MARYLAND COOPERATIVE EXTENSION
UNIVERSITY OF MARYLAND
COLLEGE PARK•EASTERN SHORE

Fact Sheet

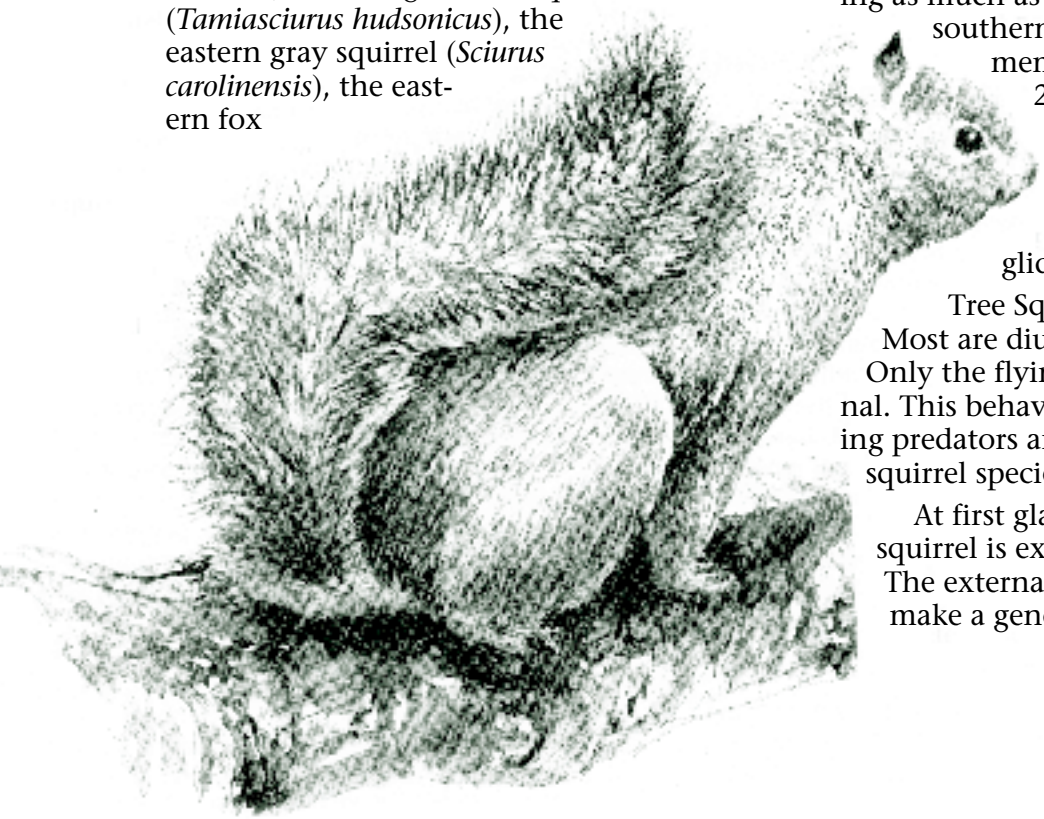
Fact Sheet 607

Wildlife Management: Tree Squirrels

Tree Squirrels are arboreal rodents, meaning that they live in and depend on trees and forests for their survival. This fact sheet describes the appearance, behavior, and habitat of these animals, as well as techniques for managing them.

Physical Characteristics

Tree Squirrels belong to the family Sciuridae and are recognized by their long bushy tails and prominent eyes and ears. Six species inhabit Maryland and the eastern U.S., including the red squirrel (*Tamiasciurus hudsonicus*), the eastern gray squirrel (*Sciurus carolinensis*), the eastern fox squirrel (*S. niger*), the southern flying squirrel (*Glaucomys volans*), the northern flying squirrel (*G. sabrinus*), and the only nonarboreal member of the group, the eastern chipmunk (Tamias striatus). Delmarva fox squirrels (S.n. cinereus), a subspecies of the eastern fox squirrel and the northern flying squirrel, are considered endangered in Maryland and portions of the mid-Atlantic region.



Tree Squirrels are similar in body form and structure; however, each species differs in size, fur coloration, markings, and other characteristics (Table 1). Fox squirrels, for example, are the largest member of this group, weighing as much as 2 to 3 pounds. In contrast, the southern flying squirrel, the smallest member, may only weigh between 2 and 3 ounces. Flying squirrels also possess a patagium, a flap of skin connecting the wrist and ankle, which, when spread, enables the animal to glide.

Tree Squirrels are active year-round. Most are diurnal (active during the day). Only the flying squirrels are strictly nocturnal. This behavior is advantageous for avoiding predators and competition with other squirrel species.

At first glance, the age and sex of any squirrel is extremely difficult to determine. The external genitalia must be examined to make a gender distinction.

Table 1. Description of tree squirrels in Eastern North America

Species	Coloration	Weight (lbs)	Body length (in)	Unique features
Fox squirrel	Fulvous (brownish-yellow) coloration, grayish on back and sides. Almost pure fulvous on belly, feet, cheeks, and ears. The broad tips on the tail hairs and tufts behind ears fulvous, not white as in gray squirrels. Delmarva fox squirrels are totally gray on back and sides, with white feet and belly.	1.2-3.0	19.5-22	Largest tree squirrel
Gray squirrel	Generally grayish with fulvous wash on sides. White or light gray belly. Tail hair is tipped with white. Black phase is all black with some dark gray under parts.	0.75-1.5	16-20	Melanistic black phase
Red squirrel	Bright red upper surface of tail. Black line along side between white belly and red-gray upper parts. White eye ring.	0.25-0.5	11-13.5	Ratchet-like call
Chipmunk	Two light, three dark stripes on face. Five dark, four light lines extending to base of tail on back and sides. Stripes are brown, gray, and cream color.	0.15-0.25	9-10.5	Stripes on face and back
Northern flying squirrel	Soft fur. Dark fulvous color on upper back. Slate-colored belly hair at base.	0.15-0.3	9.5-11.5	Loose folds of skin (patagium) used for gliding
Southern flying squirrel	Soft fur. Grayish fulvous on back. Belly white.	0.1-0.15	8.5-10	Same as above

Abundance and Distribution

The ranges of many of these species overlap and several may be found coexisting. Eastern fox and gray squirrels are found throughout most of the eastern half of the U.S.; however, fox squirrels are not found in New England, and their range extends farther west into the plains states than that of gray squirrels. Red squirrels and northern flying squirrels are found throughout Canada, the eastern Rocky Mountains, the northern Midwest, New England, and south along the Appalachian Mountains. Chipmunks live in southeastern Canada and the eastern half of the U.S. except Florida and coastal areas of North Carolina, South Carolina, Georgia, Louisiana, and Mississippi. The southern flying squirrel lives in the eastern half of the U.S. except northern portions of Maine, Vermont, and New Hampshire.

Chipmunks, gray squirrels, and southern flying squirrels live in all parts of Maryland. Red squirrels and eastern fox squirrels live in the western half of Maryland, while Delmarva fox squirrels occupy isolated areas along the lower Eastern Shore.

Territory

Territoriality and home-range size are a response to food supplies, population densities, sex and age of animals, habitat, and nesting females defending den trees. Large home ranges indicate poor habitat, insufficient food, and reduced population densities. Red squirrels and chipmunks demonstrate the

greatest amount of territorial behavior. Fox and gray squirrels are generally nonaggressive and may share dens during colder months. Ordinarily, only pregnant females become aggressive around den trees during the breeding season; however, a social hierarchy exists when populations become extremely high.

Usually the older squirrels become dominant. Flying squirrels are extremely gregarious, and again, only pregnant females exhibit territorial responses, protecting den trees and the immediate area.

Squirrels (especially the juveniles born in the spring) frequently move to new locations in the fall. Squirrels also move as food supplies change. This shift depends on the habitat type and diversity of food in the area.

Life History of Tree Squirrels

Breeding

Tree Squirrels, like other rodents, are prolific breeders (Table 2). The timing of the breeding season varies and is largely influenced by weather and day length. The breeding season may extend from January through September, with peak mating activities occurring between January and March and again between June and July.

Tree Squirrels, with the exception of the burrow-nesting chipmunk, nest in tree cavities or construct outside leaf nests. At times, red squirrels construct underground nests. Nesting sites are generally located in or around the trunks of trees growing in clusters, rarely in isolated trees, to provide greater protection from the weather and escape routes from predators.

Gestation takes from 4 to 6 weeks, and normally two litters per year are produced; however, red squirrels may produce only one litter in the northern portion of their range. Young are usually born during early spring and again in midsummer, with litter size ranging from two to eight young per nest.

Squirrels develop more slowly than some other rodents. They are born furless and blind. Their eyes and ears do not open until they are 5 weeks old. Young remain in the nest for at least 4 to 6 weeks. In about the 9th to 12th week, they begin to fend for themselves. Sometimes young born in the spring become sexually active and may produce litters of their own the following fall. All squirrels become sexually mature by the end of their first year.

Habitat

Tree Squirrels occupy a wide range of forested habitats. Fox squirrels, gray squirrels, chipmunks, and southern flying squirrels

Table 2. Life history of tree squirrels

Species	Gestation period (days)	Litter size	Breeding season	Number of litters per year	Weaning (weeks)	Home range (acres)	Sexual maturity (months)	Time active	Maximum life span (years)
Fox squirrel	44	2-5	Dec.-Jan. June-July	2	8-9	1.25-4	10-12	Day	10
Gray squirrel	44	3-5	Dec.-Jan. June-July	2	8-9	1.25-5	10-11	Day	15
Red squirrel	35	4-7	Feb.-March June-July	1 or 2	7-8	3.25-3.75	10-12	Day	10
Chipmunk	32	2-8	April-May July-August	2	-	1.25	After first winter	Day	3
Northern flying squirrel	40	2-6	Feb.-March June-July	2	6-8	1.25-7.5	-	Night	10
Southern flying squirrel	40	2-6	Feb.-March June-July	2	6-8	1.25-7.5	-	Night	10

generally prefer hardwood forests. Red squirrels and northern flying squirrels live in both coniferous and deciduous forests. Fox squirrels, relying upon forest edges, are more abundant in dense timber along rivers and streams, hardwood swamps, and oak forests. Gray squirrels generally live in forest interiors and are found predominantly in more mature forests. As the percentage of woodland increases, the number of gray squirrels increases while fox squirrel numbers decline. Typical fox squirrel habitats consist of woodlots of 1 or more acres with about 20 mature trees, mostly oak, per acre. Areas with a limited number of oak support only a few animals, and then only seasonally. Delmarva fox squirrels also will occupy predominantly loblolly pine forests provided the trees are of sufficient size.

Red squirrels live mainly in coniferous forests of spruce, eastern hemlock, pines, and balsam fir. In eastern North America, the red squirrel is abundant in mature mixed forests that contain some coniferous tree species. These animals are rare in hardwood forests that do not contain oaks, chestnuts, or walnuts.

Flying squirrels also are considered forest interior species. The vertical structure of the forest is more critical to flying squirrels than to any other tree squirrel species. They prefer a highly stratified forest with vertical patchiness, a closed canopy, large trees, and an understory that affords protection from predators and offers travel lanes for unobstructed glides when escaping danger or just moving between locations.

Food

Tree Squirrels consume a wide variety of foods, relying heavily upon mast, such as acorns, beechnuts, hickory nuts, walnuts, and elm and maple seeds. Squirrels also eat fungi (such as mushrooms), and insects. During the spring and summer, squirrels eat the buds and flowers of many plant species, as well as cultivated crops such as corn and soybeans. Red squirrels and Delmarva fox squirrels also eat conifer seeds.

During the summer and fall, squirrels actively store food in caches to be used in winter when food is scarce. These caches generally are located in tree cavities, snags, and fallen dead trees and are shared among members of their own species. Food caches are important since none of these squirrels hibernates. Only the chipmunk goes through 2-week intervals of inactivity during the winter.

Perhaps the best habitat for Tree Squirrels, in general, is a large mature forest with highly diversified vertical structure. Such forests contain dominant mast- and cone-bearing trees, snags, and fallen timber. An interspersion of open meadows and agricultural fields can enhance the habitat.

Mortality Factors

Several factors influence squirrel survival and reproduction, but food availability may be the most important. Summer and fall mast production in conjunction with spring buds and flowers have a direct influence on population numbers. When available food supplies decline, so do squirrel numbers. Other factors that affect reproduction and survival are the timing of the onset of breeding, the proportion of juveniles breeding, disease, predators, weather conditions, and hunting. Squirrel populations generally range from one to eight per acre in suitable habitat.

Managing Tree Squirrels

Squirrel management is relatively passive since these creatures are highly adaptable and greatly influenced by natural circumstances; however, some of the more important management considerations involve regulating hunting seasons, increasing available nesting sites, promoting mast production, and encouraging vertical diversity of forests. The major emphasis has been on adjusting hunting seasons and dealing with nuisance animals in urban and agricultural environments. Only fox, gray, and red squirrels are hunted. Red squirrels also are trapped for fur. Nuisance squirrels periodically damage trees, gardens, wires, corncribs, and crops. The most effective method of control is to remove the animal by shooting or trapping. An ear of corn is good trap bait. Natural mortality from disease, predation, competition, and starvation are significantly more influential in population regulation than active management.

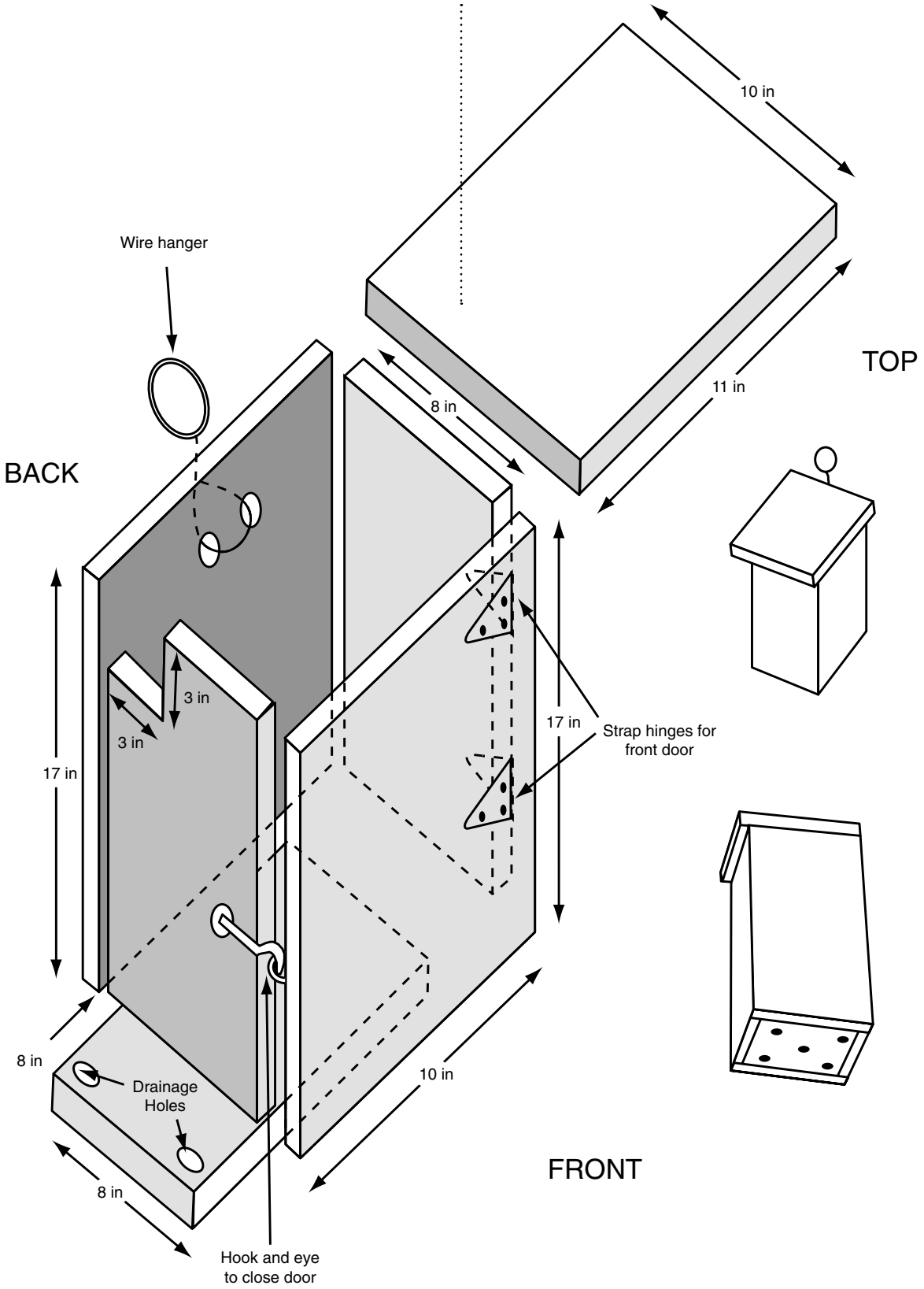


Figure 1. Squirrel nest boxes should be constructed out of 1-inch pine if possible. Clean nest boxes once every other year when not occupied by squirrels.

Manipulating habitat and erecting nest boxes can enhance an underutilized area. A suitable number of den sites, mast-producing trees, and a multistory, unevenly aged forest stand are critical for maintaining preferred squirrel habitat. Selective cutting to encourage nut-bearing trees and other mast-producing species, leaving overmature trees, snags and downed logs, and opening portions of the ground cover help promote squirrels. Maintaining a diversity of mast-producing trees is important to protect against severe food shortages in the event of a major crop failure. Timber harvests that do not maintain vertical diversity, such as shelterwood-cuts and clear-cuts, resulting in evenly aged stands are significantly underutilized by squirrels. Clear-cuts are only used for a few years and only while squirrels search for fruits and other food made available by recently felled timber.

Squirrels need at least one den site per acre to maintain occupancy of an area. Snags and overmature timber are cavity prone. Woodpeckers also excavate cavities and dens in these trees, which later may be used by squirrels. In areas where dens are scarce, such as young forests or plantations, you may place one or two artificial nest boxes per acre. Figure 1 is a diagram of one type of nest box. Place these boxes on medium to large trees, 10 feet or more above the ground. Do not place boxes in trees that contain cavities because squirrels may not select nest boxes if natural cavities are present.

Adapted from:

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Canada Geese

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