



## Lawn Care without Pesticides

The lawn is a very prominent and important part of the home landscape. Aside from its attractive looks, the lawn has many other benefits: it improves air quality around your home, traps dust, reduces noise, and works like an air conditioner by cooling your property in the summer. Perhaps this is why Americans spend billions of dollars annually maintaining their lawns. In recent years, however, people have become much more concerned about the use of pesticides in the home landscape. Can home lawns be maintained without pesticides? Yes they can, and they may even look nice too, if some very basic lawn care principles are followed. First, you will have to have a realistic perception of what a pesticide-free program will produce. There is no panacea. You may see weeds and an occasional dead area in the lawn. (Chemically treated lawns may have these problems as well.) Lawn troubles such as these, however, may be kept to a minimum through proper care. A lawn that is properly maintained will be vigorous, healthy, and much more tolerant of diseases and insects.

### Cultural Management

#### Start Right

Work you put into site preparation will pay off in a healthy lawn later. The best time to prepare and plant a lawn is in late August or early September when the weather cools. More moisture is available to tender, young grass seedlings, heat stress is lower, and there is also less competition from germinating weeds at this time. You may test your soil for nutrients and pH to determine whether lime or fertilizer should be added. If you're starting from scratch, mix the amendments right into the soil. It is important to reduce soil compaction – loosen the soil to a depth of approximately six inches. If you must add topsoil, incorporate it into the soil beneath so there are not layers of different types of soil. Grade the soil so water drains easily and to eliminate low spots, then rake the surface smooth. Follow the directions that come with your seed to apply the correct amount and use a spreader to distribute grass seed evenly. Seed will germinate best if it is not buried too deeply (covered with no more than  $\frac{1}{8}$  inch of soil) and has good contact with the soil. You may use an empty roller to firm the soil without causing compaction. Cover newly seeded areas lightly with weed-free straw or other mulch (such as Penn Mulch) to protect your seedlings and conserve moisture.

Newly seeded grass must be kept moist until the plants emerge. Water only enough to keep the surface moist before the seeds sprout, then gradually reduce watering frequency to encourage deeper rooting. During the first year, the lawn will require at least one inch of water weekly: it takes a full season for young grasses to develop drought tolerance. Watering tips for mature grass are discussed below.

#### Selecting the Proper Grass

It is important to select the proper grass types for the site. Several grass species may be used for home lawns in the Hudson Valley – a mixture is best. Species and even varieties will differ in their appearance, their adaptation, and their ability to tolerate diseases and insects. Keep in mind that even the most shade tolerant varieties require a minimum of four hours of direct sunlight daily. Most turf grasses prefer at least six to eight hours of sunlight. Kentucky bluegrasses are adapted to sunny conditions, but require a medium to high level of maintenance. Use a mixture containing 65 percent bluegrass (a combination of varieties), 15 percent perennial rye and 20 percent fine fescue. If you are looking for a lower maintenance lawn, use a blend of 100 percent tall fescue or a mixture containing 65 percent of a fine fescue blend, 15 percent perennial rye and 20 percent Kentucky bluegrass. In shadier areas, use a blend of 100 percent fine fescue. Fescues are the best choice for drought tolerance, but they do not tolerate traffic as well as other grasses. Look for grass seed brands that use named varieties.

### *Building Strong and Vibrant New York Communities*

## **Fertilization**

Soil fertility influences the lawn's ability to resist pests. Soil testing is the first step in determining fertilizer requirements of a lawn. Old, established lawns may not require fertilization. Soil testing information may be obtained from Cornell Cooperative Extension. Optimally, the soil pH (acidity level) should be maintained at a range of 6.0-7.0. Plant nutrients are available and beneficial microorganisms are most effective within this range. Modify the pH according to soil test recommendations. Nitrogen (N) is needed in moderate amounts for a pest resistant lawn. Leaving grass clippings on the lawn may reduce these requirements by 30 percent. Phosphorous (P) and potassium (K) are present in adequate levels in most soils in New York State. Additional phosphorus is likely to be carried by water runoff into bodies of water. In late fall, the risk of runoff and water pollution increases. New York State Law prohibits the application of lawn fertilizer containing phosphorous unless indicated by a soil test or the application of any lawn fertilizer between December 1 and April 1. Fertilizer must be removed if it is spilled or lands on an impervious surface and cannot be applied within 20 feet of surface water, with few exceptions. Lawns should be fertilized in the fall, if indicated by a soil test, as most root growth and food storage occurs at this time. An application may be made once the weather has cooled enough to minimize fertilizer burn – around Labor Day, though you may apply fertilizer effectively through October. High maintenance lawns may be fertilized in fall and in late spring (around Memorial Day). Slow release fertilizer sources such as natural organics will provide more uniform release of nitrogen. The lawn will be green for an extended period of time, and top growth won't be excessive. Some natural organic compost-based products will also suppress diseases.

## **Mowing**

Proper mowing will discourage weeds and increase resistance to some pests. Proper mowing involves mowing at the correct height and frequency. Mowing height will affect the depth of the root system – the shorter the mowing height, the shallower the root system will be. A lawn with a shallow root system will be more susceptible to drought injury and less tolerant of root feeding insects and root diseases than a well-rooted lawn. Lawns mowed too short will also allow more sunlight to reach the soil. This encourages weed seed germination and weed invasion. Mow Kentucky bluegrass, perennial rye and fine fescue lawns at three to four inches. Tall fescue lawns should be mowed at four inches. If your mower cannot be adjusted to four inches, set it at the highest possible setting. Proper mowing also means mowing at regular intervals. The rule of thumb is as follows: Never remove more than one third of the leaf tissue with each mowing. Scalping the lawn can shock it, making it more susceptible to stress. Lawn mower blades must be kept sharp. Dull mowers leave wounds on grass blades that serve as a point of entry for diseases. Leaf spot is especially encouraged by dull mower injury. Check the blade after every eight to ten hours of use.

## **Core Aerification**

Core aerification temporarily reduces soil compaction and thatch problems by improving air penetration and water infiltration in the soil. This encourages dense rooting of the grass plants and healthy top growth. The best time to aerate is in late summer or early fall when the weather begins to cool and the soil is slightly moist, when weeds are less likely to sprout in the disturbed soil. For longer-term results, core aerification should be performed each late summer/early fall for at least five years. Cores should be collected and compost spread over the lawn in a way that existing grass plant crowns are not buried, but compost falls down into the holes from which the cores were removed. This will help to keep the holes from collapsing.

## **Watering**

Most mature cool season lawn grasses have the capability to survive extreme drought conditions by going into summer dormancy. While this is an effective means to survive drought, unless the lawn is healthy before this stressful period, summer dormancy may result in extensive injury from insects and diseases and encourage weed invasion. Remember, it is a vigorous, healthy lawn that can best resist pests. Too much water applied at the wrong time could do more harm than good. A healthy lawn will survive the summer as long as it gets one-quarter inch of rain over a three week period, though it will be brown and dormant during this time. **If the lawn receives an inch of rainfall weekly**, it will continue to grow. As long as rain supplies this water, you do not need to add more. If there is not enough rain, you may water to add the remainder, for example, one-half inch of supplemental irrigation if there is only one-half inch of rainfall. The best time to water a lawn is in the early morning. Evaporation losses are low and the leaves dry off quickly. Do not water late in the day or at night. Evening watering will increase leaf wetness and favor disease development.

## **Sprinkler Calibration**

Assure that you are supplying the proper amount of water to your lawn by calibrating your sprinkler's output. To accomplish this, place straight-sided containers within the spray pattern and measure how much water is collected in one half hour. If one inch is collected in one half hour, then one-half hours' time would be needed to apply one inch of water to your lawn.

## **Pest Management**

### **Weed Management**

The best form of weed management is prevention. Lawns that are damaged or weak are prone to weed encroachment. Homeowners should follow cultural programs that result in a healthy, vigorous lawn that is tolerant of diseases, insects, and environmental stresses. Research has consistently shown that access to an adequate supply of nitrogen and proper mowing will help lawn grasses out-compete weeds. Even with the best cultural program, weeds will encroach into a lawn. The only weed management alternative to herbicides in a lawn is hand pulling. When pulling weeds, be sure to remove all of the root system since many perennial weeds will regenerate from underground parts. If you can remove weeds when you first notice them, they will be less likely to spread. Use of starter fertilizer at planting may help newly seeded areas gain an advantage over weeds. Apply fertilizer according to soil test recommendations. Once the grass is established, mow as soon as the grass can be cut to three inches tall. Mowing at this time will help the plants to spread out and choke out many weeds.

### **Disease Management**

Some natural organic fertilizers and composts will suppress and sometimes prevent disease problems. Composts may contain microorganisms that are natural fighters of diseases. Diseases that have been suppressed by these products include red thread, dollar spot, and others. Examples of natural organic fertilizers with known disease suppression include Ringer (Judd Ringer Corporation), and Sustane (composted turkey litter). Composts should be applied with care, to prevent storm water from moving the nutrients off site into storm drains or surface water. When diseases occur on home lawns, they are often associated with certain environmental conditions or cultural methods. Since lawn grasses are perennial, diseases may be present throughout the year – if the environmental conditions favor disease growth, symptoms will appear. Consult with Cornell Cooperative Extension to identify the problem and to find out what management strategies exist for the diseases that afflict your lawn.

### **Insect Management**

There are basically two types of insects that feed on lawn grasses. Surface feeders include chinch bugs and sod webworms. Root feeding insects include several different white grub species. As with other pests, a properly maintained lawn will be more tolerant of insects than a neglected lawn. For example, a lawn that is well grown may tolerate 10 to 15 grubs per square foot without any visible damage. The same number of grubs, however, may devastate a weak, poorly maintained lawn. In recent years, plant breeders have been working on varieties of lawn grasses that have insect resistance. They have been able to do so by introducing a fungus called an endophyte into perennial ryegrass plants. Endophytes produce a chemical that is toxic to insects. Unfortunately, the toxin does not move to the underground plant parts. Thus, insect resistance is limited to surface feeding insects such as sod webworm and chinch bug. The most common damaging insects in home lawns in New York are white grubs. Larvae (grubs) of five species of beetles in New York feed on turfgrasses. The most common grubs are those of the European chafer and the Japanese beetle. Currently, there are two biological insecticides labeled for grub management in turf.

**Milky spore** is a naturally occurring bacterial parasite that infects Japanese beetle grubs. It is not effective on other white grub species. Milky spore products on the market do not survive New York winters very well. They have been, at best, marginally effective here.

**Beneficial nematodes** are microscopic round worms that feed exclusively on ground dwelling insects, including grubs. While results with nematodes are expensive and have been inconsistent, they are a viable choice for insect management on lawns. Homeowners that rely totally on biological management for white grubs may have to renovate their lawns when heavy grub infestations occur.

Revised 4/15 by Amy Albam, Horticulture Community Educator and Gerald G. Giordano, Senior Horticulture Consultant, Cornell Cooperative Extension of Westchester County.

Resources: Cornell Home Gardening Lawn Care. <https://turf.cals.cornell.edu/lawn/>

*Please note that neither Cornell Cooperative Extension of Westchester County nor any representative thereof makes any representation of any warranty, express or implied, of any particular result or application of the information provided by us or regarding any product. If a product is involved it is the sole responsibility of the User to read and follow all product labeling instructions and to check with the manufacturer or supplier for the most recent information. Nothing contained in this information should be interpreted as an express or implied endorsement of any particular product or criticism of unnamed products. With respect to any information on pest management the User is responsible for obtaining the most up-to-date pest management information. The information we provide is no substitute for pesticide labeling. The User is solely responsible for reading and following manufacturer's labeling and instructions.*