

37

SQUIRRELS

WHERE PUBLIC OPINION has been polled regarding suburban and urban wildlife, squirrels generally rank first in likeability *and* in problematic behavior (Figure 83). Such is the paradox: people want them and they don't, depending on what the squirrels are doing at any given moment. Tree squirrels are arguably the most successful mammal in North America at accommodating to human-altered environments. They owe their success to the same attributes as other urban-ready species—adaptability, hardiness, productive breeding habits, and ability to use human-built environments—but really excel when it comes to being likeable. Not that we recommend it, but stories abound of urban squirrels allowed carte blanche onto balconies and even into homes where they are rewarded, of course, with free handouts.

Their likeability stems from a variety of considerations, not all of which make good objective sense. Their bushy tails are appealing, and because squirrels have large, bright eyes relative to the size of their heads, they present an image that animal behaviorists call pedomorphism. Put simply, the physical appearance of squirrels is somewhat akin to that of babies, kittens, puppies, or similar large-



Figure 83 *Gray squirrel*

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- ◆ **Tree squirrels will nibble on the antlers shed by male deer, especially in late winter, when they crave the calcium these contain.**
 - ◆ **Squirrels unintentionally “plant” countless trees when they bury acorns and fail to retrieve them before they sprout, thus helping to ensure a continuing supply of the trees they count on for food.**
 - ◆ **They will not bury acorns with insect parasites in them—their sense of smell is so keen that they recognize these as spoiled and reject them.**
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eyed young, and it probably unconsciously warms people to them. Norway rats are similarly built except that their naked tails and small, beady eyes seem to evoke a strong negative reaction in people. (Of course, squirrels also engage in fascinating and endearing behaviors that work to their advantage.) Squirrel watching can be an educational and enriching experience, and, because squirrels are active by day, it is also easy.

Classification and Range

There are an astonishing number of squirrels worldwide, and many are strikingly attractive animals. In North America there are six species of “tree” squirrels in the genus *Sciurus*, in contrast to the even greater variety of “ground” squirrels (genus *Spermophilus*). The fox squirrel (*Sciurus niger*) (Figure 84) and eastern (*S. carolinensis*), and western (*S. griseus*) gray squirrels are the species usually involved in homeowner conflicts. The pine or red squirrels of the genus *Tamiasciurus* (Figure 85) cause problems similar to fox and gray squirrels throughout their extensive range. Northern and southern flying squirrels (*Glaucomys volans* and *G. sabrinus*) may also nest in buildings near wooded sites and occasionally can cause problems (Figure 86). When they do the same general rules that apply to solving conflicts with gray and fox squirrels are suggested, keeping in mind that flying squirrels are nocturnal, smaller, and can be more prone to invading attics and crawl spaces in numbers.

Squirrels frequently sit with their tails arched over their backs, providing almost complete cover for their bodies. The generic term *Sciurus* is derived from two Greek words that combined mean “shadow tail”—an animal that can sit in the shadow of his own tail. The eastern gray squirrel is about eight to ten inches long and has a bushy tail that’s almost as long. Gray squirrels can actually be highly varied in color and range from a rufous (reddish-brown) tint to almost pure white to an all-black or melanistic form. The western gray squirrel is a little longer, on average, and



Figure 84 *Fox squirrel*

heavier than the eastern gray, weighing almost 1 3/4 pounds. The fox squirrel is the biggest of all: it can be as much as fifteen inches long, with a tail almost as long, and can weigh up to three pounds. The color of fox squirrels is as varied as that of the grays, but they tend to be predominantly a rusty yellowish color with a pale yellow or orange belly. On the East Coast, an endangered fox squirrel population from the Delmarva Peninsula is a striking steel gray color.

Habits

Both fox and gray squirrels traditionally depend on trees as places to bear and raise young, take shelter from the weather, find food, and escape from predators (Figure 87). As part of their adaptation to human changes to the landscape, squirrels use almost anything that looks like a tree, including the pilings around marinas, nest boxes set out for birds, and cozy places on and in houses. Squir-



Figure 85 *Red squirrel*

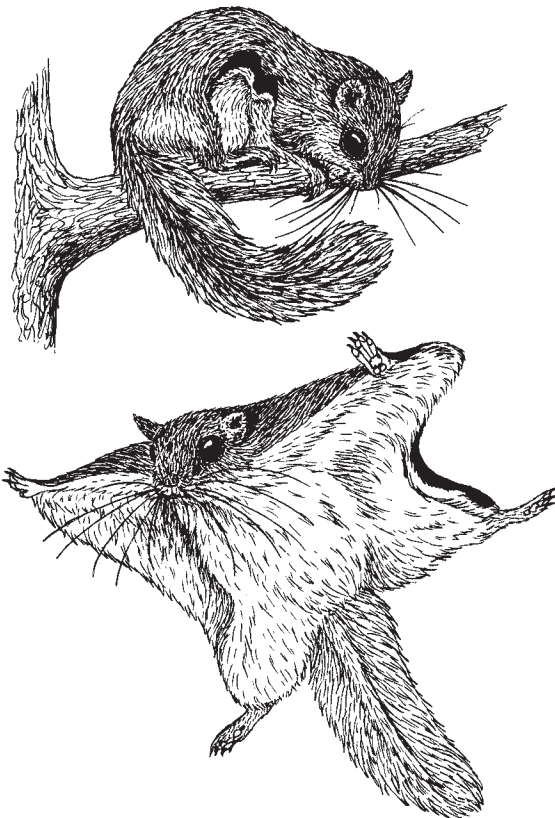


Figure 86 *Flying squirrel*

rels have adapted fluidly to the planted and landscaped “forest” of urban and suburban parks and usually can maintain themselves quite well there. They also do well all by themselves in neighborhoods, but rarely, if ever, will they turn down handouts there as well.

Squirrels’ diets vary with the seasons and the availability of the plant material that makes up almost their entire larder. Acorns and other nuts are both eaten and stored underground in the fall and early winter. These underground caches make up a substantial portion of the winter diet. In spring squirrels eat flowers and growing buds on the ends of branches, and it is common to see squirrels busily working high in yet leafless trees at this time of the year. In summer fruits such as mulberries, raspberries, and wild cherries are eaten. Some scientists speculate that this is actually the hardest time of the year for squirrels, more so than spring, when buds are a mainstay, and fall and winter, when nuts are collected and eaten. Squirrels occasionally do take bird eggs or nestlings and may even pounce on and kill small birds at feeders, much to the dismay of human witnesses who might have assumed they were always peaceful vegetarians.

Eastern gray and fox squirrels usually have two litters a year. The first breeding period begins in December or early January, with young born between February and April after a gestation period of a little more than forty days. A second breeding period begins in early summer, with that litter born in August or September. The western gray squirrel has only one breeding season a year, and young are born between February and June.

Courtship features frantic chases, often with several males pursuing one female. After mating the female drives the males away and raises the two to five young by herself. The babies are born naked and helpless and do not venture out of the nest for seven or eight weeks. They are weaned at eight to ten weeks of age (in gray squirrels) or ten to twelve weeks (in fox squirrels). The spring litter is usually driven away by the mother shortly after weaning, just as the next breeding cycle begins. The fall litter may stay with the mother in the nest through the winter until well after the winter courtship season.

Squirrels use two types of natural dens, tree cavities and leaf nests, and take liberal advantage of shelter provided by humans in attics and crawl spaces along the upper floor

of buildings. Leaf nests, called dreys in England, need constant repair and do not provide as much protection from predators and weather extremes as do tree cavities.

Both fox and gray squirrels are active during the day (diurnal). Fox squirrels may spend more time on the ground than grays and have been found to use larger home ranges on average than do grays, although both species have been found to use home ranges as small as two acres and as large as fifty acres or more. Both species have extensive home range overlap between individuals with no evidence of territoriality, although core areas may be defended. Squirrels become active at first light and usually rest in the middle of the day before becoming active again later in the afternoon. These patterns vary, however, depending on weather conditions and other factors.

The most remarkable yearly event for gray squirrels from a human perspective is the “fall shuffle,” when the seasonally frenetic activity of collecting, eating, and burying nuts is accentuated by the dispersal of both adults and juveniles, perhaps in search of that “perfect” home site. Automobiles kill many squirrels at this time of year.

Public Health Concerns

Squirrels can harbor pathogens (such as salmonella) of potential consequence to humans, but rarely, if ever, are they documented as transmitting these. Rabies can occur in squirrels,

as in any mammal, but squirrel-to-human transmission has not been documented.

Problems

Squirrels may cause damage by nesting in buildings, digging in lawns, eating ornamental plants and bulbs, and stealing food from bird feeders. The most serious problems with squirrels probably involve adult females nesting in a building. They will explore any promising opening while searching for a den site and often enter chimneys or attics through unscreened vents or openings left by loose or rotten boards. Squirrels invariably enter a building somewhere high on the structure and exploit an existing hole, though they may enlarge the hole by gnawing. A homeowner’s first sign of the squirrel’s presence is usually the sound of scampering in the attic. Squirrels entering chimneys are sometimes unable to climb back out and, in desperation, emerge from a fireplace or get loose in the basement.

Squirrels nesting in attics usually gather insulation into a nest near the entrance and may gnaw on adjacent boards and electrical wires. People typically hear the squirrel during daylight hours as it comes and goes on foraging trips. Juvenile squirrels, and occasionally adults, roaming around the attic may fall into wall cavities and be unable to climb out, making persistent scratching noises as they attempt to escape, eventually dying if they are unsuccessful.

Squirrels often become nuisances at bird

Figure 87
This branch is a virtual highway to the roof for squirrels. After repeated invasions of the building, the branch was finally trimmed back and squirrel traffic rerouted to nearby trees.



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feeders, where they consume large quantities of birdseed or gnaw on the feeders themselves (Figure 88). Squirrels can also damage ornamental plants or fruit and nut trees by feeding on bark, buds, and fruits. Spring bulbs, especially tulips and crocuses, may be dug up and consumed, or the plants may be clipped and eaten just as they start to flower. Squirrels occasionally gnaw on outdoor furniture, wooden decks, and wood trim on buildings. All rodents have ever-growing front incisors that require gnawing to keep them sharp and at a manageable length (Figure 89). If squirrels do not wear down these teeth through eating, they may begin to gnaw on other objects.

Solutions

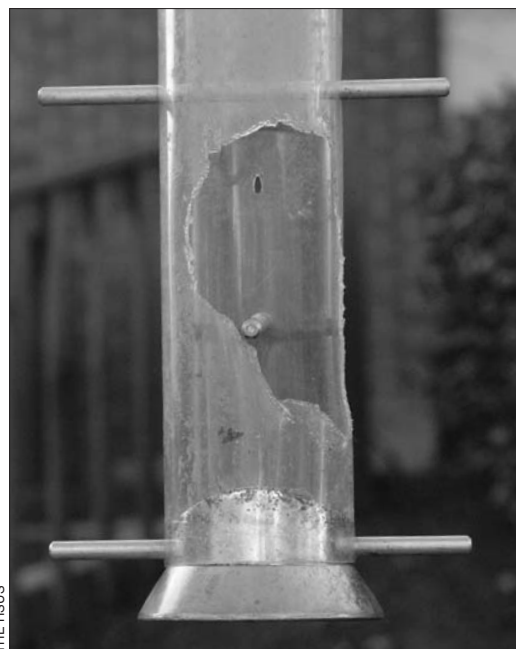
Tolerance

Sometimes it's easy for people to accept, tolerate, and enjoy squirrels, and sometimes it isn't. No one is pleased when one is loose in the house, and continuous emptying of bird feeders can test normal endurance. It is important to remember, however, that these animals are only doing what is natural to them—seeking release from entrapment or looking for a meal. The first approach to dealing with squirrels is to establish limits of tolerance, accept them for what they are, and be patient enough if they need to be excluded from an attic or prevented from stealing bird food so this can be done in a way that does them and their young no harm.

Exclusion from Attics

Thoroughly inspect inside the attic to find the opening(s) and try to locate the nest to see if babies are present. Concentrate the search in the area where noises were heard. If there is no access to the attic, inspect the exterior eaves, vents, and roof until the opening is located.

If the nest can be seen and no immature squirrels are present, attempt to frighten the squirrel outside by banging on the rafters inside the attic, or wait until you are sure all



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Figure 88 *Most homeowners don't appreciate spending good money on bird feeders only to have the local squirrels eat the seed, and, sometimes, most of the feeder. Contrary to the urban myth that surrounds them, squirrels can be excluded from bird feeders very effectively—which may be why we suggest an occasional handout for them, too.*

squirrels have left, which they usually do during the day. Seal up the opening with hardware cloth, securely fastened. Extend the patch at least six inches beyond the hole in all directions to prevent the squirrel from gnawing around it. Seal any other weak spots or potential entrances in the same way. Listen carefully for the next day or so to be sure no squirrel is trapped inside or has regained entry. Watch closely to see if the squirrel persistently attempts to regain entry. Mothers will go to extreme lengths to reunite with their young, and frantic attempts to reenter are usually strong evidence that young are still in the house. In this case, let the mother return and observe whether she moves the litter (Figure 90).

If the nest is inaccessible or out of sight and there is the likelihood of a litter (the squirrel has been in the house for more than a couple of days and it is February through May or August through October), the home-



Figure 89 *Bird feeders aren't the only things squirrels will chew on as they try to find food. This trash can should be replaced with one that is made of galvanized metal. A handout or two to the obviously motivated and hungry local squirrels might be in order, too, to carry them over the transition from available to not.*

owner may opt to try to force relocation. Any campaign to displace squirrels is best fought on several fronts at once, using an arsenal of weapons affecting sight, sound, and smell. A light left on, a strong-smelling substance such as household ammonia-soaked rags, and a battery-powered radio or similar sound source left on around the clock can overwhelm the squirrel mother and motivate her

Trap and Release

Many people think live-trapping squirrels and taking them to "the woods" where they will happily live thereafter is the ideal solution to local problems. It is not. Studies are beginning to show just how few squirrels may survive such procedures and the many different ways they may be compromised by this often well-intentioned procedure. What happens when a squirrel is removed from a yard, anyway? Another squirrel moves in, sometimes within a few days.

to relocate her litter. In tight situations, such as crawl spaces between floors, we have heard of success when a vacuum cleaner hose was snaked into the restricted space, reversed to blow air, and left on to unnerve the nester. In all of these campaigns, human presence is an important ally, sometimes sufficient by itself to force relocation. It doesn't hurt to make yourself obvious to the intruder, even to the point of preparing a short speech on the subject of the sanctity of your home, which, if delivered in the appropriate tone of voice, may do the trick by itself.

Exclusion from Chimneys

Assume that the squirrel heard scrambling in a chimney is trapped unless there is clear evidence he is able to climb out on his own. Never try to smoke a squirrel (or any other animal) out of a chimney—a trapped animal or babies too young to climb out may be killed. If the squirrel is not trapped, the battle tactics described above should be tried to encourage him on his way.

If the squirrel is above, or has access to, the flue damper, a three-quarter-inch or thicker rope hung down the chimney may provide a means of escape. Be sure to tie one end of the rope to the top of the chimney before lowering the other end, and make certain that it reaches the damper or smoke shelf. Be careful not to lower anything into the chimney that cannot be retrieved easily. The squirrel will climb up the rope and escape, usually within a few (daylight) hours. After it is certain that the squirrel has escaped, remove the rope and cap the chimney, preferably with a commercially made chimney cap.

If a squirrel is actually in the fireplace itself (behind glass or a screen), try making enough noise to scare him back up above the damper. If successful, close the damper and proceed as above. If the squirrel cannot or will not leave the fireplace, the next best option is a suitable live trap. Bait it with peanut butter and set it very carefully inside the fireplace. Most squirrels will retreat to a back corner of the fireplace as the doors are opened and stay

there if the trap is placed slowly and quietly just inside the doors. Close the doors and leave the room to wait for the squirrel to enter the trap. As a precaution, before opening the doors of the fireplace to set the trap, close any interior doors in the room and open an exterior door or window in line of sight from the fireplace, if possible. In the event that the squirrel gets out of the fireplace, do not chase him; follow the directions below.

Evicting a Squirrel Loose in the House

A squirrel who entered a house has done so by accident. She does not want to be there and is trying to find a way out. Place any cats and dogs into a room *without* the squirrel. Close interior doors to limit her movement and open a window or exterior door in the room. The squirrel will find the way out if left alone and will even readily jump from a second-story window onto a lawn without harming herself (but don't let her jump onto concrete). If it is not possible to give the squirrel an exit, set a baited live trap on the floor near the squirrel and leave her alone for a few hours.

Squirrels can be captured in a blanket if trapping is not an option. While wearing heavy gloves, slowly approach the squirrel with the blanket held in front of your body, so that she does not see a human form. Drop the



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Figure 90 *This commercially made one-way door is set where a family of squirrels has been entering and leaving a house. The young are old enough to be mobile, and all will be safely evicted using this device and prevented from getting back in.*

blanket on the squirrel and roll it up, taking care not to put too much weight or pressure on the animal. Then take the blanket and squirrel outside immediately and unfurl it, letting the animal escape.

Once the squirrel is out, discover how she got in the house and take measures to prevent it from happening again. Look for tracks in soot or dust around the fireplace or furnace that may show how she came down the chimney or flue, and check the attic for evidence of a nest or entrance hole that may need attention.

Protecting Bird Feeders

The agility of squirrels makes it difficult to prevent them from reaching bird feeders. It also provides a retirement career opportunity for those with enough time to defeat squirrels' attempts to outthink and outmaneuver their human neighbors. Many homemade solutions to keep squirrels from feeders have been invented and tested, but today there are a number of specialized feeders commercially available that seem to do that job well. Some are designed to respond to the greater weight of squirrels and close a metal cover over the birdseed when they climb onto the feeder; others simply provide a metal cage within which standard tube feeders fit. In fact, it is now possible to buy both a feeder and cage as one unit, and in our experience both of the above designs work perfectly to keep squirrels away from the main source of food. The birds always manage to drop some seeds, so as an added bonus the squirrels get something, too.

Squirrels will also have difficulty raiding a feeder hung from a tree branch on a wire more than ten feet long. The feeder should be positioned at least eight feet away from the tree trunk, limbs, or structures from which the animals might leap. If a squirrel does slide down the support wire, a plastic or metal umbrella-shaped commercial or homemade baffle mounted over the feeder will deflect him.

A less complicated approach is to offer foods that squirrels simply might consider unworthy of Herculean efforts. Safflower

seed, white millet seed, and Niger thistle are favored by many desirable songbird species such as finches, cardinals, chickadees, and titmice, yet disdained by most squirrels. Of course, those who give in to the impulse to kick back and enjoy the squirrels along with our feathered wild neighbors will hear no argument from us as long as feeding is done in moderation.

Limiting Damage to Plants

Since squirrels only infrequently do significant damage to plantings, the first step is to make sure the damage is not being caused by another animal. Squirrels are only active during the day, so it should be possible to observe damage as it happens. Once a squirrel has been implicated, consider preventing access to the affected plant. Up to several fruit trees isolated from surrounding trees may be protected by wrapping a two-foot band of sheet metal around the trunk about six feet off the ground. Be careful not to leave the bands on any longer than necessary, since insect damage might occur, and the trunks of sensitive trees may get sunscald if bands are removed after a long time. Branches growing below six feet also may have to be trimmed. Squirrels show a preference for certain varieties of ornamental plants and leave others alone. Small fruit and nut trees can be protected by netting the entire tree for the short period when squirrel (or other animal) damage is most likely.

Squirrels will dig up and eat the bulbs of ornamental plants such as tulip and crocus, but they do not bother daffodils. The great variety and other desirable characteristics of daffodils as spring-flowering plants may be enough to satisfy most gardeners, but if the other bulbs are desired, several repellents on the market may deter squirrels. Bulbs can be soaked in any repellent with Thiram as the active ingredient (and labeled for use as a squirrel repellent) before planting. Other repellents registered for squirrels, with capsaicin or oil of mustard as active ingredients, can be sprayed on the plants when they first emerge in the spring. Many gardeners also

report success in protecting their bulbs by laying down chicken wire over the planting bed to deter digging or using wire bulb cages.

Solving Other Issues

Squirrels who have been in attics for any period may have chewed on exposed wiring and could contribute to a potential for fires. Once they are evicted or have moved on their own, a close inspection of exposed wiring is in order. For the rare situations in which squirrels seem to be engaged in recreational gnawing on deck railings or wooden lawn furniture, we recommend trying the capsaicin-based repellents or lightly rubbing the exposed surfaces with a bar of soap. Take care to remember that capsaicin can be transferred to your hands and will cause intense irritation if inadvertently rubbed in the eyes. Also use these repellents around patches over squirrel entry holes in buildings to discourage gnawing in attempts to reenter.

We have also encountered capsaicin products to coat birdseed so that it repels squirrels. This relies on the different sensory systems of birds and mammals. Birds are not irritated by capsaicin-based products as are mammals. This may be fine in principle, but the product is extremely irritating to the squirrels, and we do not recommend this when other, less harmful, and more successful strategies to keep squirrels out of bird feeders are available. Finally, we again remark on the use of sticky gels, which are marketed to deter squirrels from climbing on branches or other surfaces, as dangerous to other wildlife and inappropriate for wildlife control.

A Last Word

There are volumes written about squirrels, some focused entirely on the warfare humans conduct against them every year in neighborhoods nationwide. Readers browse the shelves in their local library for details of these complex engagements. We advocate for peace, following a simpler set of battle maneuvers to control those violations of our treaty with squirrels that must be addressed.

For those who want more action, we suggest another form of recreation. Squirrels are fascinating animals to watch, photograph, and study. They make themselves available for observation as few other animals do and have a rich and complex repertoire of behaviors to award both the novice and expert with the challenge of deciphering what they really are about. For those willing to be patient, to learn, and to watch, squirrels may just invoke more interest than enmity, as watching leads to learning, learning to understanding, and understanding to tolerance.

Resources

There are lots of books about squirrels. Kim Long's *Squirrels: A Wildlife Handbook* (Johnson Books, 1995) and Michael Steele and John Korprowski's *North American Tree Squirrels* (Smithsonian Institution Press, 2003) are welcome and highly informative additions to other resources.





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