

Bermudagrass

Athletic Field Maintenance Calendar

This calendar of suggested management practices is designed to assist you in the seasonal care of your athletic field. Location, terrain, soil type and condition, age of field, previous management practices, and other factors affect turf performance. For these reasons, the following management practices and dates should be adjusted to suit your particular athletic field conditions.

April through June

Mowing

Set mower to 1-inch cutting height and remove debris before the grass turns green in the spring. The best mowing height during the growing season is 1 inch for common bermudagrass and 3/4 to 1 inch for hybrid bermudagrass. Do not allow bermudagrass to grow above 1 1/2 inches between mowings. Two or three weekly mowings may be necessary. Remove only those clippings that windrow.

If the grass gets excessively high during a wet period, raise the mower and cut off one-fourth to one-half of the present growth; then lower the mower to its proper height in a day or two. Reel mowers are preferred for a clean cut. Rotary mowers are a second choice provided the blades are sharp and can be lowered to the appropriate height; however, scalping frequently occurs at lower cutting heights.

Fertilization

Apply 1 pound of nitrogen per thousand square feet two or three weeks after the grass turns green. A complete (3-1-2 or 4-1-2 ratio) fertilizer may be necessary only once or twice annually with remaining applications composed of nitrogen sources such as urea (45-0-0) and ammonium

Fertilizer Analysis	Pounds of Product	
	per 1,000 sq. ft. ⁽¹⁾	per acre ⁽²⁾
12-4-8	8.3	360
16-4-8	6.3	272
8-8-8	12.5	540
10-10-10	10.0	435
46-0-0	2.2	95
34-0-0	2.9	125

1. Amount of product needed to apply 1 pound of nitrogen per thousand square feet.
2. Amount of product needed to apply 43.5 pounds of nitrogen per acre. To determine the amount of product needed to deliver 1 pound of nitrogen per thousand square feet, divide 100 by the first number in the fertilizer ratio. For example, for 16-4-8 fertilizer, divide 100 by 16. The result is 6.25 pounds of product per thousand square feet.

nitrate (33.5-0-0). (Table 1). If growth appears to be slow and the grass is yellowish green, apply a nitrogen source every four to six weeks at 1 pound per thousand square feet as needed.

Test the soil to determine phosphorus, potassium, and lime requirements. Obtain test kits at your Cooperative Extension Service office or from the Agronomic Division Soil, Plant, and Nematode Testing, North Carolina Department of Agriculture, Raleigh, NC 27611.

Apply lime as needed, but no more than 50 pounds per thousand square feet per application. Apply in split applications four or more weeks apart if the suggested amount exceeds 50 pounds per thousand square feet. If possible, apply lime just before coring the soil. Table 2 gives examples of field sizes in acres.

Table 2. Typical Field Sizes in Acres	
Field	Size (acres)
Baseball*	
Little League, Bronco	1.2
Pony	2
Colt	3
Babe Ruth, Senior League, Official	3.0 to 3.85
Infield	0.16 (7,000 sq. ft.)
Field Hockey*	1.2
Football	
Playing surface 360' X 160'	1.3
Playing surface & bench area 360' X 200'	1.6
Hash mark area 300' X 54'	0.37
440 oval	2.3
Lacrosse	1.4
Rugby*	1.4 to 1.7
Soccer*	2.2 to 2.7
Softball, Adult*	
Slow pitch (12"), fast pitch	1.5 to 2.0
Modified slow pitch (16")	1.2 to 1.7
Softball, Youth*	1.5 to 2.0
* varies depending on the following:	
1. size and number of fields	
2. orientation and layout of fields	
3. quality and type of support facilities	
4. internal and external buffer zones	

Irrigation

Water in the early morning to a depth of 6 to 8 inches. Bermudagrass usually requires a weekly application of about 1 1/4 inches of water. In sandy soils, apply 1/2 to 3/4 inch of water every three to four days. It takes 620 gallons of water to apply 1 inch per thousand square feet. Do not irrigate again until symptoms of wilt appear (folded or curled leaves, footprinting, or bluish green color). Probe the soil to detect dryness. Avoid light, frequent irrigations because they promote shallow rooting and encourage algae and moss growth.

To reduce compaction and wear, do not irrigate for two days before heavy use. Minimize field use when wet. Postpone play or use alternate sites for band practice and practice sessions. **Game fields should be used only for team play and not for team practice, physical education, or band practice.**

Soil Cultivation

Vertically mowing to remove thatch (dead plant residue) is essential for bermudagrass, especially for aggressive cultivars such as Vamont and Tifway. Verticut the field with a power rake about two to three weeks after the grass turns green to remove thatch. Run the verticutter over the field twice, with the second pass at right angles to the first, and sweep and haul off the debris.

Aerification (coring) relieves compaction on heavily trafficked athletic fields. Aerate monthly beginning two weeks after the grass turns green during the growing season using 3/4- to 1-inch diameter tines that remove soil cores. Aerate the field lengthwise twice and crosswise once to penetrate heavy clay soils. These soils must be moist. (Water the field several days in advance.) Allow the plugs to dry, then pulverize them with a mower or power rake and redistribute with a dragmat. More frequent coring may be necessary along heavily trafficked and compacted areas such as player benches, between hash marks, along sidelines, and in front of goals. Football fields may be aerified right after the last game of the season to avoid disruption of team play.

Rent, borrow, or contract for these services if you do not have equipment on hand. Soil cultivation practices are necessary for an acceptable field; however, do not perform these practices if the turf is under stress. It may take three weeks of good growing conditions for the turf to recover after aerification.

Renovation

April and May are preferred for renovating bermudagrass fields.

Weed Control

Postemergence* - Grasses and Sedges: Metribuzin (Sencor DF) applied at 0.25 to 0.5 pounds of active ingredient per acre (lb ai/A) will control small crabgrass and goosegrass plants. Do not apply to bermudagrass turf under stress or to turf < 0.5 inch in height. Repeat application may be needed 7 to 10 days later. MSMA (various brands) applied at 1.5 lb ai/a can be tank-mixed for improved goosegrass control.

MSMA (various brands) applied at 2 to 3 lb ai/A will control crabgrass species, goosegrass, bahiagrass, dallisgrass, sandbur, annual sedge and nutsedge species. Begin treatments when grasses (before tillering) and sedges (3 to 5 leaves) are young. Repeat applications may be needed at 7 to 10 day intervals. Nutsedge species and sandbur may require 3 to 4 applications. Read the MSMA label to determine if a surfactant should be included.

Bentazon (Basagran T/O or Lescogran) will control annual sedge and yellow nutsedge. Apply 1 to 2 lb ai/A and repeat in 10 to 14 days. Do not mow 3 to 5 days before or after treatment.

Imazaquin (Image LC) 0.25 to 0.5 lb ai/A and halosulfuron (Manage) 0.5 to 1 oz ai/A will control green kyllinga, purple nutsedge and yellow nutsedge. Do not apply until after spring greenup. A nonionic surfactant is required for each product. For improved nutsedge species

control, MSMA applied at 1.5 lb ai/A can be tank-mixed with Image LC. Manage only suppresses green kyllinga. A second application is usually required 6 to 10 weeks after the initial treatment.

Postemergence* - Broadleaves: Broadleaf weeds such as knotweed, spotted spurge, common lespezea, dandelion, plantain species, white clover, etc. can be controlled with mixtures containing 2,4-D amine, mecoprop, dicamba, dichlorprop, triclopyr and clopyralid (various brands). Read the label for suggested use rates. For some hard-to-control weeds (common lespezea, Virginia buttonweed, etc.), applying these products at half the label rate and repeating the application in 7 to 10 days has proven effective.

*Do not mow or water bermudagrass turf for at least 24 hours after application. Treat when air temperature is between 80 F and 90 F. Do not apply to turf under stress.

July through August

Mowing

Follow the April-June mowing guidelines.

Fertilization

Follow the April-June fertilization guidelines.

Irrigation

Follow the April-June irrigation guidelines.

Soil Cultivation

Follow the April-June soil cultivation guidelines.

Renovation and Establishment

Make arrangements now to begin renovation and establishment early next spring. Ensure that the necessary labor, equipment, and supplies are available. Bermudagrass can be planted any time soil temperatures reach 50 F, usually in April but sometimes as early as March. The other option is to sod the field. Although this option is very expensive, the fields can be ready for play within six weeks.

Early June is the latest preferred date for renovating a bermudagrass field by sprigging. It takes about two to three months of good growing weather before a sprigged field is ready to withstand light traffic (less than 10 football games per year). Looks can be deceiving. Good coverage can be achieved within nine weeks with aggressive cultivars like Vamont; however, the plants will not be mature enough to withstand much traffic.

Weed Control

Follow the April-June weed control guidelines for control of grasses, sedges and broadleaf weeds.

Generally, do not apply postemergence herbicide treatments during July and August when the bermudagrass turf is drought or heat stressed and air temperatures exceed 90 F. Temporary

bermudagrass discoloration can be expected in hot weather and dry soils. Rainfall or irrigation will revive the turf.

September through December

Mowing

Follow the April-June mowing guidelines until several weeks before the first expected frost. Raise the mowing height 1/2 inch as winter approaches if fields are not scheduled to be winter overseeded. Mowing height is usually raised in mid- to late September in the piedmont. Mowing height of athletic fields in the western and northwestern areas of the piedmont may be raised to one to two weeks earlier, whereas in the south central and southwestern regions it may be raised one to two weeks later. Do not exceed a 2-inch cutting height.

Fertilization

Do not apply more than 1/2 pound of nitrogen per thousand square feet (22 pounds per acre) after September 15. Use a low-nitrogen, high-potassium fertilizer such as 200 pounds of 5-10-30 per acre or supplement straight nitrogen sources with potash (K₂O) using 70 pounds of muriate of potash (0-0-60), 86 pounds of potassium sulfate (0-0-50), or 220 pounds of sul-po-mag (0-0-22) per acre. Repeat in three weeks. Bermudagrass must be green and growing actively (not dormant) to benefit from this application. Irrigate immediately after application to prevent turf discoloration. Potassium lessens the chance of bermudagrass winterkill. Avoid the use of nitrogen unless fields are to be overseeded with annual or perennial ryegrass.

To determine the amount of product required to apply 1 pound of potash per thousand square feet, divide 100 by the third number in the fertilizer ratio. For example, for 6-6-12 fertilizer, divide 100 by 12. The result is 8.3 pounds of product per thousand square feet.

$$100/12 = 8.3$$

Irrigation

Follow the April-June irrigation procedures.

Reduce compaction and wear by avoiding irrigation before heavy use. Minimize field use under wet conditions. Postpone play or use alternate sites for band and athletic practice sessions. **Game fields should be used only for team play and not for team practice, physical education, or band practice.**

Soil Cultivation

Do not vertical mow, dethatch (power rake), or aerate (core) bermudagrass fields unless you plan to overseed in the fall. This can result in bermudagrass injury because plants are not able to successfully recover before winter.

Bermudagrass fields should not be renovated at this time of year.

Weed Control

Annual bluegrass and many winter annual broadleaf weeds can be effectively controlled in bermudagrass turf from autumn to early winter. These weeds, if left nontreated and at high densities, will outcompete bermudagrass the following spring for sunlight, thus delaying

bermudagrass greenup. For nonoverseeded bermudagrass, atrazine (Purge, AAtrex) applied at 1 to 2 pounds of active ingredient per acre (lb ai/A) should be applied from November 15 to December 31 to dormant turf. Usually, 1 lb ai/A is sufficient when applied in November - early December. Simazine (Princep DF) should be applied from November 15 to December 15 at rates similar to atrazine. Along with annual bluegrass, these herbicides provide preemergence and/or postemergence control of chickweed, speedwell and clover species, lawn burweed, henbit, Carolina geranium, etc.

Winter Overseeding

Fields used late in the fall, in winter, or in early spring may be overseeded with cool-season grasses to provide color and protection. Baseball fields are frequently overseeded. However, spring recovery and growth of bermudagrass will be delayed by the overseeded grass.

January through March

Mowing

Mow baseball infields overseeded with ryegrass at 1/2 to 3/4 inch and outfields, sidelines, football fields, and soccer fields at 3/4 to 1 1/2 inches. Reduce mowing height two weeks before the grass is expected to turn green in the spring to weaken ryegrass and allow bermudagrass to respond with minimum competition.

Fertilization

Do not fertilize athletic fields that have not been overseeded. Apply no more than 1/2 pound of nitrogen per thousand square feet to winter overseeded fields every three to four weeks.

Irrigation

Dormant turf may need to be irrigated when warm, windy weather prevails. Winter overseeded fields lose greater amounts of water than fields that have not been overseeded. Probe the soil to determine dryness.

Soil Cultivation

Do not power rake or aerify dormant fields until the soil temperature approaches 50 F at a depth of 4 inches. Initiate verticutting of winter overseeded bermudagrass two weeks before it is expected to turn green in the spring to weaken ryegrass and enhance bermudagrass recovery. Coring the soil at this time helps warm the soil.

Weed Control

Winter weeds and perennials - Postemergence Control: If atrazine or simazine were not applied in autumn, glyphosate (various brands) may be used for postemergence annual bluegrass, winter annual and perennial broadleaf weed control. This treatment should be applied to dormant bermudagrass turf at a rate of 0.5 pound of active ingredient per acre (lb ai/A). Read the label for surfactant recommendations.

Summer annual grasses - Preemergence Control: Crabgrass species and goosegrass should be controlled preemergence in February and March. A general guideline is to apply preemergence herbicides when forsythias are in full bloom. In Wake county, this occurs in mid to late February. Many preemergence crabgrass herbicides are not suggested for use in bermudagrass athletic fields. These include the dinitroaniline family herbicides and prodiamine (Barricade)

which are root inhibitors. These products provide good to excellent crabgrass species control and fair to good goosegrass control. However, they can adversely affect bermudagrass rooting at the nodes of the stolons. Heavy play or traffic on the turf while affected could result in significant stand loss. Bermudagrass is least affected by oxadiazon (Ronstar G, 50WP) applications. Ronstar 50WP should be applied to dormant, established bermudagrass 2 to 3 weeks before greenup. Ronstar formulations should be applied at 2 to 3 lb ai/A.

Grass Selection

Bermudagrass is preferred for most athletic fields where it can be grown successfully. This includes the Coastal Plain, Piedmont, and parts of western North Carolina. Bermudagrass cultivars should not be planted in mixtures or in shaded sites.

Common does not have the density, disease resistance, and cold tolerance of the hybrids. However, it does perform well on a limited budget and can also be seeded.

Tifway is an aggressive, dark green hybrid bermudagrass with fine texture and excellent density, cold tolerance, and disease resistance. It is established vegetatively (by sod or sprigs) and grows rapidly. From sprigs, expect full coverage in approximately three months.

Tifway II is an improved selection of Tifway. It has the same desirable characteristics as Tifway but it makes a denser turf and exhibits longer fall color retention and turns green earlier in the spring. These characteristics are most noticeable when Tifway II is mowed less than 3/4 of an inch. It is also planted vegetatively.

Vamont is a coarse-bladed, vegetatively propagated cultivar that exhibits outstanding vigor resulting in rapid establishment, good wear tolerance, and excellent recovery from injury. Vamont's aggressive nature makes it a heavy thatch producer and difficult to overseed with cool-season grasses. It is quick to turn green in the spring. It has also exhibited excellent cold tolerance compared to many other bermudagrass cultivars.

In addition, there are numerous vegetative (GN-1, Navy Blue, Quickstand, Tifsport, Tifton 10) and seeded (Princess, Savannah, Sunstar, Sundeval II) bermudagrass cultivars that have been recently released for use on athletic fields.

Renovation of Bare Areas on Hybrid Bermudagrass Fields

Determine Extent of Winterkill Damage

Determine the extent of injury before the growing season by removing several plugs of turf as soon as the soil allows. Place them in a greenhouse or south-facing window that receives a lot of light. Healthy plants should turn green in two to three weeks. Lack of green growth suggests the need to plan for renovation. Exposure of underground plant parts to soil temperatures of less than 27 F can result in significant turf loss. Plants in compacted areas and those less than 12 months old are also prone to injury.

If large areas are dead, sprigging is the most reasonable method of reestablishment. If small areas are dead, plugging is the best method. Sodding may be the only option if time is important.

April and May are preferred for planting bermudagrass if you plan to schedule play in the fall. Plant as early as possible to ensure that the field can withstand traffic.

Method of Reestablishment

Plugging. Place plugs on either 6-inch or 12-inch centers, depending on the reestablishment speed desired. Most bermudagrass plugged on 6-inch centers provides 90 percent ground cover in one to two months. Plugs on 12-inch centers provide 90 percent cover in 6 to 12 weeks. Use a plugging device to remove plugs of soil from bare areas, then insert bermudagrass plugs collected from sideline areas. Put bare area plugs back in holes where bermudagrass plugs were removed. Fertilize area with starter-type (high phosphorus) fertilizer such as 10 pounds of 5-10-10 per thousand square feet.

Sprigging Large Areas (15,000 square feet or larger). Apply the recommended amount of fertilizer and lime according to soil test results. If test results are not available and the field has not been limed in the past three years, apply 75 pounds of lime and 20 pounds of 10-10-10 fertilizer to the area to be sprigged. Lightly disk or rotovate the lime and fertilizer into the soil surface; be careful not to destroy the existing surface drainage or crown of the field. Spread sprigs at the rate of 7 to 10 bushels per thousand square feet. Lightly disk sprigs into the soil with the disk set relatively straight for good sprig-to-soil contact. Some sprigs should be buried and some should protrude. Roll the sprigged area to firm the soil and ensure sprig-to-soil contact. Keep the area moist for 30 days or until the sprigs are rooted. *Do not let them dry out.*

Fertilize with a complete (N-P-K) fertilizer such as 10 pounds of 5-10-10 per thousand square feet every four weeks until coverage is complete. This can be supplemented with a weekly application of 1/2 pound of nitrogen per thousand square feet (for example, 1 1/2 pounds of 33-0-0 fertilizer per thousand square feet) until establishment is complete. Begin mowing with a reel mower when the foliage reaches a 1-inch height.

Sprigging Smaller Areas. Use a core aerator with 3/4-inch-diameter tines to disrupt the soil surface. Make a minimum of six to eight passes over the area, allow the plugs to dry, and pulverize them with a dragmat. Cut out any germinating weeds such as knotweed or crabgrass with a hoe and scatter sprigs (7 to 10 bushels per thousand square feet) on the surface. Broadcast 1/4 to 1/2 inch of soil over the sprigged area to partially cover the sprigs. Make sure the soil used is similar to the existing soil to prevent layering. *Do not topdress a clay field with sand.* Apply 10 pounds of 5-10-10 per thousand square feet over the sprigged area. Roll the sprigged area to firm the soil and to ensure sprig-to-soil contact. Keep the area moist for 30 days or until the sprigs are rooted. *Do not let them dry out.*

Fertilize with a complete (N-P-K) fertilizer such as 10 pounds of 5-10-10 per thousand square feet every four weeks until coverage is complete. Weekly supplemental applications using a nitrogen-only fertilizer (1/2 pound of nitrogen per thousand square feet) enhances the filling-in process. Begin mowing when the foliage reaches a 1-inch height.

Sodding. Sodding is the only option when play is expected within 8 to 10 weeks following the date of renovation. Purchase planting material free of objectionable broadleaf and grassy weeds. Planting certified sod is a good way to ensure that the material is true to type and free of objectionable weeds and crop species. Sod must be cut thicker than normal (1 1/2 to 2 inches

rather than 1/2 to 3/4 inch) if play is expected within four to six weeks because there is insufficient time to root. (Generally, thin sod roots quicker than thick sod.)

Apply the recommended amount of fertilizer and lime according to soil test results. If test results are not available and the field has not been limed in the past 3 years, apply 50 pounds of lime and 20 pounds of 10-10-10 fertilizer per thousand square feet. Lightly disk or rotovate the lime and fertilizer into the soil surface being careful not to destroy the existing surface drainage or the crown of the field. Rake or harrow the site to establish a smooth and level final grade. Lay the sod and roll the area for good soil-to-sod contact.

Thoroughly irrigate the sod immediately after rolling, making sure the soil underneath is wet. Keep the soil continually moist by watering daily until the sod starts to root. Gently tug on the sod resistance indicates rooting. Rooting normally requires two to three weeks. Irrigation can be reduced gradually to once a week after the sod is fully anchored. A high-phosphorus starter fertilizer applied three weeks after installation may assist in rooting.

Overseeding Bermudagrass

Bermudagrass usually stops growing and turns brown after the first hard frost. It remains dormant until temperatures reach 60 F. Each fall, many athletic fields are overseeded with either annual or perennial ryegrass to provide color, uniform surface conditions, and wear tolerance. This is particularly true for fields used extensively in the spring. Baseball and soccer fields are prime candidates for overseeding because of spring use. Bermudagrass adds strength, resistance, and wear tolerance even though it is dormant when the fields are in use.

The overseeding process is conducted in late fall; however, preparing bermudagrass for overseeding is a year-long process. Bermudagrass must be healthy to withstand the harsh cultural practices and turf competition associated with overseeding.

Seeding Date

Successful overseeding can be done two to three weeks before the expected first frost date or when the soil temperature declines to 75 F. Overseeding in the Raleigh area is usually done between September 15 and October 1. Western and northwestern areas of the Piedmont may be seeded one to two weeks earlier, whereas the south central and southeastern areas of North Carolina may be seeded one to two weeks later.

Overseeding Preparations

Close mowing just before overseeding is essential. Hybrid bermudagrasses should be thinned using a dethatching mower, and clippings and thatch should be removed with a sweeper. It may be possible to skip the dethatching process with common bermudagrass. The field should be cored several weeks in advance and the cores dragged with a steel mat similar to the one used to drag the base paths. This prevents spotty germination.

Seed Selection

Annual and perennial ryegrass are the major grass species seeded. Both are quick to establish, relatively inexpensive (especially annual ryegrass), and fairly wear tolerant. The new perennial ryegrass cultivars have a finer texture; are more heat, disease, and cold tolerant, and make a smoother transition than annual ryegrass. Another type of ryegrass, referred to as intermediate

ryegrass, is now available. Cultivars of intermediate ryegrass are moderate in performance compared to annual and perennial ryegrass but may have the added advantage of being less persistent than some of the perennial ryegrass cultivars.

Cultivars that perform well in the fall but do not persist in the spring are the logical choice for football fields, whereas the late-transition cultivars are the logical choice for soccer and baseball fields with extensive spring play. Color contrast between the sidelines, outfield, and infield can be obtained by using different cultivars.

The sidelines and outfields can be seeded at 5 to 10 pounds per thousand square feet, whereas heavily trafficked areas, such as the infield and around players' benches, should be seeded at 20 to 25 pounds per thousand square feet. Soccer and football fields can be seeded at 7 to 15 pounds per thousand square feet.

A drop-type spreader should be used to define the margins of overseeded areas. Areas inside the borders are seeded using a rotary spreader, applying half the seed by moving in one direction and the other half by moving at right angles to the first pass. Intensively managed areas such as infields, goal areas, and players' benches can be topdressed with soil to help hold the seed in place, and the area can be dragged with a mat or carpet to smooth the playing surface. Less intensive areas such as outfields do not need to be topdressed but should be dragged with a chain link fence or steel mat.

Postseeding Care

Irrigate two to three times daily until the seedlings begin to emerge. Irrigate just enough to moisten the surface while preventing lateral movement of the seed. As seedlings emerge, reduce irrigation frequency to daily, and eventually irrigate only as needed.

Begin mowing the grass at a height of 1/2 inch on the infield and 3/4 inch on the sideline, the outfield areas, and on football and soccer fields. Weekly mowing is often sufficient in late fall and winter, but mowing twice a week is the spring norm.

Do not fertilize while overseeding because this may encourage the bermudagrass to compete with the young plants. Begin to fertilize shortly after shoot emergence and continue until cold weather halts the ryegrass growth. This normally requires the application of 1/2 pound of nitrogen per thousand square feet (for example, 1 1/2 pounds of 33.5-0-0 fertilizer) every two or three weeks, or 1 pound of controlled-release nitrogen per thousand square feet every four to six weeks.

Spring Transition

Close mowing when night temperatures approach 60 F sets back the overseeding, reduces competition, and warms the surface to hasten bermudagrass recovery. Avoid applying fertilizer while the grass turns green in the spring to prevent injury to the bermudagrass and to discourage the ryegrass.

Perennial ryegrass should be totally removed from bermudagrass by the time bermudagrass is actively growing in late spring/early summer. This will ensure that perennial ryegrass does not compete with bermudagrass in summer which can result in death of bermudagrass. The most consistent way to remove perennial ryegrass from bermudagrass is to use a herbicide. Cultural

methods that involve scalping, verticutting, aerification, fertilization, etc in late spring to promote the bermudagrass at the expense of ryegrass, will not consistently remove perennial ryegrass.

For chemical removal, several products are effective. However, the speed at which these products remove ryegrass varies greatly from rapid to very slow. The fastest method of ryegrass removal is metribuzin (Sencor). Metribuzin applied at 0.5 lbs of active ingredient/acre will kill perennial ryegrass in late spring/early summer in about 2 to 3 days. The problem with this application is that the rapid transition will result in a total brown-out of perennial ryegrass. Therefore, the overall appearance of the playing surface will be unattractive until the bermudagrass fills in.

Metsulfuron (Manor) is also effective in removing perennial ryegrass from bermudagrass. Manor should be used at 0.5 ounces of product/acre mixed with a nonionic surfactant in late spring/early summer. Perennial ryegrass will gradually die over a 2 to 3 week period. This transition is slower than metribuzin but may still result in some brown ryegrass as it dies.

The slowest method of ryegrass removal involves the use of pronamide (Kerb). Kerb applied at 1 lb of active ingredient/acre will totally remove ryegrass over a 4 to 6 week period. This transition from perennial ryegrass to bermudagrass is the slowest and will result in the least amount of unattractive turf because the transition is very slow.

Reducing Compaction and Wear

Compaction is the main reason for turf failure on athletic fields. Extremely high soil compaction cuts off the oxygen in the soil that is essential for good root growth. Turf managers can reduce the problem through aerification (coring) by using a machine that inserts a hollow metal tine or spoon into the soil. Aerification is the only way soil can be tilled without seriously disturbing the turf. The hole left by this process allows more oxygen to reach the root system and harmful gases to escape. These holes also allow better movement of water, nutrients, and pesticides into the soil.

Other steps that can be taken to reduce the effects of compaction are:

- Avoid irrigation two days before heavy use. Keep use of the field to a minimum when it is wet.
- Postpone play or use alternate sites, if feasible, for band and athletic practice sessions.
- Set aside one field for team or tournament play if possible.
- Move nonstationary goals as depicted in Figure 1 so that play is not concentrated in a given area week after week. Consider widening existing fields to accomplish this; it enhances recovery.
- Stay off of partially thawed areas.
- Do not play on new areas until they are fully established.

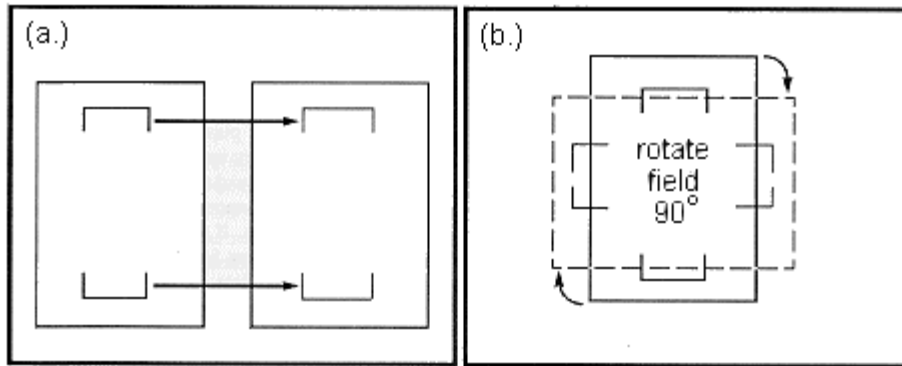


Figure 1. Movement of nonstationary goals (a.) or reorientation of fields (b.) can lengthen the life of an athletic field.

Pest Problems

Diseases and insects are seldom a problem on properly maintained athletic fields. If you suspect a pest problem, make sure you correctly identify the pest before applying a pesticide. Contact your county Cooperative Extension Service agent or refer to Extension Service publication [Turfgrass Pest Management Manual: A Guide to Major Turfgrass Pests and Turfgrasses, AG-348](#), if you need assistance in identification and nonchemical control measures. If pesticides are needed, select the most appropriate and read and follow label directions. Extension Service publication [Pest Control for Professional Turfgrass Managers, AG-408](#), provides the latest pesticide recommendations. Often a pest problem indicates that changes in the turf management program are necessary.

Integrated Pest Management: The Sensible Approach to Lawn Care

Many pest problems can cause your turf to look bad --diseases, weeds, insects,, and animals. If you are really unlucky, you may have all of them at one time.

So what do you do? Use a pesticide? Or make changes in cultural practices? Both methods, and some others as well, may be needed. The balanced use of all available methods is called *Integrated Pest Management (IPM)*.

The idea is simple. It involves the use of all available prevention and control methods to keep pests from reaching damaging levels. The goal is to produce a good turf and minimize the influence of pesticides on man, the environment, and turf.

IPM methods include:

1. Use of best adapted grasses.
2. Proper use of cultural practices such as watering, mowing, and fertilization
3. Proper selection and use of pesticides when necessary.

Early detection and prevention, or both, will minimize pest damage, saving time, effort, and money. Should a problem occur, determine the cause or causes, then choose the safest, most effective control or controls available.

When chemical control is necessary, select the proper pesticide, follow label directions, and apply when the pest is susceptible. Treat only those areas in need. Regard pesticides as only one of many tools available for turf care.

To learn more about integrated pest management, pest identification, turf care, and proper use of pesticides, contact your county Cooperative Extension Center.

DISCLAIMER: Recommendations for the use of agricultural chemicals are included in this publication as a convenience to the reader. The use of brand names and any mention or listing of commercial products or services in this publication does not imply endorsement by the North Carolina Cooperative Extension Service nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Be sure to obtain current information about usage regulations and examine a current product label before applying any chemical. For assistance, contact your county Cooperative Extension Service agent.

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