



## Squirrels

Most Pennsylvanians are familiar with the gray squirrel, which lives both in towns and rural areas. The gray is Pennsylvania's most common squirrel; the fox, red and flying squirrels are three other species native to the state. Squirrels are fast and agile, scaling trees and jumping from treetop to treetop with great speed. When jumping, they use their large tails to help keep balanced.

Squirrels see only in shades of black and white, but their eyes are sharp and detect movement well. They have keen senses of hearing and smell. They are most active in early mornings and late afternoons, except the nocturnal flying squirrels. Squirrels are rodents and the four species do not interbreed. Born blind and hairless, young are dependent upon their mother for up to two months.

### Biology

**Gray Squirrel:** Adult gray squirrels (*Sciurus carolinensis*) weigh 1 to 1½ pounds and are 18 to 20 inches in length; about half this length is broad, bushy tail. Most grays are colored silvery-gray above and off-white below, often with rusty or brownish markings on the sides or tail. Albinism is rare, but melanism (black coloration) is fairly common. Once, black-phase gray squirrels were found throughout Pennsylvania. Today, they occur most often in the northcentral counties. "Black squirrels" may be any shade from dark gray to nearly jet black, often with a brownish tinge.

Gray squirrels eat mast—acorns, hickory nuts, walnuts and beechnuts. Other foods include berries, mushrooms, pine seeds, corn (only the germ at the base of the kernel is eaten), and dogwood, wild cherry and black gum fruits.

In early spring, squirrels eat buds, a high-energy food. They eat the buds and flowers of red and sugar maples in April, and later may feed on the winged fruits of red maple. These foods have a high moisture content that supplies squirrels' water needs, although grays will drink from available ground water sources. Grays smell out nuts which they bury for winter food. Unrecovered nuts may sprout and grow into trees. In this way, squirrels help ensure continual forest growth.

gray squirrel



Grays are probably the wariest of Pennsylvania's squirrels. They're quicker than fox squirrels and less vocal than reds, although they sound warning barks and assorted "chucks." Hawks, owls, foxes and tree-climbing snakes occasionally kill young squirrels, but adults are not easily taken. Predators do not appreciably affect squirrel populations on good ranges. Availability of food is the key to population size.

A maximum life span for a wild gray squirrel could be 10 years or even longer, but few live more than two or three years. Grays live in nests and dens. They build leaf nests in trees near good food supplies in both summer and fall, the leaf nests are cooler than tree dens, they're about 12 by 16 inches and are built of twigs, leaves, grass, bark and other plant materials. Tree dens are often in cavities where limbs have broken off or in deserted woodpecker holes, usually 40 to 60 feet off the ground. Resident squirrels gnaw back the outer tree bark that, in time, would otherwise seal off den holes.

Peaks in summer breeding activity are thought to occur from May to July, whereas peaks in winter breeding may occur in January and February. Although peaks in breeding activity occur, squirrels can be reproductively active throughout much of the year.

Following a 44-day gestation period, females bear litters of 4 to 5 young. The young are usually raised in tree dens and nursed by their mother for 5 to 7 weeks. Some gray squirrels bear a second litter in July or August. Small grays seen in autumn are from summer litters. Grays are gregarious and do not seem to demonstrate territoriality. Three or four individuals may feed side by side where food is plentiful.

**Fox Squirrel:** There are two subspecies of fox squirrel extant in Pennsylvania. The more common western subspecies, *Sciurus niger rufiventer*, has a rusty red underbelly and was historically more common in southern and western Pennsylvania Counties. The more rare eastern subspecies, *S. n. vulpinus*, has a white underbelly and has historically occurred in southern and eastern counties. The western subspecies is thought to have expanded its distribution to the east in recent years causing concern that they may be outcompeting or hybridizing with the eastern subspecies. The eastern subspecies is currently listed on the State Wildlife Action Plan as Species of Greatest Conservation Need due to the concerns listed previously in addition to a decline in habitat.

Unlike gray squirrels, fox squirrels prefer open, park-like woods with sparse ground cover, usually avoiding mountains and extensive forests. Their nesting, denning and feeding habits are much like those of gray squirrels. Fox squirrels have gray to reddish-gray upper parts and buff to pale orange-brown or white undersides. Larger than grays, weighing nearly two pounds, they are slower, more sluggish and less vocal. They are about 21 inches in length, including a 10-inch tail.

Like the other Pennsylvania tree squirrels, fox squirrels never actually hibernate in winter but will hole up and sleep soundly through several days of snowstorms or extreme cold.

Mating season is in January, and young are born in late February or early March. The average litter size is 2 to 4 young. Only one litter is raised per year.

Fleas, chiggers and mosquitoes may bother squirrels, and tapeworms have been found in some specimens. Fox and gray squirrels seem to get along together wherever their ranges overlap.

**Red Squirrel:** The red squirrel (*Tamiasciurus hudsonicus*) is alert, raucous and energetic. About half the size of the gray, the red measures about a foot from nose to tail-tip



fox squirrel



red squirrel

and weighs about 5½ ounces. In summer its fur is a rich, rusty brown, turning grayer in winter, when this squirrel also develops prominent ear tufts. The undersides are off-white.

The red squirrel is sometimes called a chickaree or a pine squirrel, reflecting its preference for nesting in conifers. Behavior, feeding habits and denning practices are generally similar to those of gray and fox squirrels, although reds sometimes nest in holes at the base of trees. They enjoy eating the immature, green cones of white pine. Unlike fox and gray squirrels, reds do not bury nuts singly, preferring a large cache, often in a hollow log, for storing food.

The breeding season for red squirrels begins in late winter, with 3 to 6 young born in April, May or June after a 40-day gestation period. Reds have strong territorial instincts, often defending food sources and den trees against intrusion.

**Flying Squirrels:** Of the four Pennsylvania squirrels covered here, only the flying squirrels (*Glaucomys volans* and *Glaucomys sabrinus*) are nocturnal. This squirrel is about 8½ to 10½ inches in length, including a 3½- to 5-inch tail. Its large eyes are adapted for night vision. The fur of the flying squirrel is very soft and tan-brown in color, with white underparts. The so-called flying membrane is a loose flap of skin between the fore and hind legs on either side of the body; this is stretched taut when the legs are extended, allowing the animal to soar or glide but not to fly in the true sense of the word. The broad, flat tail is used as a rudder while the animal is airborne. A flying squirrel can soar in a downward direction, often from tree to tree. They generally sail 20 to 60 feet, though instances up to 300 feet have been recorded.

This squirrel is primarily arboreal, but also forages on the ground for truffles. Because of their arboreal habits and nocturnal nature, flying squirrels are not often seen.

They nest in hollow tree limbs, woodpecker cavities, and stick nests called drays. One to three young are born in April or May following a 40-day gestation period, and some biologists believe a second litter may be produced in July or August. Feeding habits are like those of other Pennsylvania squirrels.

## Population

Once there were so many gray squirrels in Pennsylvania that they were considered nuisances by pioneering farmers. In fact, bounties were paid on 640,000 squirrels in 1749, and many more were doubtless taken for the table.

Settlement and development of Pennsylvania has changed the habitat, and squirrel numbers have decreased since the 18th century. Even so, there is no shortage of squirrels in Pennsylvania today. Squirrels and woodchucks are the most heavily harvested small game species in Pennsylvania.

Biologists estimate that a healthy autumn squirrel population is composed of about 35 percent juveniles, 30 percent sub-adults and 35 percent adults. One gray squirrel per acre of woodland is a good density and three per acre is excellent and only occurs on prime habitat. Although a hundred or more squirrels may thrive in a park or campus, these situations do not occur in the wild. If food becomes scarce in the wild, large segments of the gray squirrel population may leave their home locales to travel in search of food and concentrate where they find it.

Squirrel populations fluctuate. Good reproduction—with most females bearing two litters—follows autumns in which large mast crops were produced. Severe winters, on the other hand, may reduce squirrel numbers, especially if they follow a mast failure.

## Habitat

Woodland areas can be managed to favor squirrels. Of the two main forest types found in Pennsylvania—oak-hickory in the south and beech-birch-maple in the north—the oak-hickory forest is better squirrel habitat, mainly because it has a greater variety of vegetation types.

Gray squirrels prefer a deciduous forest with a variety of tree species that provide a diverse food supply. A forest of mixed maples, oaks, hickories and beech, for instance, would support more grays than would a ridge-top stand of walnut and chestnut oaks. The fox squirrel needs woodland edge—places where the trees border corn or other crop fields.

A good squirrel woods should contain many mature mast-producing trees, a mixture of other tree and shrub species to provide seasonal food variety, natural den trees and hollow tree cavities for escape

purposes. Diverse tree and shrub species ensure adequate food supplies even though weather, tree characteristics or tree vigor may cause food crop failure of some types of vegetation.

Red, black and scarlet oaks regularly produce mast, while white and chestnut oaks are less reliable. Although white oak makes better sawtimber, landowners favor the red oak group if they wish to support a large, stable squirrel population. In selective logging operations, four to six hickories should be left per acre (if they are available), as they are heavy mast producers.

Old, hollow trees with many openings are rarely used for dens, although they provide temporary shelter from predators and hunters. A good den site is usually a tree nearing maturity with one or two openings into a cavity. Entrance holes are round and seldom over three inches in diameter. If you want to manage a timber tract for squirrels, keep at least four or five active den trees on each acre. In forests where trees have reached a mast-producing stage but are not mature enough to serve as good den sites, artificial nesting boxes may be used.



southern flying squirrel