MONTANA STATE UNIVERSITY EXTENSION

MontGuide

Casey M. Delphia

YARD AND GARDEN

MT202004AG, REVISED 08/23

Maintaining Successful Lawns in Montana

By Cheryl Moore-Gough, Extension Horticulture Specialist; Tracy Dougher, Professor of Horticulture; Eva Grimme, Extension Plant Disease Specialist; Laurie Kerzicnik, Extension Insect Specialist; and Noelle Orloff, Extension Plant Identification Specialist

This MontGuide contains insights and information on maintaining a lawn. Topics include fertilizers, mowing, water, disease, and weed and insect control.

LAWNS TIE MOST HOME LANDSCAPES TOGETHER, CONTROL soil erosion, dampen traffic noise and cool the air. But these things only happen if the lawn has been installed and maintained correctly.

Fertilizers

For most Montana conditions, apply 2 to 4 pounds of actual nitrogen per 1000 square feet of lawn per year. Make two to three applications so that no more than 1½ pounds of available nitrogen per 1000 square feet are applied at one time. The precise times for fertilizing lawns vary across the state, but fertilizing around Memorial Day, Labor Day and Indigenous Peoples Day (after the last mowing but about four weeks before the soil freezes) are good rules of thumb. If you only apply fertilizer once or twice a season, the two fall applications are the key fertilizing times. Your lawn will green faster in spring if you remember the Indigenous Peoples Day application.

Rates of application are given in pounds of actual nitrogen and the oxides of phosphorus and potassium. A 30-10-10 fertilizer contains 30 percent nitrogen, 10 percent phosphorus pentoxide, and 10 percent potassium oxide. A 100-pound bag will contain 30 pounds of available nitrogen (actual N) and 10 pounds each of the oxides of phosphorus and potassium. The remaining 50 pounds is inert material.

To figure how much of a given fertilizer you need to apply, use this formula:

lbs. of nitrogen you want
÷ the percentage of nitrogen in the fertilizer mix
= lbs. of fertilizer mix needed.

For example, if you wished to apply 4 pounds of actual nitrogen using ammonium sulfate (21-0-0), you would need 19 pounds of the fertilizer. To get this value, divide the pounds of nitrogen wanted by the percent nitrogen in the fertilizer:

4 (lbs. of nitrogen needed)
÷ .21 (decimal representing the percentage of nitrogen in the fertilizer mix)
= 19.04 (lbs. of fertilizer mix needed)

So, 19.04 lbs. of 21-0-0 provides 4 lbs. actual nitrogen. Similarly, if you wished to use ammonium nitrate (33-0-0):

4 ÷ .33 = 12.1

It will take 12.1 pounds of 33-0-0 to provide 4 pounds of actual nitrogen.

Mowing

For a healthy lawn, mow frequently enough to remove only ⅓ of the grass blade and don't catch the clippings. Instead, allow them to decompose on the lawn to return nitrogen to the soil. Clippings don't cause thatch.

Keep mower blades sharp to avoid tearing grass and giving a whitish cast to the lawn.

The optimum mowing height for Kentucky bluegrass/fescue/ryegrass mixes is between 2.5 to 3 inches. Kentucky bluegrass will tolerate lower mowing, but fescues and ryegrasses will thin when mowed short. Higher mowing heights, especially in the warmer summer months, allow turf to have deeper root systems and less weed problems.

Thatch and Aeration

Thatch is primarily the accumulation of dead, nondecomposed rhizomes (**Figures 1A and 1B**). A thatch layer thicker than ½ inch will interfere with the penetration of air, water, and nutrients into the turf.

In a healthy, well-maintained lawn, thatch will not accumulate. Most thatch problems are caused by overvigorous

growth and can be corrected by reducing nitrogen application and/or irrigation. Aeration is an effective method of reducing heavy thatch, but it must be followed by changes in fertilization and/or irrigation practices to reduce thatch accumulation.

Mechanical de-thatchers and power rakes should only be used when the thatch layer has become overly excessive. De-thatching causes severe damage to the grass and is roughly equivalent to renovating a lawn. Dethatch in the spring before the grass has started to grow to reduce impact and follow up with changes in cultural practices such as reduced nitrogen and/or irrigation to avoid additional thatch buildup.

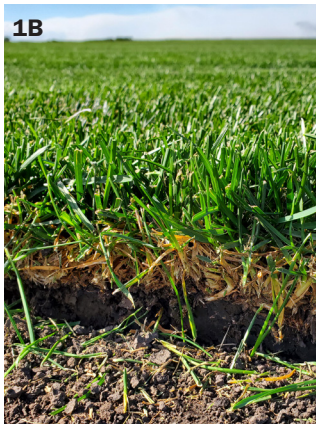

Figure 1A: Excessive thatch interferes with the penetration of air, water and nutrients when it accumulates in a layer thicker than ½ inch. Here it reaches almost 3 inches. Photo: Cheryl Moore-Gough

Figure 1B: A healthy thatch layer is no more than ½ inch. Photo: Tracy Dougher

Where thatch is heavy or soil compacted, aeration will provide quicker results than de-thatching. Aerating is best done with coring machines which remove cores ¼ to ⅜ inches in diameter and 3 to 4 inches deep. Under poor soil conditions, incorporating a thin (¼ inch) layer of compost after aerating can improve soil quality. Aeration should occur when the turf is vigorously growing (in the spring and fall), and never when it is dormant. For best results, aerate when the soil is moist, to allow the tines to penetrate. If needed, you can also overseed your lawn after aerating, to improve seed to soil contact.

Devices that use solid spikes to "aerate" the lawn are not effective and can contribute to soil compaction.

Watering

Improper watering results in poor lawns. Frequent light watering leads to shallow rooting, which makes grass less tolerant to drought. Weeds such as annual bluegrass and rough stalk bluegrass thrive under frequent, light waterings.

The baseline rule for watering grasses is to water in the early morning and water as deeply and infrequently as the soil will allow. Clayey soils have slower water infiltration and must be watered more slowly but will hold more water, so it lasts longer. Sandy soils will absorb irrigation water quickly, but also drain and dry out quickly and so need to be watered more frequently. The frequency of irrigation must also be adjusted for the season with more frequency in hotter, drier periods.

Over-watering can starve roots of oxygen by saturating soil and leaching valuable nutrients away from the rootzone. Estimate water needs for a lawn by observing water loss from a free-water surface like evaporation pans used by climatologists, or a wide-mouthed bucket or washtub. Well-maintained bluegrass lawns consume about as much water as what evaporates from the pan. For most of Montana, this amounts to 1 to 1½ inches of water per week early and late in the season, but may be as high as 2½ inches of water per week in mid-summer. The amount used to irrigate should be this value minus the amount of rainfall since the last irrigation. See the MSU MontGuide *Yard and Garden Water Management* (MT198915AG) for more information.

Pest Management

An integrated pest management approach is recommended to manage lawn diseases, weeds, and insects. This approach uses multiple strategies to manage pest populations in a way that is economically and environmentally sound. It does not rely on any one management technique. For lawn pests, a combination of cultural, mechanical, chemical, and other methods can be useful to keep pest populations at an acceptable level.

DISEASE MANAGEMENT

Although they are a minor problem, you may encounter several diseases in a lawn. Most are caused by fungi that attack leaves and cause grass thinning. Fertilizers containing sulfur (a fungicide) reduce disease incidence. Maintenance practices which favor lush lawns, e.g., over-fertilization, overwatering, excessive thatch and mowing can all lead to disease development.

Here are several diseases that may affect lawn grass in Montana:

Gray Snow Mold (*Typhula* spp.) – A disease occurring in early spring, visible just after snow melt (**Figure 2**). It appears as a white, webby mass on top of grass in a patch that is a few inches to a few feet in diameter. Gray snow mold damage disappears as temperatures warm and grass begins to grow. Raking can speed recovery. Avoid over-fertilizing in the fall, rake up leaves, and mow turf at recommended heights until it is no longer actively growing. Try to avoid piling up snow onto the lawn.

Figure 2: Snow mold is commonly seen in spring on Montana lawns. Photo: Cheryl Moore-Gough

Melting Out/Leaf Spot (*Drechslera poae* and *D. triseptatum*) – These fungal pathogens attack Kentucky bluegrass, perennial ryegrass, and tall fescue and result in thinning of turf. Melting out is favored by cool, wet weather, while leaf spot thrives during hot weather. Symptoms include yellowing of lower leaves and reddish-black spots surrounded by a yellow zone.

Control includes fertilizing to encourage moderate growth. Apply water in early morning and water deeply and infrequently. Mow as high as the grass selection will allow. See the MSU MontGuide *Planting and Planning Successful Lawns* (MT202003 AG) for a discussion of different grass species and mixes that thrive in Montana. Remove thatch by aeration in spring if it accumulates to more than ½ inch. Prune woody landscape plants to remove dense shade. Fungicides are effective if cultural controls fail but not usually recommended for home lawn use. Contact your local MSU Extension agent for current recommendations. Avoid fertilizer with high nitrogen and/or nitrogen in a rapid release form which can promote these diseases.

Powdery Mildew (*Blumeria graminis*) – This appears as small colonies of white dust on the leaves and leaf sheaths. Colonies grow together and cover much of the leaf surface, generally the lower ones. Leaves may become puckered and eventually yellow. It is usually observed in spring and fall during cool, humid periods and most often found in shaded areas where air circulation is poor. Heavy fertilization favors this disease.

Control strategies include a mix of shade-tolerant grasses. Pruning woody plants to reduce shade intensity and allow better air movement also helps to control powdery mildew. Mowing higher during disease periods and reducing fertilizer applications will reduce infection.

Fairy Ring (many mushroom-forming fungi) – Symptoms include the formation of arcs or rings of lush green turfgrass. Mushrooms grow from the rings. Rings usually don't cross each other but instead, unite to form larger rings.

Fairy rings are most severe on light-textured, infertile, droughty soils. Since they grow on organic matter, turf on soil containing much residue from previous crops and old plant roots, or turf allowed to accumulate a dense thatch layer, is most susceptible.

There is no single, successful control. Support turf health by providing adequate water and nutrients during the growing season. Consider adding additional nitrogen fertilizer (0.1–0.25 lb. per 1,000 sq. ft; source: Purdue Extension) to mask the dark green bands. Aerating lawns also supports turf health.

Another control method is to physically remove infected soil, replace it with clean soil and reseed.

Do not eat the mushrooms associated with fairy rings.

Rhizoctonia Blight (*Rhizoctonia solani* and *R. cerealis*) – Brown patch is caused by *R. solani* and affects cool-season grasses during hot weather. Infected areas may show patches with purplish or smoke-colored margins. Patches turn from purplish-green to brown with disease progression. Tan lesions with reddish-brown margins may develop on leaf blades.

Yellow patch is caused by *R. cerealis* and mainly affects annual bluegrass and Kentucky bluegrass in cool and wet weather. Yellow-to-tan patches appear in turf with affected leaves becoming yellow- or tan-colored.

To minimize effects of this disease, improve drainage and aeration of soil, provide adequate fertilizer, and avoid over-irrigation. Irrigate early in the morning, maintain thatch at less than ½ inch, and trim surrounding trees and shrubs to increase sunlight and air circulation.

WEED MANAGEMENT

A weed is an undesirable plant. Any plant may be considered a weed if it becomes a hazard, nuisance, or causes injury to us, our animals, or our cultivated crops. A plant may be considered a weed in one instance and beneficial in another. Even some ornamental plants can become weeds when they grow where they are not wanted. It is often not necessary to control every weed, and in fact many plants considered weeds provide ground cover and food and shelter to animals and beneficial insects.

Plants considered weeds tend to grow in disturbed areas that have bare ground or thin turf, or other issues like compacted soil. That means you can prevent weeds by making sure a lawn is healthy using cultural management techniques.

This strategy includes making sure a lawn is adequately watered and fertilized, and perhaps aerating or over-seeding with an appropriate turfgrass in thin areas.

If you have an existing weed issue, mechanical removal before plants have produced seeds will be helpful. Mechanical removal includes hand-pulling, hoeing, or digging. If you think plants may have already produced mature seed, dispose of them in the trash. Since seeds are one common way that plants reproduce, preventing seed production will limit spread.

Another option for weed management is herbicides. There are many herbicides available at local hardware stores to control broadleaf weeds in lawns. Always follow directions on the product label to achieve the best weed control, and to avoid injuring non-target plants like trees, shrubs, flowers, and even the lawn itself.

INSECT MANAGEMENT

Insect damage in turfgrass is typically from root-feeding insects in the larval (immature) stages. Characteristic damage often resembles drought stress. Newly established turfgrass is particularly vulnerable to insect infestations. Some common turfgrass pests are underreported.

White grubs – The larvae of several scarab beetles are called "white grubs." White grubs feed on turfgrass roots, causing drought stress and death of turfgrass. Adults do not cause lawn damage.

May and June beetles (*Phyllophaga* spp., *Polyphylla* spp.) – These are the most common white grubs found in turfgrass in Montana (**Figure 3**). Adult beetles can also be found at porch lights in May and June.

Figure 3: May beetle larva or "White grub." *Phyllophaga* sp. Photo: Steven Katovich, Bugwood.org

Japanese beetles (*Popillia japonica*) – The Japanese beetle is established in several areas in Billings, MT. These beetles prefer highly-managed turfgrass in good condition. Yellowing, stunting, and death of turfgrass is characteristic of feeding, and damage is evident in late summer. The adults are also foliage feeders on over 300 plants, so they are pests in all life stages. See the MSU Extension MontGuide *Japanese Beetle* (MT201404AG) for more information.

White grubs are under the soil most of the year and are often found in the first few inches of the soil. The grubs can grow up to 1" long. If a tug of the turfgrass pulls up bits of sod, it is possible turfgrass has grub damage. Skunks or raccoons feeding on white grubs can often be an indicator of grub presence.

White grub management: Lawns that receive heavy moisture during egg-laying periods of the adult beetles are more susceptible to damage by white grubs.

Insect parasitic nematodes in the genus *Heterorhabditis* are available for grub control. *Bacillus thuringiensis galleriae* strain (or Btg) is another biological control that is available. Both biological controls are most effective when applied in late July or early August and are non-toxic to beneficial insects, pollinators, birds, and pets. Follow the label for efficient control.

Several insecticides are available for grub control. A common threshold that warrants management for white grubs is one grub per square foot of lawn. Timing of applications is critical and dependent upon the product chosen. Aeration will hasten penetration of the chemical into heavily-thatched turfgrass. When applying a granular control, irrigation postapplication is critical to make sure insecticides reach the larvae. Follow all label directions to avoid harm to yourself and pollinators, and keep children and pets off the lawn for a day after application.

Billbugs (*Sphenophorus* spp.) – Billbugs are not true "grubs," they are weevils. They are smaller than white grubs (⅜" – ½" long), white, c-shaped, and legless. They are typically found just below the thatch layer.

Young larvae will feed in the stem, crown, and roots. Older larvae will feed below ground on turfgrass roots. Symptoms aboveground include brown and dying grass spots, which are evident in mid-to-late summer. A similar "tug test" as described previously can be used for monitoring. Frass or insect excrement (similar to sawdust) is evident at the base of the turfgrass and can be diagnostic of the pest.

Billbug management: Some varieties of turfgrass have greater resistance to billbugs. Perennial ryegrasses and fescues with endophytic fungi can be highly resistant. Turfgrass that is overfertilized and overwatered can be attractive to billbugs.

Insect parasitic nematodes in the genera *Steinernema* and *Heterorhabditis* can be applied for both adult and larval stages.

As with white grubs, one billbug per square foot of turfgrass often indicates a need for chemical control. Reaching larvae within stems is difficult; systemic treatments can penetrate these feeding areas. Treatments are most effective in late spring to early summer. Pyrethroid-based insecticides can provide a residual on the turfgrass surface when adults are present.

Other insect/arthropod pests of turfgrass include ants, clover mites, sod webworms, leafhoppers, and wireworms.

MONTANA STATE UNIVERSITY | EXTENSION

MT202004AG, REVISED 08/23

YARD AND GARDEN (GENERAL)

To download more free online MontGuides or order other publications, visit our online catalog at *store.msuextension.org,* contact your county or reservation MSU Extension office, or e-mail *orderpubs@montana.edu.*