

Maintaining Athletic Fields¹

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Athletic fields play an important part in Florida's recreational and competitive outdoor sports. From school lot pick-up games to professional team sports, a quality playing surface is appreciated by all participants and produces a pleasing appearance to spectators. Many athletic field problems result from poor construction, design, and/or neglect of routine maintenance. To have a quality turfgrass playing surface, competitive athletic fields must have the following: 1) adequate water drainage; 2) properly designed, installed, and maintained irrigation systems; and 3) a sound, regular maintenance program. An unacceptable turf often results when one or more of these elements are omitted. The following maintenance practices are suggested for bermudagrass or bahiagrass athletic fields.

Cultural Practices

Mowing

Proper mowing practices promote adequate rooting and surface density and uniform growth. Regular mowing at the proper height is a must for acceptable athletic fields (Figure 1)

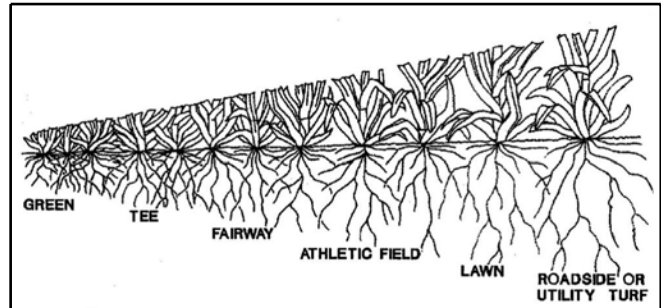


Figure 1. Blade and root density according to intended use.

Refer to Table 1 for suggested mowing heights and frequency on bermudagrass and bahiagrass fields. Mowing frequency should be based on the general rule of thumb of removing no more than 1/3 of the leaf surface at any one mowing (Figure 2).

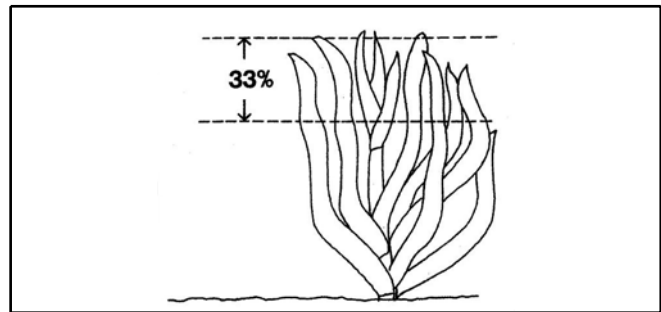


Figure 2. Remove no more than one third of leaf surface when mowing.

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For example, bahiagrass maintained at 3 inches in height would need mowing when a height of 4 inches is reached, while common bermudagrass mowed at 1 1/2 inches should be clipped when 2 inches height is reached. Mowing at less than these heights will encourage a thin, weak turf that is less resistant to wear and water stress. If mowed too infrequently, the grass is often scalped, resulting in thin turf that is slow to recover. Highly maintained bermudagrass fields require two to three mowings weekly.

A reel mower produces the finest cut because of its scissor-type clipping method and is mandatory for bermudagrass. Due to the tough stems, leaves, and seedhead stalks of bahiagrass, a sharp, rotary mower is suggested. Flail mowers may be used on bahiagrass but should be used only in low maintenance areas that are not intended for competitive athletics. Clippings are normally returned to help recycle nutrients. However, excessive clippings will block sunlight and form a habitat favorable for disease. Large quantities of clippings should thus be dispersed or removed. For a striping effect, mow strips (i.e., between each five yard line) the same direction continuously. The stripes will be most pronounced when ryegrass has been used for overseeding and a reel rather than a rotary or flail mower is used.

Fertilizing

Nitrogen and Potassium

Proper fertilizer rates and timing are essential for wear resistance, quick turf recovery from traffic damage, and for aesthetic considerations. A total of 5 to 7 pounds of nitrogen and 3 to 5 pounds of potassium per 1,000 sq. ft. per year is generally required for bermudagrass, and approximately 4 pounds nitrogen and 2 to 3 pounds of potassium per 1000 sq. ft. per year is generally required for bahiagrass turf used for athletic purposes (Table 2). In the absence of soil tests, fertilize with a 4-1-2 or 3-1-2 ratio fertilizer at least once yearly. A general nitrogen source such as ammonium nitrate (33-0-0) or ammonium sulfate (21-0-0) can be used during normal summer fertilization to promote rapid growth recovery and color response. Do not apply fertilizer to dormant or semi-dormant turf. This will encourage leaching and/or weed infestation. Table 2 lists a suggested yearly fertilizer program for athletic fields.

Note that fertilization frequency is dependent on the nitrogen source. Potassium is often deficient in highly leachable, sandy soils. *Turf managers need to apply almost as much potassium as nitrogen in these situations.*

Phosphorous

Soil testing will indicate phosphorous levels present. Most Florida soils retain fertilizer phosphorous; therefore, apply this only once per year (spring and early fall) unless soil tests indicate otherwise.

For further information refer to EDIS publication SL-191: "Recommendations for N, P, K and Mg for Golf Course and Athletic Field Fertilization Based on Mehlich I Extractant."

Soil pH

The optimum soil pH for bermudagrass is between 6.0 and 6.5. For bahiagrass, this optimum is around 5.5 to 6.0. Most Florida soils have pH levels in or above these ranges. To determine if your soil is in these ranges, submit a soil sample to your local county Cooperative Extension Office and follow their recommendations on pH adjustment.

Irrigation

Supplemental irrigation is necessary to maintain a desirable playing surface. For Florida's sandy soils, in the absence of rain, irrigation will be necessary a minimum of one to two times weekly during summer to prevent stress on the turf. Many turf managers also irrigate immediately after athletic events and practices. This helps prevent worn areas from drying out and aids in recovery. In most Florida areas, 3/4 inch of water should be applied per irrigation. Irrigating with 3/4 inch will wet the entire root zone without leaching nutrients from the soil profile. Do not irrigate frequently (i.e. daily) with light rates of water because this encourages shallow turf rooting and increased pest activity.

The irrigation system must be calibrated in order to determine specific amounts being applied. Calibration can be performed by randomly placing several empty cans throughout the field and measuring the time required to collect the desired

amount. Irrigate with 3/4 inch water when the turf shows signs of drought stress (i.e. wilting, bluish-grey color). Wait until drought symptoms reappear before watering again.

Remember to irrigate in early spring when day temperatures are warm but night temperatures are still cool. Bermudagrass turf crowns coming out of winter dormancy are especially susceptible to dehydration at time of "green-up." Refer to Fact Sheet ENH-61, "How to Calibrate Your Sprinkler System," and Bulletin 200 (<http://edis.ifas.ufl.edu/Document EP024>), "Water Requirements of Florida Turfgrasses," for further details on water requirements and irrigation system calibration. Higher mowing heights will increase the drought tolerance of turfgrasses.

Dethatching

Removal of thatch (a layer of undecomposed living and dead organic matter intermingled with soil surface and live plant stems) is necessary for highly maintained bermudagrass. It is generally not necessary for bahiagrass. Vertical mowing, or verticutting, is the preferred mechanical method for thatch removal. It should be timed for spring after active growth has begun, and, if thatch layer is excessive, repeated in mid-summer (Table 3). Blade spacings should be 1 inch for bermudagrass and 3 inches for bahiagrass. Vertical mow in two directions at right angles deep enough to just penetrate the soil surface. Scalp the turf by low mowing (1 inch for bahiagrass and 0.5 inch for bermudagrass) both before and after vertical mowing to remove debris. Any remaining debris can be raked, vacuumed, or blown off, but it is essential that it be removed. Irrigate deeply immediately following debris removal to provide moisture to roots exposed during verticutting. Approximately one week following vertical mowing, apply fertilizer to stimulate grass regrowth. Use 1 lb. of soluble nitrogen (i.e., ammonium nitrate/sulfate) per 1000 sq. ft. and immediately irrigate in. Because vertical mowing exposes soil containing weed seeds, it is best to verticut before applying preemergence herbicide.

Compaction

Coring (cultivation) is the practice of removing a soil core 5/8 to 1 inch in diameter to a depth of 3 to 4 inches. Core cultivation is one of the most important management practices for competitive playing fields. This procedure relieves compaction, allows better soil-oxygen penetration, and encourages deep rooting. Compaction is especially prevalent along player benches, between hash marks, along sidelines, and in front of goals where traffic is very heavy. Seasonal play-only fields should be cored a minimum of twice yearly (Table 3), once in the spring (April or May), just before fertilization, and again in mid to late summer. Heavily compacted areas may need to be cored in two directions. More frequent coring is necessary in areas of heavy use, but do so only when the turf is actively growing. For intensively used practice and play areas, plan to core a minimum of 3 to 4 times per growing season. Coring should begin in early May and be repeated monthly, or at least every other month, until cool fall temperatures halt bermudagrass growth or one month before anticipated fall overseeding time. Following each coring, the plugs should be allowed to dry, then pulverized with a vertical mower and redistributed with a steel dragmat. Debris should then be raked, vacuumed, or blown off the field. Irrigate after removing debris, and fertilize several days later with 1 lb. soluble nitrogen per 1000 sq. ft. to encourage rapid grass recovery.

Topdressing

Topdressing is the addition of a thin layer of soil to the turf surface. Topdressing provides thatch control and levels out low spots or ruts in the playing surface. Topdressing should begin in early spring immediately following vertical mowing and fertilization. Topdress with material similar to the soil type currently composing the playing field to prevent the formation of layers. Use a pull-behind steel dragmat or brushes to incorporate the topdressing material into the turf. Table 4 lists the soil volumes required to obtain the desired level of topdressing depth. Light, frequent topdressing applications to build up low areas are preferred over less frequent, heavier ones.

Overseeding

Overseeding athletic fields serves two main purposes: a) provide green color during fall, winter, and early spring months; and b) protect the permanent grass from wear during cooler months when the permanent grass is not actively growing. Overseeding is an expensive, time-consuming operation and therefore should not be performed unless adequate time, effort, and money are allocated.

Overseeded grasses are also very competitive during spring green-up, slowing transition back to the permanent grass. The decision to overseed or not is usually based on economics and play scheduling. If play continues during winter and/or early spring months, overseeding an athletic field is suggested. However, overseeding is not necessary if play ends in November or early December and will not resume until the following spring or summer, and/or if heavy frosts are not normal for your area.

If overseeding, plan it for mid to late fall, usually in November before heavy play, if possible. Perennial ryegrass is the best choice, due to its rapid establishment and wear tolerance. Use fungicide-treated seed to reduce diseases such as *Pythium*, brown patch, or other seedling diseases. Proper preparation and management of the permanent grass is necessary during overseeding. One month before overseeding, core aerify to help relieve soil compaction. A month usually is needed to allow regrowth to cover the aerifying holes to avoid a speckled pattern after seed germination. One to 2 days prior to overseeding, drop the mowing height by 1/2 inch, and vertical mow the area in two directions to help remove thatch and to open the turf canopy to ensure good seed-to-soil contact. Mow or use a sweeper to remove verticut debris and use sufficient irrigation to wet the soil surface. Apply seed at a rate of 8 to 20 pounds of seed per 1,000 sq. ft. (350 to 870 pounds per acre, depending on desired appearance and/or budget constraints), in two directions (at right angles), and go over the area with a dragmat to help work the seed into the soil. Peripheral areas such as baseball outfields and football sidelines can be seeded at lighter (5 to 10 lbs) rates per 1000 sq. ft. (215 to 435 pounds per acre). Topdress with a suggested amount of 1.5 cubic yards per 1000 sq. ft.

to cover the seed and to smooth rough surfaces. Initially, irrigate the field frequently enough (2 times per day) to enhance seed germination. One quarter inch per application is sufficient. As seedlings emerge, reduce watering to once daily, and after emergence, irrigate as needed (approximately once or twice per week). Reducing irrigation frequency will encourage deep rooting while discouraging disease development.

Mow the overseeded ryegrass to 1 inch after it reaches 1 1/2 to 2 inches in height. Infields can be mowed at 1/2 to 3/4 inch. Use only a sharp mower blade to avoid excessive shearing. Remove clippings if play is disrupted or clumping occurs. Mowing frequency is generally weekly in winter but may be required twice per week in spring. No more than 1/3 of the leaf area should be removed in one mowing.

If warm, humid weather, including foggy conditions, occurs, plan on using a fungicide such as Heritage[®], Koban[®], Subdue[®], or Aliette[®] to help reduce *Pythium* blight on the overseeded ryegrass. Treatment should be every 10 to 14 days as long as weather remains warm or until seedlings are well established. Reduce irrigation (to once or twice weekly) and fungicide use as seedlings mature.

If bare areas result from excessive play, reseed with ryegrass after each game. Ryegrass seed (5 to 10 lbs per 1,000 sq. ft.) may be pregerminated by soaking in water for 24 to 48 hours and mixed with topdressing prior to dispersal.

Pest Control

Weeds are usually a result of a poorly managed turf. Weeds do not kill out healthy turf but appear when turf density and competitiveness decrease. However, with the extensive damage from traffic on athletic turf, weeds can become established, and control measures are generally necessary.

Weeds are generally classified as grasses (i.e., crabgrass, goosegrass), broadleaves (i.e., dandelion, knotweed, spurge), or sedges (i.e., yellow and purple nutsedge). Preemergence herbicides (applied before weed germination) are generally more effective on the grass weeds, while postemergence herbicides

(applied after weed appearance) are more effective on broadleaves and sedges.

Preemergence Weed Control

Summer Grasses

If summer annual grasses such as crabgrass and goosegrass were present in previous years, they probably will be in future ones. The first line of defense is to provide those cultural practices (e.g., proper mowing, fertilizing, watering, compaction, and thatch control) that favor healthy growing turf that is less likely to allow weeds to become established. In heavy-use areas, bermudagrass is often thinned and worn-out, allowing these weeds to become established. Selecting the right preemergence herbicide and using it properly will help prevent weed establishment. A key to success in using preemergence herbicides is proper timing of application. Application must be prior to weed seed germination. Normally, for preemergence crabgrass control, herbicides should be applied around Feb. 1 for south Florida, Feb. 15 for central Florida, and March 1 for north Florida and panhandle regions.

For goosegrass control, delay these dates by 3 to 4 weeks because goosegrass generally germinates later in the season than crabgrass. Table 5 lists those preemergence herbicides that are effective.

For areas of thin bermudagrass, Ronstar[®] would be a better preemergence herbicide to use. Ronstar[®] does not adversely affect bermudagrass rooting as other materials. If other herbicides must be used in thin bermudagrass stands, apply only one-half the normal rate. Preemergence herbicides should not be applied within 16 weeks of overseeding.

Poa annua Control

Generally, *Poa annua* seed germination is in early to mid-October for north Florida and mid-October to mid-November for central and south Florida. Preemergence herbicides must be applied just prior to these germination times. If the bermudagrass is not going to be overseeded with ryegrass, most preemergence herbicides (pendimethalin, oryzalin, betasan, etc.) will provide good *Poa annua* control. If the area is to be

overseeded, only the materials Kerb[®] or Rubigan[®] may be used, but must be very careful of timing.

Fenarimol (Rubigan[®] 1 AS) may be used for preemergence control of annual bluegrass (*Poa annua*) in perennial-ryegrass-overseeded bermudagrass. One or more applications to reach 8 ounces total per 1000 sq. ft. is necessary. The multiple application method is preferred. Spray on a 10- to 14-day interval with final application 2 weeks prior to the scheduled date of overseeding. If three applications are made, use 2.7 ounces of material per 1000 sq. ft. for each treatment. Use 4 ounces each if two treatments are made, or 8 ounces if only one treatment is made. Expected *Poa annua* control is 75 to 95%. Read and follow all label directions.

Pronamide (Kerb[®] 50 WP) is also used for preemergence annual bluegrass control. However, note precautionary measures before use. Use 1 to 2 pounds Kerb[®] 50 WP per acre. *Do not* apply within 30 days prior to expected overseeding. *Do not* apply to established ryegrass, fescue, or bentgrass. Follow all label directions.

Postemergence Weed Control

Summer Grasses

Summer grasses such as crabgrass, goosegrass, crowfootgrass, and thin paspalum can be controlled in bermudagrass using the arsenate herbicides (MSMA, DSMA, and CMA) sold under various trade names. With repeated applications, these herbicides will also control many sedges and sandbur. MSMA (4 lb/gal) is used at the rate of 2 to 3 pints of product per acre per application. Two to three applications are necessary, 7 to 10 days apart, for mature grass weeds. For best control, set up a schedule to apply the material on 1 particular day for 3 consecutive weeks. Failure to stick to such a program will result in temporary yellowing of the weeds, but they will recover shortly thereafter. Three to four applications may be needed for nutsedge and sandbur control. A non-ionic surfactant is required with this treatment.

If goosegrass and crabgrass are well established, combinations of MSMA 4 lb/gal, (2 pints of product per acre) with Sencor[®] 75 (0.50 pounds of product per acre) will improve control. Do not mow or water

turf for at least 24 hours after application. Treat when air temperatures are below 85°F and good soil moisture is present. Temporary discoloration of turf may be expected with this herbicide combination. Do not treat bermudagrass turf that is maintained at 1/2 inch mowing height or less with this combination. Do not add a non-ionic surfactant to this treatment because increased turf damage may result.

Nutsedge

Yellow nutsedge, as well as most other important sedges (*except purple nutsedge*), can be controlled with Basagran® (4 lb/gal). Apply 2 to 4 pints of product per acre to actively growing yellow nutsedge. Do not mow 3 to 5 days before or after treatment. Another application 10 to 14 days later may be required for complete control.

Purple nutsedge and sandbur may be controlled with Image® (1.5 lb/gal) at 0.75 to 1 fl. oz. of product per 1000 sq. ft. (33 to 45 oz. of product per acre) alone and in combinations with MSMA (4 lb/gal) at 2.5 to 3 pints of product per acre. Add a nonionic surfactant at 0.25% v/v (1 qt. of X-77 per 100 gal. of water). This combination also controls yellow nutsedge. Do not apply MSMA plus Image® combinations to desirable bahiagrass, centipedegrass, or St. Augustinegrass.

Manage® and Monument® also provide good control of most nutsedges. Manage is also safe to use on all warm-season turfgrasses. Two applications spaced three weeks apart provide best control with minimum turf damage.

Broadleaf Weeds

Broadleaf weeds such as Florida pusley, knotweed, prostrate spurge, lespedeza, and pennywort can be controlled when actively growing using 2- or 3-way combinations of 2,4-D, 2,4-DP, MCP, triclopyr, or dicamba (Banvel®). Bermudagrass must be actively growing and not under heat or drought stress when herbicides are applied or excessive injury may result. As with MSMA, most broadleaf herbicides should be on a set schedule for several consecutive weeks until complete control is achieved.

For further information, refer to EDIS publication ENH-100: "Response of Turfgrass and Turfgrass Weeds to Herbicides."

Insects

Several insects can become problems in athletic turf if left unchecked. These include mole crickets, white grubs, armyworms, and sod webworms. Cultural practices that encourage insect attack are irregular mowing, thatch buildup, and overfertilizing with soluble fertilizers, which produces lush, succulent growth. Follow the management guidelines in this publication to reduce insect problems.

The turf area should be checked weekly during the season for insect damage. Mole crickets can be detected by the tunnels they leave while searching for food. Off-colored areas with blades having a chewed appearance (skeletonized) are signs of sod webworms and armyworms. Further examination for sod webworms, armyworms, and mole crickets can be done by a soap flush. Mix 1 fluid ounce of lemon-scented dishwashing soap in a 2-gallon sprinkling can full of water and drench a 2-square-foot area. Observe the area for several minutes, and, if present, insects will emerge.

Grass that turns yellow in spots at first and then brown as feeding increases is suspected to be infested with root-feeding white grubs. Further inspection of damaged areas for white grubs involves cutting three sides of a one-foot-square piece of sod about two inches deep with a spade or shovel. Force the sod back with the spade and check for C-shaped white grubs. Sample several areas. In general, if grubs average two or three per square foot, an insecticide may be warranted.

Insecticide recommendations change constantly; therefore, check with your local county cooperative extension office for the latest recommendations or for help with insect identification. Follow the application timing suggested in Table 3 for mole cricket control.

For further information, refer to EDIS publication ENY-351: "Insect Pest Management on Golf Courses."

Nematodes

Several kinds of nematodes are responsible for damage in Florida. Nematode presence should be suspected if the following are evident: a) turf wilting under moderate moisture stress, gradual decline (yellowing), and establishment of indicator weeds such as spotted spurge and Florida pusley; and b) roots that are dark and short with few lateral roots; these short root systems do not hold soil together as well as does a healthy root system when a core or plug is taken. If nematode presence is suspected, submit a soil sample to the Florida Nematode Assay Laboratory or to a reputable private laboratory for assaying. Check with your local county cooperative extension office for nematode sampling kits.

Effective chemical control for nematodes is currently not available. Cultural practices to encourage turf growth to withstand higher nematode populations include the following: apply thorough, less frequent watering to encourage roots to grow deep; maintain adequate soil potassium and phosphorous levels; raise mowing heights to encourage root growth; and avoid overfertilizing with nitrogen.

For further information, refer to EDIS publication ENY-038: "Nematode Management for Non-Residential Lawns, Athletic Fields, Racetracks, and Cemeteries in Florida."

Diseases

Diseases are rarely a problem in most Florida athletic fields if proper turf management practices are followed. Preventative fungicides generally are not necessary, except for *Pythium* control following overseeding with ryegrass.

Plant fungicide-treated seed. This is the first, and easiest, line of defense against disease development. Prudent watering practices are the second defense because constant moisture is necessary for disease development. Thirdly, use preventative fungicides, especially if several days of warm weather with high humidity and/or fog are forecasted. If a disease problem is suspected, submit a sample to the Florida Cooperative Extension Service Plant Disease Clinic through your local county cooperative extension agent.

Dollar spot is a disease that can become a problem in lower maintained bermudagrass turf areas. Symptoms include scattered brown areas two to three inches in diameter (size of a silver dollar) that develop under warm, humid weather conditions. White, web-like strands (mycelium) of the fungus may be visible in early morning. Disease severity is masked by application of nitrogen-containing fertilizer at a rate of 1/2 pound of nitrogen per 1000 sq. ft. (i.e., 1 1/2 pounds of 3300 per 1000 sq. ft.). If the problem persists, a fungicide may be necessary. Due to the constant change in fungicides available, refer to your local county cooperative extension specialist for the latest control recommendations.

Helminthosporium leaf spot is another disease that normally occurs when the bermudagrass is maintained at extremely low nitrogen rates and/or when weather conditions favor reduced or slower bermudagrass growth. Purple spots scattered across individual bermudagrass leaf blades indicate early disease developments. Brown patches or spots roughly 2 to 4 inches in diameter occur during later stages of disease development. Lightly fertilizing with nitrogen will encourage bermudagrass recovery and if the disease persists, a fungicide may be required.

For further information, refer to EDIS publication SS-PLP-02: "Collecting and Submitting Turf Samples for Disease Identification."

Table 1. Mowing heights and frequency for athletic fields with common or hybrid bermudagrass or bahiagrass.

Grass Present	Mowing Height	Mow When Turf Reaches This Height
Common bermudagrass	1 1/2	2 to 2 1/4
Tifway and Tifsport bermudagrass (football, soccer, outfields)	3/4 to 1	1 1/4 to 1 1/2
Tifway/Tifsport bermudagrass (infields)	1/2 to 3/4	3/4 to 1
Bahiagrass	3*	4
*During the sports season, these grasses can be temporarily mowed at 2 inches.		

Table 2. Suggested fertilization schedule for athletic fields without the benefit of a soil test.*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Overseeded bermudagrass with ryegrass and/or south Florida bermudagrass fields	--	N ¹	--	C ²	--	N	--	N		C	--	N
Non-overseeded north Florida bermudagrass fields	--	--	--	C	--	N	--	N		C	--	--
Bahiagrass	--	--	--	C + Fe ³	--	N	--	N	--	C + Fe	--	--

*This guide is for turfgrass fertilization under circumstances where a soil test does not exist. In order to properly apply the rate of P and K required, a soil test is required. It is recommended always to soil test.

¹Application frequency will be determined by nitrogen source used. A slow release source such as IBDU or sulfur-coated urea should be applied at 1 pound actual nitrogen per 1000 sq. ft. (i.e., 3.2 pounds 3100 per 1000 sq. ft. or 140 pounds per acre). A quick-release nitrogen source such as ammonium nitrate should be applied at 1/2 pound actual nitrogen per 1000 sq. ft. every 2 to 3 weeks (1.5 pounds 3300 per 1000 sq. ft. or 66 pounds per acre) during those months indicated with N. Be sure to irrigate quick-release nitrogen sources immediately after application to minimize turf burn.

²Use a complete (C) fertilizer ratio (e.g., 4-1-2 or 3-1-2) at 1 pound nitrogen per 1000 sq. ft. (i.e., 6.25 pounds 16-4-8 per 1000 sq. ft. or 272 pounds per acre).

³Yellow appearance may indicate iron (Fe) or manganese deficiency due to low soil temperatures, excessive soil pH (>7.0), or excessive soil phosphorous levels. Spray iron (ferrous) sulfate (2 oz. in water per 1000 sq. ft. or 87 oz. per acre) or a related iron source to enhance color, as needed. If manganese deficiency is suspected, apply manganese monthly at 0.25 lb/acre.

Table 3. Suggested maintenance schedule for athletic fields.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Core aeration followed by verticutting, topdressing, fertilization and irrigation												
a. intensively used fields	--	--	--	+	--	+	--	+	+	--	--	--
b. seasonal play-only fields	--	--	--	+	--	--	--	+	--	--	--	--
Overseeding	--	--	--	--	--	--	--	--	--	N	C-S	--
Preemergence weed control (crabgrass, goosegrass)												
a. bensulide, betasan, pendimethalin, prodiamine, oryzalin, oxadiazon, etc.	--	S-C	N	--	R	--	--	--	--	--	--	--
b. Kerb (<i>Poa annua</i>)	--	--	--	--	--	--	--	+	--	--	--	--
c. Rubigan (<i>Poa annua</i>)	--	--	--	--	--	--	--	--	+	+	+	--
Disease control (overseeded bermudagrass)	--	--	--	--	--	--	--	--	--	+	+	+
Mole cricket control*	--	--	+	--	--	+	+	--	+	--	--	--
N - North Florida; S - South Florida; C - Central Florida; R - Repeat treatment, if necessary												
*Mole Crickets have 1 generation per year in most areas of Florida. Time insecticide applications between June 1 and 15. A follow-up application should be timed between July 1 and 15 to control any new crickets. It is suggested that either the home-made or one of the commercial baits be used at this time. After this, spot treat as needed with Orthene®. Follow the label directions when using any material. Most (except Orthene®) need to be watered in immediately after application. Apply all insecticides as late in the day as possible. Consult current Pest Control Guide (ENH 124) for specific chemical recommendation.												

Table 4. Soil volumes required to topdress 1000 sq.ft. to various depths.

Depth (inches) fraction (decimal)	Soil Volume	
	ft ³	yd ³
1/32 (0.03)	2.6	0.1
1/16 (0.06)	5.2	0.2
1/8 (0.125)	10.4	0.4
1/4 (0.25)	21	0.8
1/2 (0.5)	42	1.5
3/4 (0.75)	62.4	2.3
1	83.3	3.1

Table 5. Herbicides for control of summer grass and broadleaf weeds in Florida.

		Weed Type	
Preemergence	Trade Name Examples	Grass (crabgrass, goosegrass, thin paspalum, etc.)	Postemergence
		Grass (crabgrass, goosegrass, thin paspalum, etc.)	
benefin	Balan [®]	MSMA, DSMA*	several available
bensulide	Betasan [®] , Pre-San [®] , Bensumec [®]	metribuzin*	Sencor [®]
DCPA	Dacthal [®]		
dithiopyr	Dimension [®]	foramsulfuron	Revolver [®]
oxadiazon	Ronstar G [®]	rimsulfuron	TranXit [®]
oryzalin	Surflan [®]		
(combinations of above)	Team [®] , Control [®] , XL [®]		
pendimethalin	Pre-M [®] , Southern Weedgrass Control [®] , Pendulum [®]		
proflamime	Barricade [®]		
napropamide	Devrinol [®]		
Annual bluegrass (Poa annua) ***			
pronamide	Kerb [®] 50W***	pronamide	Kerb [®] 50W***
fenarimol		Rubigan 50W***	
Broadleaf (dandelion, spurge, clover, knotweed, lespedeza, etc.)			
isoxaben	Gallery [®] 75 DF	2, 4-D; MCPP**	several available
		dicamba**	Banvel [®]
		clopyralid and others	Millenium Ultra [®]
		(combination of above)	Trexsan [®] , Trimec [®] , Triamine [®]
		carfentrazone and others	Speed Zone [®] , Power Zone [®]
		metsulfuron	Manor [®]
Purple nutsedge			
---	---	imazaquin*	Image [®]
		trifloxysulfuron	Monument [®]
		halosulfuron	Manage [®]
Yellow nutsedge			
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		halosulfuron	Manage [®]

*DO NOT apply to bahiagrass. **Do not apply when temperatures are above 85°F. *** See text for details.