



Herkimer Outdoors

VOLUME 7, ISSUE 3
May/June 2008

TREE SQUIRRELS

Four species of squirrels the gray squirrel, fox squirrel, red squirrel, and northern flying squirrel reside in New York State. The fox squirrel is limited to the southern portions of Chautauqua, Cattaraugus, and Allegany Counties as well as the Lake Erie plains; New York State constitutes the extreme northeastern edge of its range. Each of these species inhabits wooded areas in both rural and suburban landscapes and plays an important role in forest ecosystems.

General Biology

Gray squirrels (*Sciurus carolinensis*) typically are gray on the top of the body and have a white underside. The gray squirrel measures 18 to 20 inches long, its broad bushy tail accounting for about half its length, and weighs 1 to 15 pounds. Most adult gray squirrels first breed in mid December or early January, and 5 to 10 percent of older females may breed again in June. The gestation period is 42 to 45 days, after which gray squirrels typically give birth to three young. The young are born hairless and blind and spend their first 10 to 12 weeks in the nest before beginning to explore the outside world. Gray squirrels typically live about two to three years. Hawks, owls, and foxes occasionally prey on young squirrels, but adults are not frequently taken. Predation does not greatly affect squirrel populations in areas that have good food and cover.

Fox squirrels (*Sciurus niger*) are gray to reddish-gray above and buff to pale orange brown on the

underside. The fox squirrel is so named because its color often resembles the brownish red-orange of the red fox. Larger than gray squirrels, fox squirrels are about 21 inches long and weigh nearly 2 pounds. Fox squirrels mate in January and give birth to two to four young in late February or early March. Unlike gray squirrels, fox squirrels have only one litter per year.

Red squirrels (*Tamiasciurus hudsonicus*), also known as barking squirrels, boomers, chickarees, and chatterboxes, are alert, noisy, and energetic. They spend most of their time in trees and are extremely agile, sometimes leaping 10 feet between branches or 30 feet to the ground. Red squirrels are known to fall

Continued on page 2

Inside this issue:

Tree Squirrels	1-4
Routine Lawn Maintenance	4-11
Summer Flowering Bulbs	11-15



considerable distances with little or no apparent injury. When this happens, the squirrel extends its legs and flattens its body and tail, thereby reducing the speed of the fall. About half the size of the gray squirrel, the red squirrel measures about 12 inches from its nose to the tip of its tail and weighs about 5.5 ounces. In the summer, its fur is a rich, rusty brown color, turning grayer in winter when the squirrel also develops prominent ear tufts. The under-sides are off-white. Breeding season for red squirrels begins in late winter; three to six young are born in April, May, or June after a 40-day gestation period. Red squirrels are strongly territorial and will defend their food sources and den trees against intruders.

The northern flying squirrel (*Glaucomys sabrinus*) is New York's only nocturnal squirrel. The flying squirrel is about 8.5 inches long, including a 35-inch tail. Its large, round eyes are adapted for night vision. The fur of the flying squirrel is soft grayish-brown above and white on the underside. The flying membrane is a loose flap of skin between the front and hind legs on either side of the body. The membrane is stretched tight when the legs are extended, allowing the squirrel to soar or glide but not to fly in the true sense of the word. The broad, flat tail is used as a rudder to guide the animal while it is soaring. Flying squirrels can sail up to 40 yards in a downward direction, often soaring from tree to tree. Two to six young are born in April or May following a 40-day gestation period.

Habitat and Food Habits

Tree squirrels inhabit woodland areas. Fox squirrels prefer the forest edge, where trees border crop fields or other open areas. Red squirrels favor coniferous or mixed deciduous and coniferous forest but will inhabit mature deciduous forests where coniferous habitat is unavailable. Although the gray squirrel is the most common and adaptable species, all three species regularly live in cities and suburbs as well as forests.

Good squirrel habitat contains many mature fruit- and nut producing trees and a mixture of other tree and shrub species to provide a variety of food throughout the year. Natural dens and tree

cavities are used for escape and breeding cover. In addition, gray and fox squirrels build and use leaf nests in trees during summer and fall. Leaf nests are typically 12 x 16 inches and are built of twigs, leaves, grass, bark, and other plant materials. Red and flying squirrels prefer to nest in hollow tree limbs and wood pecker cavities.

Fox and gray squirrels share similar food preferences. They typically feed on mast (fruits and nuts) in fall and early winter. They favor acorns, hickory nuts, and walnuts and often store them for use in the winter. In late winter and early spring they prefer tree buds and in the summer they eat fruits, berries, and succulent plant materials. Fungi, corn, and cultivated fruits are taken when available. When populations peak, these squirrels may chew bark from a variety of trees. They will also feed on insects and other animal matter such as bird eggs. Red squirrels prefer pine seeds and buds but will also eat a variety of other foods common to the gray and fox squirrels. Flying squirrels feed on items similar to other squirrels, but they are the most carnivorous of all tree squirrels, feeding on bird eggs and nestlings, insects, and other animal matter when available. All tree squirrels cache, or hide, food to be eaten during the winter. Red squirrels cache large amounts of food at a single location such as a hollow log. Gray and fox squirrels, however, bury nuts singly at numerous locations.

Description of Damage

Squirrels can become a nuisance when their feeding and nesting habits conflict with human interests. Damage frequently occurs when squirrels feed on cherry blossoms and ripe pears or chew the bark of fruit trees. In addition, squirrels may carry off mature nuts. In gardens, squirrels may eat planted seeds, flower bulbs, mature fruits such as tomatoes, or grains such as corn. Hungry squirrels also frequently raid bird feeders and may chew holes through the tubing used in maple syrup production. In residential areas, squirrels sometimes travel on power lines and may short out transformers.

Continuing on page 3

Tree squirrels can become a problem when they gnaw on wires, enter buildings, and build nests in attics. Squirrels may damage siding, insulation, or household contents when they take up residence in homes or other buildings.

Laws and Regulations

Gray and fox squirrels are considered small game species in New York State and can be taken during the established hunting season for these species. Red and flying squirrels are considered unprotected species and can be taken at any time with a valid hunting license. New York State Environmental Conservation Law (section 11-0523) specifies that whenever gray, fox, red, or flying squirrels are injuring property on occupied farms or lands or dwellings, they may be taken at any time in any manner by the owners or occupants thereof or by a person authorized in writing by such owner or occupant. By law, any animal taken outside the regular hunting season by the landowner must be killed or released on site. Nuisance wildlife control operators licensed by the New York State Department of Environmental Conservation are authorized to trap and transport animals off site and will do so for a fee.

Preventing Damage

Population Reduction

Gray, fox, and red squirrel numbers can be reduced by shooting, but the results are often short lived. Squirrels also can be trapped using snap-back rat traps, box traps, or cage traps. Cage traps should have a 6-x-6-inch opening and be 2+inches long. Effective baits include apple slices, walnuts removed from the shell, peanut butter, corn, or sunflower seeds. When using box or cage traps, tie the trap doors open for two to three days to allow squirrels to become accustomed to feeding there. Then set the traps and check them twice a day.

Repellents

Capsaicin (the active ingredient in hot peppers) has been found to have repellent properties. In a recent Cornell University study, use of capsaicin-treated sunflower seeds reduced consumption by squirrels by about 80 percent. Squirrels also spent considerably less time at feeders stocked with capsaicin-treated seeds, and birds and

chipmunks spent more time at those feeders. Chipmunks, however, were not deterred from carrying away the capsaicin treated seeds because their fur lined cheek pouches seemed to prevent them from experiencing the full effects of the capsaicin. Although capsaicin-treated birdseed did significantly reduce the amount of sunflower seeds taken by squirrels, it did not completely prevent them from eating the seed. In addition, certain individual squirrels appeared to be more tolerant to the effects of capsaicin than others.

Several birdseed products treated with capsaicin are available to reduce consumption by squirrels. These products include Suet with Pepper Treat, Seed Saver, and Pepper Treat Wild Bird Seed and another product called Squirrel Saver Get Away Squirrel and Raccoon Repellent is registered for lawns and gardens to prevent squirrels from digging in landscaped areas. The level of capsaicin in this product appears to be sufficient to repel squirrels.

Miller Hot Sauce Animal Repellent is registered in New York State for use on maple sap collection equipment, including plastic tubing, lines, and fillings. This repellent can be used to prevent squirrel damage to maple sap collection equipment. Follow label instructions for applying this product to sap collection lines.

Fencing and Other Barriers

Squirrels can be excluded from buildings by securely fastening hardware cloth over attic vents, which are a common entry point into buildings. Also seal openings at joints of siding and overhanging eaves. In addition, seal openings where utility cables or pipes enter buildings. Install chimney caps on all chimneys and check for gaps in the flashing at the chimney base. Be sure not to trap squirrels inside. A squirrel excluder can be constructed by mounting an 18-inch section of 4-inch-diameter plastic pipe over the building opening used by squirrels. The pipe should point down at a 45-degree angle to allow squirrels to exit but prevent them from reentering. Alternatively, if squirrels are located inside an attic, traps may be set to ensure that any squirrels left inside are removed.

Continued on page 4

ROUTINE LAWN MAINTENANCE

To prevent squirrels from climbing up trees to gain access to buildings, taking fruit or nuts, or stripping bark from a tree, fasten a 2-foot band of sheet metal around the trunk 6 to 8 feet above ground. Sheet metal can be fastened by wrapping wires around the trunk and attaching them together with springs. This method allows the sheet metal to spread as the tree grows. All trees that need protection, plus all trees within jumping distance (branches with 6 to 8 feet), should be protected with a sheet metal band. Tree limbs also should be trimmed to 6 to 8 feet from buildings to prevent squirrels from leaping onto buildings.

Squirrels can be prevented from raiding bird feeders by placing feeders on top of poles and mounting a baffle around the support structure at a height of 6 feet or greater. Another option is to suspend a feeder from a cable or rope running over pulleys between two buildings or between a building and a pole. Placing a baffle on top of the feeder will prevent persistent squirrels from accessing the feeder from the suspended line.

You can protect garden crops by building a fence of 1-inch-mesh galvanized wire. The fence should be at least 30 inches high and extend 6 inches below ground, with an additional 6 inches bent outward at 90-degree angle to discourage burrowing. Set at least two electrified strands, one 2 to 6 inches above ground and the other at fence height, off the fence about 3 inches.

Newly planted bulbs can be protected with 1-inch-mesh poultry wire. Dig a trench slightly deeper than the desired depth of planting and fit the poultry wire in the bottom. Add dirt and plant the bulbs. Place another strip of poultry wire over the plantings so that the bulbs are completely encased, and finish cover with dirt.

Source: Paul D. Curtis and Kristi L. Sullivan; Cornell Cooperative Extension, Wildlife Damage Management Program

Every lawn needs to be mowed regularly and fertilized occasionally. Watering is necessary under certain circumstances. A Kentucky bluegrass lawn, for example, will require more water than a fine fescue lawn because fine fescues are a low-water-use species.

Mowing

Mowing is the most fundamental turfgrass management practice. It provides a uniform and usable surface for aesthetic purposes or recreational activities. Mowing has a profound effect on turfgrass: the removal of photosynthetically active tissue temporarily stops root growth, reduces carbohydrate production and storage, and lessens water absorption by the roots. Proper mowing discourages weeds and makes the lawn more resistant to pests.

Lawns must be mowed to the correct height. Height affects the size of the root system. A shorter lawn has a shallower root system and is thus more susceptible to drought injury, less tolerant of root-feeding insects and root-pruning diseases, and more prone to germination of weed seeds. Keep mower blades sharp and properly adjusted to avoid injuring turfgrass plants. Mow Kentucky bluegrass and fine fescue lawns to a height of 2 to 3 inches and tall fescue lawns to a height of 3 inches.

Proper mowing also means mowing at regular intervals. The rule of thumb is never to remove more than one third of the leaf tissue with each mowing. Scalping the lawn can shock it, making it more susceptible to stress.

Always leave the clippings where they fall because they return nutrients to the soil. This can reduce nitrogen and potassium requirements by up to 30 percent. Properly mowed lawns should not have increased thatch or clumps of clippings.

Continued on page 5

Composting Clippings

Keep the following points in mind when composting grass clippings:

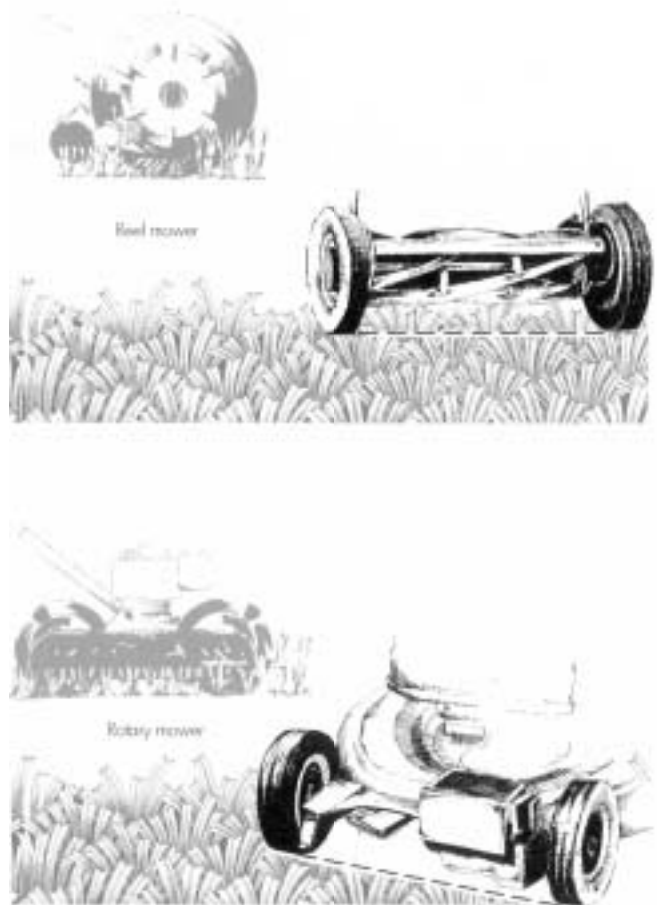
- Do not use only grass clippings because they mat together and deprive the compost microbes of oxygen, causing an odor.
- Mix grass clippings with leaves in a ration of three parts leaves to one part clippings. Any woody lawn debris added to the compost pile should be chopped up small.
- Turn the compost pile with a shovel or pitchfork every couple of weeks to facilitate decomposition and eliminate odors.
- Use composted clippings as a mulch in the garden or in flower beds.
- Leave chemically treated lawn clippings on the lawn or compost them for at least two months before using them as mulch. This will allow time for pesticides to break down.
- If you cannot use collected grass clippings in your yard, find a neighbor who might value them as mulch or compost material.
- Because collection and disposal costs are high, keeping your lawn clippings out of the garbage truck saves money.

Choosing a Mower

Three types of mowers are widely available for home lawn use: reel mowers, standard rotary mower, (see figure A) and mulching rotary mowers. The reel mower clips grass by the scissors-like action of the reel on the bedknife. It shears the grass blades cleanly when it is sharp and properly adjusted, but if the blade is dull and makes poor contact with the bedknife it will tear and mutilate the leaves, causing brown and ragged tips. Reel mowers work best on smooth lawns that are mowed regularly. They require relatively low horsepower to operate, but the initial cost and maintenance may be higher than that of a rotary mower.

The standard rotary mower does not cut as well as a reel mower, but a sharp blade will give a perfectly acceptable cut. A dull blade may cause

Figure A



the grass to have a scorched or singed gray appearance the day after mowing. The mower operates by the high-speed chopping action of a flat rotating blade. Rotary mowers are more versatile than reel mowers because they can mow tall grass and weeds, mulch or bag leaves, and are relatively easy to maintain. They usually have a very tight turning radius for excellent maneuverability. Rotary mowers can be dangerous and should be operated only by adults. Many operators have been injured by the whirling blades, and bystanders have been hurt by thrown stones or debris. Do not remove any of the guards that have been installed for safety reasons.

The mulching mower has become increasingly popular because an average half-acre of turf can produce 5,500 pounds of clippings each season. Many municipalities have banned yard

Continued on page 6

waste from their landfills, and a mulching mower provides an alternative to the time and expense of bagging yard waste for disposal. It has four cutting edges rather than two, resulting in finer clippings and quicker decomposition. A mower built for mulching re-cuts each grass blade several times so it will decay faster and look less unsightly, and it spreads the clipping out over a wider area. Certain bagging mowers can be converted to mulchers using a kit containing a special blade and a plug.

If you decide to use a mulching mower, keep the following points in mind to make the job easier and more effective:

- Don't handle too much grass at once: mow more often and more slowly.
- Keep the blade sharp. It cuts every piece of grass several times.
- To avoid plugging your machine, don not mow wet turf. The finer clippings clump more easily in the housing when wet.

The mulching mower also provides an alternative to the time consuming job of raking leaves. Leaf collection is usually necessary because uncollected leaves cause turfgrass to deteriorate as a result of limited light. A mulching mower that grinds up fallen leaves as it cuts grass is a convenient, economical, and environmentally sound way to dispose of leaves.

Adjusting Mower Cutting Height

Reel and rotary mowers can be adjusted easily for height of cut. The height of cut of most rotary mowers is set by adjusting the height of the wheel. Height adjustment is more complicated for reel mowers. In either case, follow the instructions in the manual for proper adjustment.

Fertilizing

Turfgrass requires moderate amounts of nitrogen and potassium to produce a healthy, vigorous lawn that requires minimal pesticides. Returning grass clippings after mowing can reduce these requirements by 30 percent. Kentucky bluegrass lawn require 2 to 3 pounds of actual nitrogen (N) and 1 to 3 pounds of potash (K₂O) per 1,000

square feet per year split into two or three applications. Fine fescue and tall fescue lawns require 1 to 2 pounds of nitrogen and 1 to 3 pounds of potash per 1,000 square feet each year.

Lawns should be fertilized two or three times annually, either in the spring and early fall or in late spring, early fall, and late fall. Fertilization in late fall is not recommended in areas with sandy soils, including Long Island. Nitrogen is released more uniformly in slow release fertilizers such as sulfur-coated urea or natural organics. The lawn will be greener for a longer period and will have less top growth. Some natural organic products will also suppress diseases.

What is in a Bag of Fertilizer?

Fertilizer companies are required by law to list on a fertilizer bag the amounts of elements contained in the fertilizer. This is referred to as a guaranteed analysis. The fertilizer grade is also listed. It designates the percentage of nitrogen, available phosphate, and water-soluble potash in the product. A 10-6-4 grade fertilizer contains 10 percent nitrogen, 6 percent available phosphate, and 4 percent water-soluble potash. Thus a 40-pound bag of 10-6-4 contains 4 pounds of nitrogen (10 percent of 40), 2.4 pounds of available phosphate (6 percent of 40), and 1.6 pounds of water-soluble potash (4 percent of 40).

Fertilizer recommendations are often made using a fertilizer ratio, which refers to the relationship between the percentages of nitrogen, phosphate, and potash. A 16-8-8 grade fertilizer contains twice as much nitrogen as phosphate or potash. Thus it has a 2-1-1 ratio. Grades of 10-5-5 and 20-10-10 also have 2-1-1 ratios. A grade of 20-5-10 has a 4-1-2 ratio. The easiest way to determine the ratio is to divide each number in the grade by the smallest number in the grade or by the highest whole number divisible into all three numbers of the grade containing nitrogen, phosphate, and potash) that has an approximate 2-1-1 or 3-1-2 ratio and has at least 35 percent of its total nitrogen as water insoluble nitrogen (WIN).

Continued on page 7

A turf grade fertilizer is a complete fertilizer (Water-insoluble nitrogen is not immediately available to the plant. Instead, the nitrogen is released over relatively long periods of time. Fertilizers with a least 35 percent WIN can be applied at higher rates than can quick-releasing fertilizers (water-soluble nitrogen) with little risk of burning the turf. A fertilizer bag might have the following label:

20-5-10...Guaranteed
Analysis...20-5-10
Total Nitrogen: 20% (8%WIN)
Available Phosphate: 5%
Water-Soluble Potash: 10%

If a fertilizer contains slow release nitrogen, a percent water insoluble nitrogen (WIN should be listed on the label in the guaranteed analysis. This WIN is the slow release nitrogen present in the bag, and it is expressed as a percentage, by weight, of the bag's contents. It is also important, however, to know what percentage of the total nitrogen is slow release. This can be determined easily by dividing the percent WIN by the percent total N, then multiplying by 100. In this case, $8\% / 20\% \times 100 = 40$, or 40 percent of the total nitrogen is water insoluble.

Sixty percent of the nitrogen in this example is quick release and will provide quick greening. The other 40 percent is slow-release nitrogen that will become available over the next several weeks. Some manufacturers and formulators will claim slow release nitrogen in a product, but if you run through this calculation, you may find that the amount of slow release nitrogen is insignificant. A fertilizer should have at least 30 percent of the total nitrogen as WIN if it is expected to have some slow-release characteristics.

Chart B



- Nitrogen affects shoot growth and density, root growth, and susceptibility to damage from disease, heat, cold, and drought
- Phosphorus is especially important in a new seeding because it promotes root growth
- Potassium promotes rooting, improves heat and cold tolerance, and reduces occurrence of disease
- Returning the clippings after mowing can reduce fertilizer requirements by up to 30 percent

Properties of Fertilizers

Turfgrass requires a greater amount of nitrogen than of any other nutrient (*See chart B*). The many sources of nitrogen are usually classified by availability: quick release (water soluble) or slow release (water insoluble).

Quick-Release Fertilizers

Advantages

- rapid response
- minimal dependency on temperature
- less expensive than slow-release forms

Disadvantages

- short duration of response
- high salt index, possibility of foliar burn
- possible losses from leaching and volatilization

Quick-release forms of nitrogen should be applied more often and at lower rates than other forms. They can also lower soil pH.

Slow-Release Fertilizers

Advantages

- more constant supply of nitrogen
- less potential for leaching and burning

Disadvantages

- more expensive than quick-release forms
- effectiveness can depend on temperature and moisture

Slow-release sources include natural organics, synthetic organics, and coated materials. The release of nitrogen from these sources, especially natural organics, is affected by temperature and moisture. Several types of fertilizer, their analysis, and properties are outlined in chart C on page 8.

Continued on page 8

Chart C.

Properties of Nitrogen Fertilizers Used on Turfgrass

Nitrogen Carrier	Type	Nutrient Content			Soil Acidifying Effect	Water Solubility	Potential for Burn	Comments
		% N	% P ₂ O ₅	% K ₂ O				
Quick release								
Urea	Syn. organic	46	0	0	Moderate	High	High	The nitrogen in this group of quick-release sources is readily available to turf, prone to leaching, prone to volatilization (urea), has a high salt content, should not be used during times of stress, and should be applied more often at lower rates.
Ammonium sulfate	Syn. organic	21	0	0	Very high	High	High	
Ammonium nitrate	Syn. inorganic	33	0	0	Moderate	High	Very high	
Potassium nitrate	Inorganic	13	0	44	None	Moderate	Very high	
Monoammonium phosphate	Syn. inorganic	11	48	0	Slight	Moderate	Low	
Diammonium phosphate	Syn. inorganic	20	50	0	Moderate	Moderate	Moderate	
Methylol ureas	Syn. organic				Undetermined	Moderate	Low	
Slow Release								
IBDU (isobutylidene dirurea)	Syn. organic	31	0	0	Undetermined	Very low	Low	IBDU is moisture dependent but has minimal temperature dependency. It has a slow initial response, and N release is slow at high pH. IBDU has a medium residual time.
Urea-formaldehyde	Syn. organic	38	0	0	Undetermined	Very low	Low	UF is moisture and temperature dependent, has a slow initial response and medium to long residual activity.
Methylene urea	Syn. organic	39	0	0	Undetermined	Very low	Low	Moisture and temperature dependent. Quick initial response. Short to medium residual.
Milorganite	Nat. organic	6	2	0	Undetermined	Very low	Low	Moisture and temperature dependent. Slow to medium initial response. Medium long residual. Low N analysis. Some have disease suppressive activity.
Ringer's	Nat. organic	6	1	3	Undetermined	Very low	Low	
Sustane	Nat. organic	5	2	4	Undetermined	Very low	Low	
Plant Right	Nat. organic	3	4	3	Undetermined	Very low	Low	
Sulfur-coated urea (SCU)	Syn. organic				Undetermined	Very low	Low	Contains from 32-37 percent nitrogen. Minimal moisture and temperature dependency. Moderate initial response, medium long residual. Particle size effect (finer products release more quickly). Mottling of turf can occur, especially with large particle size at low rates. Contain from 39-42 percent nitrogen. Uniform release patterns. Temperature dependent. Excellent physical properties.
Polymer-coated sources	Syn. organic				Undetermined	Very low	Low	

Continued on page 9

Some Notes on Fertilizing

- Soil testing is the only way to determine how much phosphorus, potassium, and lime or sulfur your lawn may need for optimal growth. This information helps eliminate unnecessary applications.
- The amount of nitrogen fertilizer that most lawns require depends on the predominant species of turfgrass, soil type, desired turfgrass, quality, type of nitrogen used, and climatic factors. Refer to charts D and E

below for general guidelines on how much and how often to fertilize.

- Avoid fertilizing in early to mid spring because a heavy application (especially of nitrogen) can cause certain disease problems and shallow root growth, which can lead to serious trouble for your lawn during the summer. Do not fertilize in the summer because turfgrass is often under stress from drought and heat and may be damaged by fertilizer.

Chart D. Suggesting timing of fertilizer application based on the number yearly applications*

Number of Yearly Applications	Late Spring	Late Summer/Early Fall	Late Fall/ Dormant†
1		X	
2	X	X	
3	X	X	X

*The maximum rate of application of nitrogen is 1 lb. per 1,000 square feet per single application. Therefore, if you plan to apply 3 lb. of nitrogen per 1,000 square feet per year, three applications must be made.

†Avoid late fall/dormant fertilizer applications on Long Island if water-soluble fertilizers are used.

Notes:

- late spring refers to the period just after the

“spring flush” but while temperatures are still very mild (60°-70°F day, 40°-60°F night).

- Late summer/early fall is after the summer heat spell, usually in late August or early September when temperatures start to moderate and nights are cool.
- Late fall/dormant refers to the period just after last mowing until winter snow cover.

Chart E. Approximate pounds of fertilizer (nearest 1/2 pound) required to supply rate of nitrogen recommended

Pounds of Nitrogen per 1000 sq. ft.	Urea 46-0-0	10-5-5 10-6-4	16-8-8	25-3-3	20-3-7 20-5-10	Natural Organic 6% N
1/2	1	5	3	2	2 1/2	*
1	2	10	6 1/2	4	5	*
1 1/2	3	15	9 1/2	6	7 1/2	17
2	*	*	13	8	10	33 1/2

*not recommended at these rates.

Continued on page 10

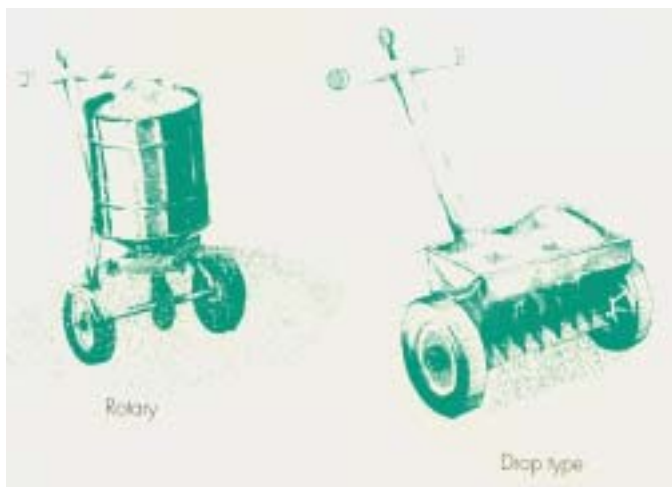
Precautions

- Most fertilizers are salts and will burn grass if improperly applied
- Water-soluble fertilizers will burn more severely than fertilizers containing slow-release nitrogen
- Apply fertilizer only when the grass blades are dry, and water thoroughly after application

How to Apply Fertilizer

Fertilizer must be applied evenly to ensure even growth and color and prevent burning. A mechanical spreader is best for this work. Organic fertilizer can be used in almost any season without danger of burning grass. Inorganic fertilizers can be used during the growing season, but take these precautions against burning: distribute fertilizer evenly, spread fertilizer only when grass is completely dry, and immediately wash the fertilizer off the grass blades to the ground

Dry fertilizers can be applied with a gravity drop spreader or a centrifugal spreader (see figure below). Use a drop spreader when applying fertilizer-herbicide products to minimize the chance of herbicide injury to trees, shrubs, and vegetable gardens. A drop spreader is also good for applying ground limestone.



Centrifugal spreaders generally cover a larger area with each pass and decrease the time it takes to fertilize your lawn. Uniform application is more difficult, however because fertilizer particles are more susceptible to wind. Centrifugal

spreaders can also be used to apply granular lime and sulfur materials.

When using either spreader, make at least two passes over your lawn. Apply half of the fertilizer in one direction and the other half at a right angle to the first pass. This will help eliminate the streaks that develop from an uneven application.

**Adding Lime or Sulfur
Modification Soil pH**

In some regions of New York, soils have an acceptable pH and may never need lime or sulfur. In other regions the pH may be higher than 7.5 (too alkaline) or lower than 6.0 (too acidic). When pH is above 7.0, nutrients such as iron, zinc, manganese, and copper become unavailable. A pH below 6.0 results in reduced availability of phosphorus and depletion of calcium and magnesium. At the higher and lower pH ranges, microorganism activity slows or even stops, reducing the break down of organic matter and the consequent release of nitrogen, sulfur, and other nutrients. The only way to be certain of a soil's pH is to have it tested. Your local Cooperative Extension agent can assist you with this test.

To Raise Soil pH

Once you know the soil pH, (refer to chart below) for replanting liming recommendations or refer to the chart on page 11 for established lawn recommendations.

Pounds of ground limestone/1,000 sq. ft. needed to raise soil pH to 6.5. These amounts indicate pre-plant amounts to be incorporated into the upper 6" of soil.

Soil Type

pH	Sandy Loam	Loamy	Clayey
4.5	126	253	348
5.0	106	211	290
5.5	42	84	116
6.0	17	33	45

Liming can be done in spring or fall but not during summer or within two weeks after applying fertilizer. Avoid using hydrated lime because it is caustic and difficult to handle.

pH modification for established turfgrass soil

To Raise soil pH
Pounds of ground limestone/
1,000 sq. ft. to raise pH to 6/5-surface application*

	Sandy Loam	Loam	Clay
4.5	42.0	84.3	116.0
5.0	35.3	70.3	96.7
5.5	14.0	28.0	38.7
6.0	5.7	11.0	15.0

*Do not apply more than 50 lb. of limestone/1,000sq. ft. per application.

To Lower Soil pH
Pounds of elemental sulfur/1,000 sq ft.
to lower to 6.5

	Sandy Loam	Loam	Clay
>8.0	6	11	16
7.5--8.0	4	7	9
7.0-7.4	2	3	5

*Do not apply more than 5 lb. or sulfur/1,000 sq. ft. per application. Do not apply sulfur during the summer.

See figure below for a description of several liming materials and suggested methods of application.

When a large amount of lime (more than 50 pounds per 1,000 square feet) is to be applied to established turfgrass, a split application is recommended. Apply half in the spring and the other half in the fall. Add water to remove lime from the shoots and move it into the soil.

To Lower Soil pH

When the pH is greater than 7.5, acidifying

materials should be applied. Elemental sulfur is the preferred material to lower soil pH. For ease of application, use a pelleted form, which can be applied with a centrifugal spreader. Do not apply more than 5 pounds of elemental sulfur per 1,000 square feet per application to established lawns (see chart above). Be sure to water in sulfur to avoid burning. Apply sulfur only during spring and fall. Refer to Chart on page 9 for the rate to use when sulfur will be incorporated into soil during lawn establishment.

Continued on page 12

Material	Composition	Rate of Reaction	Method of Application	Comments
Ground Limestone	Granular Ground Limestone	Slow and Gradual	Drop Spreader	Water in if lawn appearance is a concern; only a slight chance of leaf burn. Its effects can last up to two years.
Pelleted Limestone	Pelleted Finely Ground Limestone	Very Fast	Centrifugal Spreader	Apply 60-70% of the ground limestone rate; effects is not long lasting. Yearly applications are necessary

Do not use ferrous sulfate and aluminum sulfate for soil acidification. Ferrous sulfate can burn grass blades, and aluminum sulfate is not as effective as elemental sulfur.

Watering

Most cool season lawn grasses can survive conditions of extreme drought by going into summer dormancy. Unfortunately, dormancy may result in extensive injury from insects and diseases, and it encourages weed invasion. It is preferable to avoid drought conditions through proper maintenance.

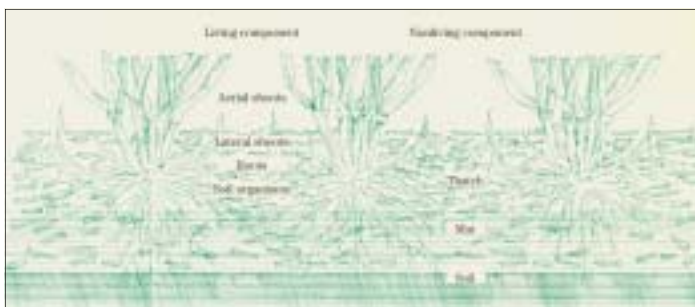
When the lawn first begins to wild in the spring, water it thoroughly with about 1 inch of water. This deep watering encourages deeper rooting, whereas frequent light waterings in the spring promote shallow roots, making the lawn more susceptible to root pruning insects and diseases. During the summer, it is natural for much of the root system to deteriorate. Summer waterings should be light and frequent; never apply water faster than the soil can absorb it.

The best time to water a lawn is early morning when evaporation losses are low and leaves dry quickly. Evening watering does not allow time for the leaves to dry and creates an environment conducive to disease development.

Thatch

There are many misconceptions about the causes and problems of thatch. Thatch is a layer of undecomposed and partially decomposed organic residue situated above the soil surface and capable of supporting turfgrass growth (see figure below).

As thatch accumulates, it becomes a tightly intermingled mat of dead and living stems, leaves, and roots. A moderate amount of thatch (less than 1/2 inch) generally causes no problems and



is even desirable because it increases wear tolerance, decreases soil compaction, and insulates the soil from extreme temperature. Excessive thatch, however leads to scalping, decreased fertilizer activity, water repellence, roots that are limited to the thatch layer, increased disease and insect problems, and decreased tolerance of high and low temperatures.

Thatch accumulates when there is an imbalance between plant growth and decomposition. Heavy nitrogen fertilization and irrigation promote thatch development, which is why the nicest lawns are often the first to have thatch-related problems. To determine if your lawn has excessive thatch, take several wedge-shaped slices, including the surface soil layer, at several locations. Inspect the samples to determine the thickness of thatch. A layer of thatch that is 1/2 inch thick or thicker may require attention. Control requires an integrated approach that include prevention, biological control, and mechanical removal.

Prevention

Water and fertilize often enough to maintain good growth but not enough to encourage succulent, unnecessary growth. Excessive irrigation inhibits breakdown of thatch by microorganisms. Keep soil pH above 5.5. Mow tall grass proper intervals. Grass clippings are a valuable source of nitrogen and do not contribute to thatch development if the lawn is mowed regularly. Certain species or cultivars of grasses thatch more quickly than others. Some Kentucky bluegrass cultivars are notorious producers of thatch because of their vigorous growth habit. Where these cultivars are used, mow at a shorter height (1½") to retard shoot production. Fine fescues grow slowly, but their leaves and other plant parts resist decomposition and are thus prone to development of thatch.

Biological Control

Altering the soil environment to promote activity of fungi, bacteria, and other microorganisms will enhance decomposition of thatch. Microbial activity is influenced by moisture, temperature, aeration, pH, and supply of inorganic nutrients. Cultivation by core aeration, using a machine that punches a hollow tine into the soil to remove a small soil core, can greatly improve the microenvironment.

Continued on page 13

Mixing the soil cores with thatch increases microbial activity by providing more favorable moisture and temperature conditions. Core aeration is most effective as a preventive measure and should not be used to remove large amounts of thatch. Home owners who have high-maintenance lawns should consider annual core cultivation.

Mechanical Removal

Vertical mowing or power raking is the most common method used to remove thatch. Following severe vertical mowing, a lawn should have at least three to four weeks of good growing weather to recover. Early fall is the best time to power rake a lawn in New York. If it is necessary to power rake a lawn in the spring, consider applying a preemergence herbicide afterward to control annual grasses such as crabgrass, especially in downstate New York. Preemergence herbicides prevent seedling establishment. They do this by creating a chemical barrier in the soil. When weeds germinate in this zone, the herbicide is absorbed and kills the plant. Power raking after applying a preemergence herbicide will break the herbicide barrier and decrease efficacy. A light application of fertilizer following raking will help the grass recover from injury.

Lawns with a serious thatch problem may require a severe power raking each fall until thatch is less than ½" of thatch will need to be reestablished from seed or sod.

Source: *Home Lawns - Establishment and Maintenance*; Mary C. Thurn, Norman W. Hummel, and A. Martin Petrovic

SUMMER FLOWERING BULBS

Montbretia - Montbretia grows 3 feet tall. It blooms in August and September and produces flowers 4 inches in diameter. Colors of the flower are orange, gold, red, or yellow. Use montbretia in borders and as cut flowers.

Peony - Peony grows 2 to 4 feet tall. It blooms in late spring and early summer. The flowers are white, yellow, cream, pink, and red. Use peony in borders and for cut flowers.

Tigridia - Tigridia (Mexican shell flower) grows 2 feet tall and blooms in mid summer. The tripetaled flowers are a mixture of white, red, yellow, and rose colors.

Tuberose - Tuberose (polianthes) grows 2 feet high and blooms in late fall. Its waxy, white, double flowers are very fragrant. Use tuberose in flowerbeds and as cut flowers.

Selecting Bulbs

Bulbs are sold in nurseries, drug and variety stores, garden shops, and through florist or nursery catalogs. Buy from a reputable dealer.

Make sure bulbs are not diseased. Diseased bulbs look moldy, discolored, or soft and rotted. Bulbs should be firm and have an unblemished skin.



Buy bulbs of varieties that flower together and grow to about the same height. Be sure to buy enough of each color and type for a good display in your garden.

If you buy bulbs before planting time, keep them in a cool, dry area. A temperature of 60° to 65°F is cool enough to prevent most bulbs from drying out until you plant them.

Planting

Some kinds of summer flowering bulbs are grown in the garden out doors and others in pots indoors. You can start many bulbs in flats or pots indoors in winter or early spring and replant them outdoors when the danger of frost has passed in the spring.

Continued on page 14

Most bulbs need full sunshine. Try to select a planting site that will provide at least 6 to 10 hours of direct sunlight a day. Bulbs planted in a southern exposure near a building or wall bloom earlier than bulbs planted in a northern exposure.

Before preparing new flower beds, test the drainage of the soil. Dig a hole about a foot deep and fill it with water. The next day, fill the hole with water again and see how long it remains. If the water drains away in 8 to 10 hours, the soil is sufficiently well drained.

If water remains in the hole after 10 hours, it will be necessary to improve the drainage of the planting site. Dig furrows along the sides of the bed and add soil from the furrows to the bed. This raises the level of the bed above the level of the ground.

Dig and plant your flower beds when the soil is fairly dry. Wet soil packs tightly and retards plant growth. If you can crumble the soil between your fingers, it is dry enough for digging and planting.

Spade the soil 8 to 12 inches deep. As you dig, remove large stones and building trash, but turn under all leaves, grass, stems roots, and anything else that will decay easily.

Add fertilizer, sand, and coarse peat moss to the soil. Use ½ pound (1 rounded cup) of 10-6-4 fertilizer for a 5 by 10 foot area, or a small handful for a cluster of bulbs. Plane a 1-inch layer of sand and a 1 to 2 inch layer of peat moss over the bed. Thoroughly mix the fertilizer, sand, and peat moss with the soil.

Use a small handful of 10-6-4 fertilizer and equal parts of garden soil, peat moss, and sand for each pot plant. All bulbs require low levels of fertilizer. Avoid frequent applications of high nitrogen fertilizers; this will promote rotting in the bulbs.

In loose, sandy soil, plant bulbs 3 to 4 inches deeper than the depths recommended.

Be sure to plant bulbs at recommended distances apart because many of them need room to develop new offshoots.

You may allow space for over plantings of dwarf marigolds, petunia, ageratum, alyssum, coleus, or verbena. These annuals provide excellent color contrast and flower display with your bulbs.

Care of Plants

If weeds grow in your flower beds, you can usually pull them by hand. Be careful when you use a hoe or other weeding tool; these implements may injure plant stems and surface roots.

Normal rainfall usually provides enough moisture for summer flowering bulbs. But during dry weather, you should water the plants at weekly intervals. When you water, soak the ground thoroughly.

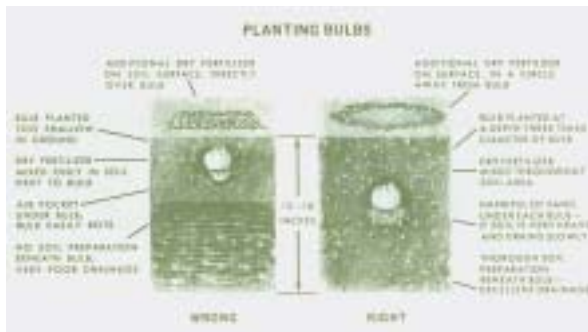
When plants bloom, fertilize them lightly with 5-10-5 fertilizer. Use no more than ½ pound for a 5 by 10 foot flowerbed or a light ring around each plant. Many flowerbeds will be fertile enough from fertilizer used with other plants grown in the bed. Avoid high nitrogen fertilizers.

Be sure to keep fertilizer off the leaves and away from bulbs and roots; it will burn them.

In addition to 5-10-5 fertilizer, you can use bone meal as an extra source of nitrogen to promote plant growth for the next year. Bulbs decay when too much nitrogen is used at one time. But decay is unlikely when you use bone meal because it releases nitrogen slowly.

Apply bonemeal at flowering time. Use no more than 3 pounds for a 5 by 10 foot bed. Mix it thoroughly into the soil. Do not use bonemeal on pot plants.

When flowers fade, cut them off to prevent seed formation. Seeds take stored food from the bulbs.



Continued on page 15

After the leaves turn yellow, dig the bulbs and store them for replanting the next year. Destroy the dead stems and foliage of the plants. Foliage left on the ground may carry disease to new growth the next year. If disease is severe, plant bulbs in a new location.

Besides the general instructions given here for the care of plants, be sure to follow the special instructions given for each plant. If the general instructions conflict with the special instructions, follow the special instructions.

Care of Bulbs

Although bulbs, corms, and tubers are all referred to as bulbs, they differ in appearance.

A true bulb is composed of layers of flesh, or scales, that overlap each others like the layers of an onion. A complete flowering plant develops inside the bulb. Each year, the growing plant replaces the bulb either partially or entirely.

A corm is a swollen underground stem that grows upright. Each year, the growing plant produces a new corm on top of the old one. The plant grows from the top of the corm.

A tuber is the swollen end of an underground side shoot that has eyes, or growing points. Each eye produces a separate plant.

Tubers multiply from year to year and may be cut apart, or divided, to increase the number of plants you can have in your garden. When tubers are divided for re-planting, each division must have eyes on it. Tubers without eyes will not grow.

Most summer flowering bulbs should be dug and stored when the leaves on the plants turn yellow. Use a spading fork to lift the bulbs from the ground. Wash off any soil that clings to the bulbs, except for bulbs that are stored in pots or with the soil around them.

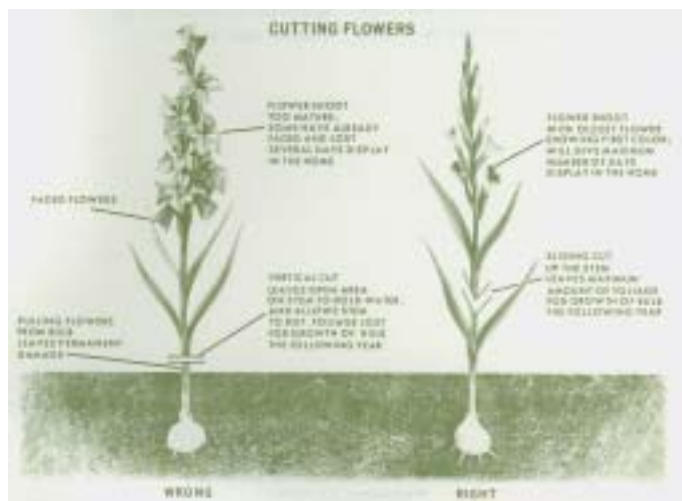
Leave the soil on achimenes, begonia, canna, caladium, dahlia, and ismene bulbs. Store these bulbs in clumps on a slightly moistened layer of peat moss or sawdust in a cool place. Wash and separate them just before planting.

Spread the washed bulbs in a shaded place to dry. When dry store them away from sunlight in a cool, dry basement, cellar, garage, or shed at 60° to 65° F. Avoid temperatures below 50° or above 70° F unless different instructions are given for a particular bulb.

Inspect your bulbs for signs of disease. Keep only large healthy bulbs that are firm and free of spots. Discard undersized bulbs.


If you have only a few bulbs, you can keep them in paper bags hung by strings from the ceiling or wall. Store large numbers of bulbs on trays with screen bottoms. Separate your bulbs by species or variety before storing them.

Be sure that air can circulate around your stored bulbs. Never store bulbs more than two or three layers deep. Deep piles of bulbs generate heat and cause decay.



Source: United State Department of Agriculture, Home and Garden Bulletin Number 51, Prepared b Science and Education Administration

CORNELL COOPERATIVE EXTENSION
HERKIMER COUNTY



We're on the web!!
www.cce.cornell.edu/herkimer

Herkimer County CCE Staff

Executive Director/Agriculture

Bernard Armata

Assistant Director/Nutrition Education

Linda Robbins

4-H Program

Jennifer Collins

JoAnn Richards

Administrative Assistants

Barbara Johnson

Rachel Shaver

Bookkeeper

Veronique Stormes

Nutrition Staff

Joan Clanton

Mary Ann Walrath

Melissa Graepel

Lorrie Serow

Even Start Program

Rebecca Benson

Readers' comments are always welcome.

Please contact:

Cornell Cooperative Extension of Herkimer County
5657 State Route 5 Herkimer, NY 13350
Phone: 315.866.7920
Email: herkimer@cornell.edu

Editor:

Bernard Armata

Outdoors is published six times a year by Cornell Cooperative Extension of Herkimer County. Newsletter fee \$5.00 to help defray expenses.

Whenever trade names are used herein, it is with the understanding that no discrimination is intended and no endorsement by Cornell Cooperative Extension is implied.

Reprinting: Unless otherwise noted, permission is granted to reproduce material appearing in this magazine upon notification of the author, providing that full acknowledgement is made of the source and no charge is made without approval.

CORNELL COOPERATIVE EXTENSION
OF HERKIMER COUNTY
5657 STATE ROUTE 5
HERKIMER, NY 13350

NON PROFIT
U.S. POSTAGE PAID
PERMIT NO. 25
13350