pepper directly on foliage (but not on plant parts you plan to harvest).

STRONG-SMELLING SOAP. Use an ice pick to poke a hole through a bar of scented deodorant soap and stick a length of flexible wire through the hole. Hang the soap from a stake. Or collect odds and ends of leftover soap and put them in small bags made from cheesecloth, panty hose or old socks, or net bags from grocery store produce. Fasten the bags with twist ties or twine. Some gardeners even grate bars of soap directly onto the surface of garden beds.

OLD CLOTHES. Well-worn clothing and leather shoes supposedly carry enough human scent to scare away rabbits. Hang items on short stakes around the perimeter of your garden.

HAIR. Collect hair from a local barber or animal groomer. Spread it over the soil surface and work it lightly into the top inch of soil. Or put it in bags as you would soap.

BLOODMEAL. You may have a bag of bloodmeal in the garage that you use as fertilizer. It works as an animal repellent, too. Sprinkle it directly on foliage or put it in bags.

FENCING

Building a fence is the surest way to stop animals from damaging your garden. For rabbits, construct a 2-foot-tall fence of 1-inch chicken wire. Use metal or sturdy, rot-resistant wood stakes, and hammer them into the soil at least 12 inches deep. Use landscape pins to secure the bottom edge of the fence so the rabbits can't push underneath.

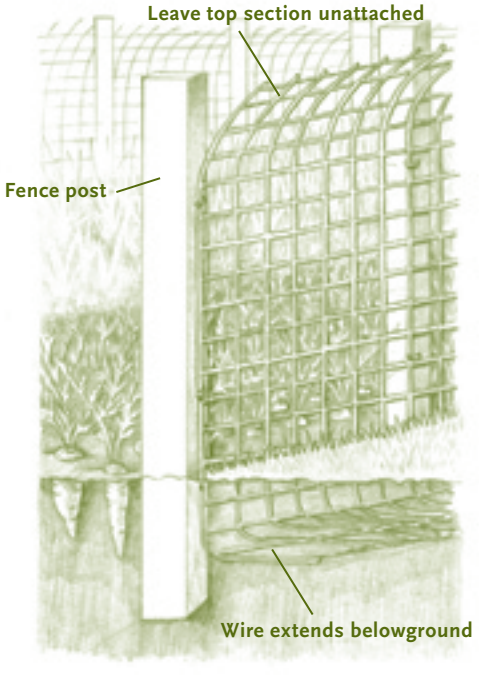
If woodchucks are potential raiders, increase fence height to 4 feet, but leave the top 18 inches floppy so that if the woodchuck climbs, its weight will pull the fence outward and over. Suspended in midair, the woodchuck will have no choice but to let go and drop back to the ground—outside your garden. Raccoons can climb taut vertical wire fences, but a floppy fence like this will probably stop them also.

See Deer to learn about fence designs to keep out deer.

UNDERGROUND BARRIERS

Rabbits and woodchucks sometimes tunnel under a fence, especially one that's put up after they've already sampled the treats growing in your vegetable patch. There are two design options to discourage burrowing: an underground barrier or an electric fence positioned a few inches outside the conventional fence.

Adding an underground feature to a fence requires a lot of digging, but it is effective. Some sources suggest extending wire 6 to 12 inches deep to keep out rabbits or woodchucks. Others say that the wire should curve or fold outward to create a three-dimensional barrier, as shown in the illustration below.



Extending a wire barrier belowground prevents digging animals from finding their way under the fence. The floppy top portion foils groundhogs and raccoons that try to scale the fencing.

ELECTRIC FENCES

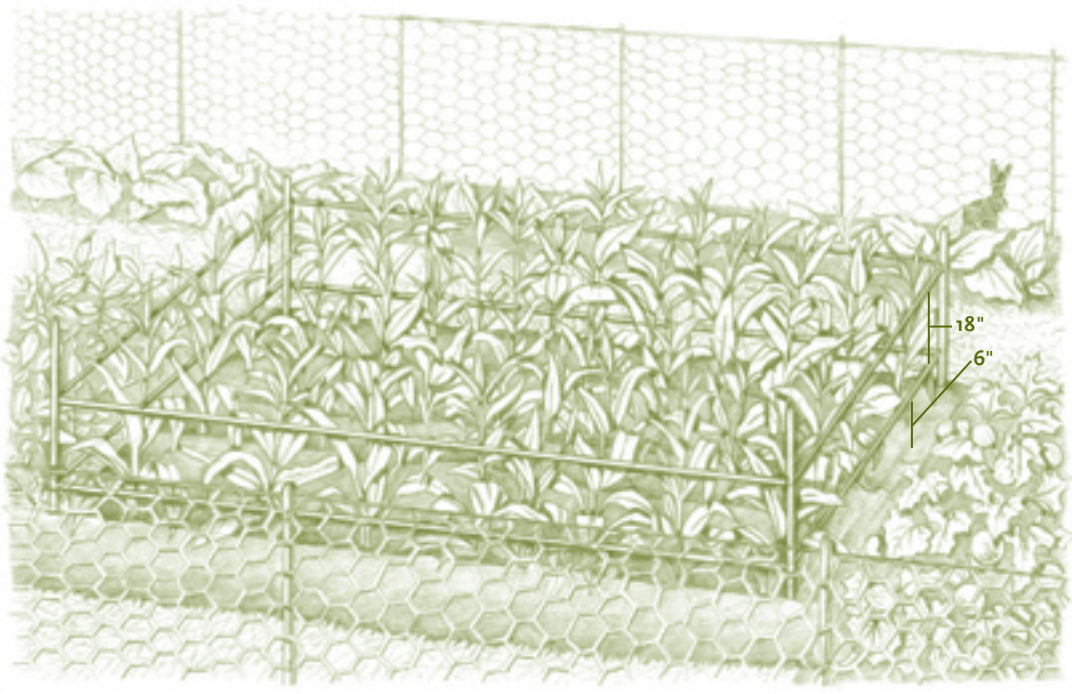
Electric fences provide a psychological barrier, not a physical one. These fences scare animals by sending a pulse of electricity through the animal's body. The type of electricity is different than that in our household electric lines, so there's no danger of electrocution by an electric fence. Each pulse from the fence lasts only a fraction of a second, with enough time between for muscles to relax. Even if a raccoon, for example, gripped an electric fence wire in its paw, it would not become "frozen" to the wire. Instead, it would immediately pull its paw away and retreat in fear.

To learn how to set up electric fencing and attach it to a charger (which supplies the power to the fence), see Deer.

ELECTRIC FENCE DESIGNS. A fence about 2 feet high will keep out groundhogs, raccoons, and rabbits. The fencing is available as polypropylene netting with rods already attached to the netting (see the illustration on page 171). This type of fencing is easy to set up. For rabbits, the minimum voltage needed is 3,500 volts.

If raccoons are the sole animal pest troubling your garden, you can use one or two strands of electric wire (or polytape) rather than netting. String the wire on insulators attached to metal posts, setting one wire about 6 inches above ground level and the other at 18 inches.

IF YOUR FENCE FAILS. There are two common reasons why animals sometimes find their way through your fence into the garden. First, you turned off the fence so that you could work in the garden and forgot to turn it back on afterward. What's the solution for this?



If your regular garden fence isn't designed to keep out raccoons, set up a temporary electric fence connected to a battery-powered fence charger around your corn or melons as they approach ripeness. Two strands of polytape will do the trick.

Perhaps an old-fashioned string tied around your finger!

The second cause is that weed growth is interfering with the flow of current through the wires so the animals aren't getting much or any shock when they touch the fence. If that's the case, they'll easily worm their way under or through the flexible netting or between the wires. To prevent this, occasionally shut off the fence, move it aside, and use a mower or string trimmer to cut down weeds. (Remember to turn it back on.) Or, when you set up an electric net fence, lay flat stones or strips of heavy cardboard along the fence line to block weeds.

COMBINATION DESIGNS

Supplementing a chicken wire or woven wire barrier with electrified fence wire will keep out rabbits, woodchucks, raccoons, and some other pests, with no underground barrier required. One design calls for running two electric wires outside the nonelectric wire fence, a few inches away from the fence, as shown in the illustration on the opposite page. If rabbits or woodchucks try to push through or climb over the fence, they inevitably come in significant contact with one or both electric wires. This type of fence will keep out squirrels, too.

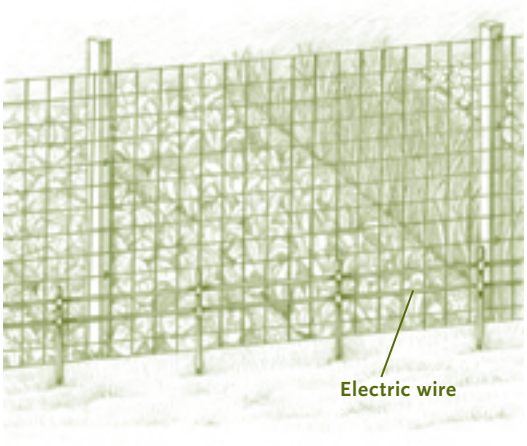
With this approach, it's unlikely that animals

will ever try digging, but if they do, it's certain that they will be zapped by the lower wire before their excavation hits pay dirt.

You can assemble a fence like this yourself or buy a kit that has all the components and instructions on how to assemble them. As with any electric fence, be sure to attach the wires properly to a charger and ground rod.

TO TRAP OR NOT TO TRAP

Bunny or woodchuck raiding the garden? One great solution would seem to be catching it in a humane trap and taking it off to the woods or open fields so it can live in nature and stop eating your plants. However, live trapping isn't that simple. Often, it's not one animal feeding in your garden; it's two or three, or eight or ten. If you expect to solve the problem by trapping, it may take weeks of repeated effort.



Electric wires set a few inches outside of a conventional garden fence will shock any small mammals that come close to investigate.

In some states, regulations limit the release of live-trapped nuisance animals to the property of the person who trapped them. So, it's legal to trap an animal only if you release it in your own yard. The only other option is to euthanize it.

To find out whether and where you can safely and legally release trapped animals in your area, contact your Cooperative Extension office, your state department of natural resources, or your state's USDA Office of Wildlife Services.

Be aware that even if you find an appropriate place to release the animal, you may be releasing it to a hard life or a quick death. Wild animals that have become accustomed to feeding in suburban areas often don't readapt to a wilder setting. Other resident animals may chase it out or kill it. If it does survive, chances are it will be because it finds some other yard or cultivated area to live in.

Finding solutions to these problems should be enough to discourage you. However, if you still decide to try trapping, educate yourself before you act. Find out which size trap you need. Learn how to bait traps and how to handle the traps when an animal is inside. Practice using the gate latch and release in advance so you won't fumble or panic once an animal is in the trap. Wear gloves and be cautious. Once a trap is open, the trapped animal will most likely run away from you as fast as possible. But while it's in the trap, it may try to bite or scratch you in self-defense if you get too close. If you live in an area where rabies among raccoons is a problem, be aware of the risks in handling a trap with a raccoon in it.

Hiring a professional wildlife contractor to set traps and remove the animals from your property is a safer, albeit more expensive, option.

For most gardeners, the only time a live trap comes in handy is when a pest animal finds its way inside a fenced garden and takes up residence inside. When that happens, set up the trap inside the garden. Lure the animal with the freshest and most alluring bait you can, setting a trail of food from outside the trap leading in. Once you've caught the animal, take the trap to the edge of your yard and release it. With luck, it will be so traumatized that it will head off to find a new home elsewhere.

MORE PESTS

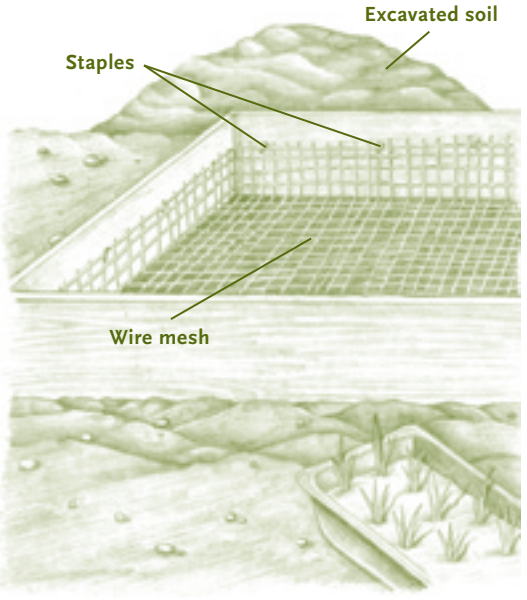
ARMADILLOS

These unusual animals eat white grubs and other insects, earthworms, slugs, and carrion. They dig in the soil to find their food, and it's their digging that annoys gardeners in the southern states where these animals live. A standard mesh fence or electrified net fence should be effective for armadillos.

GOPHERS

With oversize heads and protruding teeth, gophers are well equipped to chew through soil and to decimate a tasty crop of carrots. Gophers also will eat other kinds of plant roots, seeds, and bulbs and sometimes devour entire plants—roots, stems, and leaves. Gophers can trouble gardens almost anywhere from the western United States east to the Great Plains and south into Texas and Oklahoma.

Gophers spend most of their lives in underground burrows, tunneling around in search of food. To protect crops from gophers, trench around your garden and install a barrier of ¼- or ½-inch wire mesh fencing, or build raised beds with solid sides and line the bottom of the beds with wire mesh.



Line the bottom and lower sides of raised beds with wire mesh to foil hungry gophers.

For regular garden beds, dig down 1 foot and line the bottom and sides of the bed with wire mesh. If you don't want to dig out an entire bed, trench around it 2 to 3 feet deep. Set fence posts along the trench and install a wire mesh fence (openings no larger than 1 inch; ½ inch is better) to the bottom of the trench, extending up to 12 inches above soil level, too.

Special wire or box traps can be set in gopher burrows to kill them. Follow the instructions that come with the trap to position it and bait it properly. It may take time and repeated effort to lure gophers into traps.

GROUND SQUIRRELS

Ground squirrels are pests of the West and Midwest, and they have an appetite for leafy crops as well as seeds, grasshoppers, lizards, and sometimes other rodents. Their burrows are a nuisance around yards and gardens. They're most likely to trouble vegetable gardens in the spring. They can climb over or tunnel under most fences. A combination fence of wire mesh with an exterior electrified wire will keep ground squirrels out of gardens. Another design that may work is a 4-foot-high wire mesh fence with a 2-foot-wide skirt of smooth sheet metal at the top so the squirrels can't climb over. An underground skirt may help, but ground squirrels can burrow several feet deep.

Ground squirrels prefer a covered area to retreat to. Discourage them from bothering your garden by moving brush piles and wood piles at least 50 feet away from the garden.

Large-size snap traps (mousetraps) will work for trapping ground squirrels. Bait the traps with nuts or seeds and put them near the entrance to the squirrels' burrow.

HARES

Hares look like oversize rabbits, and they are related. Snowshoe hares and black-tailed and white-tailed jackrabbits are the most damaging to gardens. A sturdy fence of 3-inch wire mesh will keep out hares. It doesn't need an underground portion because hares don't dig. Repellents also may stop hares from feeding.

SKUNKS

A skunk's diet consists mainly of insects, including grubs and beetles, so they may frequent your vegetable garden. Occasionally, skunks will raid a corn patch. If you can, tolerate skunks around the garden, and stay out of their way. Fences that keep out rabbits and woodchucks usually are effective for skunks, too.

SNAKES

Snakes won't hurt your garden; in fact, they eat rodents, and some eat insect pests. So whether snakes are a pest depends on your attitude. If you're scared of snakes and don't want to encounter them in your garden, clear away brush, wood, or rock piles around your yard. Only about 1 percent of the snakes found in home gardens are harmful to people, but it's wise to find out whether poisonous snakes live in your area. If any do, be sure you know how to identify them. Encountering a poisonous snake in your yard *is* a problem, especially if you have children or dogs. Consult your local Cooperative Extension office for recommendations about dealing with the snake safely and appropriately (it may not be legal to kill the snake).

VOLES

Voles are secretive, hiding out of view in mole tunnels or under mulch. They eat a wide range of plants, and in vegetable gardens, voles nibble on plant roots or consume entire plants. They reproduce rapidly, bearing several small litters each year. Several different species can be garden pests, and each species has slightly different habits (such as how deeply they dig). If you can determine the particular species that is troubling your garden, you can tailor your control efforts to its habits.

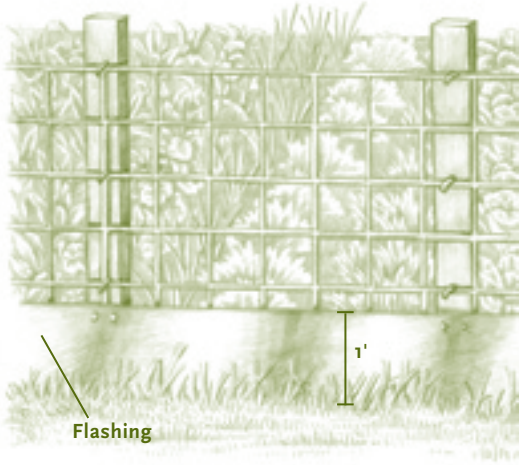
Voles and moles look similar, but moles have slitted eyes, big padded feet, and a pointy snout.

Voles have open eyes and a short snout. If you catch a flash of movement from the corner of your eye as you work in your garden, it's likely a vole scurrying away from the disturbance.

Spilled birdseed attracts voles, so move your birdfeeders far from your vegetable garden. Some kinds of voles don't burrow, and you can discourage them by removing mulch from your garden. In this case, you'll have to balance whether the risk of weed problems or soil drying out is more harmful to your garden than the vole damage is.

To fence out voles, install metal flashing or ¼-inch mesh around the perimeter of your garden (you can position it flush with the inside or outside of a conventional garden fence). Use 2-foot-wide flashing or mesh, with up to 1 foot below soil level and 1 foot above. The barrier must be continuous. If you leave an opening for a gate, the voles could get through there.

Standard snap traps (mousetraps) baited with pieces of apple will work for catching voles. Place the trap close to the opening of a vole tunnel. Unfortunately, voles aren't very interested in bait when food is plentiful, so the best time for trapping is in fall, but if you have a vole problem in spring or summer, you probably won't want to wait that long! If you have a serious infestation, your only choice may be to remove all mulch from your garden until you have time to put up a barrier. In fall, also set traps to reduce the resident population.



A barrier of metal flashing added to your garden fence will make it vole-proof. Be sure the flashing extends 1 foot underground, too.

MUCH ADO ABOUT MOLES

Homeowners complain about moles in their yards, primarily because of the raised tunnels that spoil a stretch of green lawn. Many gardeners also assume that moles feed on plants, but that's not true. Moles feed on insects (including many plant pests) and earthworms. Most likely, moles will be more interested in the grubs under your lawn than your garden.

PETS

Defending a vegetable garden against hungry wildlife is tough enough, so we may reach the breaking point when we discover dogs and cats (especially our own) digging in the garden. In many cases, a garden fence will keep out dogs and cats, too. Or try some of these tricks to prevent pets from bothering your garden.

TEMPORARY BARRIERS

Loose soil is often what attracts dogs and cats to vegetable gardens. Once plants are well

established, the garden will be less attractive. Row covers or a screen cage like the one on page 64 will protect seedbeds from digging pets. Or simply lay chicken wire on the ground around the freshly worked soil. You can walk right across the chicken wire, but your pets will avoid it, not liking the feeling of the wire under their feet.

REPELLENTS

Try commercial repellents to keep dogs and cats out of gardens. Some home remedies may work, too:

- Sprinkle bloodmeal on the soil surface to repel cats.
- Spread orange and grapefruit rinds around the garden—they're reputed to repel cats.
- Spread crushed eggshells over freshly worked soil; the animals won't want to walk on the crunchy shells.
- Stick plastic forks into the soil with the tines protruding above the soil surface.
- Buy mats with protruding plastic teeth (available at garden centers) and spread them around the garden.

ANTHRACNOSE

Anthracnose shows up on a range of crops from beans to tomatoes, starting out as spots on leaves or stems. This fungal disease usually isn't severe in home gardens. However, if the fungus attacks fruits or pods, the infected areas are easy targets for soft rot pathogens.

Anthracnose spores are spread in wind-driven or splashing rain, by insects, or by people working among wet plants; the spores can enter through wounds or penetrate the leaf surface during wet conditions.

RANGE: Eastern and central United States; southeastern Canada; rare in arid climates

CROPS AT RISK: Beans, tomatoes, potatoes, peppers, cucumbers, melons, watermelon, gourds, and some other crops; rarely a problem on peas, squash, or pumpkins

DESCRIPTION: Dark spots or lesions, often sunken and wet-looking, are characteristic of anthracnose, followed by formation of pinkish or salmon-colored spores at the center of the lesions. Bean plants develop dark red or black spots first on the underside of the leaves, but these often go unnoticed. The elongated dark brown spots later show up on upper surfaces of leaves and on pods. Lesions on pods are more prominent and sometimes filled with pink masses of spores. Inside the pods, the seeds may show dark spots, too.

In melons, cucumbers, and watermelons, yellow water-soaked spots form. These spots turn black on watermelon leaves, brown on

leaves of other vine crops. These spots may tear out of the leaves or spread so completely that the leaves die and fall off. Stems may develop long lesions, too, with a pinkish jelly present during wet weather. When stems become infected, the vines may lose all their leaves. Infected fruits will develop dark sunken areas and salmon-colored spores. Infected fruits may be flavorless or bitter.

On tomatoes, fruits develop sunken spots with concentric rings; spores may form at the center of the spots. Secondary rots may set in and ruin the fruit.

Seedlings that sprout from seeds infected with anthracnose may show symptoms similar to damping-off (see Damping-Off).

FIGHTING INFECTION: Remove and compost infected plant parts or plants. Stop using overhead sprinklers to water the garden. Spraying with sulfur will prevent the spread of anthracnose, but since the disease spreads mainly during wet weather, it's difficult to apply the spray effectively. Check tomato plants daily and harvest fruits as soon as they ripen. Tomato and pepper fruits can develop symptoms after harvest due to infection by spores on the surface of the fruit at harvest. To prevent this, wash and dry all healthy-looking fruits as soon as you bring them inside. Keep infected fruit separate from healthy-looking fruit.

GARDEN CLEANUP: Anthracnose fungi survive winter on seeds, weeds, and crop debris. When harvest is complete, compost, dig in, or discard all crop remains.

NEXT TIME YOU PLANT: Choose resistant varieties when possible; for beans, there are different races of anthracnose, so even resistant varieties may become infected. Plant clean seed. Watch for volunteer seedlings that sprout from infected seed (left in the soil when tomatoes or melons rotted in the garden the previous year). Uproot and discard them as soon as you spot them. Stake tomatoes and peppers to improve air circulation. Try preventive sprays of *Bacillus subtilis.*

CROP ROTATION: Anthracnose fungi can't survive very well in soil, and different species cause infection in different plant families. A simple 2-year rotation of crop families should break the disease cycle in your soil. However, new infections can arise from windblown spores (perhaps from a neighbor's garden), so don't be disappointed if it seems as though your crop rotation isn't "working." The disease would probably be more severe if you had planted muskmelons, for example, in the same bed year after year.