While the spotlight focuses on the white tail deer in the cavalcade of wildlife pests, a much more insidious pest that’s a rodent, menaces our flower beds, vegetable gardens and fruit trees. *Sciurus carolinensis*, the ubiquitous Eastern Gray Squirrel, causes considerable damage in a broad geographical area that covers nearly the entire east coast of North America. This squirrel populates rural and suburban areas where deer are abundant but will ravage gardens in urban areas as well where deer are scarce. Gray squirrels are found throughout the entire US east coast and breed twice a year. As many gardeners will attest, squirrels dig up bulbs, raid bird feeders, assault vegetable gardens and ravage fruit trees, particularly the dwarf and semi dwarf varieties. Though deer will eat just about anything green or flowering, squirrels are much more selective in their attacks. They like green and ripe fruits and vegetables, the pride of our labors. Consider that you can fence out deer with an eight to ten foot fence but a fence is no
deterrent to a squirrel. Nevertheless the real question is, "Will anything stop squirrels?" What follows is a summary of some techniques and strategies on management, prevention and damage control, with a few suggestions of what might be appropriate under certain conditions. Unfortunately, there is no panacea, just a range of possible suggestions. There is no silver bullet!

At the outset, this article does not advocate harm to squirrels, direct or indirect. All of the strategies referenced here are prophylactic and are not designed to injure. Further, as discussed below, removal is not a viable strategy. No toxicants are federally registered for use on squirrels. So, what are our options?

The focus of the bulk of this article is on strategies for protecting vegetable gardens and dwarf and semi dwarf fruit trees. Chicken wire placed strategically below and above planted bulbs will protect them from these pests. So long as bird feeders are placed more than fifteen feet from shrubs and trees (the range a squirrel can leap from tree limbs) and provided a large circular metal plate is attached to the pole, feeders are usually squirrel proof. Likewise, squirrels may be kept from an individual full size tree with high branches by encircling the trunk with a two foot deep metal collar placed six feet off the ground. This obviously doesn't work for dwarf and semi dwarf fruit trees. "Squirrel proof" feeders with weight sensitive platforms from which birds can feed but not squirrels, are on the market but there is not consensus that these devices work well consistently.

Squirrel proofing gardens and smaller fruit trees is a much more daunting endeavor. Strategies for management, prevention and control may be divided into five categories: Exclusion, habitat modification, repellents, removal, and currently under study, birth control. The simplest strategy is removal. Whether one prefers trapping and/or hunting, neither is a humane or practical solution for suburban or urban neighborhoods. There are just too many squirrels. Removal of one family just means a turf battle between remaining clans. The area from which the squirrels have been removed will just be resettled by neighbors. A squirrel's natural habitat range may be several acres, so any territory abandoned is fair game for the neighbors.

As for birth control, Clemson University's Division of Natural Resources is conducting a study on the effects of black sunflower seeds coated with a cholesterol-lowering drug and disbursed at campus feeders accessible only to gray squirrels. A squirrel's cholesterol is the molecule from which sex hormones are made. As we wait for the results, there are two issues to consider. First, implementation will require approval of federal and state agencies, while in the interim, injury caused by the animals is an ongoing problem. Second, effective birth control may stem the growth of the gray squirrel population on a macro level, but individual squirrel habits will continue and we must still rely on other strategies.

Exclusion techniques usually include a fence of some kind. Metal mesh "chicken" wire fences, are common around gardens. The gaps between wires should be no greater than one inch, smaller if available, to keep out younger squirrels and chipmunks too. A
practical fence to exclude most small animals such as woodchucks (cousins of the squirrels), rabbits, chipmunks, moles or voles, may be about four feet high, loose on the top and should extend outward a few inches below ground for about one foot. It is designed to prevent climbing and burrowing under the fence and works well for all those varmints who don't jump. Problem: Squirrels are good jumpers and climbers. They are acrobats extraordinaire!

Another exclusion technique involves plastic netting (polyethylene mesh netting) found commonly in hardware and home improvement stores as "bird netting" or "small animal" netting. This has been used by some either alone or in conjunction with fences. Terrorized annually by fruit loving squirrels, gardeners have tried wrapping apple and pear trees with bird netting. The problem is that squirrels will either chew or tear through it to get to the prized fruit. Though the netting doesn't necessarily work to protect apples, there has been some success anecdotally with the use of netting in vegetable gardens along with chicken wire to "cage in" tomatoes on all sides and on top. This appears to discourage squirrels, birds, and other animals. Yet, success may not be lasting and can make harvest challenging.

At the Hart's Brook Park and Preserve demonstration garden maintained by Cornell Cooperative Extension Master Gardeners, blueberry bushes are protected with a large cage-like structure of netting, supported by 4x4x10 inch beams. Although more expensive, hardware cloth could be used for greater durability. The entire "cage" is about 10x15x8 feet high. It is a rather elaborate structure designed to keep out birds, but also appears to "squirrel proof" the bushes inside. Try it if you have the skill, materials and time.

A wired fence runs the risk of becoming lethal to squirrels (or other small animals) that could be trapped and an unpleasant experience for others. An exclusion fence could be placed outside the "wired" fence to keep domestic animals and small children out of harm's way. This fence would have to be constructed so that a squirrel could not jump from the top of the exclusion fence to clear the "wired" fence to the forbidden zone. The wired fence would have to be tall enough that a squirrel could not jump in from the ground or a perch and it should contain enough wires to prevent the squirrel from squeezing in. In other words, it is not practical in many situations. Additional problems with electric fencing include the availability of a power source, what type of transformer to use and the impact of a power failure if it's not solar powered. Further, electric wired fences are prohibited in some communities (be sure to check for local ordinances).
With suspected amusement, a gray squirrel seems to contemplate Master Gardener Louis Petralia’s latest attempt at thwarting his next move on Lou’s apple trees.

Other management techniques, with no scientific research to demonstrate effectiveness, include motion activated sprinklers, ultrasonic devices (known to be ineffective) and fake owls. These owls are available in a variety of species: non-moving, wind activated, solar powered, head bobbing, motion sensitive with moving head. Some have lighted eyes and hoot! A myriad of testimonials (paid or unpaid) are on the internet but there is no scientific proof of the effectiveness of these fake predators. Truth be told, this author has two plastic owls that are moved around periodically. One solar powered owl with a rotating head has caused a squirrel or two to pause and retreat. Other squirrels and chipmunks are not phased. If employed, scare devices must be moved around periodically, because squirrels and other wildlife will react to anything new in the environment. They eventually figure out that an owl or other predator effigy is nothing more than a paper tiger.

Habitat modification is another strategy. This begins with the location of the garden. Select a garden location situated more than fifteen feet from shrubs and tree limbs that provide launching platforms for hungry squirrels. If the only available or desirable garden site is within squirrel leaping distance, the garden is probably too close to the trees and is likely to face shade and root competition. You may have heard of providing
an alternate food source for the animals, such as nailing an ear of corn to a nearby tree or fence or scattering a handful of peanuts on the ground close to where the squirrels nest or forage. Unfortunately, this will support the local population and the squirrels will likely eat up the buffet and still steal your produce.

Use of repellents brings variable results. Repellents include a bittering agent that can be applied to seeds, flowers, trees and shrubs. Products containing this agent have had a very limited success rate. Other taste repellents may be more effective. However, what appears to be the most popular and well documented taste repellent is capsaicin, derived from hot pepper plants such as jalapenos and habañeros. It is what gives peppers their "hot" sensation. The warm sensation capsaicin leaves in the animal's mouth is believed to cause an avoidance of the dining experience. In a 2001 Cornell University study, use of capsaicin-treated sunflower seeds reduced consumption by squirrels by 80 percent at bird feeders. Taste repellents should be applied to fruit trees and vegetable crops before the fruit or vegetable is set or mature. Be sure the repellent that you use is labelled for edible plants and follow all label directions as to timing of the application and if the produced has to be washed before consumption.

There are combination products that include capsaicin combined with other ingredients, such as putrescent whole egg solids and garlic to create both an odor and taste barrier. While this appears to deter neighboring squirrels, the product does not appear to deter chipmunks or other animals that are summertime garden pests. Unlike squirrels, chipmunks like tomatoes and other garden produce. Now the bad news regarding repellents: the applications will have to be repeated after every rainfall and as plants grow and continue to produce and again, the same labeling advice referenced above, as to following all directions, applies.

So what is a gardener to do? All strategies considered, it appears that one technique alone is not foolproof or will make your garden squirrel proof. A variety of strategies, a restaurant menu of options, must be employed. And, if you use owls, be sure to employ two, so they can dance with one another. Or, if you use one, move it around, alter its appearance, disguise it, paint a mustache on it, have fun with it, because isn't this what gardening is about? Besides, it is not the squirrel who might be foolish but perhaps the gardener who thinks anything is foolproof.