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Low-Maintenance Lawn Care, Stressing Pest Avoidance and Organic Inputs

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Lawns provide a number of benefits in urban and suburban settings. Because lawns absorb rainwater very effectively, they buffer streams from sudden flooding, protect surface waters from pollution by runoff, and recharge groundwater. Lawns help moderate the sometimes harsh climate of the urban landscape by reducing temperature fluctuations and providing cooling through evapotranspiration (a combination of evaporation and natural water loss from plants called "transpiration"). They also improve air quality by reducing dust levels, and they reduce noise levels by absorbing sound. Finally, lawns help reduce injuries to active children by providing protection against abrasions and sprains.

As a society, Americans place a high value on lawns, spending more than $30 billion each year on lawn maintenance. However, the value that individual homeowners assign to their lawns differs widely. Some homeowners install automatic irrigation systems and may spend more than $500 annually for an "estate-quality" lawn-maintenance program on a quarter-acre lot, with the goal of maintaining a uniform, dark green lawn of a single grass species nearly year round. The benefits of such a high-maintenance lawn include aesthetic appeal and increased property value. Other homeowners maintain yards with infrequent mowing and no inputs of fertilizer, irrigation, or pesticide. For some, economic necessity is the motivation for a low-maintenance approach to lawn care. However, for a substantial number of people, the benefits of anything other than a low-maintenance approach to lawns are not worth the financial expense. Others may not mind the expense but value other aspects of a low-maintenance approach.

This publication is written for those who wish to maintain their lawn with minimal inputs. Low-maintenance lawn care offers certain benefits, such as minimal pesticide use, reduced fertilizer input, less need for irrigation, and reduced mowing frequency. However, when choosing a low-maintenance approach, recognize that the lawn will not offer the same dark green, uniform sward of turf that is seen under a high-maintenance lawn-care program.

Considerations for a Low-Maintenance Lawn

Once the option for a low-maintenance lawn is chosen, other decisions must be made about grass selection, fertilizing, mowing, irrigation, and ways to control weeds, pests, and diseases. The following sections offer the homeowner more information on making these decisions.

Grass Selection

Tall fescue is the grass species of choice for most Kentucky lawns. This cool-season grass is well adapted to full sun or medium shade, and it will grow better than other grasses on heavy clay soils. It has good traffic tolerance, no serious insect problems, is very competitive with weeds, and requires little, if any, irrigation in all but extended periods of drought. As for drawbacks, tall fescue grows quickly during springtime and sometimes requires more frequent mowing than other grasses. It also suffers from a very common fungal disease called brown patch. However, both brown patch and rapid spring growth can be minimized with reduced nitrogen inputs, as described in this publication.

Information based on research at the University of Kentucky that identifies top-performing varieties of tall fescue and other turf species can be obtained online at http://www.uky.edu/Agriculture/ukturf/top_varieties.htm.

Most older Kentucky lawns are composed of mainly Kentucky bluegrass. With relatively low maintenance, it has few pest problems, has relatively slower growth, and can go completely dormant (brown foliage) without permanent damage during a hot summer drought. The drawbacks of Kentucky bluegrass are that it does poorly on heavy clay soils, is often damaged by white grubs in early fall, and must be irrigated during the summer in order to maintain acceptable green cover.

To switch to a lawn that requires fewer inputs for a quality lawn, a homeowner can effectively renovate a Kentucky bluegrass lawn with tall fescue during late summer and early fall. However, a successful transition to tall fescue will require the use of both pre-plant herbicides and fertilizer as described below.

Fertility

Another consideration in a low-maintenance lawn is the use of fertilizer. Kentucky lawns vary in the amount of fertilizer or lime needed, and a great number of lawns may go for years without additional phosphorous, potash, and lime. It is best to have a soil sample tested by your county Extension office and to apply only the nutrients recommended.

To maintain a relatively good quality turf with minimum weeds, nitrogen is one nutrient that is needed every year. Autumn and early winter are the best times of year to apply fertilizers to cool-season grasses like tall fescue and Kentucky bluegrass. In response to autumn fertilization, the turf develops a better root system and becomes very dense. Other advantages to autumn fertilization include better recovery from summertime diseases and other stresses, better color during the winter, and earlier green-up in the spring.

Apply 1.0 to 1.5 pounds of actual nitrogen per thousand square feet of lawn once or twice during the period from mid-October through late December. If unfamiliar with determining fertilizer rates, see the University of Kentucky Extension publication AGR-53, *Lawn Fertilization in Kentucky* (see page 6 for how to obtain a copy).

Resist the temptation to fertilize the lawn as it greens up in the spring. Heavy fertilizer use during spring and summer can actually increase the risk of several destructive diseases, such as brown patch of tall fescue and summer patch of Kentucky bluegrass. It also reduces tolerance of the turf to summer stresses and increases the need for frequent mowing.

Types of Nitrogen Fertilizer

Nutrient sources used for lawn care may be *inorganic, natural organic,* or *synthetic organic.*

- **Inorganic, farm-type fertilizers** are the most inexpensive sources of nutrients for lawns. Fertilizers like ammonium nitrate (34-0-0) or urea (46-0-0)[1] supply no nutrients other than nitrogen, and they are quickly available for uptake by the plant. If a soil test shows that the lawn needs phosphorous or potassium, one or two applications of a fertilizer such as "triple 19" (19-19-19) can be applied.
- **Natural organic fertilizers** are becoming more common. They are derived from biological materials, generally composted manures, sewage sludge, or organic wastes. Natural organic fertilizers are suitable for lawn care, although the environmental benefits of these products probably have little to do with improving the health of the lawn ecosystem. Their environmental benefits result from a form of "recycling" since disposal of the raw materials in these organic fertilizers by other means sometimes can cause environmental problems. When used as nutrient sources, these organic fertilizers are broken down *(mineralized)* by soil microorganisms to release the inorganic nutrients bound in the organic matter. Thus, ultimately the turfgrass plant receives the same nutrients as with inorganic fertilizers; the turfgrass plant does not distinguish between nutrients supplied by inorganic versus organic fertilizers.

  Mineralization depends on environmental conditions (temperature and moisture) as well as the microbial health of the soil. As such, and even under optimal conditions, nutrient availability from organic sources is much slower than from inorganic sources. There may occasionally be some physical benefits to the soil from applying these materials, but this is mainly accomplished when the organic fertilizer is mixed with the soil. A topdressing of organic fertilizer would not improve soil tilth but certainly would provide nitrogen and minute quantities of other nutrients. Most natural organic fertilizers contain between 1% and 6% nitrogen. Therefore, to supply one pound of actual nitrogen per thousand square feet of lawn, you would need to apply 100 pounds of a fertilizer providing 1% nitrogen or 17 pounds of a fertilizer providing 6% nitrogen at each application.

  Natural organic fertilizers are less effective when applied after mid-autumn. Once the soil temperature drops below 50°F—usually sometime in November in central Kentucky—nitrogen mineralization by microorganisms nearly stops. Soil temperatures do not consistently climb above 50°F until early April in central Kentucky, a time when nitrogen fertilizers should not be applied to our cool-season turfgrasses.
- **Synthetic organic fertilizers** are generally synthesized from urea and contain a portion that is slowly soluble or has a slowly soluble coating. Most fertilizers sold in garden centers fall into this category. Specialty turf fertilizers almost always contain some slow-release nitrogen. This results in less of a flush of growth after fertilization and also less of a potential to "burn" the turf if the fertilizer is overapplied. Slow-release nitrogen may also have less leaching potential in sandy soil, which may help protect groundwater from contamination.

Apply Fertilizer Properly to Avoid Contaminating Surface Waters

Improper application of lawn fertilizers can contribute to nitrate and phosphate contamination of groundwater and surface water. This is true whether the fertilizer used is organic or inorganic.

To reduce the risk of water pollution from lawn fertilization, note the following guidelines.

- Apply fertilizer only onto the lawn. Fertilizer applied onto sidewalks, driveways, and other paved areas may wash directly into storm drains, contributing to pollution of streams and lakes.
- Do not apply more than 1.5 pounds of actual nitrogen per thousand square feet of lawn at any one time. Applying excessive fertilizer may result in increased potential for the leaching of nitrogen into groundwater, especially in sandy soils.

[1] Although urea is classified by chemists as an organic compound, it converts to inorganic nitrogen very quickly after application; therefore, it is treated here as an inorganic fertilizer source.

- Do not apply fertilizer when heavy rain is forecasted or when the ground is frozen because such applications could easily wash into surface waters.

White Clover Can Replace Nitrogen Fertilizer

Seeding white clover into a lawn has been a traditional way to provide nitrogen to the grass without fertilizers. White clover "fixes" atmospheric nitrogen into a form that plants can use. When the roots of white clover decompose naturally, the mineralized nitrogen can be taken up by the turfgrass.

White clover can be seeded into a lawn in late winter or early spring. Best results are obtained by disturbing or roughing the soil with a dethatcher or a rake prior to seeding. Only about 0.1 pound of seed per thousand square feet is needed. Although white clover will often outcompete crabgrass, other broadleaf weeds such as dandelion, plantain, and thistle can be very competitive. Unfortunately, herbicides used to kill these weeds will also kill the clover.

White clover in lawns does pose several drawbacks. For one, the leaf texture and color of white clover is visually quite different from that of turfgrass, an aesthetic effect that some homeowners dislike. It also produces nonuniform clumps of white flowers. Bees are attracted to the flowers, and active children will run the risk of more frequent bee stings than in a yard that is free of white clover. Also, the green stains from white clover do not wash out of clothing, as do the stains from grass.

Mowing

Choosing the right mowing height is important to a low-maintenance lawn. A mowing height somewhere in the range of two to three inches is commonly recommended for a typical Kentucky lawn. However, for a low-maintenance lawn, a mowing height of about three inches is preferable. High mowing heights result in a more competitive grass and more shading of the soil, which reduces weed competition.

Grass under a high mowing height will produce a deeper root system, making it more tolerant of stressful conditions, particularly drought. Kentucky bluegrass lawns under a high mowing height are significantly less susceptible to damage from a very destructive disease called summer patch.

Another benefit of high mowing height is that the lawn does not need to be mowed as often. Mowing more than one-third to one-half of the length of the leaf blade at any one cutting stresses the grass. Thus, a lawn mowed at two inches must be mowed when only one inch of new growth appears, whereas a lawn mowed at three inches can accumulate 1.5 inches of growth before mowing is needed again. Mowing less often yields benefits such as less use of fossil fuels, less air and noise pollution relating to mowing, and more time for other activities of personal interest.

There are certain drawbacks to a high mowing height. One is that the turfgrass will not be as dense and uniform as a closely mowed lawn, which is often considered more aesthetically pleasing. Another drawback is increased temporary cosmetic damage from brown patch in tall fescue. During an outbreak of brown patch, leaf damage from the disease is less severe in closely mowed tall fescue. Outweighing this, however, is the fact that closely mowed turf suffers more root rot and plant death from brown patch, which actually is a more destructive problem to the turf than is brown patch damage on the leaves.

Avoid mowing when the turf is under heat or drought stress. This can physically damage the turfgrass, thus causing browning and increased weed emergence.

Grass Clippings: To Remove or Not?

Homeowners often question the practice of leaving versus removing (bagging) grass clippings when mowing. Without question, leaving the clippings in place is generally preferable, both for the fertility of the lawn and the goal of low maintenance. Grass clippings contain the same nutrients that fertilizers do. Although the concentration of nutrients in clippings is less than in commercial fertilizers, grass clippings may contain as much as 3% nitrogen. Nutrients in the clippings are recycled to the live turf by natural decomposition.

Many published studies have shown that grass clippings *do not* contribute to thatch accumulations. Heavy thatch problems are usually related to one of two factors: excessive nitrogen applications and/or excessive pesticide applications that reduce earthworms and microbes, which contribute to natural organic decomposition of thatch. Also, thatch is more often a problem with species that produce lateral stems; i.e., stolons and rhizomes. Tall fescue is a bunch-type plant without lateral stems and so is not very prone to thatch problems. Kentucky bluegrass is a prolific producer of rhizomes and hence is much more prone to thatch problems, especially under heavy nitrogen fertility.

Many landfills have limits on—or they completely refuse to accept—grass clippings. So, from both environmental and agronomic perspectives, it is best to return clippings to the lawn. The only exception to this may be when mowing at proper frequencies cannot be accomplished and growth is excessive. In this situation, it may be best to bag clippings to avoid smothering the live grass below. Instead of sending the clippings to the landfill, use the clippings as a garden mulch, or add them to an active compost pile. However, if the lawn was recently treated with an herbicide targeting broadleaf weeds, the residue may pose a risk of injury to garden plants.

Irrigation

Irrigation is usually not needed in lawns maintained with a high mowing height and without nitrogen fertilizer applications during spring or summer. Turfgrasses under these conditions are generally well adapted to going dormant when dry conditions develop. If one chooses to avoid irrigation entirely, this conserves resources by reducing municipal water demand, as well as other maintenance inputs. There is a limit, however, to how much drought a lawn can take. Even dormant plants need some soil moisture, and during extended summer droughts, judicious irrigation can help the turf survive and avoid the need to renovate in the autumn.

A drawback to using little to no irrigation is that it sometimes can increase weed pressure. If the turf goes dormant during a temporary drought in early to mid-summer, warm-season weeds like crabgrass are quick to take advantage of the next significant rainfall that might occur, so a vigorous infestation of crabgrass can develop under some conditions. Since crabgrass is an annual plant, fertilizing the lawn after the crabgrass dies in the autumn can help the desirable species recover and fill in the infested areas.

If you choose to irrigate, avoid irrigating during the heat of the day, when much of the water will evaporate and not be used by the turf. When watering, wet the soil to a depth of three to four inches to promote deep rooting. Check the watering depth by pushing a metal rod or screwdriver into the soil. It will sink easily until it reaches dry soil.

Weed, Disease, and Pest Control

Weeds

The *best defense* against weeds is developing a healthy, dense turf. Because many lawn weeds like dandelion, plantains, and thistle have a rosette growth habit, they can easily be removed by hand tools. Viney weeds such as clover, ground ivy, and wild strawberries are almost impossible to control by hand-plucking. However, most of these weeds can be easily controlled by spot-spraying with ready-mix herbicides that are commonly available in garden centers. With the establishment of a dense turf and a high mowing height, crabgrass is seldom a problem. There are some amino acid (organic/soap) herbicides that can be purchased, but they are marginally effective and expensive, and they must be spot-sprayed onto the weeds.

If crabgrass does persist in a lawn, it is best controlled with a crabgrass pre-emergence herbicide applied prior to mid-April. These herbicides resist leaching and pose little risk of leaching into ground water. Corn gluten meal is being marketed as a completely natural organic crabgrass pre-emergence product. However, it is marginally effective in reducing crabgrass and, because it contains a very significant amount of organic nitrogen, it will cause a flush of grass growth. This increases the necessary mowing intensity, decreasing spring root growth of the turf, and it decreases summer heat and drought tolerance.

Diseases

Diseases pose a low risk to long-term turf health in low-maintenance lawns. Brown patch may occur frequently in tall fescue, but it seldom thins the lawn that is not fertilized with nitrogen in spring or summer. Dollar spot, leaf rusts, and certain other diseases can occur in low-maintenance lawns but seldom cause a reduction in stand. The management practices described in this publication help reduce the overall risk of serious disease problems.

Insects

The need for insect control can be reduced in the low-maintenance lawn by understanding the biology of the insects that are likely to attack the lawn. White grubs, the larval (immature) stage of masked chafers and Japanese beetles, are the only serious insect pests of Kentucky lawns. White grubs chew off the root system in late summer and early autumn. Heavily infested turf dies out in patches that can easily be lifted or rolled back, like a loose carpet. Tall fescue generally is less vulnerable to grub damage than is Kentucky bluegrass. Lawns managed at a relatively high cutting height also are less susceptible to visible damage. The adult females are attracted to moist turf for egg-laying, so not irrigating during their egg-laying period (June 15 to August 1) may discourage infestations. Should a lawn become infested, however, irrigating in late summer (August to early October) will help the grass to outgrow the loss of roots from grub feeding.

Homeowners not wanting to use chemical insecticides can try applying insect-parasitic nematodes, available from gardening catalogs. Look for the products containing the nematode *Heterorhabditis bacteriophora.* Other nematode species may not control white grubs. Apply the nematodes in August or early September when grubs are present, and irrigate thoroughly before and immediately after treatment. Milky spore powder, marketed for control of Japanese beetle grubs, has *not* been effective in trials at the University of Kentucky. Planting peonies in home landscapes may attract beneficial *Tiphia* wasps that parasitize Japanese beetle grubs. Japanese beetle traps, which tend to attract far more beetles than are captured, normally will not reduce grub populations in home lawns.

Halofenozide is a synthetic insecticide that mimics the action of the insect molting hormone, forcing grubs into an abnormal, lethal molt. Granular insecticides (e.g., MACH 2) containing the active ingredient halofenozide, available from garden centers, work well against white grubs in lawns. Products containing the active ingredient imidacloprid also are highly effective. Both halofenozide and imidacloprid are considered to pose relatively little hazard to humans or the environment. Both products work best if applied preventively (i.e., before grubs have hatched). The best treatment window is June 15 to July 15. Neither product is effective once the grubs are large and damage is apparent.

Moles

Moles are major problems in lawns with good soils and in lawns growing near farms and woods. They uproot turf and often make soil mounds. Pesticides are ineffective in controlling moles because their major food is earthworms. All pesticides that kill earthworms have been prohibited. Mole traps are still the best method of control. There are some castor-oil-based mole repellants that can be applied over the grass, and these may repel moles for a few weeks.

A Sample Lawn-Care Program

- Start with a tall fescue lawn, if seeding or re-seeding.
- Test the soil and determine fertility needs, and apply lime accordingly.
  - *If the soil test indicates only nitrogen is needed,* apply three to four pounds of ammonium nitrate or two to three pounds of urea per thousand square feet of lawn in October. This application can be repeated in December, although it is not necessary.
  - *If the soil test indicates that phosphorous and/or potassium are needed, along with nitrogen,* apply five to seven pounds of 19-19-19 fertilizer per thousand square feet in October. Ammonium nitrate or urea can be used for future applications, but retest the soil every two to four years to see if additional potassium or potash is needed.
- Mow the grass at a height of three inches, as needed, leaving clippings on the lawn. Refrain from mowing if the turf is under drought stress.
- If crabgrass has been a repeated problem in the lawn, apply a pre-emergence herbicide no later than mid-April. Spot-treat or hand-dig broadleaf weeds.
- Insect control should usually not be necessary in a low-maintenance tall-fescue lawn, nor should disease control products.
- During periods of drought, allow the turf to go dormant by withholding irrigation. Light irrigation (to keep turfgrass crowns from drying up) may be needed during a sustained drought.

Publications of Interest from the University of Kentucky

(available through county Extension offices or the UK Web site)

AGR-50 *Lawn Establishment in Kentucky*
(http://www.ca.uky.edu/agc/pubs/agr/agr50/AGR50.pdf)

AGR-51 *Improving Turf Through Renovation*
(http://www.ca.uky.edu/agc/pubs/agr/agr51/agr51.pdf)

AGR-52 *Selecting the Right Grass for Your Kentucky Lawn*
(http://www.ca.uky.edu/agc/pubs/agr/agr52/agr52.pdf)

AGR-53 *Lawn Fertilization in Kentucky*
(http://www.ca.uky.edu/agc/pubs/agr/agr53/agr53.pdf)

AGR-54 *Mowing, Dethatching, Coring, and Rolling Kentucky Lawns*
(http://www.ca.uky.edu/agc/pubs/agr/agr54/agr54.pdf)

ID-79 *Home Lawn Irrigation*
(http://www.ca.uky.edu/agc/pubs/id/id79/id79.htm)

ID-105 *Disease Management in the Home Lawn*
(http://www.ca.uky.edu/agc/pubs/id/id105/id105.htm)

ENT-10 *Controlling White Grubs*
(http://www.ca.uky.edu/agc/pubs/ent/ent10/ent10.pdf)

AGR-16 *Taking Soil Test Samples*
(http://www.ca.uky.edu/agc/pubs/agr/agr16/agr16.pdf)

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