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Eastern Chipmunk (*Tamias striatus*)

Description

The Eastern Chipmunk is one of the most well known and distinctive small mammals in New York State. This rodent (Order Rodentia) is brown, with five dark horizontal stripes along the sides and back of its chunky body. (Its species name, "striatus", refers to these stripes, or striae.) One narrow dark line extends lengthwise along the middle of the chipmunk's back. Paralleling this on each side is a band, typically gray, but sometimes orange or brown, about twice as wide as the central stripe. On each side of the body, two more narrow, horizontal dark brown/black stripes outline a buff band. The chipmunk's short, round face is also striped. White stripes, bordered with dark brown, are located above and below the eye. A single short black stripe (between the white eye stripes) passes through the eye. The short, rounded erect ears and the cheeks are a gray or tawny brown. Individuals may become paler in the winter, and some may have a grayish cast year round.

The chipmunk's short, soft fur is white along the belly, and buff on its legs and feet. Its tail is furry, but not bushy like its "relatives" in the squirrel family (Family Sciuridae). The narrow, somewhat flattened tail is black on the upper side, rust on the underside, and fringed with white or light gray hairs. Both sexes and even very young chipmunks show these color patterns.



The chipmunk is about one-third the size of the gray squirrel, another common New York State mammal. The chipmunk is 215-247 mm (8.4-9.6 in.) in total length. Tail length ranges from 77-113 mm (3.0-4.4 in.), and the hind foot length ranges from 32-38 mm (1.2-1.5 in.). Adults weigh 70-110 g (2.5-3.9 oz.). Both sexes are similar in size.

The Eastern chipmunk is also called striped ground squirrel, chipping squirrel, chippie (for the sound it makes), hackee, rock squirrel (for its favorite burrow site), or grinnny.

Distribution and Abundance

The Eastern chipmunk is found throughout much of North America. Its range extends from Quebec south through the Eastern United States to Georgia and Florida. It occurs west to Manitoba, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Louisiana. In New York State two nearly indistinguishable subspecies exist: Tamias striatus fisheri occurs in southeastern New York and T. s. lysteri occurs throughout the rest of the State.

Chipmunks are numerous throughout their range and very common in New York State. Their population numbers peak in June and again from September to October, times when young chipmunks first become active above ground. Population size may also fluctuate from year to year, probably in relation to the availability of important foods.

Estimates of population densities range from 2 chipmunks per acre (.4 hectare) up to 29 per acre. Such density estimates vary depending upon the time of year they were made. Someone who watches chipmunks during the late summer or winter when they are less active might underestimate the size of the population. In good habitat, populations average 6-8 individuals per 0.4 hectare (1 acre), but most areas average 2-3 chipmunks per 0.4 hectare (acre).

Life History

In Central New York, the chipmunk's first breeding period of the year begins in mid-March and continues through early April. During the spring, older females, some yearlings, and some 8-month-old females born the previous summer will breed. The second breeding period occurs in mid-summer, from mid-June to mid-July. During this period, older females and yearlings that bred in spring may breed for their second time that year; other yearlings and a very few 3-month-old females born that spring may breed for the first time. Nearly all adult female chipmunks in New York State will give birth to two litters per year. Chipmunks are promiscuous; one female may be bred by several different males while she is in estrous (in heat). The mating relationship is short; males do not remain with the females or help rear the young.

Gestation lasts 31-32 days. The spring young are born from late April to early May. Summer young are born in late July to mid-August. There may be 1-8 young per litter, but usually there are 4 or 5.

The young are blind and hairless at birth, and have reddish, nearly transparent skin. Newborn chipmunks average 3 g (0.11 oz.) and 64 mm (2.5 in.) in total length. Littermates may differ markedly in size, weighing from 2.5-5.0 g (0.0875-0.175 oz.). When 5 days old, facial whiskers are visible, and the young may already be 80 mm (3.2 in.) long. By the eighth day, the distinctive dark stripes are visible as hair follicles develop. Body hair is visible by day 11, and the chipmunk's snout is furred by day 12. The young are able to support themselves on their feet by 2 weeks of age. The juvenile chipmunks remain scantily furred until 3 weeks old, but by the fourth week they are fully furred and their coloring is similar to the adult's.

When about 30-31 days old, the young chipmunk's eyes are open. They are weaned when 35-43 days old. At this time, the young chipmunks first leave their underground nest and may be seen foraging for solid food with their mother. Two weeks later, the juveniles become independent and establish their own burrows, usually a short distance from the mother's burrow. In New York State, most chipmunks are sexually mature when one year old. However, males born in the summer litters will mature at 7-8 months of age and breed during their first spring. Likewise, a few females will breed when 7-8 months old, and a very few may breed when just 3 months old.

Except during the time young chipmunks remain with the mother, each animal is solitary and occupies its own burrow. These unsociable rodents can be fairly aggressive toward each other. A pecking order exists within the chipmunk population. Larger individuals (of either sex) are most dominant and will chase away smaller individuals who come too close while foraging. Most aggressive actions are just "displays". These are ways of settling arguments without causing injury or death to each other. The chipmunk's least aggressive display is the "threat". In this, the individual shows it intends to chase away the other. The medium-intensity action is the "chase". The individual will run and chase the intruder or smaller, subordinate individual for a short distance. Finally, the most aggressive and least common action is a fight. Injury is rare in such fights, except when the chipmunks are unnaturally confined in a cage. By such interactions, resources are divided among the individuals of the population.

Each chipmunk establishes a territory, an area which is defended against intruding chipmunks as described above. Breeding females, especially, establish territories to keep other breeding females out of their immediate area, although in general chipmunks' territories are not always well-defined. The territory is a small central part of the animal's home range, the area used by the animal for gathering food and raising young. Home ranges may overlap broadly but territories never overlap. In New York State, the size of the chipmunk's yearly home range is estimated from 0.072-1.24 hectares (0.18-3.10 acres). Adult males usually have larger home ranges than adult females. In general, chipmunks spend most of their lives within a 0.4-hectare (1-acre) area. A chipmunk occasionally ventures outside its home range.

There are no mass movements made by chipmunks, but immature individuals of either sex and adult males may disperse over considerable distances (up to 857 m [942 ft.]). However, about half of any litter of young will stay very near where they were born.

Home ranges are ordinarily symmetrically shaped and centered around the chipmunk's burrow entrance. The entrance hole is usually concealed by brush, in a rock pile, at the base of a stump or rotten log, or within a tree's root system. The hole is about 5 cm (2 in.) in diameter. In building the burrow, the chipmunk first digs a "work hole". It digs the entrance hole and the rest of the burrow system from the inside out, then later it plugs the work hole. No mound of excavated dirt is present at the entrance hole. The new burrow is usually built in a well-drained area, whether sloped or level. The burrow system may be simple, with only one small chamber and one or two shallow tunnels up to 60 cm (2 ft.) long. These new burrows offer little protection from winter weather and usually are not large enough for storing food. Older burrows are more extensive. The tunnels are more complex, deeper (90 cm [3 ft.] underground) and longer (up to 9 m [30 ft.] long). These may have more than one entrance, and may have 3-5 large chambers and several small chambers. One chamber is used exclusively for defecation and urination. Others are used for food storage and for sleeping. The nesting chambers are 30-45 cm (1-1.5 ft.) in diameter. Food may be piled at the bottom, then the chamber is filled almost completely with broken dried leaves, the usual nesting material. Here the chipmunk gives birth to young, sleeps, and "hibernates" during winter.

In late October or early November, the chipmunk plugs the burrow entrance with soil, for protection from winter weather and predators. The chipmunk is not a "true" hibernator, like the woodchuck. Instead, chipmunks enter a shallow state of torpor (inactivity) for periods of 1-8 days at a time. Individuals experience different degrees of torpor; some awaken more often than others. Since chipmunks do not accumulate body fat as a winter energy reserve, they must awaken to feed on seeds or nuts they stored the previous fall. They may feed from caches within the burrow, or they may emerge and travel to their other nearby caches. These animals may be observed above ground during winter (especially during mild days) or their tracks may be seen in the snow. After feeding, the chipmunk curls into a

ball, placing its head between its hind legs and its tail over its legs and head. In this position and with a full stomach it becomes torpid for a few more days. The chipmunk's body temperature usually remains several degrees higher than the air temperature. (The body temperature of a "true hibernator" becomes nearly equal to the air temperature within the burrow.) Torpidity allows the chipmunk to decrease its energy (food) needs by about 85%, so this animal can survive the winter months when food is very scarce.

Chipmunks in New York State emerge from their burrows in late February or early March. Males may become active a few days earlier than females. During spring, summer and fall, chipmunks emerge daily from the burrow to feed and drink. Unlike many other mammals, they are diurnal (active only during the day). Activity peaks around 2-4 hours after daylight, and again in the cooler, late afternoon. Activity is greatest in the morning and on warm, sunny days when wind is relatively calm. Although they avoid activity during the hottest part of the day, chipmunks may occasionally bask in the sun. Several naturalists report that chipmunks remain below ground in their cool burrows to avoid the heat during late summer. This brief period of reduced activity may, however, be mostly due to the females remaining underground with their summer litters.

Chipmunks occasionally climb trees to heights of 6-12 m (20-40 ft.) to find food or to escape from danger, but these animals are primarily terrestrial -- they spend most of their time on the ground (hence, the term "ground squirrel"). While foraging, a chipmunk walks slowly, bounding occasionally when moving through deep leaf litter. As it feeds the body and tail are relaxed; the tail does not curl over the body as it does with gray or red squirrels. Occasionally, it will stop foraging to groom itself while sitting upon a stump or log.

The chipmunk relies on its keen sight to locate food. Sitting upright on its haunches, it manipulates each morsel of food with its forepaws, and bites off sharp edges before eating or tucking away the food in its cheek pouches. If danger is present, the chipmunk will not take time to handle the food; it may pick up food with its lips and tongue and push the food directly into the pouch. The two internal pouches are located along the cheek and neck region just under the skin. Each pouch opens within the mouth between the lips and teeth. The pouches function mainly as "shopping carts" for the

chipmunk; in the fall, when food is plentiful, these industrious foragers pack scores of seeds and nuts into their pouches. Then they transport them to the burrow or to special locations on the forest floor, empty them from the pouch by squeezing with the forepaw from the outside, and deposit them in caches. In this way, the chipmunk prepares for the winter when food is more difficult to obtain. The expandable cheek pouches are able to contain relatively large amounts of food; one animal's pouches were found to contain 48 cherry pits. Another contained 31 corn kernels; still another individual was carrying 70 sunflower seeds. The chipmunk's pouches are also used to carry off soil excavated from its burrow.

The chipmunk does not always carry away its food. Sometimes, especially in summer, it will eat "on the spot". It often selects a stump, rock, log, or other elevated point as a feeding site where it is able to watch for predators. Broken nut shells, seed husks, and seed fragments at these feeding stations provide evidence that chipmunks are in the area.

The chipmunk is omnivorous, but its favorite foods are nuts, seeds, and fruits from a wide variety of plants. The chipmunk eats acorns, hazel nuts, hickory nuts, beechnuts, and the seeds of elm, maple, box elder, striped maple, shadbush, dogwood, viburnum, mulberry, American yew, clover, ragweed, wintergreen, false Solomon's seal, wild geranium, may apple, wild mustard, Canada mayflower, wild buckwheat, trillium, and sunflower. It also eats flower bulbs, creating problems for gardeners. The chipmunk may occasionally eat corn, wheat, oats, and the seeds of grasses. It will also consume honeysuckle berries, chokecherries, raspberries, strawberries, black berries, juneberries, other cultivated berries and cherries, and the fruit and seeds of watermelon, apples, pears, peaches, squash, and cantaloupe. The chipmunk is also reported to feed on wild mushrooms and small fungi. The chipmunk's occasional animal foods include: insects, insect larvae, worms, snails, slugs, small snakes, mice, moles, salamanders, frogs, young birds, and birds' eggs. The chipmunk drinks water daily. During breeding season, it requires up to 25% of its weight in water per day.

Mammalian predators are probably the principal causes of death to chipmunks. Mink, weasels, martens, coyotes, foxes, bobcats, house cats, raccoons, Norway rats, and red squirrels prey on chipmunks. Hawks, large snakes, and owls also take chipmunks. The life span for chipmunks is 2 to 3

years; only a small percentage reach 3 years of age. Some kept in captivity lived 5-8 years.

A chipmunk may be affected by external parasites including fleas, lice, mites, and cuterebra or botfly larvae. Internal parasites of the chipmunk include tapeworms (cestodes), roundworms (nematodes), flukes (trematodes), and horny head worms.

Besides the tell-tale signs of its feeding activity, the chipmunk may offer other evidence of its presence in an area. Sometimes the chipmunk's elevated feeding station is also used as a sort of "calling perch". The chipmunk produces four characteristic noises which probably function as alarm signals, warning of predators. Calls may also serve to establish territories. One noise is a single, high-pitched "chip". Another noise is a "chip-rrrr" (a "chip" followed by a trill). The chipmunk will give this call just before running to safety, with its tail perpendicular to the ground. Another noise is a softer, low-pitched "cuk". Finally, the chipmunk may produce a series of "chips". This "chipping" may continue as long as 11 minutes. There may be up to 130 chips per minute, and sometimes several chipmunks will form a chorus. It is this "song" that accounts for its nickname "chippie".



The chipmunk's tracks may be seen in mud, dust, or wet snow. The tracks of its forefeet show four clawed toes. The vestigial (reduced and functionless) "thumb" does not appear in the track. The tracks of the hindfeet show the five clawed toes arranged in a fanlike pattern. The hind and front pairs of tracks are usually parallel to each other, with the tracks of the hindfeet ahead of those made by the forefeet. Sometimes, the forefeet tracks are behind one another. Each footprint is about 2.5 cm (1 in.) wide, and each set of footprints is about 6.25 cm (2.5 in.) wide. There may be 17.5-37.5 cm (7-15 in.) between the sets of tracks, depending on the size of the chipmunk's leaps. The scats (feces) are about 0.75 cm (0.3 in.) long, but they are highly variable in size and shape depending on what foods are most common in the individual's diet at that time.

Habitat

The chipmunk can survive in a variety of habitats, as long as food and shelter are present. They may be found in open woodlands (especially in hardwood stands), along brushy forest "edges", in shrubby thickets or brushland, or along brushy or wooded hedgerows (between fields). They often conceal their burrow entrances beneath refuse heaps, brush or rock piles, among a tree's root system, or near buildings. Their favorite spots are old stone walls, many of which still border fields and pastures in rural New York State. These animals are also seen in yards, gardens, campgrounds, and even in wooded city parks and urban lots. The only areas chipmunks do not inhabit are poorly-drained, marshy areas and areas with very dense undergrowth.

Ecological Role

Although the chipmunk is considered an omnivore because of its varied diet, its main ecological role is in converting plant tissue into its own animal tissue. In searching for components of its "vegetarian" diet, chipmunks may compete somewhat with other mast (nut) eaters in the forest community such as grouse, turkeys, deer, squirrels, and mice. Occasionally, the chipmunk plays a predatory role in the forest or brushland community's intricate food web, eating insects, snails, slugs, and birds' eggs.

Each chipmunk annually caches large amounts of food -- usually more than it is able to consume during the winter. This may deprive a few other

animals of food by making it unavailable to them. On the other hand, the seeds and nuts buried in the soil may germinate somewhat more quickly, thus contributing to regeneration of the forest.

The chipmunk also serves as prey for many wildlife species. This animal and other small mammals such as shrews and mice are considered "buffer species". They provide an alternate food source for predators that otherwise feed on larger mammals or birds. These smaller prey items "carry over" predators in times when their usual prey (rabbits, for instance) are few or unavailable.

Economic and Social Values

The chipmunk is one of the most popular animals around homes, parks, and campgrounds. In a 1979 survey, metropolitan New York residents ranked the chipmunk as the fourth most preferred animal to see in nearby parks; only waterfowl, turtles, and pheasants were ranked higher. The 1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (conducted by the U.S. Fish & Wildlife Service) indicates that chipmunks and squirrels were the animals most people observed, photographed, or fed. This perky, enchanting animal is fun to watch. It is common for chipmunks living in or around campgrounds and backyards to be tame enough to take food from a person's hand.

The chipmunk seldom is considered a nuisance. Generally it does not eat large amounts of fruit, seeds or nuts that are important to humans. Occasionally a chipmunk will dig in a garden to obtain newly planted seeds or flower bulbs. Chipmunks cause less damage to human-made structures than their other rodent "relatives" do. On occasion, they may enter homes or camps, or their burrow entrances may be undesirable in lawns, stone walls, rock gardens, or near building foundations.

Control Methods

Most landowners find the chipmunk entertaining and may even try to attract more of these lively animals to their yards. However, bothersome chipmunks may be eliminated in two ways: by trapping or by habitat manipulation. Snap-back rat traps may be baited with peanut butter, rolled oats, corn, or sunflower seeds, and set near chipmunk burrows. Small live

traps may be used; the captured rodents should be transported to suitable habitat at least 8 km (5 mi.) away (because of their homing ability). In New York State, the chipmunk like most other small rodents is not protected by law and may be taken at any time in any number.

If chipmunks are a nuisance around the home, the habitat can be made less attractive to them. Potential denning areas (stone walls, logs) can be removed or sealed off. The homeowner may also screen or seal off holes in foundation walls, windows, vents, and other ground-level openings through which chipmunks gain access to buildings. Poison is not recommended; because of the chipmunk's habit of caching food, poison might be transported to undesirable locations.

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(Illustrations drawn by Donna Curtin.)

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