

Turfgrass Management BMP's and Monthly Management Guidelines

It is advised to read the information below in conjunction with the *Monthly Turfgrass Management Calendar*. With extensive variations in soil type, climatic conditions, grass species, turf use, and turf quality expectations, the actual timing and implementation of a particular management practice can differ from one site to another throughout the state. It is important to properly identify the predominant grass species in your lawn in order to make the appropriate management decisions. The following recommendations and calendar are not completely uncompromising, rather they are intended to simply highlight ideal windows of implementation and general best management practices (BMP's).

Mowing

Mowing of the turf is the most basic and frequent cultural practice that takes place during the season. Regular removal of plant tissue via mowing is a major source of turfgrass stress. To ensure that the stress of mowing is minimized there are a couple of items to consider.

- Maintain a sharp mower blade. The mower blade may need to be sharpened or replaced multiple times during the season depending on intensity of use.
- Adhere to the “ $\frac{1}{3}$ Rule”. Do not remove more than 33% of the plants leaf material in a single mowing event.
- Height of cut
 - Cool-season grasses - 3.0 - 4.0”
 - Warm season grasses - 2.0 - 3.0”.
- Do not mow when turf is under drought stress.
- Returning clippings back to the turf is strongly encouraged (mulch mowing).
- Remove all grass clippings from impervious surfaces. Clippings contain nutrients and they should be handled in the same manner as fertilizer.
- In the spring, do not begin mowing until the turf is actively growing.
- For cool season grasses, on average, late March to early April is when mowing should be anticipated to begin, and mowing will not typically be required after approximately November 15th.
- For warm-season grasses, on average, late April to early May is when mowing should be anticipated to begin, and the last mowing of the season should be anticipated between the end of September to early October.
 - Unlike cool-season grasses, warm-season grass growth in the fall will slow significantly, the grass will lose its green color and the enter into a dormancy period every winter. Understand that allowing for maximum above ground biomass to remain on the plant prior to dormancy will increase winter hardiness. Consider raising the height of cut prior to the last few mowings of the season.

Fertilization

It is most desirable if the soil can provide 100% of the turfgrass nutrition. When the soil is unable to meet the nutrient demand of the turf or a nutrient deficiency is evident, application of fertilizer will be warranted. Regular soil testing can determine the nutrient status of the soil and provide

guidance for your fertilizer applications. Understanding the proper timing, rate, placement, and sources of fertilizer is critical to maintain acceptable turfgrass quality throughout the growing season. In many situations, nitrogen will be the only nutrient that may be necessary to sustain a healthy stand of turf.

- Fertilizer applications are prohibited by law from December 7th to February 15th.
- Obtain a soil test prior to applications of fertilizer to determine the nutrient status of the soil.
- Periodically calibrate your spreader or sprayer and ensure that all application equipment is functioning properly prior to use.
- Remove all applied fertilizer materials from impervious surfaces.
- Avoid fertilizer applications when the turf is drought or heat stressed.
- Do not apply fertilizer directly to or within close proximity of any water source.
- Phosphorus fertilizers should never be applied unless recommended by a soil test from a nationally certified laboratory.
- Use fertilizer products with >30% slow-release (water insoluble) nitrogen sources.
- Avoid applications rates of nitrogen greater than 1.0 lb nitrogen per 1000 square feet.
- Avoid fast-release fertilizer applications in the spring and summer months on cool season grasses.
- Early fall (September to mid October) is the best time to apply nitrogen to cool-season grasses.
- Nutrient losses are highest in the late fall to early spring (November to March). Fall fertilizer applications to existing stands of cool season turf should be typically be completed no later than November 15th.
- Warm season grasses should only be fertilized during their active growth period of approximately late April to early September.

Irrigation

Irrigation systems should be viewed as a means to provide supplemental water only when rainfall is insufficient. In a typical year, supplemental irrigation will likely not be necessary until sometime in late May to June and will be finished in early October unless you are establishing seed or sod during this time.

- Establish a yearly spring audit plan to ensure that all irrigation components are functioning properly when pressurizing the system.
- Adjust irrigation heads and nozzles to ensure that they are hitting the intended target areas and that coverage is uniform.
- Adjust irrigation spray patterns so that impervious surfaces, such as sidewalks and driveways, are not receiving water.
- Avoid setting your irrigation system to a set schedule at the beginning of the season
- Only irrigate when the turf starts to show signs of drought stress.
- Pay attention to the weather forecast to ensure that the irrigation is not scheduled to run during a rain event.

- Practice “deep and infrequent” watering principles during the summer months, as opposed to light and frequent.
- On average, 1.0 - 1.5 inches of supplemental irrigation may be needed each week during the summer months or dry periods of the season.
- Monitor or track local rainfall. Rain data can be then used to determine how much supplemental irrigation is needed.
- Install rain or soil moisture sensors to increase control and accuracy of your irrigation system.
- A small amount of drought stress early in the season can induce greater rooting and better acclimate the turf for summer conditions.
- Occasional irrigation audits (“Catch Can Test”) may be necessary to determine the flow rate (gallons per minute) and improve the uniformity of water distribution.
- Do not irrigate past the point in which water is actively running off the soil surface
- Newly established turf may require additional irrigation until the roots are well established.

Secondary Cultivation

Cultivation typically refers to any practice that disturbs the soil surface with the intent to improve root zone conditions. Solid tine or hollow tine aerification, verticutting (dethatching), slicing, and spiking are some examples of secondary cultivation practices. While many of these practices can be beneficial, the effects are usually temporary.

- Avoid cultivation during periods of stress.
- Cultivation should be scheduled prior to the application of pre-emergent herbicides. Soil surface disruption will decrease the effectiveness of the herbicides.
- Cultivation can also be used as a method to overseed an existing stand of turf.
- Prior to the topdressing of soil amendments, such as compost or sand, cultivation will improve soil incorporation.

Thatch Management

Excessive thatch can lead to a plethora of problems for turfgrass stands, but in order to prevent excessive thatch, one must avoid implementing the practices that promote thatch build-up. Excessive thatch is the result of the turfgrass growing faster than microorganisms can breakdown and decompose the plant parts that are a byproduct of plant growth. In simpler terms, the turf is growing too fast or microorganisms are not breaking down the plant parts efficiently. Rapid growth is the result of too much nitrogen in the system. Soil compaction can also inhibit microbial activity and slow thatch decomposition. Before you implement a thatch management cultural practice such as aerification or verticutting, be sure to evaluate the contributing factors mentioned above and make the necessary adjustments to mitigate the root problem.

Establishment

Cool-season grasses such as tall fescue, Kentucky bluegrass, fine fescue, and perennial ryegrass should be seeded in the fall. Warm season grasses should be seeded/sodded in the late spring when frost is no longer expected.

- While cool-season turfgrasses can be established rapidly by seed in the late spring or summer, the fall is the primary window to accomplish this task. If seeding in the spring or summer months understand that combating weed competition will become a major challenge as this period is the main window for weed germination and proliferation.
 - More irrigation may also be required when establishing turfgrass via seed/sod during the summer months of the year.
- Turfgrass is established either by seed or vegetatively with sod, sprigs, or plugs.
- Cool-season grasses are typically established by seed or sod.
- Warm-season grasses are typically established by sod, sprigs, or plugs.
 - There are also a few seeded options for zoysiagrass and bermudagrass.
- Avoid older cultivars. Select cultivars that have been identified by the National Turfgrass Evaluation Program ([NTEP](#)) to perform well in your region.

Pest Management

Any organism that reduces the aesthetic or functional value of turfgrass is defined as a pest and this includes weeds, insects, mites, nematodes, diseases, and various vertebrate mammals. In the following section, management protocols for only insects, weeds, and diseases will be discussed. Refer to other extension publications for control solutions for mites, nematodes, and vertebrate pests. Do not assume that you have a pest problem and apply a pesticide prior to proper identification. Always read pesticide labels thoroughly and follow the directions.

Herbicides

Weed control becomes more difficult as the plants mature and increase in size. The best defense against weed encroachment is a healthy and dense stand of turf. Weeds can have vastly different life cycles and certain species may require herbicide applications during various times of the year. Also, understand the difference between selective and non-selective herbicides. Selective herbicides are herbicides that are formulated to target and control certain species or categories of weeds (ie: Trimec Classic). Non-selective herbicides are formulated to target a wide range of weeds and most, if not all, plants that it is applied to will incur death or some level of injury (ie: Round-up). Non-selective herbicides are also commonly referred to as “broad spectrum” herbicides. Periodically switch to a different active ingredient to avoid herbicide resistance.

Pre-emergent Herbicides

- These products prevent germinating weeds from becoming established.
- Pre-emergent herbicides should primarily be applied in the spring to control summer annuals and prior to soil temperatures reaching 50°F, but they can also be applied from late summer to fall to control annual winter weeds.
- Pre-emergent herbicides must be applied and watered-in, via irrigation or rainfall, prior to weed seed germination in order to provide effective control.

- Pre-emergent herbicides provide longer lasting and more effective control if the application rate is split in half and applied as two applications 6 to 8 weeks apart.
- Avoid applying pre-emergent herbicides prior to establishing turf via seed.

Post-emergent Herbicides

- These products control weeds that have germinated and are already established.
- Post-emergent herbicides should be applied when the target species is actively growing.
- For post-emergent control of both broadleaf and grassy-type weeds be sure to properly identify the target species before applying herbicides.
- Post-emergent control of weeds, at times, can be considered an ongoing task depending on the level of tolerance to weed density in the turf.
- Adding a surfactant to the spray solution can improve leaf coverage and overall efficacy of the herbicide.
- Avoid applying herbicides when weeds are drought stressed.
- Visit the factsheet [Weed Control in Turf](#) for more information.

Insecticides

The insect pests that are most common to turfgrass lawns in Delaware are White Grubs, European Crane Fly, Billbugs, and Cutworms. Armyworms have also become a pest recently, but should not be considered a perennial nuisance. Be sure to understand the life cycle of the target pests so that you apply the insecticide at the appropriate time in order to achieve maximal control. Some years insecticides may not be warranted, but a good integrated pest management program can help a turf manager make proactive, as well as, reactive decisions.

- Use insecticide that are recommended to control the target pest and is labeled for the correct application site (e.g., golf course, sports field, residential lawn).
- Read the label carefully and use the recommended rate.
- Supplemental irrigation may be required for select products in order for the pesticide to reach the area of the plant where the pest is actively feeding.
- Pesticide efficacy can be enhanced by adding a wetting agent or spread-sticker to the spray mixture.
- Insecticides with different modes of action should be rotated to avoid development of pest resistance.
- The University of Delaware Diagnostic Lab, Master Gardeners, and Extension personnel can assist with insect identification.

Fungicides

The application of fungicides should be a tool that is utilized when all other IPM principles have failed. Selecting resistant cultivars, applying moderate rates of nitrogen, and proper management of water are the most important factors for controlling turfgrass diseases. Avoiding thatch buildup, applying supplemental irrigation around sunrise, and ensuring that the soil drains well are also key agronomic practices that can aid in managing fungal outbreaks.

- Correctly identify the pathogen. The UD Plant Diagnostic Lab can assist with disease identification.
- Properly managing soil and plant moisture is the most critical component of effective disease management.
- Apply compost to improve soil drainage and structure. Microbial populations in compost have been shown to decrease disease occurrences.
- To shorten the duration of leaf wetness any supplemental irrigation should begin just before sunrise. The irrigation water will help remove the dew/guttation from the leaves and speed up drying of the turf.
- Practice sound irrigation management. Overwatering of the turf will promote disease outbreaks.
- Fungicides can be applied preventatively or curatively.
- Curative fungicides are designed to be applied at the highest label rate and prevent the disease from spreading to new tissue, but it will not heal affected tissue.
- Preventative fungicides are designed to be sprayed at lower rates and prevent fungal infections.
- Sites with a history of disease development should be considered for preventative fungicide applications.
- Plant disease resistant cultivars that have been identified during NTEP trials.

Visit the factsheets [Diseases of Turfgrass: Identification and Management](#) and [Turfgrass Disease: Best Management Practices for Delaware](#) for more information.

The [UD Plant Diagnostic Clinic](#) can identify turfgrass insect pests and diseases free of charge. [Submission guidelines for the UD Plant Diagnostic Clinic](#)
[Plant Diagnostic Clinic Sample Submission Form](#)

Soil Testing

Soil testing can be done any time of the year, but the recommended time is in the late fall to early winter.

- Buy a soil testing probe
- Do not soil test within 6-8 weeks of a fertilizer application.
- Soil testing should be performed at approximately the same time every year.
- Avoid sampling in saturated conditions. If need be, allow samples to dry on paper for one day prior to submission
- For well established turfgrass systems, a sample depth of 4 to 6 inches is recommended. Whichever sampling depth you choose, be sure to keep the sampling depth consistent from year to year.
- Do not pinch off the above ground plant material. Leave the core intact.
- “At-Home” soil tests are not valid as their results are highly variable and unreliable.
- Use accredited and reputable laboratories, such as the University of Delaware ([UD soil-testing](#)), for your soil, water, organic amendments, and tissue testing needs.

Monthly Turfgrass Management Calendar

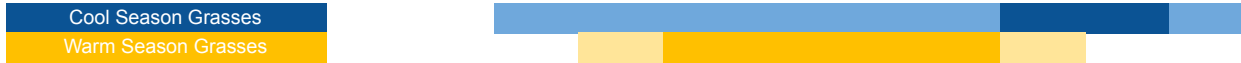
Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Primary Cultural

Mowing



Fertilization



Supplemental Irrigation



Secondary Cultural

Cultivation Practices



Propagation

Seed Establishment



Sod Establishment



Pest Management

Pre-emergent Herbicides



Post-emergent Herbicides



Pre-emergent Insecticides



Post-emergent Insecticides



Preventive Fungicides



Curative Fungicides

