

ATHLETIC FIELD MANAGEMENT

COOPERATIVE EXTENSION SERVICE
THE UNIVERSITY OF GEORGIA COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

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A good athletic field management program produces an attractive and wear-resistant surface. Such a surface results from proper field construction, turfgrass selection, properly-timed cultural practices and good judgement of field use.

The best and most commonly-used turfgrasses for sports fields are Tifway (also called Tifton 419), TifSport and Tifway II hybrid bermudagrasses. TifSport is the newest release from the University of Georgia and has a better cold tolerance and better turf quality at a 1/2-inch mowing height than the other two grasses. Arizona Common and other newer seeded type bermudagrasses are preferred for non-irrigated, low maintenance fields.

Proper construction produces a field with good surface and internal drainage that is more easily maintained. Therefore, field maintenance is generally easier on sandy, well-drained soils than on finer-textured soils that have high clay and silt content.

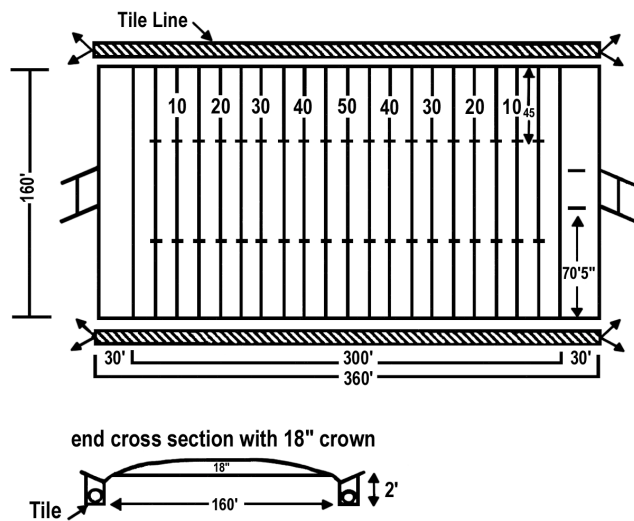


Figure 1. Diagram of Regulation Football Field

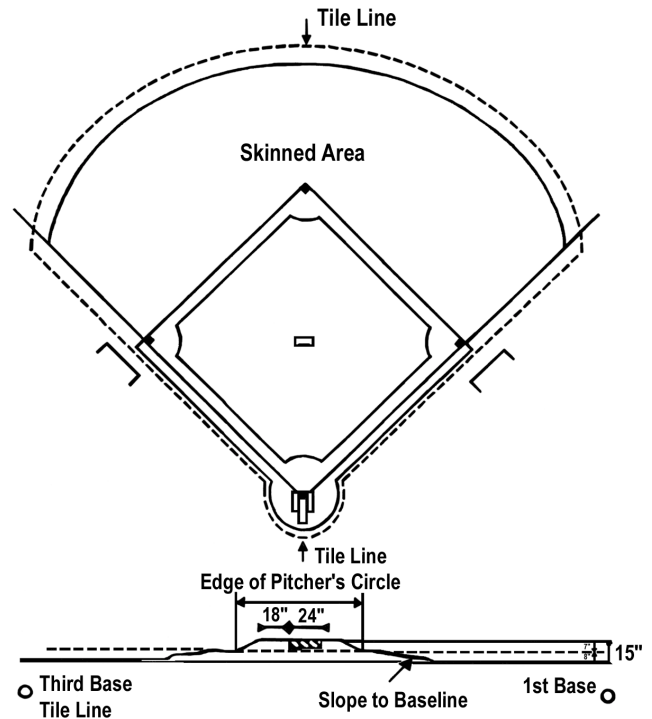


Figure 2. Regulation Baseball Diamond Showing Design of Tile System

A football field should have a crown of 12 inches for sandy soils and 18 inches for clay soils from the sideline to the center or a 1 percent to 1.5 percent slope (Figure 1). Baseball infields should have a 1 percent slope or an 8-inch fall from the bottom of the pitcher's mound to beyond the baseline. (Figure 2).

Maintaining acceptable playing surfaces requires properly-timed cultural practices. These practices include mowing, fertilization, irrigation, cultivation, weed control, post game repair, controlling field use, and controlling other pests like insects or diseases when necessary. A well-developed and maintained sports field can withstand extensive use.

Mowing

Proper mowing promotes deep rooting and good shoot density, desirable mat, and uniform growth. Regular mowing at the right height with properly-maintained equipment cannot be overemphasized. For the hybrid bermudagrasses (Tifway, TifSport and Tifway II), a mowing height of $\frac{3}{4}$ to 1 inch is preferred, and for common bermudagrass $1\frac{1}{2}$ to 2 inches is preferred. The first mowing in the spring should be low by as much as one-half the desired final height. This helps increase turf density and allows the cutting height to be raised during the summer if scalping occurs.

The grass should be mowed often enough so that no more than $\frac{1}{3}$ of the leaf surface is removed at a mowing. Generally, this means the field should be cut twice a week during the summer. Higher mowing heights don't need as frequent mowing but result in lower quality and weaker turf.

If mowing frequency is properly adjusted, clippings may be returned without harming the turf. If excessive clumping of clippings occurs, they should be dispersed or removed. Reel mowers provide the best cut for bermudagrass turf. Regardless if a reel or rotary mower is used, keep the blades sharp and properly adjusted.

Fertilization

Applying fertilizer at the right time is as important as using the right fertilizer. Fertilization should be determined from soil test analysis for pH, phosphorus and potassium needs. Most turfgrasses do best when fertilized with a 3-1-2 or 4-1-2 ratio fertilizer if a soil test is not available.

Most turfgrasses require 3 to 7 pounds of nitrogen per 1,000 sq. ft. per year (3 to 5 pounds in north Georgia and 4 to 7 in south Georgia). The nitrogen is usually applied at a rate of 1 pound of nitrogen per 1,000 sq. ft. per month of active growth. A typical example of a fertilizer program would be to apply a complete fertilizer (one that contains nitrogen, phosphorus and potassium) in early spring when green up begins, and again two to four weeks before the average first frost date. Between these times, only nitrogen need be applied as desired to maintain turf vigor. The more often a field is used, the more frequent fertilizer should be applied to maintain rapid growth for proper recovery from use.

Irrigation

It is very difficult to maintain an athletic field without irrigation. Schedule irrigation to supplement rainfall, and frequency and duration depends on environmental factors and limitations of the irrigation system.

The best time to irrigate is just before wilt occurs. Most grasses have a darker or a dull bluish-green color, and the leaf blades begin to fold or roll when the grass is under water stress. Irrigation should begin when these signs are first observed.

Apply enough water to soak the soil to a depth of at least 6 to 8 inches. On medium-textured soils, this usually means applying about 1 inch of water per week during the summer. Light, frequent irrigations encourage shallow, weak root systems and thatch accumulation.

The best time of day to irrigate is before sunrise because there is less wind and lower temperatures, thus less water loss to evaporation. Irrigation at night is more efficient than irrigation during the day. Irrigating after dew develops or before the morning dew dries off does not increase disease problems. Irrigating 24 to 48 hours before major field use will help reduce soil compaction.

On many fine-textured soils, runoff may begin before the soil is properly wet to the right depth. When runoff occurs, stop irrigating and let the water soak into the soil for one to two hours before starting again. It may be necessary to repeat this cycle several times before irrigation is complete.

Cultivation

Cultivation generally includes aeration, vertical mowing and topdressing. The traffic on fields produces a compacted surface layer in the top 2 to 3 inches of soil. This results in reduced pore space, reduced internal air and water movement and gradual thinning of the turf.

The centers of football fields, around sideline bench areas, soccer goal mouths and baseball diamond infields are good examples of areas prone to soil compaction. Even sandy soils are prone to compaction in these areas, especially when the field is used under wet conditions.

Aeration using hollow tines (coring) or open spoons are the most common means of relieving soil compaction, encouraging deep rooting and improving

turf quality. Aeration is also one of the most important and most neglected practices. Coring commonly uses a machine that removes a soil core $\frac{3}{4}$ of an inch to 1 inch in diameter to a depth of 3 to 4 inches. A core of soil should be removed and deposited on the soil surface.

There are many other acceptable aeration techniques and pieces of equipment. Frequency of aeration generally depends on soil texture and frequency of field use. Fine texture soils, fields with heavy use and fields used when wet need more frequent aeration.

As a general rule, the spacing between aeration holes should be 2 to 3 inches. This often means three passes in different directions with most aerators is necessary.

Aerate fields a minimum of two times per year. The first should be done in the spring just before fertilization and the second in mid summer. Each aeration should involve a minimum of three passes over the playing field. If field use is heavy or the soil is compacted, aerate monthly during the growing season. After the soil cores have dried, they can be crumbled and spread over the turf by using a flexible steel drag mat or some other means.

Slicing with solid blades $\frac{1}{4}$ to $\frac{1}{2}$ inch wide cultivates the soil with minimum surface disruption. Units with offset tines can be quite effective in relieving soil compaction.

Aerate when soil moisture is at field capacity. This generally translate to 8 to 24 hours after rainfall or irrigation or when a spoon-type aerator would remove soil cores to the surface. If moisture were higher or lower, cores would not easily move to the surface. However, some equipment, particularly solid tines or blades, are most effective when soil moisture is drier than field capacity. Aerate when the turf is actively growing and not under stress.

Topdressing

Topdressing is the addition of a thin layer of soil on the turf surface. Parts of the field that are used continuously tend to become depressed from the heavy use. Topdressing with a $\frac{1}{8}$ -inch layer (10.4 cu. ft. or 0.4 cu. yds. per 1,000 sq. ft.) can level and smooth these areas. In addition to smoothing the surface, topdressing also reduces thatch. Topdressing after fertilization and during periods of active growth is best. Light, frequent topdressings to build

up lower areas are preferred over less frequent, heavier topdressings. The topdressing soil should be of similar texture to the soil on site and can be dragged into the turf with a flexible mat.

Vertical Mowing

Vertical mowing is only needed where thatch is excessive (generally thicker than $\frac{1}{2}$ inch). Thinned areas should not be vertically mowed unless done prior to reseeding or overseeding and when the turf is actively growing.

High Wear Areas

Soccer fields often create special challenges because the fields are heavily used in the fall and spring when bermudagrass is growing slowly or not at all. Obviously, proper field construction is important. One technique used to address this issue is to construct fields so sidelines can be moved 2 to 3 yards in all directions. This helps reduce wear from the linesman. Also, using movable goals helps disperse traffic.

Another practice for such conditions is to use more fertilizer later in the year. This helps retain growth later in the fall and earlier in the spring. These areas also need more aeration to reduce the soil compaction. Finally, allowing the turf to grow slightly higher (up to $\frac{1}{2}$ inch) in the fall should improve wear tolerance.

Field Use

There is a limit to the amount of traffic even the best managed turf can stand without excessive injury. Steps that reduce management problems include the following: (1) schedule minimum use when the field is wet; (2) rotate areas of play to permit recovery of turf; (3) avoid or reduce concentrated foot traffic, such as band practice, whenever possible; (4) limit or withhold use of newly-planted areas until the turf is mature and developed; (5) allow the turf to recover from winter dormancy before using it in the spring.

Weed Control

Since sports fields are subjected to tremendous wear and damage within a relatively short period, turfgrass cover is decreased and weeds can become a

major problem. Herbicides are often needed during the playing season and in the off-season to control these weeds. Successfully controlling weeds depends upon correctly identifying the problem weed species and applying the appropriate herbicide at the correct time of the year. Weed identification assistance is available through your county extension office.

Bermudagrass usually becomes dormant before football and soccer game schedules are completed. The cool temperatures of fall produce poor growing conditions and the turf has little opportunity to recover from use, especially in the center of the field and around the benches. The dormant or semi-dormant turf provides minimal competition to winter weeds and subsequent summer annual weeds.

A dense infestation of winter weeds can severely inhibit the early spring growth of bermudagrass. The turf will weaken and summer annuals, such as crabgrass and goosegrass, will readily invade the open areas that remain when the winter weeds die.

The most commonly-used herbicides to control winter annuals in bermudagrass that is not fall-overseeded with a cool-season turfgrass are atrazine (Aatrex), simazine (Princep, Wynstar), and metribuzin (Sencor Turf). These herbicides will provide good to excellent control of annual bluegrass, common chickweed, lawn burweed and other winter annuals. All three herbicides have pre-emergence and post-emergence activity on winter annuals; however, metribuzin has the shortest period of pre-emergence activity.

Pre-emergence or post-emergence activity enables these herbicides to be applied over a wide time period, from November through February. It is generally recommended to apply atrazine, simazine or metribuzin after the last game. Atrazine or simazine at the recommended rate (1.0 lb. a.i./acre) applied in November and again in early February consistently provides excellent weed control. For maximum turf safety, use atrazine only on dormant bermudagrass.

Pronamide (Kerb), which also has pre-emergence and post-emergence activity on annual bluegrass, corn speedwell and common chickweed, may also be used over a similar time period on non-overseeded bermudagrass fields.

Two-way and three-way mixed herbicides contain mixtures of 2,4-D, MCCP, dicamba or 2,4-DP and may be used for winter broadleaf control in non-overseeded and overseeded bermudagrass fields. In

addition to controlling winter annual broadleaf weeds, these herbicides control perennials such as plantains and wild garlic. Apply these herbicides on warm, sunny days. Two applications, at intervals of 14 to 21 days, may be required to control certain weeds. Wild garlic can also be effectively controlled in non-overseeded bermudagrass with imazaquin (Image).

Weedy grasses constitute the greatest weed problem during the summer in bermudagrass. Annuals, such as crabgrass spp. and goosegrass, and perennials, such as dallisgrass and bahiagrass are the most common grassy weeds. Pre-emergent herbicides provide good control of annual grasses. However, they will not control established perennial grasses. Pre-emergence herbicides are recommended for use on established turfgrasses that have good density and cover.

If the field has been severely damaged from the fall or winter sports program, use only a herbicide that contains oxadiazon (Ronstar, Regalstar). Unlike other pre-emergence herbicides, oxadiazon does not inhibit root development from the stolon nodes of bermudagrass. Ronstar formulations may also be used at the time of sprigging bermudagrass. If seeding of common bermudagrass is planned for the field, do not apply any pre-emergence herbicide. Residues from a spring application can prevent the establishment of common bermudagrass from seed.

In athletic fields with large, thin, weak turfgrass areas, or on sites where renovation operations are scheduled, post-emergence herbicides can control emerged weeds. MSMA or DSMA can be used to control annual and perennial grasses. Two to three applications of MSMA or DSMA are usually needed to control emerged grasses. Make the second application five to ten days after the first application. If perennial grasses show signs of recovery three to four days after the second application, apply a third treatment seven to ten days after the second application. On newly sprigged bermudagrass, delay applications until the sprigs are well rooted and actively growing. MSMA and DSMA will moderately discolor (yellow) bermudagrass. However, the discoloration is temporary and normal color will return one to three weeks after the last application.

Goosegrass is less susceptible than crabgrass spp. to MSMA or DSMA. A mixture of metribuzin

(Sencor at 0.125 lbs. a.i./acre) + MSMA (2.0 lbs. a.i./acre) will provide good control of goosegrass. Two applications seven to ten days apart are required to control established, mature goosegrass. Metribuzin can interfere with root development from the stolon nodes of bermudagrass. Do not use MSMA + metribuzin on newly sprigged bermudagrass until complete soil coverage has been achieved.

If nutsedge becomes a problem during the summer months, use either imazaquin (Image), halosulfuron (Manage), bentazon (Basagran T/O) or MSMA. The choice of which herbicide to use often depends on the species of nutsedge. For example, bentazon will control yellow nutsedge and annual sedges, but will not control purple nutsedge. Imazaquin applied alone, or in combination with MSMA, will provide approximately six to eight weeks control of purple and yellow nutsedge, and other sedge species. Similar to imazaquin, halosulfuron has activity on both yellow and purple nutsedge; however, this herbicide is less injurious to bermudagrass than imazaquin. For

season-long control of nutsedge, apply halosulfuron in two applications, each six to ten weeks apart. Monthly applications of MSMA also can be used to suppress the growth of many sedges.

Two-way or three-way herbicides (2,4-D, MCPP, dicamba, or 2,4-DP) may be used for summer broad-leaf weed control. Turfgrass tolerance and weed control will be better when applications are made in the late spring or early summer months when temperatures are less than 90 degrees F.

Recommendations for weed control in turf are constantly changing. The current issue of the *Georgia*

Pest Control Handbook and the weed control calendar for athletic fields on page 7 in this bulletin will help you in selecting the appropriate herbicide.

In most cases insects and diseases are not nearly as much a problem as weeds. However, if these pests do occur, contact your county extension office for information. When using any chemical, be sure to read and follow all label directions.

General Information

Fertilizer calculations: The following are examples of the amounts of fertilizer needed to apply 1 pound of nitrogen per 1000 sq. ft.

Fertilizer	lbs./1000 sq. ft.	lbs./Acre
34-0-0	3	130
12-4-8	8	350
16-4-8	6	260
10-10-10	10	450

Football Field Dimensions and Areas

Dimensions	Square Feet	Acres
Outer = 360' x 160'	57,600	1.3 Acres
Hash marks = 300' x 70'	21,000	0.5 Acres

Soccer Field Dimensions and Areas

Dimensions	Square Feet	Acres
300' x 165'	49,500	1.1
300' x 195'	64,350	1.5
300' x 225'	81,000	1.9
Area within 1/4 mile oval track	92,000	2.1

Topdressing Quantities

Depth	per 1000 sq. ft.	
<i>Inch</i>	<i>cu. ft.</i>	<i>cu. yd.</i>
1/8	10.5	0.4
1/4	21.0	0.8

Approximate Infield Square Footage

Infield Area	Baseball ¹	Softball ²
Total	17,000	6,000
Skinned	9,000	2,500
Turf	8,000	3,500

¹Bases 90' apart ²Bases 60' apart

Suggested Weed Control Calendar for Bermudagrass Athletic Fields

NOTE: All herbicide rates are expressed on a per-acre basis

MONTH	RECOMMENDED WEED CONTROL PRACTICE
November	Apply 1.0 qt. of simazine liquid or Aatrex 4L (or equivalent amount of other simazine or Aatrex formulations) to control winter annual weeds. Simazine and Aatrex will control annual bluegrass, common chickweed, henbit and most other winter annuals. DO NOT APPLY to fields over-seeded with perennial ryegrass. Simazine and Aatrex will not control wild garlic, dandelion, plantains and most other perennial weeds.
Late November through December	Apply 1.0 quart of 2,4-D (3.8 lb./gallon formulation) or a "Trimec" type product to control wild garlic (onions), dandelions and plantains. Add 0.25% v/v of a nonionic surfactant with 2,4-D or "Trimec" type product. 2,4-D and "Trimec" type products are safe to use on fall seeded ryegrass that has been mowed 4 to 5 times. OR Apply 2.0 pints of Image + 0.25% v/v nonionic surfactant to control wild garlic after the bermudagrass is dormant. Image will also control henbit, common chickweed, and parsley-piert. DO NOT APPLY to fields overseeded with perennial ryegrass.
Mid-January to Mid-February	If wild garlic was treated with 2,4-D or "Trimec" type product, repeat the application 6 to 8 weeks after the first application.
Mid-February to March 1	If winter annual weeds emerge following the November application of simazine or Aatrex, apply an additional 1.0 lb. ai. per acre of either herbicide. If field has received application of 2,4-D or "Trimec" type product for wild garlic control, this application may not be necessary unless annual bluegrass is the predominant weed. Other herbicides may be substituted for many of the uses discussed in this calendar. Refer to the current issue of the <i>Georgia Pest Control Handbook</i> .
Mid-February to March 15	Apply a recommended preemergence herbicide for crabgrass and goosegrass control prior to March 15. If bermudagrass has been severely damaged from the fall sports program, use Ronstar or Regalstar. If field is not severely worn or damaged, select any pre-emergence herbicide. NOTE: Certain preemergence herbicides (e.g., Balan, Surflan, others) are reapplied at an interval of 8 to 10 weeks following the March application for improved goosegrass control.
May through June	If crabgrass, bahiagrass or dallisgrass becomes a problem, use MSMA at a rate of 1/3 gallon. (6.0 lbs./gal. formulation). If goosegrass becomes a problem, add 2.67 oz. of Sencor 75W Turf to recommended rate of MSMA. Repeat the application on a 7- to 10-day schedule. Sencor should be used only on bermudagrass that is close to or has achieved complete soil coverage. Turf will be temporarily injured. For broadleaf weed such as pennywort (dollarweed) and dichondra, use an amine formulation of 2,4-D or "Trimec" type product.
June through July	If nutsedge becomes a problem, apply Image at 2.0 pints + 1/3 gallon of MSMA + 0.25% v/v nonionic surfactant. Repeat applications of MSMA can be used for partial control of yellow and purple nutsedge. Basagran T/O at 3.0 pints can be used to control yellow nutsedge and various annual sedges. Additionally, Manage at 0.67 to 1.33 ounces + 0.5% v/v nonionic surfactant can be used for yellow and purple nutsedge control. Manage will cause less injury (yellowing) to bermudagrass than Image and MSMA. Refer to the specific herbicide label for information on repeating the herbicide application.

General Guidelines for Herbicide Use on Athletic Fields

1. Use a spray volume of 20 to 40 gpa.
 2. Avoid the use of postemergence herbicides at air temperatures greater than 90 degrees F. Herbicide injury usually increases at high air temperatures.
 3. Avoid the use of postemergence herbicides, simazine and atrazine during the spring green-up of bermudagrass. Herbicide use at this time can temporarily injure bermudagrass (about one month) and retard spring green-up. Use herbicides at this time only if there is a severe weed infestation.
 4. The re-entry restriction, or time interval, for all herbicides that are used on athletic fields in Georgia is 24 hours. The Georgia Department of Agriculture Posting Rule - Chapter 40-21-9 requires that athletic fields be posted with a sign informing the public that a herbicide (as well as any other pesticide) has been applied to the field. Players or spectators should not be allowed to enter a herbicide-treated field until 24 hours after herbicide application. Contact the Georgia Department of Agriculture for additional information.
 5. Water-in all preemergence herbicides with $\frac{1}{2}$ inch of irrigation water. This removes spray residues or granular materials from the foliage and prevents player contact with the herbicide.
 6. Schedule herbicide applications during periods of time that players are not using the field.
 7. **READ THE LABEL OF ALL HERBICIDES THAT WILL BE USED ON THE FIELD.**
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