

LANDSCAPING: TURF IN WYOMING

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Why turf?

The lawn has become one of the most important parts of the home landscape. It enhances a property's looks, a property's value, and its livability. It serves an aesthetic purpose and is also useful. A lawn is a ground cover intended to protect the home from the mud and dust of the outside world.

Homeowners usually demand much more from their lawns than just covering. The home lawn can be a carpet for the outdoor living room, a cushion for children's play, a pasture for pets, an athletic field, a border for flower beds, or an arena for other outdoor activities. It should be attractive most of the year and vigorous enough to withstand a multitude of uses and abuses. Yet it should not be so vigorous as to require excessive maintenance.

A lawn consists of a large population of grass plants. To fulfill the various needs of the individuals in the home, the species of grasses used in the lawn should be selected with care. A good lawn begins with choosing the grasses which are best suited for the area and the uses for which the lawn is planted. The state of Wyoming contains large areas of native grasslands; however, few of these native grass species have much value as turfgrasses. There are others, however, that are adapted to Wyoming conditions.

Selecting the right turfgrass

The grass people sow will be the lawn they mow. No step in growing a permanent lawn is more vital to the final results than choosing a grass or mixture of grasses fitted for the job. If there were a large number of turfgrasses, this selection process might be quite complicated. In reality, there are only a few basic species suitable for planting in Wyoming.

Consider both intended use and climate when selecting the kind of grass for a lawn.

- Will it be planted for strictly aesthetic purposes or will it be used for play? If heavy traffic is expected, choose a cultivar (cultivated variety) that will tolerate lots of use.
- Will there be plenty of maintenance time available for the turfgrass or will minimal amounts of water and fertilizer and little or no pest management be the norm? If maintenance levels will be low, choose a turfgrass that requires little irrigation and fertilization.
- Is irrigation available? Most of Wyoming is semi-arid. When lawns can be irrigated, bluegrasses or fine fescues can be used. If no irrigation will be available, choose drought-resistant species.
- Is the water supply of good quality? If the water is high in salts or other con-

taminants, a turfgrass that tolerates salty or dry conditions should be chosen.

- Is the soil sandy or a heavy clay? Clay soils tend to drain poorly and may hold too much moisture for some types of turfgrasses.
- Is the lawn area in shade or sun? Most turfgrasses will not tolerate heavy shade conditions.
- What is the elevation? The higher the elevation, the harder it will be to select a turfgrass that will survive and thrive.
- How cold is the climate? Turfgrasses are divided into warm season and cool-season types. The long, cold Wyoming winters virtually eliminate the use of warm-season grasses such as Bermuda, Zoysia, and St. Augustine.

What about a low-maintenance lawn?

This means different things to different people. To some it means no maintenance with no irrigation, no fertilization, no or infrequent mowing, and little or no pest management. To most people, low maintenance simply means reduced levels of irrigation, fertilization, and pest management. The quality expectations of low-maintenance turf should not be high, however, since minimal inputs can only be expected to produce turf of minimal quality. Proper selection of species and/or cultivars is very important since some species do not persist under low maintenance or neglect. The following table outlines various species of turfgrasses and their ability to withstand low maintenance:

Turfgrass persistence under low maintenance		
Common name	Scientific name	Persistence ranking
Buffalograss	<i>Buchloe dactyloides</i>	1 BEST
Blue grama	<i>Bouteloua gracilis</i>	1
Wheatgrass	<i>Agropyron</i> spp.	1
Smooth bromegrass	<i>Bromus inermis</i>	1-2
Hard fescue	<i>Festuca longifolia</i>	2-3
Sheep fescue	<i>Festuca ovina</i>	2-3
Creeping fescues	<i>Festuca rubra</i> spp. <i>rubra/trichophylla</i>	3-5
Chewings fescue	<i>Festuca rubra</i> spp. <i>commutata</i>	3-5
Tall fescue	<i>Festuca arundinacea</i>	5-6
Common Kentucky bluegrass	<i>Poa pratensis</i>	6
Improved Kentucky bluegrass	<i>Poa pratensis</i>	8
Perennial ryegrass	<i>Lolium perenne</i>	9-10 WORST

Kentucky Bluegrass	
Advantages	Disadvantages
sod-forming – has underground rhizomes	thatch-former
high recuperative potential and rate	disease-prone – leafspot, patch diseases, Aschochyta leaf blight
soft, easily mowed leaves	poor to fair shade tolerance
high quality – color, density	more frequent insect problems – billbugs, grubs, mites
readily available in sod form	higher nitrogen requirement than other grasses
excellent heat and cold tolerance	poor salt tolerance
good drought resistance – can go dormant and survive long periods without water	will invade flower and vegetable gardens

Turfgrass species

Few people ask the preceding questions before deciding on which turfgrass to use. The basic assumption, sometimes erroneous, is that Kentucky bluegrass must be planted and little attention is given to alternative turfgrass species. Here are some descriptions of turfgrasses that can be planted in Wyoming:

Kentucky bluegrass (*Poa pratensis*)

Kentucky bluegrass is the most popular turfgrass in Wyoming. Bluegrass is not native to North America and presumably was brought here by early colonists. This highly adaptable species has naturalized over much of the continent.

Common Kentucky bluegrass is not

genetically pure but contains thousands of variations within the species. This genetic variability allows bluegrass to adapt itself to a wide range of climatic conditions and different soils. Blends of cultivars may also provide these benefits. In recent years, many selections of bluegrass plants have been made, propagated, and introduced under various cultivar and brand names. These selections are genetically pure strains of selected Kentucky bluegrass clones.

Some cultivars of Kentucky bluegrass will tolerate shade, some require high maintenance, and others perform well with low maintenance. Kentucky bluegrass should be seeded at a rate of 3 to 5 pounds per 1000 square feet of area. Blends of at least two different cultivars of Kentucky bluegrass seed are frequently sold.

Kentucky bluegrass cultivars for various circumstances					
Shady areas		High maintenance		Low maintenance	
A-34	Freedom	P-104	Eclipse	Unique	Livingston
Alpine	Georgetown	Blacksburg	Miracle	ISI-21	SR-2000
Apex	Glade	Midnight	Shamrock	Sophia	Merion
America	Limousine	Apex	SR-2000	Voyager	Washington
Blacksburg	Mystic	Barcelona	Platini	Baronie	
Bristol	Nugget	Ascot	Bartitia		
Classic	Ram-I	Broadway	Touchdown		

Turf-type tall fescue (*Festuca arundinacea*)

Tall fescues are coarse-bladed bunchgrasses which generally do not mix well with other turfgrasses. They are often valuable in high traffic areas or where low maintenance will be provided. Tall fescues produce strong, deep, fibrous root systems and thus tolerate drought conditions. Seed distributors will often sell turf-type tall fescue blends that are combinations of several different cultivars of tall fescue. These blends are ideal for home lawn use and are generally less expensive than buying a single cultivar. Turf-type fescues should be seeded at 6 to 8 pounds per 1000 square feet.

Turf type tall fescue	
Advantages	Disadvantages
establishes quickly	seeding can produce poor results unless done very carefully
drought resistant – deep-rooted	sod availability more limited compared to bluegrass
wear tolerant	leaf shredding more common when mower blade is dull
few disease problems	some varieties must be mowed more often than bluegrass
nice texture and deep green color	heavy use by children and/or pets can produce worn areas which may need overseeding
excellent heat and cold tolerance	if rooting is restricted by poor soil, may require the same amount of water as Kentucky bluegrass
slow thatch-former	potentially short-lived
does well in shade	
good salt tolerance	
slow to invade flower and vegetable gardens	

Recommended turf-type tall fescue cultivars include the following:

Adobe	Eldorado	Marksman	Shortstop
Alamo	Falcon II	Mirage	Silverado
Apache II	Grande	Pixie	Southern Choice
Bonanza II	Finelawn Petite	Pyramid	Starlet
Bonsai Plus	Guardian	Rebel 3D	Titan
Cochise	Houndog V	Rebel Jr.	Titan 2
Coronado	Jaguar	SR 8200	Tomahawk
Coyote	Leprechaun	SR 8300	Vegas
Crossfire II	Lexus	Safari	Virtue
Duke			

The variety K-31 or Kentucky 31 is discouraged as it provides poor quality turf.

Buffalograss (*Buchloë dactyloides*)

Buffalograss is a fine-bladed perennial grass which spreads by above-ground stolons. It is very drought resistant and is suited for dryland lawns in Wyoming. It can be established by seed or sod. It is slow to establish but eventually forms a very dense lawn. During the growing season it is gray-green but turns straw colored when growth stops in the fall. It is a warm-season grass and therefore browns out with the first hard fall frost and doesn't turn green until June or even later. Buffalograss should be seeded at a rate of 2 to 3 pounds per 1000 square feet.

Buffalograss	
Advantages	Disadvantages
excellent heat and drought resistance	warm-season grass – green only a few months during the growing season
excellent cold tolerance	poor to fair shade tolerance
few disease and insect problems	fair salt tolerance
sod-former – aggressive stolons	not recommended for use at more than 6,500 feet elevation
low fertility requirement	will not tolerate heavy, constant traffic
requires only infrequent mowing	becomes less aggressive and more prone to weeds if overfertilized and/or overwatered
can be established from seed, sod, or plugs	aggressive stolons will invade flower beds, driveways, neighboring lawns
a native species	
naturalizes well with spring bulbs	

Perennial ryegrass (*Lolium perenne*)

Common perennial rye has the characteristics of quick germination and short life span. It is a bunchgrass that typically has limited use in Wyoming. Rye seed is inexpensive and is often found in turf seed mixtures. Since it has a short life span, it may be useful to use on sloping areas to help prevent soil erosion while the lawn is becoming established. The suggested seeding rate for perennial ryegrass is 6 to 8 pounds per 1000 square feet.

There are newer cultivars of perennial ryegrass that are more suited to lawn use than common rye. The following table includes some cultivars of perennial ryegrass to consider:

Accent	Dancer	Line Drive	Pegasus	SR 4400
Achiever	Divine	Majesty	Pennant II	Saturn II
Advantage	Edge	Manhattan 3	Precision	Stallion Select
Assure	Elf	Morning Star	Prizm	Top Hat
Blazer III	Excel	Navajo	Quickstart	Vivid
Brightstar	Express	Night Hawk	Riviera II	Wind Star
Calypso II	Imagine	Nobility	Roadrunner	Wizard
Citation III	Laredo	Omega 3	SR 4010	
Cutter	Legacy II	Omni	SR 4200	

Perennial Ryegrass	
Advantages	Disadvantages
quick to establish	does not recuperate well from damage
wear tolerant	leaf shredding is common from dull mowers
good color and density	disease prone – rust, leafspot
does not form thatch	poor shade tolerance
compatible in color and texture with bluegrass	unavailable as pure sod
may contain endophytes	poor freezing tolerance if flooded or exposed to wind
can possess good drought resistance if deep rooted and in well-prepared soil	
moderate to good salt tolerance	

Fine fescues (*Festuca* spp.)

Fine fescues are sod-forming grasses that make excellent turf by themselves or in mixtures with other grasses such as bluegrass. Creeping red fescue spreads slowly by short rhizomes and establishes easily from seed. Most fescues tend to grow best in moderately fertile soils but will handle poor soils as well. Fine fescues are compatible with bluegrasses. Fescue should be seeded at a rate of 5 pounds per 1000 square feet. Some suggested cultivars are listed in the table below:

Fine Fescue Cultivars	
Creeping red types	Aruba, Barcrown, Boreal, Dawson, Flyer, Jasper, Seabreeze, Shademaster II
Chewings fescues	Banner II, Brittany, Bridgeport, Jamestown II, Koket, SR5100, Shadow, Tiffany, Treasure, Victory
Hard fescues	Aurora, Brigade, Discovery, Ecostar, Reliant II, Scaldis, Spartan, SR3100
Sheep fescue	Quattro

Fine Fescues	
Advantages	Disadvantages
quick to establish	moderate to poor wear tolerance
fine leaf texture	moderate to poor recuperative potential
high density	can become thatchy
tolerates low fertility	may be difficult to mow due to tough leaves
tolerates poor soil conditions	not heat tolerant
drought resistant	susceptible to red thread, leafspot, dollarspot
moderate salt tolerance	
good shade tolerance	
cold tolerant	

Blue grama (*Bouteloua gracilis*)

Blue Grama	
Advantages	Disadvantages
excellent cold, heat, and drought tolerance	warm season grass, becomes straw colored with first frost in fall, turns green in late spring
low fertility requirement	not traffic tolerant
requires infrequent mowing	not shade tolerant
few insect and disease problems	not a sod-forming grass
rapid germination and establishment	not adapted to elevations above 6,000 feet
native species	high seed cost
naturalizes well with spring bulbs	difficult to seed due to high percentage of inert components

Crested wheatgrass (*Agropyron spp.*)

Crested wheatgrass is a long-lived, hardy, drought-resistant grass which can be used for dryland lawns throughout Wyoming. It thrives in most soils of the plains and intermountain regions. Crested wheatgrass should be sown at a rate of 5 pounds per 1000 square feet. Some suggested cultivars include Ephraim and RoadCrest.

Crested Wheatgrass	
Advantages	Disadvantages
excellent cold, heat, drought tolerance	becomes dormant quickly under drought conditions
low fertility requirement	does not form a tight sod
recovers rapidly from dormancy (drought)	light green or blue-green color

Smooth bromegrass (*Bromus inermis*)

Smooth bromegrass is also adapted to Wyoming's climate. One recommended cultivar exists - Lincoln. It should be seeded at a rate of 10 to 12 pounds per 1000 square feet.

Smooth Bromegrass	
Advantages	Disadvantages
excellent cold, heat, and drought tolerance	turf lacks density
low fertility requirement	leaves are coarse
sod former	susceptible to leafspot
persists under neglect	can be invasive due to rhizome growth

Preparation for seeding or sodding

Soil preparation

Before seeding or sodding, steps should be taken to prepare the soil. Extra time and energy spent *before* planting will go a long way toward minimizing problems in the future.

- Always choose grass species and cultivars that are adapted to the local area. Spend a little extra money to buy top quality certified seed or sod. It won't be regretted.
- A soil test is recommended on the area to be seeded or sodded. This is very important in determining fertilizer needs. Pay particular attention to iron levels in the soil. Contact the local University of Wyoming Cooperative Extension Service (UW CES) office for further information.
- Do some pre-plant weed management. This is particularly important when difficult perennial weed species are present. These tough weeds include Canada thistle, bindweed, quackgrass, bentgrass, and bermudagrass. Use a her-

bicide with no residual activity such as glyphosate (brand name Roundup). Allow enough time before planting for the herbicide to fully translocate.

- Use soil test results to determine how much fertilizer, if any, is needed. Incorporate fertilizers to a depth of 6 to 8 inches or as deeply as possible.
- If the organic matter content in the soil is less than 5% (as is the case in most Wyoming soils), incorporate 3 to 5 cubic yards of good quality compost per 1000 square feet to a depth of 4 to 8 inches. This should be enough to cover the soil with compost 1 inch deep before incorporation.

Before seeding:

- Prepare the area for seeding by smoothing and removing large rocks and other debris. Avoid overcultivating, though, because it will result in a fluffy seed bed that will be prone to compaction and crusting.
- If recommended by a soil test, apply up to 1 pound of nitrogen (N) per 1000 square feet using urea, diammonium phosphate, or any quality starter fertilizer.

- Seed in two directions at right angles to each other with one-half of the seed in each direction. Using a seed drill or slit seeder is recommended. If the seed is broadcast, lightly rake or drag the seed into the soil. Slopes that may be prone to erosion should be mulched with clean straw, netting, or matting of some type.
- Irrigate lightly and frequently during germination to keep the soil surface moist. As the seedlings mature and form a deeper root system, gradually water less frequently and increase the amount of water applied each time. Deeper, less frequent irrigation will encourage the formation of a deeper root system.
- Avoid using pre-emergent herbicides in a newly seeded lawn (one exception is siduron, brand name Tupersan). Post-emergent broadleaf weed herbicides should not be used until the turf has been mowed two or three times.
- Seed cool-season grasses in mid to late August or early September and between late June and mid-August in areas above 6,500 feet in altitude.

Before sodding:

- The soil should be prepared as for seeding, above.
- The soil should be slightly moist when the sod is laid.
- Water a newly sodded lawn frequently enough so that the underlying soil is always moist but isn't constantly saturated.

Maintaining the lawn

Irrigation

Water should be applied at a rate that allows the water to penetrate the soil and not run off. In fine-textured (clay) soils common in Wyoming, water won't penetrate as rapidly as it will in sandier soils. If the water is running off the turf surface, it is being applied too rapidly.

Enough water should be applied at each irrigation so that the soil is wet to a depth of about 12 inches. Wait to water again until an area of soil is dry. Shallow, frequent irrigations will encourage shallow root growth and undesirable soil conditions. They also wet the foliage more often, which can lead to disease problems.

A mature, healthy Kentucky bluegrass lawn will need up to 2 inches of water per week during the hottest, driest part of the summer. This should be applied in two or three irrigations per week.

It is also beneficial to water the lawn thoroughly in late fall before the ground freezes. This will help ensure that the grass roots will survive the winter. Low temperatures, as well as Wyoming's radical temperature swings in winter, can seriously damage grass roots if the soil is dry. Moist soil is "buffered" and takes longer to change temperature, thus helping to protect roots.

In winter, watering is also beneficial. If there is no snow cover and the ground is not frozen, the turf will benefit from watering every 4 to 6 weeks. Pay particular attention to exposed slopes, sites with shallow soils, and south or west-facing exposures.

Soils and fertilization

pH

The optimum soil pH range for most turf is 6.5 to 7.0. Most Wyoming soils are above that. Turfgrasses can be grown on soils with these higher pH levels if careful attention is paid to providing additional iron (Fe) and phosphorus (P). Phosphorus can be supplied by either leaving grass clippings on the lawn after mowing or by applying a balanced (complete) fertilizer. Iron deficiencies can be corrected by applying iron sulfate or iron chelate to the *foliage* of turf plants when symptoms develop. Trying to lower soil pH by using sulfur rarely works. This is because Wyoming soils are highly buffered and resist changes in pH.

Soil structure

The best way to improve soil structure is by adding good-quality organic matter before seeding or sodding. This enhances soil structure and also improves water and nutrient-retention capabilities. The organic matter used *must* be free of pathogens and weed seeds and *must* be low in soluble salt content. Good sources of organic matter include well-aged manure, composted bark or sawdust, garden compost, and sphagnum peat moss (not mountain peat). Organic matter should be incorporated to a depth of 4 to 6 inches and as uniformly as possible.

Applying organic matter over the lawn surface is not recommended because a layering effect can occur. This layering effect can disrupt both upward and downward movement of water in the turf.

Balanced (complete) fertilizers

Most turf fertilizers contain nitrogen (N), phosphorus (P), and potassium (K) and sometimes iron (Fe) and sulfur (S). It helps to add these types of fertilizers if clippings are routinely removed from the lawn after mowing. Even if clippings are left, use of a complete fertilizer is beneficial.

Winterizer fertilizers

These fertilizers usually contain higher percentages of phosphorus and/or potassium in addition to nitrogen. These fertilizers are often touted as enhancing winter hardiness of turf, but there is currently no evidence that suggests that extra P or K is beneficial for bluegrasses, ryegrasses, or fescues for winter hardiness. The most important nutrient for late-season (fall) fertilization of bluegrasses, ryegrasses, and fescues is still nitrogen. The use of winterizer fertilizers should not be discouraged, however, because it encourages homeowners to fertilize in late summer/fall, which is an excellent time.

Fertilizer application schedule for established Wyoming lawns (Nitrogen application rates are in pounds of nitrogen per 1,000 square feet of lawn area)					
Turfgrass species	Mid-March to April	May to mid-June	July to early August	Mid-August to mid-Sept.	Early Oct. to early Nov. (if grass is green)
High-maintenance bluegrass, perennial ryegrass	½ to 1	1	not required	1	1 (2)
Low-maintenance bluegrass	1		not required	1	(1)
Turf-type tall fescue	½	½ to 1	not required	1	(1)
Fine fescue	½	½ to 1	not required	½ to 1	not required
Buffalograss, blue grama	apply no N	½ to 1	½ to 1	apply no N	apply no N

Late-season fertilization

Late-season nitrogen fertilization has been applied by turf managers on Kentucky bluegrass for years. This practice involves applying much of the season's nitrogen during the late-season months of August through October (depending on location). This is not to be confused with dormant or winter fertilization. Late-season fertilization requires that nitrogen be applied before the turf loses its green color in the fall. The advantages to late-season fertilization include:

- better fall and winter color
- earlier spring greening
- increased shoot density
- improved fall, winter, and spring root growth
- enhanced storage of energy reserves (carbohydrates) within the turf plant.

When fertilizing in the late season, use a fertilizer that does *not* depend heavily on warm temperatures or microbial activity to cause the nitrogen to be released. Good fertilizers to use are those that contain

urea, sulfur-coated urea, IBDU (isobutylidine diurea), methylene ureas, and ammonium sulfate.

How much to apply

To calculate how much of a fertilizer source to apply, use the following steps:

1. Check the three numbers on the fertilizer bag. The first number is % nitrogen (by weight), the second number is % P₂O₅ (not actual P), and the third number is % K₂O (not actual K).
2. Make note of the % N in the fertilizer.
3. Divide the number of pounds of N to apply by the % N in the fertilizer.

Example: The fertilizer has a 20-5-10 analysis. The amount of this fertilizer needed is 1 pound of N to 1000 square feet of lawn area. How many pounds of this fertilizer are needed in the spreader for each 1000 square feet of lawn area?

$1 \text{ pound N} \div 0.20 \text{ N} = 5 \text{ pounds}$ of this fertilizer must be applied per 1000 square feet of lawn.

Characteristics of some nitrogen fertilizers			
Fertilizer name	Analysis	N source	Residual N activity
Quickly available N fertilizers			
Ammonium nitrate	33-0-0	ammonium nitrate	4 to 6 weeks
Ammonium sulfate	21-0-0	ammonium sulfate	4 to 6 weeks
Ammonium phosphate	18-46-0	diammonium phosphate	4 to 6 weeks
Urea	46-0-0	urea	4 to 6 weeks
Slowly available fertilizers			
Slow-release sources			
Sulfur-coated urea	22 to 38% N	urea	10 to 15 weeks
ONCE	24 to 35% N	urea, nitrate, ammonium	15 to 36 weeks
Slowly soluble sources			
IBDU	31-0-0	isobutylidine diurea	10 to 16 weeks
Ureaform reaction fertilizers			
Nitroform	38-0-0	ureaformaldehyde	10 to 30 weeks+
FLUF	18-0-0	urea/ureaformaldehyde	6 to 10 weeks
Nutralene	40-0-0	methylene ureas	7 to 12 weeks
Methylene urea	39-0-0	methylene ureas	7 to 9 weeks
Coron	28-0-0	urea/methylene ureas	7 to 9 weeks
N-Sure	28-0-0	triazone/urea	6 to 9 weeks
Natural organic fertilizers			
Ringers	6-1-3	blood, bone, seed meals	10 to 12 weeks
Sustane	5-2-4	composted turkey waste	10 to 12 weeks
Milorganite	6-2-0	activated sludge	10 to 12 weeks

Mowing

The two most important facets of mowing are mowing height and mowing frequency. Here are some tips:

- The preferred mowing height for all species is 2 ½ to 3 inches. The minimum height that any lawn should be mowed to is 2 inches. Mowing to heights less than 2 inches results in decreased drought and heat tolerance plus higher incidences of insect, disease, and weed problems. Mow at the same height all year; there is no reason to mow shorter in the fall.

- Mow frequently enough that no more than one-third of the grass height is removed at any single mowing. If the mowing height is 2 inches, the grass should be mowed when it is 3 inches tall. If the mowing height is 3 inches, it should be mowed when it is about 4 inches tall. Bluegrass or fescue lawns may need mowing every 3 or 4 days during the spring but only once every 7 to 10 days during periods of heat, drought, or cold. Buffalograss may only need mowing once every 10 to 20 days depending on irrigation frequency.

- Grass clippings should be allowed to fall back onto the yard unless they are used for composting or mulching elsewhere in the landscape. Grass clippings decompose quickly and do not contribute to thatch accumulation. If herbicides have been applied to the lawn, clippings should not be used as compost or mulch but should stay on the lawn. Clippings recycle nutrients and organic matter back into the turf - an added benefit.
- Check mowing equipment frequently during the season for sharpness and adjustment. Ideally, rotary mower blades should be sharpened every fourth mowing. This is especially important when using rotary mowers on fescue or ryegrass lawns since a dull blade will shred and fray the leaf blades instead of cutting cleanly. The result is a brown-colored, unattractive lawn. Reel-type mowers should be checked for proper blade-to-bedknife adjustment before each mowing to avoid shredding and tearing grass leaves.

Thatch and compaction management

Thatch is a tight, brown, spongy organic layer of both living and dead grass roots and stems that accumulates above the soil surface. Interactions among environmental conditions, soil conditions, and management practices (irrigation, mowing, fertilization) influence the rate and extent of thatch accumulation. Thatch tends to be a problem on Kentucky bluegrass and fine fescue lawns. It is rarely an issue on tall fescue, wheatgrass, bromegrass, or buffalograss lawns. Grass clippings *do not* contribute to thatch problems.

Take measures to slow thatch accumulation when the thatch layer exceeds one-half inch. Measure the thatch layer by removing a small piece of turf, including the underlying soil. Beyond the one-half-inch thick point, thatch can be very difficult to

manage. As the thatch layer thickens, it becomes the main rooting medium for the grass instead of the soil underneath. This predisposes the turf to drought stress and winterkill and also increases chances for insect, disease, and weed problems. Also, fertilizers and pesticides applied to a thatchy lawn aren't as effective.

Power raking and dethatching

Power raking has been used as a method of thatch removal for years. Light, shallow power raking can be beneficial if done frequently enough. However, deep power raking of a thatchy lawn can be very damaging and often removes a substantial portion of living turf. Used properly, power raking wet, matted turf can help speed spring greening and encourage air movement into the root zone.

Core aerating/cultivating

This is a much more beneficial thatch management technique than power raking. The reasons are that core aerating/cultivating helps improve root zone by relieving soil compaction and also helps control thatch accumulation. In fact, soil compaction is one of the factors that contributes to thatch accumulation.

In core aeration, plugs of thatch and soil 2 to 3 inches long (the longer the better) are removed by the aerating machine and deposited on the lawn surface. A single aeration machine with one-half-inch diameter tines will remove about 10% of the thatch from a lawn if enough passes are made to result in an average 2-inch spacing between holes.

Leaving the cores on the lawn after core aerating is recommended. Over time the cores will disintegrate and filter back down into the lawn. The resultant mingling of soil and thatch hastens the decomposition of the remaining thatch. If leaving the cores on the turf is not an option, they can be raked and composted.