Quality Lawns with Minimal Chemical Use

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There are a number of ways to reduce chemical use on lawns, with sound lawn care practices as the foundation. Oftentimes heavy use or misuse of chemicals is the result of poor underlying conditions for healthy grass growth, thus the weed, disease, or other problem persists. Focus of this session includes grass selection, soils, basic culture, and some specific pest management alternatives and methods.

Grass Selection Factors

There are a number of factors that influence the decision of the proper grass to use on a particular site. Grass characteristics that match site factors will lead to a healthier, well-adapted lawn that will keep problems and the need to apply chemicals to manage them to a minimum. Disease resistance is always a key feature of grasses, as it offers a genetic ability of the grass plant to resist infection of various pathogens. Most improved grass cultivars available today offer some level of disease resistance.

Endophytes are fungi which exist inside grass plants and either repel or kill foliar feeding insects such as chinch bug and sod webworm, thus providing insect resistance in grasses. This is often misrepresented, however, when promoting “insect resistant” grasses. Keep in mind the primary lawn insect problem in Illinois are white grubs feeding on roots, which do not contain significant levels of endophytes; thus we do not have grub-resistant grasses. Endophyte levels vary considerably in various species of grasses, with fescues and perennial ryegrass typically having the highest levels.

When choosing grasses for a newly established lawn or renovating an existing stand of turf; take the time to find quality grasses. Blends, which are combinations of cultivars of a particular grass, should always be used and include named cultivars. Products with named cultivars will be more expensive, but this is money well-spent in producing a quality, problem-free turf of diverse genetic make-up.

Soil Management

Healthy soil is a key ingredient in having problem-free healthy lawns. Soil issues are a major underlying cause of turf problems, including weeds and diseases. Compacted soils will drain poorly, contain little air for roots, and will severely retard root growth. Compacted soils also help in the development of thatch. Soil factors are often the cause of thatch, which is normally broken down by soil fungi and bacteria. Any condition that reduces these organisms will in turn slow thatch breakdown. In addition to compaction, another common soil problem is heavy clay soils, often alkaline (having high pH). A common problem scenario is placing sod over soils high in clay, and then compounding the problem with lots of nitrogen fertilizer and frequent watering.
Soil compaction can be reduced by core aeration. Coring machines that actually remove small soil cores and bring them to the surface are the most effective. Aerify in spring or fall, making sure adequate moisture exists in the soil. Make two trips over the turf, the second perpendicular to the first. An average of 15 to 20 aeration holes per square foot is suggested. This procedure will improve turf root growth and control thatch, in addition to solving the compaction problem. Core aerification can also be followed by topdressing; simply adding a thin layer (1/8 to 1/4 inch) of compatible soil over the thatch, which adds microorganisms to help in breakdown.

**Basic Cultural Practices**

**Mowing**

For most lawns in northern Illinois a mowing height between 2 to 3 inches is suggested; with the upper range best for summer. Lawns mowed at higher heights tend to have deeper roots, less weed problems, and look much better. Mowing too close invites problems such as weed invasions. Simply raising the mowing height can have a major impact on the quality of many home lawns. A mowing height of 2 inches would be fine when grasses are rapidly growing, but the height should be raised as growth slows, stress increases, and when the lawn is in the shade.

Base mowing frequency on the rate your lawn is growing. Do not to remove more than one-third of the grass leaf in any one cutting. Mowing on a regular basis as the lawn needs it is essential. Don't mow when the grass is wet.

As long as the lawn is mowed on a regular basis and the clippings readily filter back down into the lawn, clippings do not need to be collected. Returned in this manner, clippings readily decompose (contain 75 - 80 percent water) and do not cause thatch (thatch is typically a soil issue as already discussed). Clippings recycle nutrients, in particular nitrogen, so less fertilizer is needed.

**Fertilizer Use**

Fertilizing influences grass color, ability to recover from stress, and helps prevent weed invasions and disease. There are important factors to consider when fertilizing lawns, including choosing the proper fertilizer, how much fertilizer to apply, and when to apply fertilizer.

Nitrogen is the nutrient required most, although too much nitrogen can cause excessive top growth, leading to assorted problems. In most cases, a rate of 1 pound of nitrogen per 1,000 square feet is suggested for each fertilizer application to the lawn. If high percentage nitrogen fertilizers are used, then less actual fertilizer product is needed to supply that one pound compared to fertilizers with low percent nitrogen.

Another important factor in choosing nitrogen fertilizers is what kind of nitrogen is actually in the product. Nitrogen fertilizer may consist of fast-release or controlled-
release nitrogen. Fast-release sources include urea, ammonium nitrate, and ammonium sulfate. Controlled-release sources include ureaform, sulfur-coated urea, polymer coated urea, and IBDU, among others. Water insoluble nitrogen is slow-release. Most organic fertilizers are controlled-release, including activated sewage sludge and compost based products. Fertilizers containing controlled-release nitrogen sources are suggested for most applications. Check the guaranteed analysis information on the fertilizer label for what forms of nitrogen are in the product.

Regardless of the kind of nitrogen, the fertilizer must convert to the nitrate form for grasses to use it. How this occurs with various nitrogen fertilizers will vary, so it is important to understand how a particular fertilizer reacts in the soil. Bacteria play a key role, and most bacteria do best with a good combination of soil oxygen and water, thus fertilizers perform best on healthy soils.

In addition to the type of fertilizer, total application rate and timing are important. About 3 pounds of nitrogen per 1,000 square feet per growing season is suggested for most full-sun lawns (Kentucky bluegrass; Kentucky bluegrass mixed with perennial ryegrass and/or fine fescue) in northern Illinois (suggested range is 2 to 4 lbs./1,000 sq.ft. per season); about half as much suggested for shade lawns. Split into 2 or 3 applications, with each application of nitrogen being about 1 pound per 1,000 sq. ft.

After calculating how much to apply, when to apply is the final important decision. Early fall (September 1-15) is a key time for fertilizing lawns in northern Illinois, regardless of what type of maintenance program the lawn falls under. Research has also shown benefits of late fall fertilizer applications after grass growth has about stopped but the lawn is not yet dormant (roots are still active). Spring applications are suggested for early May. In most cases, avoid the hot weather months.

Use controlled-release nitrogen fertilizers in May and September and a fast-release source in late fall. Consider Mother’s Day, Labor Day, and Halloween as reminders of favorable times to fertilize lawns.

Alternative Pest Management Methods & Products

The best defense against weeds is to manage a thick stand of turf to resist weed invasion. Many weeds have specific conditions that give them the upper hand on the lawn grasses. For example, neglected lawns of low fertility are often invaded by white clover. Lawns mowed too short are prime for crabgrass invasions, especially in full sun with frequent watering. Correcting the underlying cause through cultural practices is the ideal way to manage weeds. Short-term control may require herbicide application, but modifying the site is the long-term solution to weed problems.

One popular alternative weed control product is corn gluten, developed at Iowa State. This product has a variety of trade names and has both preemergence herbicide activity and also contains slow release nitrogen. Use over several consecutive seasons is suggested with weed control improving over time with continued use. The nitrogen is also most likely a factor in improving lawn quality, thus reducing weed invasions.
White grubs get the most attention of turf insects in Illinois, and a number of products are available for control. Both the annual white grub (masked chafer beetle) and Japanese beetle lay eggs in the soil in mid-summer, primarily on well-watered lawns in full sun. Not watering lawns is one way to discourage beetles from laying eggs that hatch into grubs. Damage from annual white grubs typically starts in mid-August and may continue until early October. Typically a population of about 8 to 12 grubs per square foot causes lawn damage that requires control; whereas lower populations may not damage the grass, they may attract skunks and raccoons.

Among the insecticides available for homeowners include trichlorfon, halofenozide, and imidacloprid. Trichlorfon is fast acting conventional synthetic insecticide but is short lived in the soil. Halofenozide is suggested to be applied before grub damage appears and is a growth regulator insecticide. An example of a way to use this product would be to apply in July to irrigated lawns that are surrounded by dry lawns, especially when adult beetle flight is high in areas with a history of grub damage. Heterorhabditis bacteriophora nematode is an alternative product for white grub control that is available as an organic control for white grubs.

For all products, read and follow all label directions, then apply to damaged areas. Water the insecticide into the soil immediately. If treating a large area, stop after a portion has been treated and water the material in, then complete the rest of the lawn area needing treatment. Only treat in and around affected areas; grubs may only be in a small part of the lawn.

Sound disease management programs address the causes of the disease outbreak. Understanding the scenarios that favor various diseases is the key to solving these turf problems. Common type grasses without disease resistance, poor soil conditions, thatch, over or under fertilizing, and poor irrigation practices are some of the more common factors often leading to disease outbreaks in turf. Weather conditions also play a prominent role.

Information on a number of alternative products or methods for can be found in print and online. Always consider the source and if the product is labeled for use on turf, regardless of how safe it may be said to be. Stick to research based methods of lawn management. Do additional research on methods and materials to see if any important details have been overlooked in a particular article or advertisement.

More details on many home lawn care topics can be found in the Lawn Talk fact sheets I originally developed back in the late 1990s (which have recently been updated) in the Hort Corner of the University of Illinois Extension web page; found at http://urbanext.illinois.edu/hort.

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