

Considering the Environment in the Maintenance of Your Kentucky Lawn

A SEASON BY SEASON APPROACH

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“Going Green” is a buzz phrase that is heard a lot these days. Everything from driving hybrid cars to recycling plastics can be considered going green. But can we go green when it comes to maintaining our lawns? The answer to that question is not all that simple. Most people do not realize the environmental benefits of lawns. Lawns are known to cool the air, reduce soil erosion, remove dust and pollutants (including CO₂) from the air, reduce run-off of water and pollutants, create oxygen for humans, and improve soils over time by supplying organic matter. Lawns are also important aesthetically and have been shown to improve human well-being. However, to be 100 percent environmentally friendly, we could never fertilize or water our lawns and only mow with a self-propelled reel mower. Or, we could get rid of our lawn altogether. Neither of these options is particularly appealing for most people. We can, however, have a high quality lawn and reduce our impact on the environment by doing some very simple things at the right times of the year. The following guide will walk you through a series of steps that are important for keeping your lawn looking thick and healthy and at the same time reducing pests and the need for chemicals and other inputs.

Winter

The best advice for managing your lawn during the winter is to just leave it alone. It is not growing at this time of year so there is no reason for inputs. As a matter of fact, walking on grass that has frost on it can cause damage to the leaves. These damaged areas may be slower to green up in the spring and could result in increased weed pressure. Lawns in winter often remain wet, so reducing



traffic is important because wet soils compact much more easily than dry soils. Compacted lawns will require additional inputs such as aerification to improve them.

Snow seeding is an idea occasionally proposed as an activity for winter lawn care. Snow seeding involves grass seed being applied on top of snow and allowing the seed to trickle down into the lawn canopy as the snow melts. The seed may germinate in the spring but the new plants will be immature when the heat of the summer arrives so they may not survive. It is best to seed during late summer into early autumn (mid-August through September) if the lawn has thin areas that require seed.

Winter is also the best time to get your lawn mower running properly. Gas lawn mowers are not fuel efficient, so anything you can do to improve efficiency will help the environment. Changing the oil and air filter can improve engine performance, which can save fuel and reduce emissions. Fuel left in a mower over the winter can get water condensation in it and cause the mower to not start or to run poorly in the spring. If possible, run the mower out of gas after the last mowing in the fall or drain the mower and use the gas in your car.

There are several alternatives to traditional gas-powered mowers. Self-propelled reel mowers are still readily available at big box stores. If kept sharp, these mowers will perform a quality cut and give you some exercise in the process. If the thought of pushing a reel mower does not sound appealing, there are other alternatives that are not as environmentally friendly as self-propelled reel mowers but are better than traditional gas mowers. Electric mowers have been around for many years but have gained acceptance in recent years due to environmental concerns. Electric options have various motor sizes and include the corded varieties that stay connected to an electric outlet on your home, battery powered options that must be charged before each use, and even solar types that operate on a hybrid sun/electric recharge system. Each type of electric mower has benefits and shortcomings that should be addressed prior to purchase. These mowers produce zero emissions, which reduces air pollution. The last option for reducing your environmental footprint with mowing is propane-powered mowers. These may be purchased from the manufacturer as propane mowers or may be converted to propane-powered mowers with conversion kits. Propane



Figure 1. Dull mower blades increase mower fuel usage and potential for disease in grass plants.

as a fuel source reduces air pollution and fuel spillage and increases engine life.

Another important factor in mower maintenance is sharpening the blade. Depending on how often you mow, blades should be sharpened at least a couple of times each year. Dull lawn mower blades cause the engine to work harder as it takes more energy for the blade to cut through the grass (Figure 1). Furthermore, dull blades cause grass leaves to tear during mowing, which results in a ragged appearance and can increase the damage from turf diseases. Severe disease outbreaks may prompt homeowners to apply fungicides that could potentially have a negative effect on the environment.

Spring

As temperatures increase in the early spring, the grass will start growing. There may be an accumulation of dead grass leaves throughout the lawn that will keep the temperature of the soil a little cooler. By removing this debris with low mowing, sunlight will reach the soil surface and allow the grass to begin growing a little earlier.

As temperatures continue to rise into April, begin mowing the lawn at the same height as you were in the autumn (slightly lower than in the summer). Cool-season grasses are typically not under temperature or moisture stress at this time of year so mowing a little shorter than

normal should not negatively affect them. Shorter mowing heights in the spring may slightly improve density, which could in turn improve competition with annual grassy weeds such as crabgrass. Whenever lowering mowing heights, it is important to gradually lower the height as quick reductions can lead to voids in the canopy that can cause an increase in soil temperature and crabgrass germination/competition. With all mowing events throughout the year, it is best to leave the clippings on the lawn. Grass clippings do not contribute to thatch but can provide as much as 25 percent of a lawn's yearly fertility needs as they decay.

If the soil in your yard is compacted, early spring (or autumn) is a good time to aerify because recuperative potential is at its peak. Soil compaction is a compression of soil particles resulting in less space in the soil for air and water. Without air and water in the rootzone, plants will struggle. Further, roots will not penetrate hard soils, resulting in a shallow root system that will be more susceptible to heat and drought stress during the summer. However, most lawns do not require aerification because there is not sufficient traffic to compact the soil. To find out if the soil is compacted, with the force of your thumb try to push a pocketknife blade into moist soil. If the blade goes into the soil, it is probably not compacted enough to require aerification (Figure 2).

Excessive thatch buildup in the lawn is a good reason to consider aerifying. Thatch is a layer of living and partially decomposed plant parts (such as stems, roots, rhizomes, etc.) that can grow to significant depths in some grasses (Figure 3). A half-inch depth of thatch is considered normal for most situations. Layers deeper than this are good candidates for aerifying/dethatching. Significant thatch layers are unhealthy for the lawn as they can increase mower scalping; interfere with movement of air, water, and nutrients into the soil; cause shallow rooting; and harbor insects and fungi that cause lawn diseases. Grasses that spread by lateral stems (rhizomes and/or stolons), such as Kentucky bluegrass or zoysiagrass, can develop serious thatch problems. Excessive watering and fertilizing will lead to significant thatch layers. Bunch-type grasses without lateral stems, such as tall fescue or perennial ryegrass, do not have serious thatch problems.

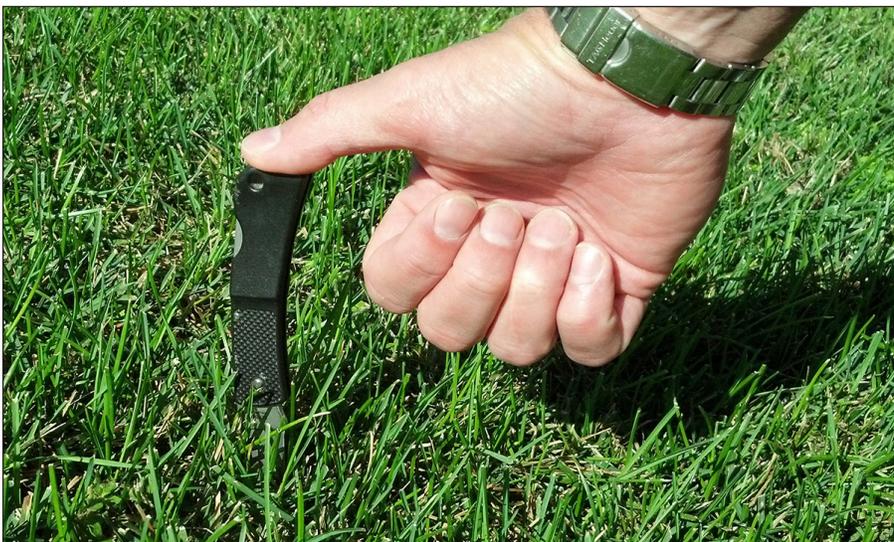


Figure 2. Testing soil compaction with a knife and the force of the thumb.



Figure 3. An excessive thatch layer in a Kentucky bluegrass lawn.



Figure 4. Crabgrass invasion in a tall fescue lawn.

Another maintenance task to take care of in the early spring is to apply a pre-emergent herbicide. It may seem counterintuitive to think about going green and applying herbicides, but the goal in a good lawn is to have thick healthy turf. One way to ensure the lawn will reach this goal is by removing any competition from annual grassy weeds such as crabgrass, goosegrass, etc. (Figure 4) through

a pre-emergent herbicide application. This one application (or two half-rate applications spaced about a month apart) will take care of most grassy weeds for the entire growing season, which means that other herbicides will not have to be used repeatedly to keep the lawn free of weeds. The pre-emergent application should be applied by April 15 in Kentucky during most years but should be applied earlier if

spring is warmer than usual. In southern and western Kentucky, the pre-emergent application should normally be made a week prior to April 15, and in northern and eastern Kentucky a week following April 15. A good rule of thumb is to make sure the pre-emergent application has been made by the time forsythia begins to drop its blooms (Figure 5).



Figure 5. Forsythia in bloom, signaling time for spring planting or pre-emergent herbicide application.

There are a couple of practices that should be avoided in the spring. The first is fertilizing. Lawns should only be fertilized in the spring if fertilizer was not applied during the autumn, and even then only in very judicious amounts. Spring and summer fertilizer applications promote warm-season weeds (bermudagrass, crabgrass, nimblewill, etc.), decrease root production, and can promote disease on desirable species. Weed-and-feed products should not be applied in the spring for a pre-emergent herbicide treatment since these products also contain fertilizer.

The other practice to avoid during the spring is seeding. The preferred time to seed is during late summer or early autumn. Spring seedings are rarely successful and will usually require extra summer maintenance and irrigation to help keep the immature and weak seedlings alive. If there is no alternative to spring seeding, plant seed around the time when forsythia begins blooming. Apply a pre-emergent herbicide that is safe on the desired species or the new seedlings will be quickly out-competed by crabgrass. Post-emergent herbicides may also be applied to seedling crabgrass with adequate success. See *Weed Control for Kentucky Home Lawns* (AGR-208) for more information on lawn herbicides. Read and follow the label directions for information on application timing for new seedlings of desirable species.

Summer

Each summer, the growth of cool-season grasses such as tall fescue and Kentucky bluegrass will slow down and their root systems will become increasingly shallow. This shallow root system means it is harder for the plants to access water and nutrients in the soil. Short mowing heights also result in shallow roots. Raising the height of cut up to 3 or 4 inches during the summer will promote deeper roots. Another benefit of mowing lawns at taller heights is that they are more competitive with weeds such as crabgrass. Research has shown that tall fescue lawns mowed at 3 or 4 inches will naturally inhibit 85 to 100 percent of crabgrass germination compared to lawns mowed at 1 or 2 inches only reducing 0 to 50 percent of crabgrass germination. On the other hand, tall fescue lawns



Figure 6. Research trials show the importance of proper mowing heights for reducing disease pressure and maintaining turfgrass quality.

mowed at 4 inches are known to have more problems with the disease brown patch because of increased humidity in the canopy resulting from reduced air movement from larger and taller grass leaves. However, because the grass is healthier at this taller mowing height, it will recover from the disease once weather turns cooler without the use of a fungicide. An intermediate mowing height of 2.5 to 3 inches may result in the best of both worlds between problems with weeds and problems from diseases (Figure 6).

Watering the lawn during the summer is a practice that might not be considered environmentally friendly. However, all plants require water to maintain their basic functions, and grasses are no different. Infrequent but crucial watering during drought might offset more intense environmentally unfriendly practices required to renovate or replace a drought-stricken lawn. Generally there are two different philosophies regarding watering lawns.

The first approach is to water as needed. Most lawn soils in Kentucky have adequate water-holding capacity and do not require water every day to sustain turfgrass growth. If you have to water, wait until the lawn is dry enough that footprints are left after walking on it—this will let you know that the lawn is just beginning to wilt. Once the first signs of wilt are apparent, water long enough to allow puddles to begin forming on the

surface. At this point you have reached the maximum percolation rate of the soil. Water again after the soil dries and footprints are once again visible. This practice will create the deepest possible root system and the healthiest plants in terms of drought tolerance. This type of irrigation scheduling is considered “deep and infrequent.” Whenever possible, it is best to water lawns in the very early morning hours (~4:00 a.m.). Watering in early morning will greatly reduce losses to evaporation by allowing time for infiltration prior to sunrise and the onset of evaporative losses. Also, watering at this time will have the largest effect on reducing the daily leaf wetness period by knocking off dew that has formed overnight. Conversely, watering in the evening will prolong the leaf wetness period. Reducing the length of the daily leaf wetness period will have a very positive impact on reducing summer disease problems.

Excessive watering is just as bad as not watering enough. Too much soil moisture causes all the pore spaces in the soil to be filled with water, reducing space for air. Roots require oxygen to grow. If soil oxygen levels are low, the root system will become shallow. An unhealthy root system will lead to problems with the aboveground portion of the plant, and shallow roots can be a concern if irrigation water becomes limiting.

The second philosophy regarding watering lawns is to not water them at



Figure 7. A Kentucky bluegrass lawn beginning drought dormancy.

all. In many years rainfall is frequent enough that supplemental water is not required. However, in some years, the effects of drought may be visible on lawns. Kentucky bluegrass lawns will become dormant during lengthy droughts and will turn brown (Figure 7). More often than not, these lawns are not dead and will recover when rain and cooler temperatures return in the fall. Tall fescue has a much deeper root system and will remain green and growing longer than Kentucky bluegrass. A concern with drought-dormant lawns is that they are not competitive against weeds, thus attention may be needed to guard against invading weeds. Further, if the drought period is extensive, there is a chance that these cool-season lawns will not recover. Traffic, including mowing, should be strictly avoided when cool-season grasses are under drought stress. Permanent damage can occur when traffic is applied to severely drought-stressed grasses. Traffic during drought will also encourage warm-season weedy species. Warm-season grasses such as bermudagrass and zoysiagrass have excellent drought tolerance and will require very little supplemental irrigation. Mowing all species taller during the summer will produce deeper roots and improved drought tolerance.

Irrigation and grass selection will also play a role in some insect populations and damage. Because insects such as white grubs feed on turfgrass roots, anything that can be done to reduce damage to roots and increase root growth is beneficial. Tall fescue innately has a deeper root system than Kentucky bluegrass and it can better withstand the pressure of root feeding insects. As previously mentioned, increased mowing height will help develop a deeper root system, which in turn will improve white grub tolerance. Since deep and infrequent irrigation will develop deeper roots, this will also help offset root feeding insect damage. The adult beetles (the mature white grubs) look for wet lawns in June and July for egg laying. A drier lawn at this time of the year will reduce egg laying, thus reducing damage later in the summer. If grubs are a serious problem, it will be necessary to water during the dry periods of August and September to prevent turf death. Avoiding certain plants in the landscape will also reduce populations of white grubs. Adult beetles are attracted to a variety of species, including roses, Japanese maples, and others. For a complete list of plants to avoid, see *Japanese Beetles in the Urban Landscape* (ENTFACT-451).

Autumn

The best chance of success for establishing a cool-season lawn in Kentucky is from mid- to late August until the second week of September. Temperatures at this time of year are cooling down, which favors the cool-season grasses. There is also far less competition from summer annual weeds such as crabgrass and goosegrass. Winter annual weeds such as henbit and chickweed will also be germinating at this time of year. Although applications of herbicides containing 2,4-D will easily control these weeds, proper management practices throughout the rest of the year will likely create enough competition in subsequent years to not have to chemically treat these weeds. Autumn rains will help new plants become established. Finally, planting in the autumn gives the grasses 6 to 8 months to mature and develop a deep root system before the onset of the summer stress period. All of these factors make early autumn the ideal time to plant.

When deciding what kind of grass to plant on lawns, the best choice for minimizing the impact on the environment is turf-type tall fescue. There are no native species that are suitable for lawns in Kentucky. The two species most commonly found in Kentucky lawns (tall fescue and Kentucky bluegrass) were both introduced from Europe. Tall fescue is more suitable than Kentucky bluegrass for Kentucky's climate as it has better heat tolerance and does not require as much maintenance, especially irrigation, to maintain high quality. This alone makes tall fescue a more environmentally friendly species. If the mention of tall fescue conjures images of large leaves and clumps of grass, it is time to revisit it. Unlike the clumpy growth and coarse leaf texture of Kentucky 31 tall fescue, the modern cultivars of turf-type tall fescue look very similar to Kentucky bluegrass in leaf texture, color, and density, making them very desirable lawn grasses for many reasons (Figure 8).

Autumn is the best time to supply nutrients to lawns in Kentucky. Nutrients are required to keep grasses growing and looking their best (for more information



Figure 8. Kentucky 31 tall fescue (front, center) surrounded by modern turf-type tall fescues.

on fertilizing, see *Fertilizing Your Lawn* [AGR 212]). If adequate nutrients are not available, grasses will show symptoms such as poor color, growth, density, and competition with weeds (Figure 9). Before any fertilizer is applied to a lawn, a soil test should first be conducted to

determine the nutrient and lime requirements (for more information on liming, see *Liming Kentucky Lawns* [AGR-214]). Lawn soils should be tested every 3 to 5 years to make sure that nutrients are being maintained (for more information, see the UK Turf video *Soil Testing and*

Fertilizers for Home Lawns at http://www.youtube.com/watch?v=eTIVnAyR_rw). Many soils in eastern and central Kentucky have adequate levels of phosphorous and potassium, therefore only nitrogen will be needed. Soils in western Kentucky may be deficient in some nutrients, but without a soil test, there is no way to know. Applying phosphorous and potassium when not needed is a waste of money and can damage the environment. Research has shown that nitrogen applied in the autumn results in better winter color, less frequent spring mowing, fewer weeds in summer, less heat stress in summer, less water required in summer, and less disease pressure in summer. So, simply following an appropriate fall fertility program can greatly reduce the need for additional environmentally unfriendly inputs such as herbicides, fungicides, and most especially water.

Most lawns will perform very well with 2 pounds of nitrogen per 1,000 square feet per year. (Apply 1 lb in September and 1 lb in November.) Synthetic nitrogen sources such as urea or ammonium nitrate can be safe for the environment when used properly. Organic fertilizers (often made from animal



Figure 9. A low-fertility lawn showing low density and many weeds.



Figure 10. A good stand of white clover supplies the lawn with up to 2 pounds of nitrogen per 1,000 square feet per year.

waste) are beneficial for improving poor soils over time and for only releasing a small amount of nitrogen each day (termed slow-release fertilizer). However, they can pollute just as easily as a synthetic fertilizer if used improperly. Knowing the size of the lawn being fertilized as well as properly calibrating application equipment are important steps to reducing the environmental impact of having a lawn. (For more information on calibrating spreaders, see *Calibrating Fertilizer Spreaders for the Home Lawn* [AGR-211].) Note that great care should be taken when applying fertilizers. Fertilizers applied to any hard surface, such as sidewalks and streets, will ultimately be washed into the storm sewer system and become pollutants.

A very “green” option to applying nitrogen fertilizers is to include a leguminous plant species such as white clover in the lawn (Figure 10). Legumes form a symbiotic relationship with certain bacteria in the soil which helps extract or “fix” nitrogen gas from the air. As the legume roots die and break down in the soil, they release some of the nitrogen that was fixed by the bacteria and it becomes

available to the surrounding plants. A good stand of white clover can supply as much as 2 pounds of nitrogen per 1,000 square feet per year, which is the same as the recommendation provided above for a lawn’s annual nitrogen requirement. However, one thing to consider is that white clover can attract bees to the property, which can be a concern if small children or pets frequently use the lawn for recreation. Research is ongoing regarding the best use of clover to supply nitrogen to lawns, including reducing flowering.

One final thing to consider during the autumn is mowing. As previously mentioned, mowing heights should be raised during the summer to produce deeper roots and to help offset heat and drought stresses (3-4 in.). During autumn, however, there is far less stress on grass plants, and they are actively growing and increasing their root systems. This allows a lower mowing height, which helps to produce thicker, more dense lawns. This in turn may help to increase desirable lawn species’ ability to compete against any weeds that try to establish in the autumn and spring. Lowering

mowing heights in the autumn can also reduce winter and spring diseases and produce an easier surface from which to rake leaves. When mowing heights are lowered, it is best to gradually decrease heights over several mowings rather than all at one time. Removing any more than 30 to 40 percent of the leaf surface (especially during times of stress) can result in scalping, which can kill some plants and will reduce density and increase weed pressure. An appropriate autumn mowing height is 2.5 to 3 inches.

When it comes to going green, we may not think of our lawns as being all that significant. However, because we should all be interested in leaving the planet a better place for the next generation, giving strong consideration to and reducing our lawn care inputs can add up over time. Small changes made throughout the year will result in a thick and healthy lawn that will require fewer inputs to keep it looking nice. Fewer inputs means you are doing your part to save the planet and will very likely result in saving a few dollars at the same time.

Resources

- Disease Management in the Home Lawn* (ID-105) (<http://www2.ca.uky.edu/agc/pubs/id/id105/id105.htm>)
- Fertilizing Your Lawn* (AGR-212)
- Japanese Beetles in the Urban Landscape* (ENTFACT-451)
- Lawn Mower Blade Sharpening* video from UK Extension (<http://www.youtube.com/watch?v=JMyIj9NR89o&feature=c4-overview&list=UUMFY6zEWe6uJEYakzOofhIg>)
- Liming Kentucky Lawns* (AGR-214)
- Mowing Your Kentucky Lawn* (AGR-209)
- Seasonal Lawn Mower Maintenance* video from UK Extension (<http://www.youtube.com/watch?v=oxgbMDdT6bQ&feature=c4-overview&list=UUMFY6zEWe6uJEYakzOofhIg>)
- Soil Testing and Fertilizers for Home Lawns* video from UK Extension (http://www.youtube.com/watch?v=eTIVnAyR_rw&feature=c4-overview&list=UUMFY6zEWe6uJEYakzOofhIg)
- Taking Soil Test Samples* (AGR-16)
- Weed Control for Kentucky Home Lawns* (AGR-208)

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Issued 7-2014