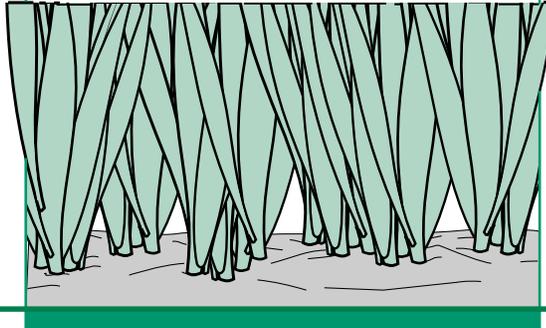


MANAGING FESCUE FOOTBALL FIELDS

Turfgrass



A football field can be either a source of pride or embarrassment to a community when used for spectator sports and other activities. Without question, the most important aspect of the field is the playing surface. The turf should provide safe and even footing, cushion falls, and prevent mud and dust.

Maintaining a high-quality turf during the playing season presents special challenges to the field manager. Often, the turf in the center of the field wears out because of the play pattern of a football game. Once the center of the field becomes compacted, it is difficult to maintain a good turfgrass stand.

Maintaining a safe, attractive playing field requires an adequate budget, a competent sports field manager, cooperation on limiting the use of the field, and a good program of athletic field maintenance. Most problems can be avoided by following a complete turfgrass management program designed especially for the football field and its particular species of grass. It is important to have a written program that is adhered to by everyone involved.

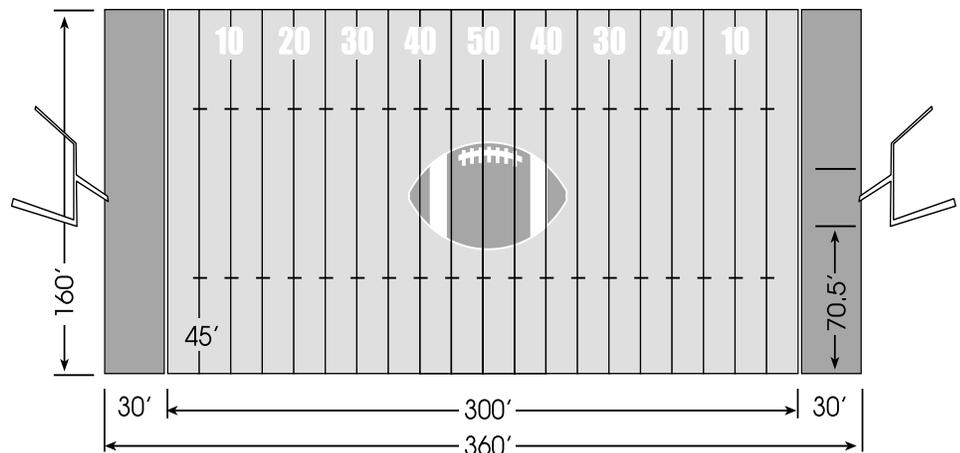
Fescue for Athletic Fields

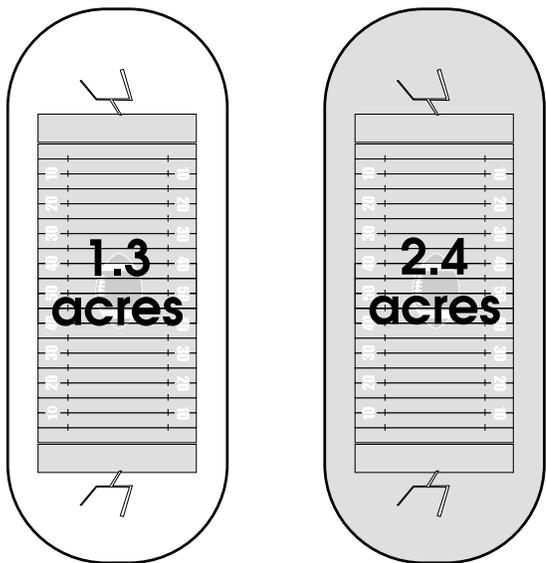
Tall fescue is the most popular turfgrass for football fields in Kansas. It is durable and remains green throughout the playing season. Tall fescue is a perennial, cool-season bunchgrass, but when seeded at the prescribed rate and managed properly, it forms a dense, attractive turf.

The new turf-type cultivars of tall fescue are an improvement over the pasture-type tall fescues such as Alta, Fawn and K-31. Cultivar recommendations are updated periodically based on K-State research results. Check your local K-State Research and Extension office for the latest recommendations.

The new turf-type fescues, like the older cultivars, require good management and proper care.

Diagram of a Regulation Football Field





Both types require similar care and management as outlined in this publication.

Marking the field: The line area should not be scalped or trenched because it causes uneven footing and a possibility of player injury. Instead, latex paint or other approved marking paint should be used. Lime can cause injury if it gets into a player's eye.

Field Dimensions: In order to accurately calculate and apply fertilizer, pesticides, seed, and other materials, the area to be treated must be known. There are 1.32 acres (57,600 square feet) within the boundaries of a standard 11-man football field. The total area within a standard running track is 2.39 acres (104,108 square feet). Subtract any large paved areas, such as the players' bench area, from these measurements when determining the amount of material to be applied.

Fertilizing

With the exception of nitrogen, fertilizer applications should be based on a reliable soil fertility test. A basic soil test (pH, phosphorus, and potassium) should be taken at least every 3 years. Take 15 to 20 random soil samples, 3 inches deep, from the field. Discard the grass leaves and thatch from the sample and mix them together thoroughly. Place a pint of the composite sample in a paper bag and take it to your county K-State Research and Extension office. There is a modest charge for the service. Allow several weeks to process the sample and interpret the results.

Examples of Nitrogen Sources and Equivalent Rates

Analysis	Lbs. of product needed for football field	Lbs. of product needed for total area inside track
Ammonium nitrate 33-0-0	180	300
Ammonium sulfate 20-0-0	300	500
Urea 45-0-0	130	220
Ureaformaldehyde 38-0-0	160	265
IBDU 31-0-0	200	325
Sulfur coated urea 32-0-0	190	315

These nitrogen fertilizers are available under a variety of brand names. The number on the right denotes amount per application.

Other tests can be run at an additional charge if specific nutritional problems are suspected, but they are usually not necessary for tall fescue. A general soil fertility test only measures levels of specific nutrients and the pH (degree of acidity or alkalinity). It does not measure soil compaction, damage from insects, disease, pesticide residues, or other problems.

Keep in mind that fertilizing is only one aspect of a good turfgrass management program. Fertilizer alone will not produce the desired results. Fertilizing must be accompanied by proper watering, mowing, aerating, pest control, and other management practices.

Nitrogen is the most important fertilizer element for tall fescue. It promotes green color, density, and growth, and helps the turf resist wear and weed invasion. The amount of nitrogen fertilizer that is applied should be based on the quality expectation for the field, along with the budget, use, and available labor.

The fertilizer spreader must be carefully calibrated to apply the right amount of fertilizer uniformly, without skips or overlapping. Applying half the fertilizer in one direction and half at a right angle to the first will minimize skipping and streaking.

Phosphorus, potassium, or lime should be applied only if the need is indicated by a reliable soil test. These elements may already be sufficient or excessive in the soil, and adding more could create nutritional imbalances. Often, the phosphorus and potassium level for established tall fescue is adequate, and may be excessive. Adding these elements is of no benefit unless they are deficient.

Nitrogen Fertilizing Schedule

Application	Time	Actual nitrogen ^a for field only (1.3 acres)	Actual nitrogen for both football field & area inside track (2.4 acres)
1st	Early September	60 lbs. soluble ^b	100 lbs. soluble
2nd	Early October	60 lbs. soluble	100 lbs. soluble
3rd	November	60 lbs. soluble	100 lbs. soluble
4th	Early May	60 lbs. insoluble ^c or 30 lbs. soluble ^d	100 lbs. insoluble or 50 lbs. soluble
5th (optional)	Early June	30 lbs. insoluble (preferred) or 30 lbs. soluble	50 lbs. insoluble (preferred) or 50 lbs. soluble

^a Pounds actual nitrogen (not pounds of product) to cover 1.3 acre football field.

Example: A 33-0-0 fertilizer contains 33% actual nitrogen. A football field would require 180 pounds of this product per application.

^b Soluble nitrogen sources: ammonium nitrate, ammonium sulfate, urea.

^c Insoluble nitrogen sources: Ureaformaldehyde, IBDU, sulfur-coated urea, Milorganite, Sustane.

^d If using soluble fertilizers in the spring, use a “spoon -feeding” approach (i.e., use the lighter rate given in the table).

Established tall fescue uses large quantities of nitrogen, only a small amount of phosphorus, and a moderate amount of potassium. These last two elements produce no visual response unless they are deficient. Tall fescue has a deep root system that extracts soil nutrients efficiently. A common mistake in fertilizing turfgrass is to use a balanced fertilizer such as 10-10-10, 12-12-12, 14-14-14, etc. Turfgrass does not use nutrients in this ratio. Established turfgrass uses nutrients in approximately a 4-1-2- ratio (nitrogen-phosphorus-potassium).

Although a pH of 6 to 7 is preferred, tall fescue will tolerate pHs ranging from 4.7 to 8.5, so it is seldom worthwhile to attempt major adjustments in the pH on an established field. Micronutrients such as iron or zinc seldom produce a response in tall fescue if the soil pH is in the acceptable range. Where the pH is above 7.0, acidifying fertilizers such as ammonium sulfate or sulfur-coated urea can be used in an effort to gradually lower the pH. The time to attempt major pH adjustments is when the field is being reestablished, and lime or sulfur can be mixed into the soil at appropriate rates. Lime is used to raise the pH and sulfur to lower the pH. Never add lime or sulfur unless soil tests indicate the need.

Fertilizing schedule: The following nitrogen fertilizing schedule is recommended for maintaining a good-quality tall fescue football field provided that it receives proper and timely maintenance.

1st application: 7 to 10 days before the first football game in September.

2nd application: Early October

3rd application: After the last regular game in November.

4th application: Early May, after spring flush of growth is over.

5th application: (optional) If nitrogen is depleted by frequent irrigation or rainfall, an early June application may be necessary to maintain color and vigor until September, especially if a soluble source is used in May.

Mowing

Frequent mowing, at the right height with a sharp blade, is a key factor in having a high-quality fescue turf. Mowing is often neglected, especially during the off-season. Do not mow a football field like a hay field, i.e. letting the grass get tall and mowing it down to a stubble. This results in a thin stand of stemmy turf that can be invaded by weeds, making it unattractive and of poor playing quality.

Tall fescue football fields should be mowed at a height of 2½ to 3½ inches in the spring and summer and 2 to 2½ inches during the playing season. Don't mow tall fescue shorter than 2 inches. Mowing at the higher end of the range will improve summer drought resistance by encouraging deeper roots.

For a thick, attractive turf, mow frequently enough so that no more than one-third of the foliage is removed at one time. For example, turf

mowed at 2 inches should be mowed when the height reaches 3 inches, so no more than 1 inch is removed. When mowing at 3½ inches, the turf should be mowed when the height reaches about 5 inches.

Mowing frequency should be based on the rate of growth rather than on a set schedule such as once a week. Fescue grows fastest in the spring, slows down somewhat during the summer and resumes a moderate growth rate in the fall.

Removing the clippings is not necessary if the grass is mowed frequently enough so the clippings settle back into the turf. Clippings return much of the fertilizer nutrients back to the soil and do not contribute to thatch. It is more efficient to mow frequently so clippings do not have to be removed. This also results in better quality turf.

Tall fescue has a rather fibrous leaf that results in a ragged look if the mower has a dull blade. In hot weather, the frayed ends bleach out and give a whitish look to the turf. Check the blades for sharpness before every mowing.

Watering

Watering requires good judgement because of variable weather conditions. The need for irrigation is determined by temperature, sunlight, wind, humidity, and natural rainfall. Mowing and fertilizing also affect the water requirement.

Frequent watering wastes water and leads to shallow rooting, weeds, insect and disease problems, and soil compaction. Water only when needed, but do not let the field become severely water-stressed. Look for the first signs of visible wilt and then apply ¾ to 1 inch of water. When using this approach during hot summer weather, the field will probably require irrigation about every 4 to 7 days, barring rainfall.

A time clock that automatically activates the irrigation system according to a preset interval is not the most efficient way to irrigate because it does not take into account the changing weather conditions.

Overwatering in the spring can lead to a shallow-rooted turf that is ill-equipped to handle summer drought stress and fall traffic. Watering only when the grass needs it will encourage deeper rooting and lead to better summer performance and increased tolerance to the heavy use during the fall playing season.

Watering in the early morning hours is best (i.e., after about 4 a.m.). Water pressure is usually greatest at this time of day, wind is minimal, and the turf has a chance to dry out before nightfall so diseases are discouraged.

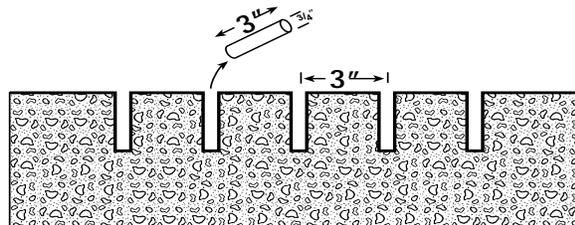
During the playing season, finish irrigating 24 to 48 hours before a game if possible. Although wet fields are soft to play on, they are very prone to soil compaction. When a field receives constant use, water immediately after the last game or practice of the day so the field can dry as long as possible before it is used the next day. Turfgrass will withstand the wear of a game better if it has adequate soil moisture. The soil should be neither soggy wet or so dry that the grass is beginning to wilt when subjected to heavy foot traffic or heavy equipment.

Core Aerating

Core aerating to reduce soil compaction is an essential management practice for athletic fields. Soil compaction of athletic fields cannot be completely avoided; it occurs in direct proportion to the amount of use a playing field receives. Compaction reduces the pore space in the soil which limits root growth and water penetration. The vigor of the turf gradually declines and will not respond well to good management. Weed invasion often follows.

A core aerating machine removes small plugs of soil from the turf. Aerating should not be confused with spiking, which only pokes small holes in the soil and may increase the compaction around the holes. Spiking will not substitute for aerating. Proper core aerating improves root growth by increasing water and nutrient infiltration and oxygen-carbon dioxide exchange in the upper soil surface.

Under normal conditions, a tall fescue athletic field should be aerated at least twice a year — immediately after the last game in the fall and again early in the spring. Severely compacted



areas can be aerated more often (up to four or five times), but do not aerate just before or during the playing season, or during very hot weather. The alternative to core aerating is to till the soil, mix in amendments, and then reestablish the turf.

Aerifying the soil requires sufficient moisture for the tines to penetrate the soil, but not so much that they become clogged. If the tines clog, the aerator functions like a sheep's foot soil compactor and will actually increase soil compaction. The soil is at the correct moisture content when a plug crumbles apart easily when worked between the fingers. Some weight may have to be added to the machine for proper penetration, but be careful not to add so much weight that the tines bend.

The tines for aerifying athletic fields should be about $\frac{3}{4}$ inch in diameter. Ideally, the depth of penetration should be $2\frac{1}{2}$ to 3 inches, but this depth may not be achieved initially on compacted, clay soil. After a few years on an aerification program, the depth of penetration should gradually increase. The spacing of the aerifier holes should be about 3 inches apart. It may be necessary to go over the field two or three times to get the 3-inch hole spacing, depending on the machine.

It is not necessary to remove the soil cores. They will be broken up by mowing and watering, and will function as a topdressing. Some of the soil cores can be collected and used for the soil fertility test. If faster decomposition of the cores is desired, verticut the cores to break them up and lightly drag the field. Alternatively, dragging alone will speed break up of the cores if the moisture content is correct.

Slicing tines can be used during the playing season to aid in water penetration without disrupting the playing surface. A machine with interchangeable tines is best. The coring tines are used during the off-season, and the slicing tines during the playing season. Slicing should be done just before irrigating. It will have to be done before each irrigation on problem fields because the narrow slits will be closed after watering.

Deep-tine Aerification

Ideally, core-aeration would be supplemented by a deep-tine aerification every year, or every other year. There are several types of deep-tine aerifiers. Most penetrate the soil to a depth of about 10 to 16 inches. These units are effective in breaking through hard pans to improve drainage.

Also, because aerating at the same depth each time can result in a compaction pan, occasionally varying the depth of penetration is a good practice.

Gypsum and Wetting Agents

The question of using gypsum and wetting agents for compacted soils often arises. Gypsum is effective only on high-sodium soils. An exchangeable sodium test should be used to determine if gypsum will be effective. When gypsum is needed to solve an excessive sodium problem, it is most effective when thoroughly tilled into the soil. Surface applications to established turf are of limited value. In any case, reclaiming a high-sodium salt is a slow, difficult process.

Wetting agents in liquid or granular form are sold under a variety of trade names. Their main use is to aid water penetration into the soil. They do not reduce soil compaction or increase pore space, but may aid in alleviating dry spots.

Renovating the Field

Tall fescue football fields should be renovated after the last game in the fall. There is a natural tendency to forget the football field after the last game and often nothing is done until late in the spring or after school ends, which is too late for good results. Late spring seeding requires frequent watering for the seedling grass to survive the summer. Excessive watering favors weeds and disease. Even with adequate watering, root growth of tall fescue is minimal during summer months. Tall fescue makes most of its root growth during the spring and fall.

Renovating includes repairing the crown (if necessary), core aerating, fertilizing, seeding, and watering. Core aerating should be done as soon as possible, after the last game, and before fertilizing and seeding. Aerate the field thoroughly by going over it three or more times. Besides helping correct the compaction from the playing season, the holes provide a place for the seed to get into the soil. Fall is the best time for aerating because the winter freeze-thaw action in the holes loosens up surface compaction.

Don't be concerned if the field looks rough after a thorough aerating. It will settle down during the winter and the soil brought to the surface will help cover the seed. Fertilizing should follow core aerating. Depending on the date of the last game, seeding may need to be

delayed for a few weeks (see “Dormant Seeding” section below). Reseeding may be necessary only in the center of the field. It is best to use a grass drill for seeding. A drill places the seed in the soil so it is not eaten by birds or washed or blown away during the winter. It is important to water in the seed and fertilizer after they are applied.

Dormant Seeding: Some ask if it is risky to seed fescue in late fall. There are risks. If you seed too early, the seed may germinate in the fall leaving an immature plant, which may not survive the winter. Some of the seed could also be lost to birds, blowing, or washing away. But there are ways to safeguard against these problems. First, waiting until after Thanksgiving to seed should ensure that no seed will germinate in the fall or winter because soil temperatures will be cold enough to prevent germination. Second, drill-seeding (especially following intensive core aeration) places the seed beneath the soil surface where birds, wind, and washing are unlikely to affect it.

The benefit of dormant seeding is that the seed is in place and ready to germinate as soon as conditions are favorable in the spring. If getting out on the field to seed in late March or early April was guaranteed, then dormant seeding provides no advantage. In fact, it would be better to wait until spring. But soils are often wet and slow to dry out in the spring, so dormant seeding avoids the problem of dealing with wet spring soils.

Early-Spring Seeding: Early spring (late March or early April) seeding of tall fescue can often be successful. Fescue planted early has a longer growing time before it is used during the fall playing season. The most important point in spring seeding is to seed early so the seedlings can become well established before spring weeds begin to grow and before hot summer weather begins. Mature fescue will stand wear better than younger stands of grass.

Weed Control on New Stands: Tupersan (siduron) is the only crabgrass preventer that can be used in areas seeded in the late fall or spring. Any other crabgrass preventer will also prevent the grass seed from growing. Alternatively, Acclaim (fenoxaprop) is a very effective postemergence crabgrass herbicide that can be used on 1-month-old fescue. Acclaim is most effective when the weedy annual grasses are

young. Also, 2,4-D and other broadleaf weed killers should not be used within 1 month before seeding and not until after new grass has been mowed three times. The exception is Buctril (bromoxynil), which can be used on seedling grass, but it must be used while the broadleaf weeds are young and small. Using the wrong weed killer at the wrong time can kill the new grass.

Controlling Weeds, Insects, and Diseases

Weeds are often a problem in athletic fields because the turf thins out from heavy use and is invaded by weeds. Weed control requires considerable knowledge of herbicides, weed identification, proper application, and safety.

Knotweed is a common problem on football fields, especially in the center of the field where compaction is most severe. Knotweed is an indicator of a compaction problem. It is an annual broadleaf weed, but when it first emerges from the soil, it has the appearance of grass. Knotweed begins growth early in the season (late February to early March). It is a difficult weed to control when it matures, so early control is necessary. Buctril (bromoxynil) can be used if the knotweed is immature. Buctril also has little to no soil residual so it will not interfere with spring or fall seeding. Other products such as 2,4-D or Trimec will control immature knotweed, but they may damage young fescue seedlings, or interfere with seeding plans.

The local K-State Research and Extension office can assist with identifying weeds and recommending methods of control.

Annual white grubs are the primary insect of concern on tall fescue football fields. The grubs feed on the roots in August and September, causing loss of turf and poor footing just as the playing season is beginning. If these insects have been a recurring problem, Merit (imidacloprid) or Mach 2 (halofenozide) should be applied in early to mid July.

Sodwebworms, armyworms, and/or cutworms occasionally cause noticeable damage to fescue. A healthy stand of turfgrass will often outgrow damage from these insects. If they are encountered in damaging populations, treat with a labeled insecticide. Check with your county extension agent for recommended materials.

Brown patch is the major disease of tall fescue. It usually occurs during July and August when

day and night temperatures and humidity are high. Avoiding excessive nitrogen fertilization in the spring, and avoiding irrigating in the evening or at night, will help discourage brown patch outbreaks. If an outbreak is severe, treat with the fungicide chlorothalonil (Daconil and others) to stop the progress of the disease.

When using any pesticide, follow label instructions carefully. Incorrect applications of pesticides can severely damage turfgrass. If pesticide applications are performed by school district staff, the applicators should become certified by attending pesticide applicator training. Check with your local K-State Research and Extension office for details.

Limiting Playing Field Use

No grass can withstand unlimited use. Football practice, band practice, games, and other activities all contribute to the wear and decline of the turf. Ideally, two or more practice fields should be provided for each main game field. Practice fields should be marked according to official regulations, reducing the need to practice on the main field.

Main fields should be used only for official games with the exception of one team and one band practice before each game. During football practice, as many of the scrimmage activities as possible should be conducted on the sides of the field, rather than in the center. Activities during the off-season also should be limited, especially during the summer when the grass is under heat stress. There is no exact number of games that can be played on the main field without excessive damage. That depends mainly on the type of soil and the condition of the grass. Generally, about 10 games can be played, but good judgment must be used. If the field continues to decline from season to season, further restrictions may have to be imposed on the use of the field.

It is normal for some damage to occur in the center of the field. There is no special kind of grass that will eliminate this problem. It should be part of the yearly maintenance schedule to renovate the center of the field at the end of each season or early the following spring.

Fescue Football Fields

Management Highlights

Fertilizing:

Should be based on a soil test and done 7-10 days before first game in September

Early October, and after last game in November
Early May, after spring growth

Mowing:

2½-3½ inches in spring and summer

2-2½ inches in fall

Keep blade sharp

Mow frequently so clippings are short

Vary mowing pattern

Don't mow when turf is under drought stress

Watering:

Soak soil deeply

Water only when needed

Morning watering is best

Core aerating:

After last game and early spring

Use slicing tines during playing season

Use ¾-inch diameter tines

Hole spacing should be 3 inches apart and 3 inches deep

Periodic deep-tine cultivation is beneficial

Renovating field:

Renovate immediately after last game

Early spring, March or April, is second choice

Don't wait until late spring or summer

Pest control:

Use only approved pesticides

Apply according to label directions

Healthy stands of grass have fewer pest problems

Steve Keeley
Assistant Professor
Turfgrass

Matthew J. Fagerness
Extension Specialist
Turfgrass

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-803 Revised

September 2001

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