Lawn care in short-season, high-altitude zones

by Tom Salaiz, Stephen L. Love, Michael Bauer, and Tony McCammon

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YOU ARE A SHORT-SEASON, HIGH-ALTITUDE GARDENER IF:

You live in Idaho at an elevation above 4,500 feet, **OR**

Your USDA hardiness zone is 4 or lower, **OR**

You have a frost-free growing season of 110 days or less

INTRODUCTION

Managing a home lawn in Idaho's more challenging high-altitude climates is similar in many respects to caring for a lawn anywhere in the state. However, some limiting factors make managing a lawn at high elevations unique. These include a short growing season, cold winter temperatures, snow cover, and shade. These factors affect grass selection, lawn establishment, management practices, and disease control and require modifying management practices typically used at lower altitudes. The recommendations in this bulletin will help you maintain a healthy lawn in Idaho's short-season, high-altitude areas.

GRASSES FOR LAWNS

Although most species of cool-season grasses can be used for home lawns in the warmer valleys of Idaho, only a portion of these are able to survive the long, cold winters of higher elevations. In Idaho, most home lawns are composed of Kentucky bluegrass, perennial ryegrass, tall fescue, or fine fescue. These grasses are classified as cool-season turfgrasses, meaning they grow best in cool weather. They grow rapidly in the spring and fall when soil temperatures are between 55–65˚F. Growth is slower during periods of higher temperatures. Other species can be used in non-irrigated, mountain-meadow type situations (see University of Idaho BUL 862, *Landscaping with Native Plants*, in the Short-Season, High-Altitude Gardening series).

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When selecting grasses, it is important to consider the purpose of the lawn. Will it be an ornamental lawn? Will children play on it? Will it be used simply to prevent soil erosion and to help keep mud from entering a mountain cabin? Determining the use of a lawn will help you choose the type of grass best suited for the purpose. The following section briefly describes grasses adapted to short-season, high-altitude areas in Idaho. A comparison of grass characteristics is summarized in table 1.

FINE FESCUES

The fine fescues are a group of grasses characterized by very narrow leaf blades and include creeping red (*Festuca rubra* spp. *littoralis* and *rubra*), chewings (*Festuca rubra* spp. *commutata*), sheep (*Festuca ovina*) and hard (*Festuca longifolia*) fescue. They are primarily bunch-type grasses, meaning they spread very slowly and tend to grow in clumps. Mowing some fine fescues can be somewhat difficult as the leaves tend to lie flat and mower blades can miss them. Chewings and hard fescues are usually dark green in color and mix well together, while sheep fescue is blue-green and creeping red fescue is light green. Fine fescues germinate in 6 to 12 days, but the seedlings can take some time to mature.

The fine fescues are perhaps best suited to high-altitude climates because of their ability to survive very cold temperatures and their low nitrogen requirement. They also are the most shade tolerant of the cool-season grasses and are commonly used in shade mixtures with Kentucky bluegrass. They are not recommended for high traffic areas because they cannot recover quickly in damaged areas due to their slow growth rate.

The fine fescues are tolerant of dry, infertile soils, but have poor heat tolerance compared to the other cool-season grasses. However, many improvements have been made to the heat tolerance of new varieties, and most commonly available varieties can easily withstand the heat associated with short-season, high-altitude climates. Choosing seed mixtures with named varieties will help insure that the variety is one of those most recently released. Check the seed label when choosing seed mixtures to insure that fine fescues are listed. Seed of pure fine fescues can often be hard to find, but can be ordered on the Internet or through the mail.

KENTUCKY BLUEGRASS

Kentucky bluegrass (*Poa pratensis*) is the most widely adapted and most commonly used lawn species in the United States. It is very cold tolerant, making it well suited to cold winters. The major weakness of Kentucky bluegrass is a lack of shade tolerance. It will form a dense, high-quality turf when grown in full sunlight, but will thin and become susceptible to powdery mildew in shady areas. Billbugs (grubs) are a troublesome pest problem for turfgrasses in Idaho, and Kentucky bluegrass is particularly susceptible to these insects. However, in high altitude areas above 5,000 feet billbugs are not found at very high densities. Kentucky bluegrass has rhizomes (underground spreading stems), and this allows it to tolerate wear, drought, and extreme temperatures.

Kentucky bluegrass has a reputation as a high water user, but actually can survive with relatively little or no water by going dormant. Although a dormant lawn is brown and may not be desirable for many people, this important characteristic pro-

Texture differences of fine fescue (left), Kentucky bluegrass (center), and tall fescue (right).

tects lawns in areas where water shortages may be encountered. Additionally, limiting the amount of nitrogen fertilizer applied over the growing season will prevent excessive leaf growth, which can cause the grass plant to use up stored energy reserves needed to provide heat and cold stress resistance. Avoid nitrogen applications from mid-July to mid-August since excessive top growth during this hot period can damage the grass. Mow at a height of 3 inches to promote deep rooting and drought resistance (the ability of a grass to survive periods of extended drought).

Hundreds of Kentucky bluegrass varieties are available with varying levels of color and overall quality. Some varieties are grouped as "common" types and tend to be lighter in color and more upright in growth habit than the darker green, more dwarf-growing "midnight" types. Kentucky bluegrass seed is usually available as a blend, meaning that more than one variety is included in the seed. This is preferable as blending increases the genetic base and adaptability.

Tall fescue (in front of small left sign) and perennial ryegrass (right) can experience severe thinning due to cold temperatures and snow cover, especially in shady areas (such as next to this building).

TALL FESCUE

Tall fescue (*Festuca arundinacea*), unlike Kentucky bluegrass, is a bunch-type grass. It is not recommended for high snowfall areas or elevations where extended, cold winters are common, because it is intolerant of cold temperatures and is very susceptible to snow mold (a disease that occurs under prolonged snow cover). Tall fescue lawns can thin as a result of repeated infection. However, tall fescue can thrive in the warmer areas of Idaho and has performed well in eastern Idaho at the warmest edges of high-elevation zones (4,000–4,500 ft).

Tall fescue has a relatively coarse leaf texture, although many improved varieties with much finer textures are now available. Tall fescue has good shade tolerance compared to Kentucky bluegrass and has few insect problems. With its bunch-type growth habit, tall fescue is slow to form thatch, and may require over-seeding on damaged areas or in places worn by heavy use.

Tall fescue has a deep, extensive root system in soils where roots can penetrate, which allows it to extract water from deep soil depths—a factor that can help it survive periods of drought. It is gaining popularity on home lawns in many areas of the country because of its heat and drought resistance. It will remain greener longer during a drought period, but will suffer more thinning during extended drought. Do not plant tall fescue if you anticipate extended periods (several weeks) of drought, as it may not survive.

Be cautious of growing tall fescue in areas with shorter growing seasons or extreme low winter temperatures. Also avoid the variety K-31, or Kentucky 31, as this is the old forage-type variety with wide blades and will result in a poor quality lawn. Lastly, be mindful of some confusing terminology that may be used with these varieties, such as "turf-type" tall fescues.

Table 1: Characteristics of turfgrasses recommended for use in short-season, high-altitude zones of Idaho

GRASS	COLD TOLERANCE	HEAT TOLERANCE	DROUGHT TOLERANCE*	SHADE TOLERANCE	NOTES
Fine fescues	High	Low	Medium	High	Tendency for leaves to lay over; not recommended for high traffic areas
Kentucky bluegrass	High	Medium	Medium	Low	Susceptible to billbug (grub) damage
Tall fescue	Low	High	High	Medium	Susceptible to snow mold; Has coarser, wider blades when turf is tall
Perennial ryegrass	Low	Medium-Low	Medium	Low	Use only in seed mixes as a "nurse" grass
Wheatgrasses	High	High	High	Low	Good choice for meadow areas or erosion control

*Drought tolerance defines a grass species' ability to survive extended periods of inadequate rainfall or irrigation. All cool-season grasses will eventually go dormant under drought conditions.

Most new tall fescue varieties have been developed for thinner leaves, but should not be confused with the fine-leaf fescues mentioned earlier. Many "turf-type" tall fescues are available and produce a high quality, dark green lawn if managed properly.

PERENNIAL RYEGRASS

Perennial ryegrass (*Lolium perenne*) is a bunch-type grass that is commonly used in grass mixtures with Kentucky bluegrass and fine fescues. It is very similar in color and appearance to Kentucky bluegrass, but has poor cold tolerance and disease tolerance and should not be used as a stand-alone grass for home lawns in short-season, high-altitude areas. It is included in mixtures with Kentucky bluegrass because of its very rapid germination that allows it to act as a "nurse" grass for the much slower-germinating bluegrass. In short-season, high-altitude areas, Kentucky bluegrass will eventually crowd out any perennial ryegrass plants that may survive the cold temperatures of these areas.

GRASSES FOR UTILITY PURPOSES

If the objective is simply to control soil erosion around a mountain cabin or to add to a prairie or meadowlike area, many wheatgrasses are available that are designed to germinate quickly and provide soil stabilization. Additionally, their seedheads provide attractive textures to the landscape. Many are commonly used along roadsides and are adapted to areas receiving less than 14 inches of precipitation, and elevations up to 10,000 feet. Crested (*Agropyron cristatum*), western (*Pascopyrum smithii*), Siberian (*Agropyron fragile*), streambank or thickspike (*Elymus lanceolatus*), and bluebunch (*Pseudoroegneria spicata*) are some of the wheatgrasses that can be used for these utilitarian areas.

These grasses are not recommended for use in lawns because most are wide-bladed and produce a thin stand, and also undergo summer dormancy. Some varieties of Crested wheatgrass, however, have been developed for turfgrass purposes with finer leaves and tolerance for frequent mowing. All the wheatgrasses produce relatively tall plants, so avoid planting along areas that will serve as a pathway, or consider mowing once or twice in the spring and again in the fall. The fine fescues, including Idaho fescue, can also function to prevent soil erosion and are much shorter in stature.

ESTABLISHMENT

The best time to seed cool-season type grasses in Idaho is late summer and fall. Soil temperatures are optimum for seed germination at this time and there is less competition from annual weeds that grow in summer. Additionally, the grass seedlings will avoid exposure to summer heat. It is possible to seed a lawn successfully in the spring, but extra care will be needed to help the seedlings along during hot summer temperatures and to keep them competitive against weeds.

In areas with very short growing seasons, seeding may need to be done in the spring. These short-season areas simply may not have enough of a fall to allow the grasses to develop sufficiently before winter. In areas where snow banks persist into mid-May and fall conditions begin in early August, a spring seeding may be necessary. Summer temperatures in these areas are mild enough that heat stress on developing seedlings will be minimal.

Several types of wheatgrasses provide good ground cover for soil stabilization, wildlife habitat, and other utility purposes.

Turf damage from winter snow and ice accumulation.

Before seeding a new lawn, properly prepare the site and soil to support a high-quality lawn for years to come. See University of Idaho Extension publication CIS 1062, *Starting a Home Lawn*, for proper steps to take in establishing a new lawn.

DORMANT SEEDING

Seeding cool-season grasses when ground temperatures are too cold for seed germination to take place or when the ground is frozen may be used in areas where fall or spring seeding is not possible because of weather conditions, work schedules, or other factors, but it is not recommended. In a dormant seeding, the seeds will not germinate until soil temperatures warm again the following spring. Until then, the seed is exposed to many conditions that will reduce viability, and the mortality rate of developing seedlings will be higher. Additionally, mice and voles will eat many of the seeds on the

ground. Seeding rates therefore need to be much higher to account for these problems. Prairie-type or meadow areas are more amenable to dormant seeding as turf quality and density are not as important as they are in a lawn situation.

CARING FOR TURF

Once a lawn is established, attention to basic care procedures will help keep it healthy and attractive. These include mowing, fertilizing, irrigating, and thatch management. All of these processes should be slightly modified from traditional procedures to give turf the best care in the short-season, high-altitude situation.

Special consideration should be given to shady areas or areas where snow and ice accumulate. These areas will tend to have a very thin grass stand, especially in the spring, and may benefit from redesigning the landscape. Low-lying areas in the landscape and corners surrounded by sidwalks are examples of areas that continually receive large amounts of hard-packed snow and ice. Consider removing grass in these areas and replacing it with hardy shrubs or a porous hardscape that allows for water drainage.

MOWING

The simple, everyday task of mowing your yard is commonly overlooked in terms of its importance to the overall health of the lawn. If done correctly, mowing will not only make a lawn look nice, but will keep it healthy and more resistant to stress and invasion from weeds, insects, and diseases.

For most home lawn situations, a mowing height of 2.5–3 inches is ideal. Mowing too low decreases root growth and makes the lawn more susceptible to drought and heat stress, as well as increases the incidence of weeds and diseases. Never mow your lawn lower than 2 inches. This is especially important in short-season, high-altitude areas since higher mowing heights translate into increased cold tolerance. This is because higher mowing heights mean more leaf area is left, allowing the grass to capture more light and produce more energy reserves. Raising the mowing height in the summer will also encourage deeper root growth and increases the lawn's resistance to drought stress.

Avoid "scalping the grass," i.e., mowing too low and exposing stems and soil, at any time during the growing season. In areas that commonly receive high amounts of snow, continue mowing late into the fall until the grass has stopped growing (sometimes late into November). This will reduce excess debris and decrease the chance of snow mold.

Clippings should be left on the ground where the valuable nutrients they contain will become available for plant growth. A mulching mower will assist in chopping up the clippings into small pieces so that they will filter more readily into the canopy. If a mulching mower is not available, a side-discharge mower can still be used as long as the lawn is mowed often enough so that the leaves are not allowed to grow too long, producing clumps of cut blades on the surface of the mowed turf. If this happens, the lawn can be mowed a second time on the same day after the clumps have been allowed to dry.

Snow mold is common on most snow-covered lawns, but does not normally kill the grass plant. Pink snow mold has a characteristic pink edge surrounding the damaged area.

The snow mold fungus will sometimes have a cottony growth that can be seen under humid conditions.

In short-season Idaho climates, grass spends considerable time dormant and under snow. It is important to encourage early and rapid spring growth. The first mowing of the spring is perhaps the only time you may consider setting the mowing height lower than normal, as this will help to remove dead, overwintered leaves and allow sunlight to penetrate into the crowns, warm up the turf, and start it growing. However, take care and don't overdo it. Excessive scalping will expose soil and allow early-germinating annual grasses such as crabgrass and foxtail to grow as well. In some cases, lightly raking matted areas with a leaf rake will help improve air circulation and allow sunlight to penetrate into the grass

canopy, warming the grass crowns and encouraging growth (see Thatch Management, Power Raking below).

FERTILIZATION

In general, the amount of fertilizer a grass needs and the correct timing of application is dictated by the length of the growing season. Over-fertilizing in the spring will cause excessive growth, expending energy reserves on leaf growth and not leaving enough to keep roots healthy and help the grass survive summer heat and drought. All that is really needed in the spring is just enough nitrogen fertilizer to prevent yellowing of the leaves.

As temperatures rise in the summer, leaf and root growth start to slow. Over-fertilization at this time could be very detrimental to the health of the grass and even cause areas to die. Avoid fertilizing during the summer except to prevent yellowing. Very light applications and use of a slow-release fertilizer will help keep the grass green in the summer without burning or damaging the lawn. In high pH soils (alkaline), the yellowing may be caused by a lack of iron available to the turf. Apply chelated iron to lawns that are yellow from iron chlorosis. Be aware that not all iron formulations work in Idaho's alkaline soils, so look for ethylene diamine dihydroxyphenyl acetate (EDDHA) in the ingredients. The more commonly available (and less expensive) EDTA (ethylenediaminetetraacetate) is only active in pH-neutral soils.

Fall is the most important time to fertilize cool-season grass lawns, rejuvenating them from summer heat stresses and preparing them for a long cold winter. As temperatures cool and daylight diminishes, grasses begin preparing for winter by sending their energy reserves to their rhizomes and roots. A fertilizer application at this time will help the plant maximize this energy production and most of this will be allocated to storage instead of leaf growth. Using a fertilizer with a combination of slowly- and quickly-available nitrogen is ideal at this time of year, because the quickly-available fertilizer will increase turf vigor, and the slow-release fertilizer will continue encouraging root growth well into fall.

A general fertilizing recommendation for cool-season grasses is a range from 0.5–3 lbs of nitrogen (N) per 1000 ft^2 per season. Lawns with tall fescue or fine fescue will only require about 2 lbs or less per 1000 ft^2 per season, while Kentucky bluegrass will require approximately 3 lbs of nitrogen per 1000 ft^2 per season. When making fertilizer applications, never apply more than 1 lb of nitrogen per 1000 ft^2 at a time to avoid burning the turf leaves.

The final fall nitrogen application should be made while the grass is still green and at least two to three weeks before the ground begins to freeze (October-November). This will allow the grass to naturally harden off (store energy reserves for winter) before winter and reduce the potential for snow mold. Most grasses will quickly recover in the spring from snow mold damage, especially if a light raking is done to improve air circulation and growth.

Hollow-tine core aerator.

Close-up of hollow-tine core aerator.

Cores from aeration left on turf surface.

Turf matted down from snow drifts. A chalky layer of dust is left behind.

IRRIGATION

Irrigation needs for lawn grasses in short-season, high-altitude areas of Idaho will be less than those for lower elevation areas because of lower daily temperatures and a shorter growing season at higher elevations. Even though the daily maximum temperatures may rise to the mid- or upper-90s in this zone, the drier air at high elevations will cool quickly in the late afternoon and reduce water use on the lawn. Additionally, lawns with significant shade and wind protection will not need as much water, but remember that the grass will be competing with tree roots for water and nutrients and extra attention needs to be given to these areas. See University of Idaho Extension publication CIS 1157, *Watering Home Lawns: How Much and How Often*, to determine proper irrigation scheduling.

At high-elevation, areas of unprotected lawn can be severely thinned by winter dessication and direct low temperature damage, even on the most cold-tolerant grasses. Make sure these areas are well watered as late into the fall or early winter as possible prior to winterizing the irrigation system. In extreme cases, these areas can be watered during the winter as long as the top 1–2 inches of the soil is not frozen. Some areas with large amounts of winter-kill may need to be re-seeded in the spring. In very troublesome areas, redesigning the landscape to catch winter snow or provide some protection should be considered.

THATCH MANAGEMENT

Thatch is the layer of living and dead organic matter found between the green, growing grass blades and the soil surface. Excessive thatch creates a favorable environment for pests and diseases and is unfavorable for root growth.

Core Cultivation. "Lawn aeration" refers to any management practice that creates openings in the turf surface, allowing for improved air exchange between the root zone and the air.

Power raking operation.

Close-up of power rake tines.

Core cultivation is the preferred method of aeration in high-elevation areas. It is done with the use of hollow tines that penetrate the lawn and remove a soil core. The benefits of core cultivation include relief of compaction, improved air movement into the soil, improved water infiltration, and improved root growth.

Depending on the amount of compaction and thatch buildup, most home lawns should be core cultivated yearly or in alternate years. The best times of the year for core cultivation are either the fall or spring when soil temperatures are ideal for root growth. However, fall is the preferred time since the

aeration holes will then avoid exposure to excessively hot temperatures during the summer that can cause heat damage and drying along the edges of the aeration holes. Also, any weed seeds that were exposed with the soil cores are less likely to compete with the grass after fall aerations. Pay attention to weather conditions in short-season areas and avoid aerating so late into the year that the lawn does not have enough growing season left to recover and fill in the holes sufficiently.

Power Raking. Power raking is commonly used to remove excessive layers of thatch. Moderate power raking in the early spring can help grass that has been matted down from compacted snow by allowing air and heat to penetrate into the crowns, leading to earlier green-up. Be cautious when power raking, especially in short-season areas as deep power raking can cause excessive damage to the grass plant. In very short seasons, the lawn may not have sufficient time to recover.

Power raking can be done with a walk-behind machine with vertically oriented tines that spin into the turf canopy, thereby removing thatch. To accomplish a "light" power raking in the spring, the tines need to be adjusted so that they just enter the top of the matted turf canopy, removing leave litter and lifting up the turf leaves in the process. Do not set the tines so low that the soil is being disturbed. Thatch and other matter brought up during the power raking process should be removed.

Thatch removal using a leaf rake following the power rake operation.

Find more gardening resources and publications online at ***www.extension.uidaho.edu/homegard.asp***

ABOUT THE AUTHORS

Tom Salaiz is a Research Support Scientist at the University of Idaho Aberdeen Research & Extension Center; **Stephen L. Love** is a Community Horticulture Specialist in the Department of Plant, Soil, and Entomological Sciences at the University of Idaho Aberdeen Research & Extension Center; **Michael Bauer** is an Extension Educator with University of Idaho Extension, Bonner County; and **Tony McCammon** is an Extension Educator with University of Idaho Extension, Washington County.

PHOTO CREDITS

Photos of hollow-tine core aerator, power raking operations, and thatch removal courtesy of Michael Bauer. Photo of soil cores on turf surface courtesy of Anthony Koski, Colorado State University. All other photos courtesy of Tom Salaiz.

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Published October 2010