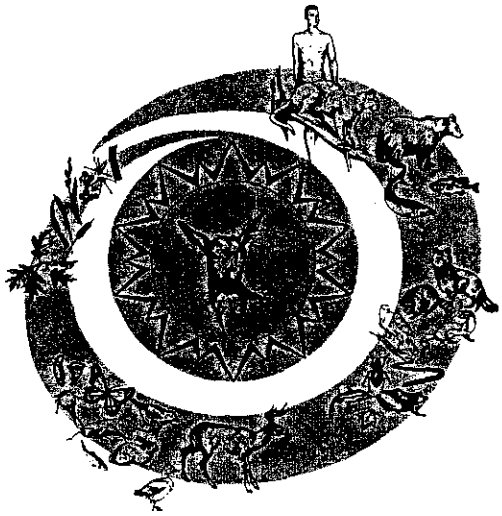

NEW YORK'S WILDLIFE RESOURCES

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Cottontail Rabbit *(Sylvilagus floridanus)*

Description

Cottontail rabbits are among the most common of our state's mammals. Two species of cottontails exist in New York, Eastern cottontail rabbit (Sylvilagus floridanus) and New England cottontail rabbit (S. transitionalis). The Eastern cottontail is most common. There are but a few subtle differences between these two species. In this paper we will refer to both species as "cottontails" or "rabbits".

The characteristic for which the cottontail was named is its short, brown and white, powder puff tail. Only the tail's undersurface is white, but it is carried such that the brown upper surface is usually not visible. Frequently, all one sees of the rabbit is this spot of white "cotton" as the animal bounds away on an erratic course toward cover. Cottontails have white undersides, but the rest of the pelage (coat) is made up of multiple-colored hairs having brown, black and tan bars. This gives the cottontail a brown, faintly speckled appearance.

Unlike the varying or snowshoe hare (Lepus americanus), the cottontail remains brown throughout the winter. The European hare (Lepus capensis) also remains brownish-gray throughout all seasons, but can be easily distinguished from the cottontail by its much larger size. The cottontail is slight of build compared to either the varying hare or the European hare. Females tend to be a bit larger than the males. The average sizes and weights of the four rabbit and hare species of New York are presented in Table 1. Note that the New England cottontail averages just slightly smaller than the Eastern cottontail,

but there is too much overlap between the two to use only size as a distinguishing characteristic.

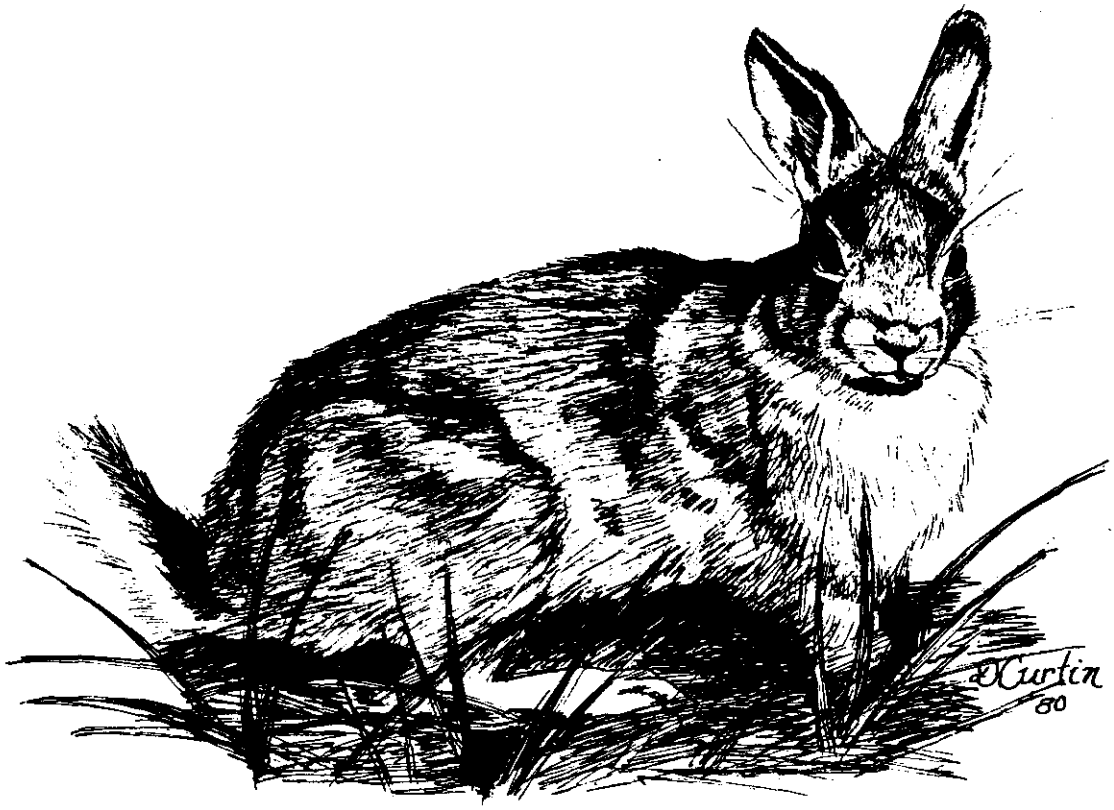
A useful, but not foolproof, field identification feature is the absence or presence of blazes on the forehead or between the ears of the rabbits. While the Eastern cottontail usually has an oblong white blaze on the forehead (particularly the young), the New England cottontail never has the white blaze, but instead has a faint black patch between the ears; occasionally some Eastern cottontails also have black patches. Positive identification of species can only be made by post-mortum examination of their skull dimensions.

Even though hares and rabbits have large, elongated incisor teeth that are adapted for gnawing, these animals are not classified as rodents. They are instead classified as lagomorphs because of a second pair of smaller incisors located just behind the upper, larger pair. Rabbits differ from hares in that their young are born naked, blind, and helpless, whereas hares are born fully furred, able to see and capable of running in just a few hours. Wildlife species with such characteristics are termed altricial and precocial, respectively.

Table 1. SOME PHYSICAL DIMENSIONS OF WILD RABBITS AND HARES IN NEW YORK STATE[a]

Common Name	Length from nose to tail		Tail length		Hind foot length		Weight	
	cm	(in)	cm	(in)	cm	(in)	kg	(lbs)
Eastern Cottontail	38.0-46.1	(14.8-18.0)	3.0-7.0	(1.2-2.7)	7.7-10.6	(3.0-4.1)	0.8-1.4	(1.8-3.0)
New England Cottontail	36.3-48.3	(14.2-18.8)	3.1-4.9	(1.2-1.9)	9.0-10.2	(3.5-4.0)	0.8-1.3	(1.6-3.0)
Snowshoe Hare	47.0-52.0	(18.3-20.3)	3.6-5.0	(1.4-2.0)	13.5-14.7	(5.3-5.7)	1.4-2.0	(3.1-4.4)
European Hare	64.0-70.0	(25.0-27.3)	7.0-10.0	(2.7-3.9)	16.0-17.0	(6.2-6.6)	3.3-4.5	(7.3-10.0)

[a] Average range of adult dimensions as presented in Godin, 1977.



Distribution and Abundance

The cottontail is generally abundant throughout New York State, with the exception of the central Adirondack Mountains. The lack of adequate brush or field habitat and that area's long, cold winters makes the region unsuitable for the rabbit. At least six subspecies of S. floridanus are found in the eastern United States; S. f. mearnsii and S. f. mallurus occur in New York. The New England cottontail or woods rabbit primarily inhabits the Hudson Valley and the eastern foothills of the Adirondack Mountains. Both species can occur on the same site, but the New England cottontail generally prefers wooded or shrubby areas rather than the more open field habitat of the Eastern cottontail. Their habits and life histories seem to be similar, although the New England cottontail has not been studied extensively.

The cottontail is superbly adapted for detecting and fleeing from predators. Its eyes are located on the sides of its head for wide peripheral vision. Its ears are pivotable, relatively large, and slightly cupped so that faint sounds

can be detected. Upon first sensing danger, cottontails usually sit perfectly still and rely on their camouflage coloration to help avoid detection. However, when necessary their long and powerful legs can propel them swiftly along on an erratic 29 to 32 kph (18 to 20 mph) dash. Despite their abilities to avoid capture the cottontail is an important prey of a wide variety of predators.

Life History

The relative success of the cottontail rabbit as a species is due in large part to its high reproductive capacity. Mating typically commences with the first warm days in late February and continues into September. Both the male and female exhibit wild, leaping courtship antics before breeding takes place. Males are promiscuous (will readily breed with any receptive female) and do not assist in the care and protection of the young.

Gestation lasts 28 days and the female frequently mates again the same day after she gives birth. Litter sizes typically range from three to seven offspring. One mature, healthy female can have as many as five litters per breeding season and can contribute up to 35 individuals to the fall population. Nests consist of shallow depressions in the ground lined with a combination of hair plucked from the female's underside and dead grasses. Nest sites occur in a variety of situations, from open fields to thick patches of brush. A cap of fur and stems is also constructed over the nest as protection from the weather and for concealment from predators.

The altricial young are born hairless and with their eyes closed. The newborn are about 10 cm (4 in) long and weigh a mere 28 g (1 oz). Young cottontails need parental care and nursing for approximately 20 days after birth. Sexual maturity can occur at three months under ideal habitat conditions. In such cases, females-of-the-year can contribute (via their reproductive efforts) up to one-quarter of the year's total population.

One might expect that the fields and woodlands would be overrun with rabbits as a result of their reproductive capabilities. If no mortality occurred, one pair of rabbits and their offspring could give rise to 5 million rabbits over a 5-year period! In a natural, diverse ecosystem, the cottontail population is kept in check by a host of mortality factors. On the average, only 20 to 25 percent of the young live one full year. This means that including adult mortality, about 85% of the population dies each year. Regional populations

tend to go through 9 to 10-year cycles which consist of slow increases for several years followed by drastic crashes over just 1 to 2 years.

Predators take many rabbits, as will be discussed later, but weather, disease, parasites and the social behavior of the rabbits also act to suppress their numbers. Survival in the nest is partly dependent upon favorable weather conditions. Cold and wet springs or falls can drastically reduce the survival rates of the first or last litters of the season. Farming activities such as haying and plowing frequently destroy nests. Through a combination of these factors, nest survival averages only 50 percent.

Cottontails are routinely infested with a multitude of external parasites (fleas, fly bots, ticks, lice) and internal parasites (tape worms, round worms, flukes). While any one type of parasite seldom kills the host directly, they can weaken the animal and increase its susceptibility to other mortality factors. Tularemia is probably the most devastating disease of the cottontail. Commonly called "rabbit fever", it appears to be 100 percent fatal to rabbits, with death occurring within 7 days. The disease is spread by contaminated drinking water and external parasites. The liver and spleen of infected rabbits generally are covered with pinhead-sized spots that are yellow to white in color. Fortunately the disease only occurs in cycles and often only when populations are at their peaks. Tularemia has been observed in New York, however it is more prevalent in warmer southern states.

The cottontail is a rather solitary animal. Throughout the breeding season dominant males maintain territories of 3.2 to 10 ha (8 to 25 A) where they breed the majority of receptive females. Other males can live within such territories as long as they remain subordinate and accept the social hierarchy. During the nesting season, females defend a home territory of about 0.8 ha (2 A) from trespassing females. Disputes are usually settled by display behavior but occasionally through fighting. When local densities are excessively high, frequent social interactions and disruptions increase physiological stress, causing reductions in litter sizes and success rates. At high population levels parasites and diseases such as tularemia spread quickly as a result of the increased incidence of contact between individuals. Good habitat during the breeding season may support 10 rabbits per ha (4/A). Fall populations are usually thinned down to 2.5 rabbits per ha (1/A) by a variety of mortality factors.

Despite the cottontail's wariness and evasiveness, a large proportion of cottontail populations succumb to predation. Crows, skunks, opossums, raccoons

and even the tiny shrew regularly raid nests. Foxes, coyotes, weasels, bobcats, feral housecats, minks and snakes prey upon the young or the adults. Death frequently comes from the sky as hawks and owls swoop down on unsuspecting rabbits. Upon spotting a nest from the air, crows may plunder it until all the young are gone.

The cottontail is a herbivore, that is the majority of its diet consists of vegetation. If given a choice, cottontails will eat succulent growth such as leaves, stems, shoots and flowers rather than dried plants, bark, or twigs. During summer months goldenrod, timothy, chickweed, clover, alfalfa, sorrel, soybeans, wheat, rye, fallen fruit, and garden crops like lettuce, peas, beans, etc. are sought and eaten by rabbits. With the approach of winter and the disappearance of green, leafy vegetation, cottontails are forced to switch their feeding to the bark and twigs of species such as sumac, white and black oak, dogwood, sassafras, maple, rose, willow, apple, raspberry and poison ivy. They will, if necessary, eat moth pupae and carrion. The rabbits frequently engage in coprophagy -- the ingestion of their own feces. This practice allows them to recycle their wastes and utilize nutrients missed in tough, fiberous bark, and to obtain vitamins formed by their digestive microorganisms.

The best times to observe cottontails are the early morning hours and about an hour before and after sunset. It is during these times that rabbits feed most actively. They can be seen moving along the fringes of clearings, just a few hops from dense cover. Because the cottontail is most active at dusk and dawn, it is called a "crepuscular" animal. By taking a quiet stroll along a country lane that has mowed shoulders or a walk through a golf course or cemetery during summer, you frequently will be rewarded by sighting a few rabbits.

One seldom sees cottontails in the open during the winter months. They seem to realize their increased vulnerability due to the sharp contrast of their brown bodies against the snow. Instead, a person with a sharp eye can pick out a stationary rabbit snuggled down in its "form" which is usually located in brush or beside a hole in the ground. A "form" is a hollow in the vegetation or snow that offers a little protection from the wind plus the advantage of overhead cover. On sunny winter days rabbits often can be seen basking in the sun just a few meters from the woodchuck burrows they use as shelters from predators and freezing weather.

One does not have to see rabbits to know they are around. Evidence of their feeding on shrubs or seedlings are cleanly nipped twigs at heights of up to 60 cm (24 in) off the ground or snow. If the twigs are cut any higher and have a somewhat jagged appearance, then deer probably were the browsers. Tooth marks on trunks of trees or along lower branches at ground or snow level can be identified as rabbit gnawing if they are about 2.0 mm wide, whereas marks about 1.0 mm wide are made by mice.

Other evidence of the presence of rabbits is their droppings. Rabbits deposit about 250 to 500 green or brown fecal pellets per day that are about one-half the size of marbles.

Rabbits leave very distinctive tracks in snow or soft soil. When hopping, the long hind feet actually come down in front of the smaller front feet so that the tendency for a novice is to follow tracks backward. The indisputable clue is the location of the claws in the prints.

Rabbits are not very vocal. Except for the few mews and soft grunts made at the nest site, the only other vocalization rabbits give is a plaintive scream when they are injured or extremely frightened. The noise is similar to the sound that can be made by blowing on the exposed edge of a blade of grass squeezed between the sides of each of your thumbs.

Habitat and Management

Cottontails are one of the easiest mammals to manage.[1] When given adequate amounts of quality food and cover, rabbit populations flourish. In areas without these requirements, rabbit densities generally are sparse. As previously stated, a wide variety of foods are suitable for cottontails, so during the summer, food is usually not a critical concern; however, they need undisturbed cover for nesting sites at this time. As with most wild animals, food and shelter are often the limiting factors of cottontail populations through the winter. The key to abundant rabbit populations are these two essential requirements.

Ideally, food and cover should exist on the same site. An example of this might be a hedgerow of multiflora rose. This briarlike plant will form a nearly impenetrable wall that livestock will not attempt to go through while at the same time providing cottontails with shelter from the elements and predators.

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[1] For a more thorough discussion of habitat management, see Gutiérrez et al., 1979.

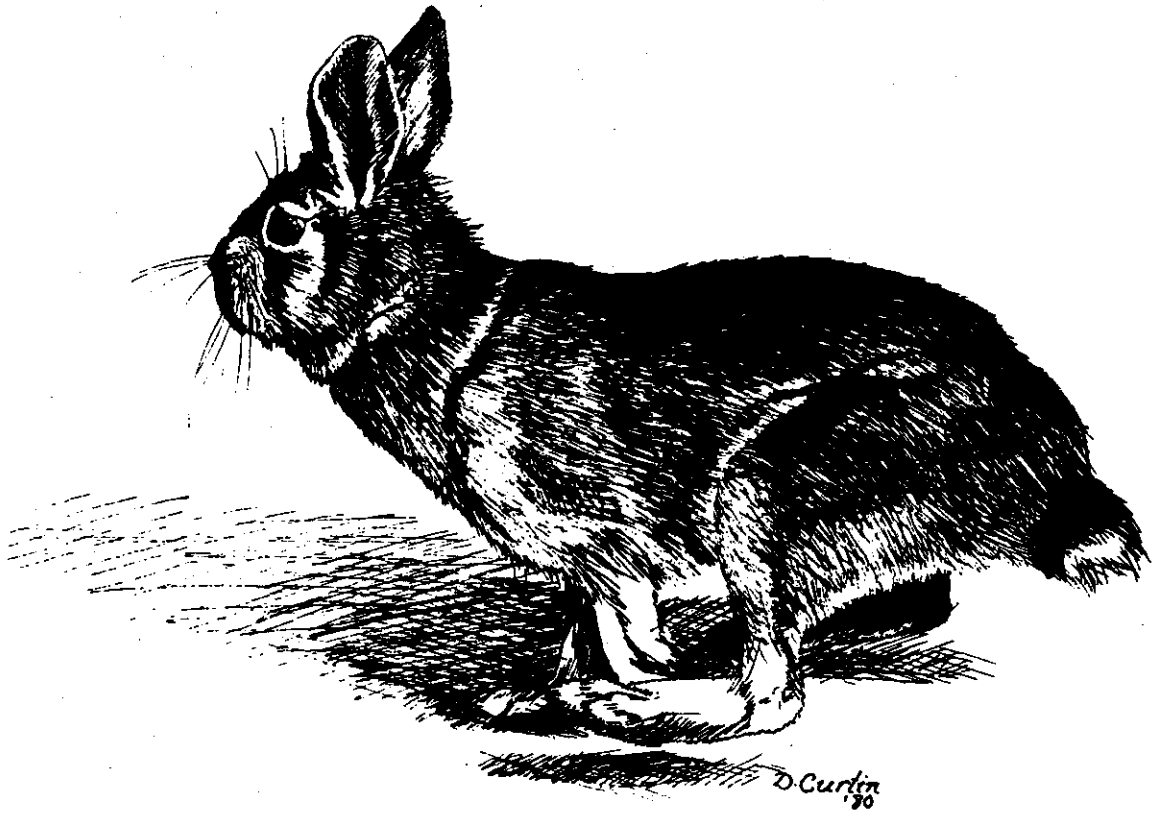
Rose hips and stem bark are valuable foods. This particular plant should only be planted where frequent mowing or plowing will keep it from spreading.

With just a little effort, existing habitat can be greatly improved. Old field vegetation should not be allowed to grow out of reach of rabbits. Large sumacs, a preferred food, can be lopped over or knocked down. Trees such as gray birch or quaking aspen and crooked or forked evergreens make excellent "living brush piles" when they are partially cut through and toppled over. Best results are obtained when several trees are used in a group.

Brush left over from logging or firewood cutting makes superb cover when piled at least 1.5 meters (5 ft) high and 3 meters (10 ft) in diameter. These shelters are most beneficial and last longer if they are placed near areas of grasses or shrubs and are built on top of old stone fences, dilapidated farm machinery, stumps, or log pieces so that the brush is off the ground where it will not decay as quickly and there are rabbit access spaces underneath the pile.

Ecological Role

Being herbivores, cottontails are primary consumers. Thus, in the natural system the cottontail plays an indispensable role by converting vegetation into animal flesh. Because of the cottontail's wide distribution and abundance, many predators are dependent upon the availability of cottontails as a food source. In areas with low densities, or during years of poor rabbit survival, predator populations are likely to decrease. In such instances, remaining predators must make greater use of other prey species, such as ruffed grouse, ring-necked pheasant, woodchuck, or mice. The cottontail is a major prey of both the red fox and grey fox, which are highly prized furbearers. An abundant and healthy cottontail population is an important component in a varied and stable New York wildlife community.



Economic and Social Values

The widespread distribution and abundance of the cottontail has contributed toward making it a favorite of some people and a foe of others. To city or suburban dwellers, cottontails are often one of the few wild mammals observable around the yard. For many, having a rabbit occasionally hop through the lot is more valuable than any number of caged pet birds or mammals. In a recent study of New York State's metropolitan residents, the rabbit was rated as the third most preferred mammal (behind chipmunks and squirrels) people would like to see around their homes or in nearby parks.

The cottontail rabbit is easily the number one small game animal in New York State in terms of hunter-days afield and number of animals bagged. It is an exciting game animal for novice and veteran hunter alike. For many, few experiences afield can be matched by an afternoon of rabbit hunting with beagles and a couple of close hunting friends. With gravy, in a stew, or as hausenpfefer, cottontails are delicious table fare.

As inoffensive as the cottontail may seem, it can be a major pest to gardeners, homeowners, orchardists, and nurserymen. Rabbits can wreak havoc on leafy garden vegetables such as peas, beans and lettuce. The bark and twigs of fruit trees and some ornamental shrubs are particularly inviting to rabbits through the winter months. Damage control will be discussed in the next section.

Hunters are often concerned over the possibility of contracting tularemia from rabbits. Symptoms of tularemia in humans include ulcerated skin at the point of infection and extremely high fever. As a rule of thumb, any game that shows signs of being diseased or sick should be handled with gloves and buried in the field. If tularemia has been reported in the area, rubber gloves should be used when dressing the animal since the bacteria can pass through even unbroken skin. Thorough cooking eliminates the possibility of contracting tularemia by eating diseased meat. Diseased rabbits are quickly killed off by freezing weather, so hunting only late in the season is a wise precaution if tularemia has been reported. If left untreated in humans, the disease may prove fatal to 4 out of every 1000 cases severe enough to be diagnosed as tularemia. The disease is rarely fatal when treated with mycin-type drugs.

Control Methods[2]

For gardeners, fencing probably is the single best method of control. The fence should be made of 2.5 to 3.8 cm (1 to 1½ in) wire mesh and stand 60 cm (2 ft) high with 15 cm (6 in) buried beneath the ground. Fencing should be attached to posts by means of twists of pliable wire so that it can be rolled up and stored at the end of the gardening season. If gardens are in poor rabbit habitat and there are just a few culprits, it may be possible to live trap them through the use of box traps placed at key entrance lanes to the garden.[3] Traps baited with corn or sliced apples and a few rabbit droppings

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[2] A more indepth discussion of control methods can be found in Caslick and Decker 1978 and 1981, or contact your Cooperative Extension Agent.

[3] The cottontail is a protected game animal in New York State, therefore it is necessary to contact your local Environmental Conservation Officer before trapping.

are usually effective. Box traps may also be the solution for homeowners who experience damage to landscape shrubbery. Trapped rabbits should be released in favorable habitat at least 5 km (3 mi) away to ensure their permanent removal. When just a few shrubs are involved, tree guards constructed of 1.3-cm (½-in) hardware cloth which encircles the trunk may be most efficient and economical. Guards must extend at least 60 cm above anticipated snow level.

Tree nurseries and orchards routinely represent substantial financial investments and as such severe damage caused by rabbits cannot be tolerated. Control methods must be effective, economical and, preferably, long lasting. Habitat management frequently meets all these requirements. Since rabbits rarely raid orchards except during the winter, the elimination of dense cover adjacent to and in orchards or nurseries effectively keeps rabbits away. Unfortunately, such practices can also eliminate suitable habitat for desirable bird and insect species. After breeding season is over, the potential overwintering rabbit population can be substantially reduced by a few successful hunts.

If habitat management is not feasible, fencing may be the best means of control. In the past the cost of fencing was considered prohibitive, but with the establishment of high density, dwarf variety plantings in orchards it may prove a feasible alternative. Chemical taste repellents can also be an effective control method. These repellents are prepared in liquid mixtures that are sprayed or painted onto exposed portions of trees prior to winter. Disadvantages of this control method are the necessity of treating trees each year and the potential of the protective material becoming eroded or diluted during severe or wet winters.

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-- Gary R. Goff
Daniel J. Decker
John W. Kelley
Ronald A. Howard, Jr.

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