

TREE SQUIRRELS



Figure 1. Gray squirrel. Photo by ADCNR

OBJECTIVES

1. Demonstrate the ability to educate clients about control options
2. Provide a diagram of typical sets used to capture squirrels
3. Identify various risks involved with homes infested with squirrels

SUMMARY OF DAMAGE PREVENTION AND CONTROL METHODS

HABITAT MODIFICATION

Remove bird feeders

Cut down or trim trees back at least 6 feet from buildings

EXCLUSION

Install sheet metal bands on isolated trees to prevent damage to developing nuts.

Chimney caps

Close external openings to buildings. Do not seal animals inside the home.

Plastic tubes on non-electrical service wires may prevent access to buildings.

FRIGHTENING DEVICES

Strobe lights

REPELLENTS

Naphthalene

Ro-Pel®

Capsaicin

Polybutenes

Oils, black pepper

Piperidine

TOXICANTS

None registered

FUMIGANTS

None registered

SHOOTING

.177 caliber pellet guns

Shot guns with No. 6 shot

.22 caliber rifles

TRAPPING

5 x 5 x 18 inch (minimum) cage/box traps

Rat traps, tunnel traps, box choker traps or body gripping-style traps with a jaw width of 5 inches or less depending on species

OTHER CONTROL METHODS

One-way doors

Occasionally, squirrels must be captured by hand using leather gloves, nets, and snake tongs.

SPECIES PROFILE

IDENTIFICATION

1. Fox squirrel (*Sciurus niger*)
2. Eastern gray squirrel (*Sciurus carolinensis*)
3. Southern flying squirrel (*Glaucomys volans*)

PHYSICAL DESCRIPTION

In this module, tree squirrels are divided into two groups: large tree squirrels (fox and gray squirrels), and flying squirrels.

Fox squirrels typically are orange-brown, but color varies greatly from all black to silver-gray. There are at least 12 or 13 color varieties of fox squirrels. Several color variations may occur in a single population.

Eastern gray squirrels (Figure 1) typically are gray, but have some variation in color. Some animals have a distinct reddish cast to their gray coat.

One species of flying squirrel occurs in Alabama. A sharp line of demarcation separates the darker upper color from the lighter belly. The most distinctive characteristics of flying squirrels are the broad webs of skin connecting the fore and hind legs at the wrists, large black eyes, and the distinctly flattened tail.

Fox squirrels measure 18 to 27 inches from nose to tip of tail. They weigh about 1¼ to 2¼ pounds.

Eastern gray squirrels measure 16 to 20 inches. They weigh 1¼ to 1¾ pounds.

Southern flying squirrels are 8 to 10 inches long.

SPECIES RANGE

Fox squirrels occur in much of the eastern and central US, as well as in several locations in the West, where they have been introduced (Figure 2).

Eastern gray squirrels have a similar range to fox squirrels but do not occur in many western areas of the fox squirrel's range. They have been introduced in several locations in the West and often are in urban areas (Figure 3).

Southern flying squirrels occur in the central and eastern US (Figure 4).



Figure 2. Range of the fox squirrel (dark) and tassel-eared squirrel (light) in North America.



Figure 3. Range of the eastern gray squirrel (dark) and western gray squirrel (light) in North America.

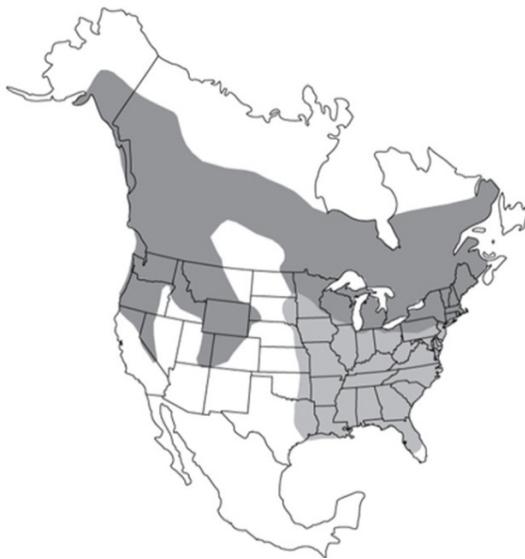


Figure 4. Range of the northern flying squirrel (dark) and southern flying squirrel (light) in North America.

VOICE AND SOUNDS

Squirrels emit a variety of sounds including churrs, barks, and squeals. Churrs express anger, barks act

as warnings, and squeals occur when a squirrel is terrorized or in pain.

GENERAL BIOLOGY

REPRODUCTION

Fox and gray squirrels first breed when they are about a year old. They breed in mid-December or early January, and a small percentage breeds again in June. Young squirrels may breed only once in their first year. The gestation period is 42 to 45 days.

During the breeding season, noisy mating chases take place when one or more males pursue a female through the trees.

Tree squirrels nest in tree cavities, human-made squirrel boxes, or in leaf nests. Leaf nests, called dreys, are constructed with a frame of sticks filled with dry leaves and lined with leaves, strips of bark, corn husks, or other materials. Survival of young in cavities is higher than in leaf nests, making cavities the preferred nest sites.

Tree squirrels have about three young per litter. At birth they are hairless, blind, and their ears are closed. Young weigh about ½ ounce at birth and 3 to 4 ounces at 5 weeks. At weaning they are about half of their adult weight. Young begin to explore outside the nest about the time they are weaned at 10 to 12 weeks.

Typically, about half of the squirrels in a given population die each year. In the wild, squirrels over 4 years old are rare while individuals may live 10 years or more in captivity.

Flying squirrels are unique in that they are active at night. All other species are active primarily during the day.

NESTING/DENNING COVER

Squirrels are cavity dwellers, preferring hollow trees and buildings (Figure 5). Large leafy nests (Figure 6) also are constructed particularly in the summer as they are cooler.



Figure 5. A pile of leafy debris serves as the nest of a gray squirrel in a building soffit. Photo by Jim Beucher of Beucher & Son.



Figure 6. Fox squirrel nest made of leaves. Photo by Stephen M. Vantassel.

BEHAVIOR

Individual home ranges vary from 1 to 100 acres, depending on the season and availability of food. Squirrels move within their range according to food availability. They often seek mast-bearing forests and corn fields in the fall and tender buds of maple trees are favored in the spring. During fall, squirrels may travel 50 miles or more in search of better

habitat. Populations of squirrels fluctuate regularly. During periods of high populations, squirrels, especially gray squirrels, may go on mass emigrations where many animals die.

HABITAT

The ecological overlap of fox and gray squirrels varies somewhat by region. In the Southeastern US fox squirrels often are associated with mature pine forests of longleaf and loblolly, while gray squirrels occupy any habitat with sufficient mast producing hardwoods. Gray squirrels often are found in great numbers in cities, especially in and around parks. The presence of mature hardwoods is often important to both species.

Flying squirrels, being more arboreal (tree-dwelling), are restricted to areas of large, mature hardwoods.

FOOD HABITS

It is important to distinguish the types of food storage used by squirrels. Larger squirrels, such as gray and fox squirrels, scatter cache, which means they will store individual acorns or other seeds (mast) in different areas around their home range.

Fox and gray squirrels have similar food habits. They eat a variety of native foods and adapt quickly to unusual sources of food. Typically, they feed on mast (wild tree fruits and nuts) in fall and early winter. Acorns, hickory nuts, walnuts, and Osage orange fruits are favorite fall foods. Fox squirrels feed heavily on pine cones; gray squirrels will as well in spring. Nuts are often cached for later use. In late winter and early spring both species prefer tree buds. In summer they eat fruits, berries, and succulent plant materials. Fungi, corn, and cultivated fruits are taken when available. Squirrels chew bark from a variety of trees.

The food habits of flying squirrels generally are similar to those of other squirrels, though they are the most carnivorous of all tree squirrels. They eat bird eggs and nestlings, insects, and other animal

matter when available. Flying squirrels often occupy bird houses.

LEGAL STATUS

Squirrels are game animals and may be harvested according to state seasons and bag limits. Permits to control nuisance squirrels are available from each district Wildlife and Freshwater Fisheries office. Alabama regulation 220-2-.27 allows property owners or tenants to “take” one squirrel per incident that is causing damage to said individual’s property without a permit.

DAMAGE IDENTIFICATION

DAMAGE TO STRUCTURES

Squirrels, being rodents, are known for their gnawing. Generally, the sizes of holes made by squirrels are as follows: fox and gray squirrels use holes the size of a baseball (Figure 7). Flying squirrels use holes the size of a quarter.

In residential areas, squirrels often travel power lines and short out transformers. They gnaw on wires, enter buildings, and build nests in attics. Feces of flying squirrels is mixed with their urine, causing stains (Figure 8).

DAMAGE TO LIVESTOCK AND PETS

Squirrels do not pose a threat to pets, but will consume eggs and nestlings. Flying squirrels are small enough to enter most bird houses and are likely to eat nesting birds.

DAMAGE TO LANDSCAPES

Squirrels occasionally damage trees by chewing and stripping bark from branches and trunks. In the Southeast, fox squirrels damage loblolly and other pines.



Figure 7. Gray squirrel hole. Photo by Stephen M. Vantassel.



Figure 8. Urine and feces below an attic vent where flying squirrels were exiting the home. Photo by Stephen M. Vantassel.

Squirrels occasionally damage lawns by burying or searching for and digging up nuts. They chew bark and clip twigs on ornamental trees or shrubbery planted in yards. Squirrels often take food at feeders intended for birds. Sometimes they chew to enlarge openings of bird houses and then enter to eat nestling songbirds. Squirrels may eat planted seeds, mature fruits, corn, and grains.

In nut orchards, squirrels can severely curtail production by eating nuts prematurely and by carrying off mature nuts. Gray, and fox squirrels may chew the bark of various orchard trees.

HEALTH AND SAFETY CONCERNS

Squirrels chew on electrical lines leading to fires and if left long enough can weaken rafters due to their gnawing. Squirrels occasionally chew on electrical wires associated with vehicles leading to considerable replacement costs.

Fox and gray squirrels are vulnerable to several parasites and diseases. Ticks, mange mites, fleas, and internal parasites are common. Squirrel hunters often notice bot fly larvae (called “wolves” or “warbles”) protruding from the skin especially before frosts. These fly larvae do not impair the quality of the meat for eating and they are not known for harboring diseases dangerous to humans.

The droppings of flying squirrels have been associated with murine typhus.

DAMAGE PREVENTION AND CONTROL METHODS

INTEGRATED PEST MANAGEMENT

TIMING, ECONOMICS, AND METHODS

Squirrels are active year-round and can be controlled whenever they are causing damage. Care must be taken during the period when young may be present, which can be February through August, as some species may mate twice a year.

In situations with longstanding conflicts with tree-squirrels, it is wise to use a variety of cost-effective methods to control the damage.

Squirrels cause economic losses to homeowners, nut growers, and forest managers. The extent of these losses is not well known.

HABITAT MODIFICATION

Trim limbs and trees to 6 to 8 feet away from buildings to prevent squirrels from jumping onto roofs. Other plants, such as ivy, that allow access should be trimmed as well.

In backyards where squirrels cause problems at bird feeders, consider providing an alternative food source. Wire or nail an ear of corn to a tree or wooden fence post away from where the squirrels are causing problems. Bird feeders should be modified to prevent squirrel foraging either at the feeder itself or on the ground.

In high-value crop situations, it may be beneficial to remove woods or other trees near orchards to block the “squirrel highway.”

EXCLUSION

Prevent squirrels from climbing isolated trees and power poles by encircling them with a 2-foot wide collar of metal 6 feet off the ground (Figure 9).



Figure 9. A tree trunk wrapped with aluminum flashing to prevent squirrels from climbing. Photo by Stephen M. Vantassel.

Consult the local power company before installing

anything on a power pole. Attach metal using encircling wires held together with springs to allow for tree growth.

Prevent squirrels from traveling on wires by installing 2 foot sections of lightweight 2 to 3 inch diameter plastic pipe. Slit the pipe lengthwise, spread it open, and place it over the wire. The pipe will rotate on the wire and cause traveling squirrels to tumble. Critter Guard® (Critterguard.org) has created a device to stop squirrels from crossing wires. NEVER install wire guards on or near electrical bearing lines. Only professional electricians and power company employees should handle power lines.

Close openings to attics and other parts of buildings but make sure to not trap squirrels inside (Figure 10). They may cause a great deal of damage in their efforts to chew out.

Place newspaper in a hole to determine if squirrels are actively using it. Place traps inside as a precaution after openings are closed. A squirrel excluder can be improvised by mounting an 18-inch section of 4 inch plastic pipe over an opening. The pipe should point down at a 45° angle. A one-way door also can be used over an opening to let squirrels out and prevent them from returning.

Close openings to buildings with heavy ½-inch wire mesh, aluminum flashing, or make other suitable repairs.

Custom-designed wire-mesh fences topped with electrified wires may keep squirrels out of gardens or small orchards.

FRIGHTENING DEVICES

No frightening devices have been proven effective. However, some claim that strobe lights show promise.



Figure 10. A piece of ½-inch plywood was gnawed through by a gray squirrel trying to reach her young. Photo by Stephen M. Vantassel.

REPELLENTS

Naphthalene may temporarily discourage squirrels from entering attics and other enclosed spaces. Use of naphthalene in attics of occupied buildings is not recommended, however, because it can cause severe distress to people. Use of any commercial repellent may require certification for pesticide use.

Ro-pel® is a taste repellent that can be applied to seeds, bulbs, flowers, trees, shrubs, poles, fences, siding, and outdoor furniture.

Polybutenes are sticky materials that can be applied to buildings, railings, downspouts, and other areas to keep squirrels from climbing. Polybutenes can be messy. A pre-application of masking tape is recommended. These products are best used to stop gnawing damage.

Havahart Critter Ridder is a taste and smell repellent containing capsaicin, oils of black pepper, and piperidine.

TOXICANTS

No toxicants are registered for tree squirrels.

FUMIGANTS

No fumigants are registered for tree squirrels.

SHOOTING

Where firearms are permitted, shooting is effective. A shotgun with No. 6 shot or a .22-caliber rifle is suitable. Pellet rifles (.177 caliber) are another option. Check with your state wildlife agency for regulations pertaining to the species in your area.

TRAPPING

Several rules apply for trapping tree squirrels. First, place traps near den holes or on travel routes. Do not rely on bait to overcome poor location. Most traps will be located off the ground, so be sure they are secure. Use enough traps. For gray and fox squirrels, use at least three traps; for the smaller squirrels use five or more; use many more when trapping flying squirrels. Remove competing food sources.

Effective squirrel bait includes slices of orange and apple, walnuts or pecans removed from the shell, and peanut butter. Other foods, such as corn or oil-sunflower seeds, familiar to the squirrel may also work well. Nuts rarely work as bait during fall when natural foods are available. Consider alternate baits if trapping in fall.

Fox and gray squirrels are classified as game species in most states, so trapping permits may be required from your local state wildlife agency.

CAGE TRAPS

Cage and box traps sized 5 x 5 x 18 inches or larger are effective in capturing tree squirrels. Use of cages made from ½ x 1 inch mesh will reduce the likelihood of damage to surrounding materials by trapped animals. Cage traps can be secured to trees and plywood shelves. In each case, be sure the squirrel has a 2 to 3 inch area to stand in front of the door. If legal in your state, multiple catch traps are extremely effective on flying squirrels, but can be used on other squirrels as well (Figure 11).



Figure 11. A colony trap in a positive set over a fascia hole (not visible at far left) for grey squirrels. The bottom of the trap has ½ x ½ " hardware cloth to prevent roof damage. Photo by Dave Schmidt.

BODY-GRIPPING TRAPS

Body-gripping style traps are very effective and show a low refusal (avoidance) rate, as they are quite inconspicuous. These traps are most commonly used in a positive set, in which the trap is set over the only entry available (Figures 12 and 13).

Tunnel traps (Figure 14) offer an excellent way to catch squirrels as captures are almost completely out of public view. Additionally, drilling small holes

at the ends of the trap allows one to secure the trap in a number of ways.



Figure 12. A properly set body gripping-style No. 55 set for gray squirrels. The hardware cloth on the trigger (middle of trap) prevents young squirrels from going through without being caught. Photo by Dave Schmidt.



Figure 13. Gray squirrel in a body-gripping trap. Photo by Dave Schmidt.



Figure 14. Two tunnel traps secured to a sheet of plywood (to protect the roof). Photo by Stephen M. Vantassel.

Rat-sized snap traps are very effective on flying squirrels. Place them inside cubby boxes to force squirrels to approach the trigger only, or set them vertically on walls with bait side down. Use these traps indoors or where birds cannot access them (Figure 15).



Figure 15. Red squirrel caught with a rat trap; Note misfired trap (right). Photo by Stephen M. Vantassel.

Glue traps for rats will catch small squirrels, but this tool is not recommended.

FOOTHOLD TRAPS

No. 0 or No. 1 foothold traps will catch squirrels but due to risks to non-target animals and concerns about humaneness, they are not recommended.

HANDLING

RELOCATION

In rescue situations such as from chimneys or basements, on-site release of squirrels is recommended provided the entrance has been secured.

TRANSLOCATION

Tree squirrels should not be translocated because of the stress placed on both transported and resident squirrels, and concerns regarding the transmission of diseases. Live caught animals may not be relocated across a county line or a major river drainage.

EUTHANASIA

Carbon-dioxide is the preferred method of euthanasia for tree squirrels. Squirrels expire relatively quickly in a rich carbon-dioxide environment.

DISPOSAL

Refer to Volume 1 of the National Wildlife Control Program and your state regulations regarding carcass disposal.

OTHER METHODS

SQUIRRELS IN CHIMNEYS AND BASEMENTS

During the mating season, it is not uncommon for males to search openings, looking for females. Unfortunately, many squirrels become trapped in chimneys as they are unable to grip the smooth flue tiles. Removal of squirrels in chimneys is a special circumstance fraught with risk. The largest risk is being bitten when handling squirrels. In addition, there is a chance that a soot-covered squirrel will run around a pristine white living room. Several

different chimney types and situations exist, so we provide a few principles to help guide your work with squirrels in chimneys.

Before opening a chimney damper, wear your personal protection equipment (PPE) including a hat or cap, safety glasses, a dust mask and heavy gloves.

1. A squirrel trapped in a chimney rarely will survive for more than 3 days. It is normal for the noise level to drop as a squirrel becomes weaker. Try to remove squirrels before they die in a chimney.
2. If possible, secure the opening of a fireplace, set a baited trap, and open the damper. Return the next day. A 1-inch thick hemp rope hung in the flue may enable squirrels to climb out. Squirrels must be healthy enough to climb for this to be an effective technique.
3. Use snake tongs to grab cornered squirrels and hand nets to catch loose squirrels.
4. Before opening a damper, remove valuable/breakable items, and close doors in the vicinity. Squirrels will run to daylight, so try to make the lighted area lead to the outdoors.

ONE-WAY DOORS

When young are not a concern, one-way doors can be an effective tool. Effective squirrel eviction requires careful site evaluation. One-way doors work best when the structure is relatively sound as this reduces the likelihood that a squirrel will chew in elsewhere (Figure 16). Secure vents, chimneys and weak areas of the home before installing a one-way door.

Use spring-loaded one-way doors in combination with a large (1 foot square minimum) apron around the hole to reduce chew-ins. Watch the weather, as freezing rain can freeze the door shut or open.

Animals are individuals. Some will fight to enter harder than others, so sometimes chew-ins occur. It

is imperative that you prepare your customer for this possibility. Flying squirrels are easier to exclude because they lack the jaw strength of the larger squirrels.

Some WCOs use one-way doors in combination with traps to help finish the job more quickly, as it motivates squirrels to check out the traps. Some one-way doors are attached to traps turning them into what is known as “positive trapping” (Figure 11). Use of one-way doors is as much an art as it is a science.



Figure 16. One-way door installed. Note the other hole (arrow) created by the squirrel in response. Photo by Stephen M. Vantassel.

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RESOURCES

KEY WORDS

Tree squirrels, wildlife damage management, nuisance wildlife control, nwco

ON-LINE RESOURCES

[Http://pcwd.info](http://pcwd.info)

[Http://icwdm.org](http://icwdm.org)

QUESTIONS FOR REFLECTION

1. List the seasons and the biological reasons for increased human-squirrel conflicts.
2. Explain to a client why her bird feeder needs to be removed during control activities.
3. Explain the process for trapping a family of squirrels.

OBJECTIVE QUESTIONS

1. When do fox squirrels mate?
 - a. Every other year

- b. Early spring
 - c. Once in January or February
 - d. Twice a year
2. Matching. Select the trap most appropriate for the species.
- a. rat snap trap
 - b. tunnel trap
 - c. multiple catch
- _____ gray and fox squirrel
- _____ flying squirrel
- _____ red squirrel
3. What are the biggest trapping errors committed in the control of squirrels (circle all that apply)?
- a. failure to use enough traps
 - b. over-reliance on bait
 - c. improper location
 - d. odor contamination
 - e. use of the wrong trap(s)

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DISCLAIMER

Implementation of wildlife damage management involves risks. Readers are advised to implement the safety information contained in Volume 1 of the National Wildlife Control Training Program.

Some control methods mentioned in this document may not be legal in your location. Wildlife control providers must consult relevant authorities before instituting any wildlife control action. Always use repellents and toxicants in accordance with the EPA-approved label and your local regulations.