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Managing Lawns to Protect Water Quality

Watering, Fertilizing, and Applying Pesticides

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Maintaining a quality lawn requires that you use intensive lawn care practices like watering, fertilizing, and/or applying pesticides. A number of best management practices (BMPs) provide safe-guards for preventing the contamination of surface water and groundwater supplies with lawn fertilizer and/or pesticides.

Lawn Watering Management

How and when you water your lawn affects its ability to resist the invasion of weeds, insects, and diseases as well as the effects of drought, wind, and excessive heat. While the water requirements of a lawn vary with changing weather conditions and lawn maintenance level, the frequency and rate of watering depend on soil type and slope of the lawn.

Best Management Practice **To water your lawn properly, replenish just the soil moisture used by the grass plus that lost directly to evaporation.**

This management practice will provide a healthy lawn and minimize water supply pollution from surface runoff or leaching. Application of the required amount of water also minimizes any effects of poor quality water [i.e. water with a high sodium or salt content).

Water requirements

High-maintenance lawns can require up to two inches of water per week during peak use period. Each time you water your lawn, you need to replace the lost soil moisture. The idea is to keep the top six inches of soil moist. Soaking, to a depth of four to six inches per watering, encourages the grass to develop deeper roots. It also allows for an adequate drying period between watering to assure proper aeration of the roots.

Watering too frequently makes grass susceptible to stresses from pathogens and other pests; it also fosters the development of shallow root systems and the buildup of thatch. Wet soil makes grass susceptible to fungal diseases of the roots, while continual moisture on the leaves increases their chances for developing fungal diseases. Generally, watering early in the day is a better practice than watering in late evening.

Excessive watering also increases the potential for water supply contamination from runoff or the leaching of plant nutrients and/or pesticides.

Too little water, indicated by wilted grass, makes a lawn vulnerable to weeds and undesirable grasses. Drought conditions also can stunt grass plants and make them vulnerable to disease. Lack of moisture during the fall interferes until the grass plant's ability to store enough food to survive the winter.

For best water management, you need to know the operational characteristics of your watering equipment. Calibrate lawn sprinkling equipment to determine its application rate. For automated watering systems activated by time clocks, rainfall must be accounted for or the automation tends to cause over watering.

Sandy soils

Sandy and sandy loam soils have low water-holding ability. Water applied to a lawn in an amount greater than the water-holding capacity of the soil in the root zone, moves below the root zone carrying with it dissolved plant nutrients and pesticides. This downward percolation of excess water greatly increases the potential for groundwater contamination from dissolved plant nutrients and pesticides.

Best Management Practice **If your lawn is on a sandy soil, reduce the quantity of water applied per watering, and water more often.**

Be sure you still supply the amount of water required for a given period. For example, to supply one inch per week, you could water your lawn twice a week, one-half inch each time.

Clayey soils

These soils have high, water-holding abilities, but their water

infiltration rates are low. The water up-take rate ranges from approximately 0.05 to 0.30 inches per hour. The low infiltration rate increases the chances of surface runoff before a required quantity of water can enter the soil profile. This increases the potential for surface water pollution from nutrient- and/or pesticide–contaminated runoff.

Best Management Practice

To soak a lawn on a clayey soil, especially a sloping lawn, apply the require amount of water using short watering cycles; allow enough time between cycles for the water to soak in.

OR

Water slowly so the require amount of water soaks into the soil before runoff can occur.

Lawn Fertilizing Management

A primary consideration in lawn maintenance is to match site conditions with a fertilization program that will produce the desired quality of lawn. Proper fertilization management requires that fertilizer applications be based on accurate, soil fertility tests. Soil sampling techniques for lawns are explained in the lawn and garden soil sampling information sheet available through county Extension offices.

Nitrogen (N) The nitrogen needs of a lawn depend on the type of grass and the quality of lawn you desire. A high-maintenance, cool-season grass lawn usually is a seeding mixture of the more vigorous varieties of Kentucky bluegrass that require more fertilizer and water. A low-maintenance, cool-season grass lawn usually is a mixture of the more common varieties of Kentucky bluegrass and other of grass varieties that grow less vigorously but do well with reduced water and fertilizer.

Nitrogen fertilizer recommendations from a soil test can range from two to four pounds of actual nitrogen per 1000 square feet of lawn per year for a high-maintenance, cool season grass lawn. Limit the application of nitrogen fertilizer to not more than one pound of actual nitrogen per 1000 square feet of lawn per application.

Best Management Practice

For general lawn care, make available for plant use the nitrogen contained in the grass clippings

Allowing the clippings to decompose on the lawn will give it one pound of available nitrogen per 1000 square feet of lawn per year. Timely mowings that produce grass clippings not more than one-half inch in length until further decomposition. Do not remove more than a third of the total plant height with any mowing.

Best Management Practice

To supply the required nitrogen for a high-maintenance, cool season grass lawn on a clayey soil, make two or three applications of fertilizer during the year.

This reduces the potential for nitrate-contaminated, surface runoff to pollute either surface water or groundwater supplies.

Nitrogen fertilizers are categorized as quick-release or slow-release sources of nitrogen. Quick-release sources of Nitrogen are water soluble and release nitrogen for plant use as soon as they are dissolved by soil moisture, rain, or irrigation water. Slow-release sources of nitrogen depend on soil microbial and/or chemical action for the release of nitrogen that is usable as a plant nutrient.

If you're making three applications of nitrogen annually, apply a third of the recommended nitrogen in a slow-release form by May 1. Apply the second one-third by Aug. 1, but use a half-and-half mixture of slow-release and quick-release fertilizer. Apply the remaining third of the recommended nitrogen in a quick-release form by Sept. 15.

If you're making two applications of nitrogen per year, make one by May 1, and the other by September 15. Use a slow-release fertilizer for the spring application and a half and-half mixture of slow-release and quick-release fertilizer for the fall application.

Best Management Practice

For a high-maintenance, cool-season grass lawn growing in a porous, sandy soil: apply a slow-release form of nitrogen fertilizer.

OR

Apply smaller amount of quick-release nitrogen fertilizer, but fertilize more frequently.

This BMP will reduce the potential for nitrates to be carried into a groundwater supply by excess irrigation water or rainfall.

Giving a lawn a one-half-inch watering immediately after applying a quick-release form of Nitrogen fertilizer helps move the nutrient into the soil where the grass can use it quickly. This also reduces the volatilization loss of nitrogen from urea fertilizer.

Minimum-maintenance lawns of cool-season grasses, using no watering, require from one to two pounds of actual nitrogen per 1000 square feet of lawn per year. Make single or split fertilizer applications using a slow-release form of Nitrogen.

Phosphorus (P)

Phosphorous is an essential nutrient for grass, but it generally is required in significantly smaller quantities than nitrogen. Quite often, lawns do not need supplemental phosphorous. Once in the soil, phosphorous quickly becomes bonded to a soil particle; this greatly reduces the potential for groundwater pollution from leaching. However, the potential for surface water pollution by phosphorous is higher because sources of phosphorus such as grass clippings, other organic matter, and soil particles can be carried into surface water supplies.

Phosphorous often is the least plentiful nutrient in surface water supplies. Consequently, when even small amounts of phosphorous enter a surface water supply, the undesirable growth of aquatic plants (algae bloom) can be accelerated.

Best Management Practice **The application of phosphorous fertilizer on a lawn or garden located near a shoreline should always be based on a current soil test.**

Monitor the application closely to prevent phosphorous from entering the surface water supply. Do not spread phosphorus fertilizer on a driveway, sidewalk, patio, or other hard surfaced area from where it could wash into a surface water supply.

Potassium(K)
South Dakota soils are considered to have high levels of available potassium with the exception of the extreme eastern counties and some sandy-soil areas. Potassium requirements of a lawn could range from nothing to four and one-half pounds of K2O per 1000 square feet of lawn per year. Base your lawn applications of potassium on current soil test information.

Applying Fertilizers
There are two types of spreaders for applying granular fertilizer: a drop-type spreader which has a more precise application pattern and a rotary-type spreader which broadcasts.

Best Management Practice **Set the spreader for one-half the recommended rate. When spreading, overlap the previous pass by one-half the swath or make the required two passes over the lawn at right angles to one another.**

This gives a more uniform application of fertilizer and reduces the chances of streaks appearing in a lawn.

Best Management Practice **Use a drop-type spreader on small areas to eliminate over fertilization and on the borders of lawns to assure that fertilizer is not spread on adjoining hard surfaces or surface waters.**

Fill or empty a granular fertilizer spreader on a clean, dry, hard surface.

This makes it easier to clean up spilled fertilizer. NEVER wash spilled fertilizer onto a street or road or into a sewer or ditch where it can be carried to a surface water supply.

Best Management Practice **Fill or empty a liquid fertilizer applicator on a grassy area other than the lawn, or on a hard-surfaced area, to prevent spilled fertilizer from being carried to a surface water supply by runoff.**
To prepare fertilizer spreaders for storage, rinse them on a grassy area to prevent the contaminated rinse water from polluting surface water supplies.

If a liquid spreader is filled, or any spreader is rinsed, on a hard surface, any spilled fertilizer or rinsate must be contained and disposed of on a grassy area. Do not exceed the recommended fertilization rate of an area when disposing of spilled fertilizer or rinsate.

Best Management Practice **Shut off fertilizer spreaders when in a pathway, sidewalk, driveway, or other hard-surfaced area, and avoid fertilizing drainage areas in a lawn.**

These practices reduce the potential for the concentration of nutrients which then can be carried to a surface water supply.

Best Management Practice **Calibrate a fertilizer spreader to assure the proper rate of application. Fertilizer applications must NEVER result in fertilizer being deposited directly into a surface water supply.**

For lakeside or streamside lawns, a buffer zone of natural vegetation along the shoreline area can capture eroding soil and runoff and help prevent pollution of the surface water supply.

Lawn Pesticide Management

In this publication, the term pesticide includes all herbicides, insecticides, and fungicides.

Best Management Practice **READ and FOLLOW the label instructions exactly as written on the pesticide container.**

This is the most important BMP when using pesticides. The label for a pesticide provides the legal requirements for use of that pesticide.

Best Management Practice **Use the safety equipment recommended on the label when preparing and applying a pesticide.**

The recommendations may include chemical resistant gloves and footware, a long-sleeved shirt, long trousers, and eye protection.

When through applying a pesticide, remove contaminated clothing and shower or wash thoroughly using soap. Launder contaminated clothing separately from family laundry.

Best Management Practice **Before applying pesticides, be sure lawn damage is being caused by pests and is not the result of neglected cultural practices.**

Environmentally sound lawn care practices reduce the need for pesticides by using alternative management practices, either natural or mechanical.

Best Management Practice **Calibrate the application equipment to assure that the prescribed amount of a given pesticide will be applied to a given area.**

Prepare only the amount of mixture required to treat a given area when a pesticide is applied in a diluted form.

Spot treat problem areas rather than the whole lawn.

Consider the population density and maturity of lawn peas, the time of day, the season of the year, the weather, and/or the physical condition of the lawn to obtain the most effective results from using a pesticide.

Apply pesticides during calm weather to minimize the potential for drift of the spray. Herbicide spray drift can harm ornamental and garden plants while insecticide and fungicide spray drift can contaminate garden crops.

Applying herbicides for broadleaf weed control after a host can minimize herbicide damage to vegetables and ornamental plants.

High temperatures can enhance the vaporization of some pesticides; this increases the potential for damage to nearby susceptible plants from pesticide vapor drift.

Best Management Practice

Assure that no pesticide is deposited directly into a surface water supply or that any spray drift be allowed to settle on a surface water supply.

Prevent pesticide spills by staying with the application equipment during filling.

Keep the filler hose out of the pesticide-water mixture, preventing its contamination and any possibility of back siphoning.

Triple rinse empty pesticide containers and use the rinsate to help fill the applicator sank. Dispose of empty containers in accordance with label instructions and local and state regulations.

Dispose of excess pesticide mixture on an untreated lawn area, at not more than the label rate.

Clean and rinse spray equipment on an untreated grassy area, away from wells and surface water supplies, spraying or spreading the rinse water on the untreated area.

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