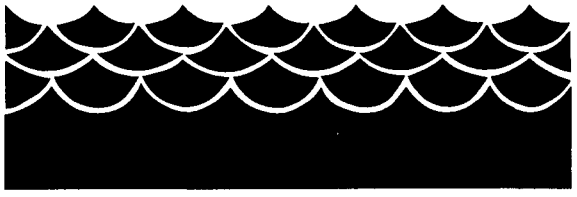
TURFGRASS MANAGEMENT
FOR PROTECTING SURFACE WATER QUALITY



Lawn Care Practices to Reduce the Need for Fertilizers and Pesticides

Providing an ideal environment for growth and function of grass plants should be a first step in any lawn care program. A healthy, vigorous lawn is the best defense against attack or invasion of various pests. A healthy lawn is better able to recuperate readily from modest insect or disease attacks without the use of pesticides.

Creating a healthy lawn environment is like any other type of gardening. The same kinds of good gardening practices used in vegetable and flower gardens are just as appropriate for growing grass plants. The means to achieve those conditions are somewhat different for lawns than for gardens, but are just as important for healthy grass plants as for healthy tomatoes.

Following are some important lawn care practices to be considered before reaching for additional fertilizers and pesticides. Limiting unnecessary fertilizers and pesticides can reduce, or possibly eliminate, potential water contamination problems from a turf site.

Improving the soil

Before seeding a lawn, consider adding some organic matter such as peat moss or compost to either a sandy soil or a heavier clay soil. (Add 5 - 20 percent organic matter; for example, 1 inch of organic matter to 5 inches of soil equals 20 percent by volume.) This helps improve water and nutrient retention in a sandy soil and improve the drainage and aeration characteristics of a heavier clay soil. Smaller quantities should be used on heavier clay soils. Larger quantities can be used on lighter sandy soils. Thoroughly mixing the organic matter into the soil improves and enlarges the root zone area for the grass plants. An extensive root system occupying larger soil volumes makes the grass more capable of withstanding adverse environmental conditions and plant stresses.

It is often tempting to add sand to heavier clay soils hoping to improve their drainage and aeration characteristics. Adding only small amounts of sand, such as an inch or two, usually only makes the condition worse. To effectively use sand to modify a heavy clay soil, sand must be added in quantities of 80 to 90 percent by soil volume. That is, about 8 to 9 inches of sand for every inch of clay soil. At these high rates, sand particles begin contacting each other, thereby opening up larger soil pore spaces. In most situations, adding that amount of sand is not practical. The addition of organic matter is a better alternative.

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Alleviating soil compaction on existing sites helps improve the turfgrass root zone. Core cultivators that remove small plugs of soil from the ground and deposits them on the lawn are available from many local rental agencies. Several passes in different directions across the lawn not only put holes into the ground, but begins the process of root zone improvement. The small soil cores can be left on the surface to decompose naturally over the course of a few weeks. Severely compacted soils may need two to three treatments per year for the first two to three years. Also, the degree of play and traffic that a lawn area receives determines future frequency of core cultivation. Cultivation helps improve the water infiltration characteristics of soil, thereby reducing runoff from compacted sites.

Watering

Proper turf watering practices can play a major role in the grass plants ability to tolerate and resist stresses and pest problems. While approximately 1 to 1 1/2 inches per week of water (including rainfall) are considered necessary during the growing season to keep the lawns green, the amount applied at any one time depends on the soil type.

Sandy soils

Sandy soils do not hold water well. Consequently any extra water applied over and above the needs of the grass and moisture holding capacity of the soil simply moves down beyond the root zone. This represents poor use of water that may also carry plant nutrients, in particular, nitrate-nitrogen. Once nitrate has moved beyond the root zone where plants can extract and use it, the potential for water contamination increases. Applying 1/2 inch of water two or three times per week may be better suited to sandy soils.

Clay/clay loam soils

Clay and clay loam soils usually have much slower infiltration rates. They hold water much better than sandy soils and at times may be too wet for good grass growth to occur. Thus, larger amounts of water can be added per application providing that the moisture is not applied with such intensity that much of it runs off before entering the soil. It is important to match the infiltration rate of the soil to the delivery rate of the sprinkler. With these soils, one 1-inch or two 1/2-inch applications of water per week is usually sufficient.

Overwatering

Overwatering can cause a number of problems for the grass plant. Soils that are too wet, particularly in spring and fall, can predispose the plant to some fungal disease problems, especially those associated with the root system. Keeping a film of moisture on the grass blade for long periods of time encourages the development of some fungal diseases. Hence, watering early in the day is generally a better practice than watering too late into the evening.

Summer watering practices

Before cool-season turfs go into a state of summer dormancy, they should be properly conditioned to better withstand the dry and often hot conditions. As the summer stress period approaches, gradually stop watering the lawn. This helps the turfgrass plant adjust to drier conditions and increases survival. Watering heavily and then abruptly stopping the application of water makes the grass much less able to endure extended warm dry periods. Even with properly conditioned turf, applying about 1/4- to 1/2-inch of water every two to three weeks on a heavier soil keeps the grass plant crowns from dehydrating beyond a point of no recovery. Shorter intervals may be

needed on sandy soils or during prolonged periods of high temperatures to achieve the same results. Once cooler temperatures and natural rainfall returns in late summer or early fall, resume regular irrigation practices if needed.

Irrigation schedules should be managed to replenish the water lost to evaporation and used by the plant. This generally provides a healthier turf and minimizes the potential problems associated with leaching and runoff concerns.

Mowing

Regular mowing with a sharp mower blade and at the proper mower height keeps the grass growing vigorously so it covers the soil surface. Continually scalping the turf seriously weakens the grass plants thereby opening the door for pests and weed invasion. For most lawn areas, mowing at a height of 2 to 3 inches provides a good quality turf for most purposes. This slightly higher height screens out light to the soil surface giving some weed control benefit. It prevents the establishment of those weed seeds such as crabgrass that need light to germinate. Also, a slightly higher cutting height encourages a slightly deeper root system, allowing roots to gather moisture and nutrients from a larger soil volume. This gives the grass plants a greater degree of stress tolerance. Where grass has become very long, it is better to lower the cutting height gradually rather than cutting back all at one time. This avoids any unnecessary stress on the turfgrass plants.

Return grass clippings to lawn areas whenever possible. They do not contribute significantly to thatch build-up. Grass clippings are a valuable organic source of nutrients, especially nitrogen (N). As they decompose, these nutrients become available for use by the grass plant. In fact, yearly nitrogen applications may be reduced by one-third to one-half where grass clippings are returned to the turf area. Mulching mowers and mulching attachments for existing mowers can reduce the clipping size, increasing the rate at which grass clippings decompose. However, mowing on a regular basis with a sharp mower blade usually produces clippings that decompose fairly quickly without further size reduction.

Recommended mowing heights for upper Midwest lawns are listed below. Grass clippings can be left on the lawn when mowed regularly at these heights. Increasing the mowing height by 1/2 inch during the summer can improve the lawn's ability to tolerate stress.

Mowing heights

Kentucky bluegrass:	
Common or public varieties (e.g. South Dakota Common, Park, S-21, Argyle, Kenblue)	2 - 3"
Improved varieties (included in most sod blends; most varieties not mentioned above)	1 1/2 - 2 1/2"
Fine fescue grasses	1 1/2 - 3"
Perennial ryegrass	1 1/2 - 2 1/2"
Bluegrass/fine fescue mix	1 1/2 - 2 1/2"
Bluegrass/perennial ryegrass mix	1 1/2 - 2 1/2"

Thatch management
Thatch, a tightly intertwined layer of dead and living grass stems and roots, develops between the soil surface and the area of green vegetation. This layer develops when dead organic matter accumulates faster than it decomposes.

While some thatch (less than 1/2 inch) gives resiliency to turf and is considered beneficial, excessive amounts can cause problems. Thatch harbors several turf insect pests and provides a home for a number of turf diseases as well. Vigorous grass varieties, acidic conditions especially within the thatch layer itself, low soil oxygen levels, excessively high plant nitrogen nutritional levels, and infrequent and very high mowing heights contribute to thatch accumulation. This can be managed with vertical mowing, core aerification, and fertilizer. These techniques keep pest problems to a minimum, reducing the need for any pesticides. Also, healthier grass plants can better use any fertilizer nutrients that are applied. And organic materials, such as grass clippings, decompose faster, releasing those nutrients for future grass plant use.

Even when proper cultural practices are used, there are times when some pest control or fertilizer supplements are necessary. For example, even though all the clippings are being returned to the lawn area, they may not be providing enough nitrogen for the turfgrass quality and density required. Denser turfs provide better protection against runoff and leaching problems. An additional amount of fertilizer may be needed to improve the overall turf density of an area.

Insects may reach serious damage levels in the best of lawns. Applying a proper control, chemical or biological, may be a better choice than risking the loss of large turf areas. Turf loss to insects can result in a multitude of other problems such as weed invasion or serious runoff problems.

Lawns that have been poorly maintained for years may require both herbicides to eliminate weeds and fertilizers to speed recovery before appropriate cultural practices can be resumed.

For additional information regarding the responsible use of lawn fertilizers and pesticides to protect surface water quality, see the following publications, available at county extension offices.

Turfgrass Management Practices for Protecting Surface Water Quality, AG-BU-5726-E
Using Lawn Fertilizers and Pesticides Responsibly, AG-FO-5889-B
Responsible Use of Lawn Care Pesticides, AG-FO-5891-B
Phosphorus Management Practices for Lawns, AG-FO-5892-B
Nitrogen Fertilizer Use for Lawns, AG-FO-5893-B.

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