



Nonchemical Alternatives for the Home Lawn

by David D. Minner, Beth Mankowski, Donald R. Lewis, and Mark Gleason

Homeowners can enjoy healthy, attractive lawns without the use of chemical pesticides. The following lawn care practices can help establish a healthy, dense lawn that is able to fend off most pest attacks.

Site and Grass Cultivar Selection

Assess the site conditions that could limit vigorous lawn growth, such as shade, soil drainage, soil compaction, and air circulation. Take steps necessary to correct the situation. For example, poorly drained soil and reduced air circulation encourage disease. Fill in low wet spots and prune shrubs and trees to increase sunlight and air circulation.

Select turfgrass cultivars recommended for Iowa. See extension

publication Pm-1578 *Selecting Turfgrass Species* for more information. Insect-, disease-, and drought-resistant cultivars also are available.

Soil Test

Lawns grown in fertile, well-drained soil are more resistant to pests. A soil test determines soil fertility levels and soil pH. Sample bags and sampling instructions are available from your local county extension office. Soil amendments, such as lime, should not be added unless your soil test recommends an application. Plant nutrient deficiencies, or excesses, and extremes in pH will weaken a lawn, making it susceptible to pest attack.

Organic Fertilizers

Fertilization should be done regularly but in moderation. Excessively fertilized turf may be susceptible to certain turfgrass diseases. Inadequate fertilization results in poor turfgrass growth, allowing weeds the opportunity to invade the area.

**Mow Tall!
Don't Bag It!**



IOWA STATE UNIVERSITY

University Extension

Ames, Iowa

Pm-1680_ September 1996



There are several organic fertilizers available for home lawns. Organic fertilizers derived from fish emulsion, seaweed, dried sewage sludge, corn by-products, and poultry and cow manure are excellent lawn nutrient sources. Organic fertilizers are unlikely to cause a flush of growth or burn leaf blades. They provide a slow release of nitrogen and build soil structure. Organic fertilizers especially are useful where lawns are grown on subsoils, with little or no topsoil. Apply at rates recommended on the label.

Organic fertilizers release nitrogen slowly through the decay process, so do not expect a rapid flush of green growth. Grass clippings are an excellent nitrogen source. The average lawn should be mowed at 2½ to 3 inches high, leaving 1 to 1½ inch-long grass clippings. At this length, the clippings easily filter into the plant canopy and out of sight. Never remove more than one-third of the grass blade at any one mowing. Leave clippings on the lawn as long as they are not clumping together. One season of grass clippings may contain as much as half of your lawn's nitrogen needs.

Decomposed poultry or cow manure can be topdressed in September at a rate of 100 pounds per 1,000 square feet. Another option is to use half this rate in early spring and the other half in the fall. Well-decomposed or composted manure is practically odor-free.

The addition of organic matter not only adds plant nutrients but also improves soil structure, aids water infiltration, and reduces water runoff.

Watering the Lawn

The homeowner can save time, money, and water by selecting drought-tolerant turf cultivars and using proper watering techniques. Improper watering is a major cause of lawn pest problems.

Newly seeded or sodded lawns need frequent, shallow irrigations. Established lawns require infrequent but deep watering to ensure a healthy stand. Water to a depth of 6 inches. Different soils have distinct infiltration rates. Test the water penetration depth by inserting a soil probe or screwdriver into the soil. Observe the depth water has penetrated. Continue to water until the water has traveled 6 inches into the soil.

Water the lawn only when water stress is evident. Thirsty lawns appear a bluish-gray color and visible footprints remain after someone walks across the lawn.

The best time to water is early morning when the humidity is high and evaporation rate is low. Irrigating during the day can result in a 25 percent water loss through evaporation. Grass remains wet for an extended period of time after midday and evening waterings, creating favorable conditions for disease.

Sprinklers are an effective method to irrigate. Be sure sprinkler heads are properly spaced, calibrated, and positioned to water the grass, not the driveway or sidewalks.

Another option is to not water. Cool-season grasses will go dormant and survive without water for several weeks. The lawn turns a straw color and stops growing. Growth and green-up will usually, but not always, resume once cooler and wetter weather return in the fall. Do not mow or fertilize dormant lawns. Fluctuations between dormant and active growth could weaken the lawn. The key to lawn survival during drought is tall mowing. If you do not plan to water after June then be sure to keep your minimum cutting height at 3 inches all year long.

Dormant lawns are more susceptible to weed invasions, especially by drought-tolerant weeds such as crabgrass and spurge. Watering to prevent dormancy is an effective way to control weeds.

Mowing

Proper mowing minimizes water uptake, may improve nutrient uptake, and reduces weed invasion. Never mow off more than one-third of the leaf blade at any one mowing. Lawns mowed too short have reduced root growth and heat and drought tolerance. Weeds also are more likely to invade closely cut lawns than lawns mowed high because the grass shades weed seeds that need light to germinate.

Keep mower blades sharp. Sharp blades help the mower operate efficiently thus saving gasoline. Dull blades shred leaf tissue and create wounds for possible disease entry.



Leave lawn clippings as long as they filter into the grass canopy and are not clumping together. Decomposing clippings provide nutrients, especially nitrogen, and reduce the need for fertilizer. Grass clippings do not add to thatch.

Thatch

Thatch is a layer of living and dead grass stems, leaves, and roots that accumulates between the soil and the grass. A thin layer of thatch is beneficial; however, excessive thatch, more than ½ inch thick, can weaken and even destroy a lawn.

Factors contributing to thatch include excessive nitrogen fertilization, excessive irrigation, and conditions unfavorable to microorganisms that decompose thatch (excessive pesticide use, poor aeration, and poor drainage).

Accumulated thatch harbors insects and disease, causes shallow rooting, and slows the movement of air, water, and nutrients into the soil. If the thatch is thick (½ inch or greater) dethatch with a power rake or a verticutter. This equipment is available at local rental stores. Store employees will demonstrate how to operate the machines.

Core aeration reduces thatch buildup and also improves water and fertilizer penetration. A core aerifier is available at local rental stores. Leave the soil cores on the lawn. Mowing and weathering crumble the cores and redistribute topsoil over the surface, as if topdressing.

Topdressing is the application of a ¼-inch layer of biologically active material, such as topsoil or weed-free manure every year or two. Topdressing improves thatch decomposition by encouraging thatch decay.

Routine core aeration and topdressing are good cultural practices to minimize thatch buildup. Lawns with excessive thatch buildup (¾ inch or more) should be severely power raked in early fall so they have time to recover before winter.

Pest Management

Healthy turf can effectively compete with weeds and fend off insect and disease attacks. Learn to watch your lawn for signs of pests and pest damage. Be willing to accept some damage.

Weeds

The best control for lawn weeds is proper cultural management. Proper fertilization, mowing, watering, thatch removal, and soil aeration are all cultural practices that can reduce weed problems. Strong, dense lawns prevent weed infestation.

If 50 percent or more of your lawn already contains broadleaf weeds, consider a one-time herbicide application to help the lawn compete. Once the lawn is successfully competing with broadleaf weeds, it may not need another broadleaf herbicide application for several years.

For annual grassy weeds, such as crabgrass, consider a natural herbicide. A new product “A-maizing Lawn” is a preemergence weed killer, derived from corn by-products. It also is an organic fertilizer. A-maizing Lawn must be applied in early spring before weed seed germinates. It does not control established weeds. If seeding a new lawn, do not apply A-maizing Lawn until grass seeds have germinated and root length is greater than 2 inches. Be patient with natural “weed and feed” products because they especially are effective after 2 or 3 years of repeated application.

Small amounts of weeds can be physically removed by pulling or digging. Be sure to remove the entire root system of perennial weeds. Overseed bare areas with grass seed.

Disease

The best lawn disease control is prevention. Select disease-resistant turf varieties adapted to your area. A blend of different varieties or a mixture of different species will aid disease control. Be certain your lawn has adequate drainage and is free of low spots where water collects.

Improper watering is a major cause of lawn disease problems. Frequent shallow waterings encourage shallow rootings and produce weak turf.



Pruning dense landscape plantings will increase light penetration and air circulation, promoting healthy grass growth and reducing disease risks.

Inspect your lawn regularly for signs of disease (Table 1). Contact your local extension office about sending disease samples to Iowa State University's Plant Disease Clinic for an accurate identification.

Lawn areas that die from summer diseases can be reestablished by fall renovation and reseeding with improved disease-resistant grasses.

Insects

Cultural management practices improve the lawn's ability to withstand insect attacks and its recuperative ability. The best defense is prevention—keep the lawn healthy. Select grass varieties that are adapted to your area. Several grass cultivars, especially those with beneficial endophytes, are resistant to certain turf insect pests (Table 2).

Encourage beneficial insects and predators, such as lady beetles, lacewings, parasitic wasps, birds, and toads to your backyard to implement natural pest control. A diverse landscape planting of flowering borders, shrubs, and perennials will provide food sources and shelter for natural enemies. Avoid overuse of insecticides, which reduces natural control populations.

Few of the vast numbers of insects are turf pests (Table 2). It is important to understand the insect pest and its life cycle. Your local county extension office can help identify insects and provide information about their life cycles that is crucial to their management in the lawn.

Learn to monitor the lawn to confirm the presence or absence of insect pests as well as beneficial insect predators and to determine the need for control. Regular monitoring detects problems before severe control measures are needed.

Table 1. Guide to Iowa lawn diseases

Disease	Time to Scout	Damage Symptoms	Management Factors
Dollar Spot	May-September	Individual leaf lesion—bleached tan center with dark brown border across entire leaf width. Constricted lesion may have hourglass shape.	Mostly on Kentucky bluegrass that is overwatered and under fertilized. Avoid frequent watering and leaf wetness. Maintain adequate nitrogen to prevent thin turf and slow growth.
Summer Patch	May-June	Early summer—wilted circular patches 6 inches in diameter appear sunken and purple.	Mostly in Kentucky bluegrass that is over fertilized, cut close, and allowed to go dormant.
	July-September	Frog eye patch appears—small green tuft of grass encircled by dead tan grass.	
Brown Patch	July-August	Patches 6 inches to 3 feet across suddenly appear, as if formed overnight. Purple margin around patch appears in early morning. Look for symptoms when heat and humidity require summer air conditioning. Found mostly in full sun areas with poor air circulation.	Mostly in tall fescue and perennial ryegrass, sometimes in Kentucky bluegrass. Develops because of high heat and humidity and poor air circulation. Excessive nitrogen and summer application of nitrogen enhance disease. Avoid frequent irrigation.



Watch for early signs of insect damage symptoms (Table 2). There are several methods to monitor insect pests in the lawn. Carefully search individual living grass blades on the perimeter of damaged areas for greenbugs.

To survey for white grubs, cut square-foot sections of the sod in several locations in the yard during August through September. Peel back the turf and search for small, C-shaped white grubs. Tamp sod back in place and water well to reestablish. An average of five or more grubs per square foot is necessary to cause damage. In many years, especially those with adequate rainfall, large populations may be present without visible side effects.

Sod webworms can be detected by applying ¼ cup of detergent to 2 gallons of water over 1 square yard of turf. Larvae, if present, should appear within a few minutes.

If the lawn is damaged but no insect pests are observed, consider other causes such as heat, drought, thatch, or disease.

A brief summary of seasonal cultural tips is outlined in Table 3. Obtain further information on lawn care from your local county extension office.

Table 2. Guide to lawn insect pests

Pest	Time to Scout for Pests/Damage	Damage Symptoms	Control Options
Annual White Grub	August-October	Irregular patches of dead or dying turf. Damaged turf feels spongy underfoot and can be pulled back like a carpet. Skunks, raccoons, moles, and birds feed on grubs, causing additional damage.	Follow proper watering practices. Parasitic wasps (<i>Tiphia</i> spp.) and scoliids attack white grubs.
Bluegrass Billbug	July (damage) March, August (adult activity)	Patches of dying or dead turf. Damaged turf is solid underfoot. When pulled back, the grass breaks off easily at the crown.	Select resistant turf cultivars, such as perennial ryegrass, fine fescues, and tall fescues, with endophytes. Use proper water and fertilizer management.
Greenbug	Mid to late summer	Irregular brown patches surrounded by yellow- to orange-colored turf in shady areas. Search grass blades on the perimeter for damage by greenbugs.	Beneficial insects, such as lady beetles, lacewings, and parasitic wasps attack greenbugs. Plant resistant turfgrass such as perennial ryegrass.
Sod Webworm	June-August	Ragged patches of turf clipped off at ground level. Green, sawdust-like pellets of excrement may be found.	Follow proper fertilizer, water, and mowing practices. Birds, as well as ground and rove beetles and predatory wasps, feed on sod webworms. Plant resistant turfgrass varieties such as perennial ryegrass.



Table 3. Seasonal lawn care tips

Spring	Summer	Fall	Winter
<ul style="list-style-type: none">• Overseed thin and bare lawn areas• Lightly fertilize, if needed• Apply natural weed and feed crabgrass control• Mow at 2-3" high• Do not bag clippings• Core aerate, as needed	<ul style="list-style-type: none">• Raise mowing height to 3-4" high• Do not bag clippings• Keep lawn actively growing to compete with summer weeds• Adjust sprinklers; avoid watering paved areas• Water to a 6" depth only when needed• If dormant, mow lawns at 3" all year long	<ul style="list-style-type: none">• Take soil samples• Calibrate spreader• Fertilize according to test results• Keep fertilizer off paved areas• Renovate weedy lawns• Best time to seed or overseed• Dethatch by power raking or verticutting• Core aerate, as needed	<ul style="list-style-type: none">• Use sand instead of deicing salts• Prune trees and shrubs to increase light penetration and air circulation

File: Horticulture and Landscape Architecture 3

This project has been funded by the Iowa Department of Agriculture and Land Stewardship through a grant from the U.S. Environmental Protection Agency.

Prepared by David D. Minner, extension turfgrass specialist, Department of Horticulture; Beth Mankowski, educational materials development specialist and Donald R. Lewis, extension urban entomologist, Department of Entomology; and Mark Gleason, extension plant pathologist, Department of Plant Pathology.

And justice for all

The Iowa Cooperative Extension Service's programs and policies are consistent with pertinent federal and state laws and regulations on nondiscrimination. Many materials can be made available in alternative formats for ADA clients.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Stanley R. Johnson, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.