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Featured Article From September LSMP 2006

Soccer Field Maintenance and Management

By Jim Puhalla, president, Sportscape International, Inc.

To help the turf stay healthy we aerate with a spiker with 6-inch curved blades and go over the turf in two directions. Topdressing the field with 3/8 inch of sand with a tractor attachment fills in and smoothes the divots created by the spiker and helps keep the surface even.

Soccer coaches don't need to be told that their game demands better turf quality than just about any other outdoor team sport. On a smooth, dry, well-maintained pitch, soccer has a graceful quality, but when the field goes bad, the game suffers. Bad ball response disrupts players' efforts to execute passes, the game slows to a crawl as miss-kicked balls constantly fly over the touch lines, and the score may depend on who can stay upright most successfully.

Good turf doesn't just happen. It takes careful planning and hard work. Here are some ideas for making soccer field maintenance and management easier.

A good place to start is a soil test to help you understand the "nutrient values" of the soil and know how much fertilizer and what kind your field needs. (If you don't know how to do a soil test, call your county extension agent. He or she will walk you through the procedure and help you find a lab to do the test. It only costs a few dollars and can save you much more in terms of wasted fertilizer, etc.)

An effective field management program requires careful, regular field inspection. Inspect each field at least every other week all year round, including during the off season. It doesn't have to take much more than five minutes per field. That five minutes can save you a lot of time, work and headaches once the season starts. Once play begins, you should do a field inspection once a week.

While a thin layer of mulched grass clippings can add nitrogen back to the turf, a thick layer of clippings on the turf can kill the grass.

What to Look For

When your turfgrass is actively growing, keep an eye out for mowing problems. If there's a thick layer of

clippings on the turf after it's been mowed, the field is being allowed to get too high between cuttings and then being cut too short. That's bad; a thick layer of clippings on the turf can kill the grass.

What's more, cutting off more than one third of the plant can weaken the grass and make it less resistant to drought, insects, disease and even weeds.

While you're at it, tear off a couple of blades of grass and look closely at the cut ends to see if they have been sheared off cleanly. If they have ragged edges it's a sign of dull mower blades. Torn grass blades can make the turf vulnerable to disease. If after mowing the field has a whitish cast as you look at it from the edge, that's a sign of mower blades needing sharpening. Too many groundskeepers let their blades get much too dull. (Of course, always make sure to follow the mower manufacturer's directions for safely sharpening blades.)

One of the most critical things to look for is moisture, which underscores the importance of off-season inspections. If the turf is too wet or too dry, it's best to solve those problems during the off-season, when you don't have to worry about getting the field ready for a game. Walk around the field sometime during or just after a hard rain so you can see (and feel) for yourself how the turf is draining.

Another quick way to check soil moisture is to push a screwdriver into the turf until you encounter some resistance. It should easily penetrate 4 to 6 inches into the soil. If it doesn't, the field probably needs watering. There's also a tool called a "soil probe" or "soil profiler" that can help you check not only moisture but compaction, thatch accumulation and root structure.

You need to check for weeds in the parts of the field that get the most traffic, as weeds can get a toehold in the most compacted areas. On northern fields, for example, the appearance of knotweed is usually a sign that the area is becoming too compacted. If you relieve the compaction by aerating, the turfgrass will have a better chance of crowding out the knotweed.

The Field Inspection Report form (Figure 1) is helpful for doing your inspections. Recording all your observations on a form like this will help you keep track of all the factors that can affect field performance and make it easier to understand how the field responds to environmental conditions all year long.

Inspection Report

Field: Date:

	Overall Appearance	Clippings	Height of Cut	Sharpen Mower Blade	Soil Moisture	Other: Color, Density, Thatch, Compaction, Weeds, Catch Basins, Sprinkler Heads, etc.
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						

Figure 1. Field Inspection Report View full Size Image

Maintaining Southern Fields

Figure 2 is an example of a maintenance program that you can tailor to fit the needs of a soccer field in the South or Southwest, usually called the “warm season zone.” This is just one example of a maintenance program that one fields manager uses. You can adapt it to the factors you observe in your field inspections over a year or two.

Sample Maintenance Schedule
(Warm Season)

Field Name: Starkville Youth Soccer — Address: Airport Road
Type of Field: Game Field — Starkville, MS 39759

Condition: good — Compaction: moderate
Type of Grass: common bermudagrass — Drainage: surface
Type of Mower: 60" flail mower — Irrigation: traveling sprinkler
Type of Soil: native clay — Thatch: 1/8"

Soil Test: — Notes: goal areas must be reseeded in May
Year: 1997 — Phosphorus: 85
pH: 6.4 — Potassium: 360

Time of Year	Fertilization	Aeration	Topdress	Overseed	0.5 Rule Mowing Ht	1" Week Watering	Weed Control
May	13-13-13 2 lb N	spike two times	1/4 " sand		1" two times a week	traveling sprinkler as needed	
June	45-0-0 1 1/2 lb N				1" two times a week	traveling sprinkler every 3 days	2,4-D plus MSMA spot treat
July	45-0-0 1 lb N				1" two times a week	traveling sprinkler every 3 days	2,4-D plus MSMA spot treat
August	45-0-0 1 lb N	spike two times	1/4 " sand		1" two times a week	traveling sprinkler every 3 days	
September	18-46-0 1 lb N		1/4 " sand after overseed	15 lb perennial rye	1" two times a week	traveling sprinkler every 3 days	
October	45-0-0 1 lb N / 0-0-60 1 1/2 lb K			spot overseed	2" one time a week	traveling sprinkler as needed	
November	34-0-0 1 lb N				2" one time a week	traveling sprinkler as needed	
December	34-0-0 1/2 lb N				2" as needed	traveling sprinkler as needed	
January					2" as needed		
February	34-0-0 1/2 lb N				2" as needed		
March	45-0-0 1/2 lb N				2" as needed		
April	45-0-0 1 lb N				2" as needed		

Figure 2. Southern (Warm Season) Maintenance Program
View full Size Image

Fertilization

This maintenance program includes very aggressive fertilization, especially in the spring. That promotes rapid bermudagrass recovery from the competitive stress of the previous season. If you irrigate the field after applying fertilizer, you can make the heavy nitrogen applications all at once, otherwise, you should split the fertilizer into two applications two weeks apart.

A complete fertilizer (for instance, 13-13-13) is good to apply in May to make sure that nutrient levels are

strong as summer approaches. In the summer, fertilization calls for urea (45-0-0) for maintenance applications of one pound of N. An additional application of K in October helps the turf stand up well to the winter; the winter fertilization application of ammonium nitrate (34-0-0) helps to maintain ryegrass growth.

Mowing with dull blades causes turfgrass ends to shred, making them more vulnerable to disease.

Aeration and Topdressing

For many soccer fields, the only periods of limited use during the growing season are early May and August. That means you can aerate the field to help the turf stay healthy. We like to use a spiker with 6-inch curved blades, run over the turf in two directions. Topdressing the field with sand will smooth the divots created by the spiker and help keep the surface as even as possible.

Overseeding

This is a very good practice many field managers overlook. Overseeding helps to fill in the thin spots and keeps your fields looking much better year-round.

We like to overseed the field with a three-way perennial ryegrass blend at the end of September, putting down about 15 pounds of seed for each 1,000 square feet. Areas where the turf is especially bad can be spot-seeded in October. Overseeding is especially important where there is year-round use of a field. If you spread one-quarter inch of sand over the field after overseeding, you'll get better seed germination, because the topdressing promotes seed-to-soil contact.

Mowing

We recommend mowing twice a week at a height of about one-inch from May through September. This maximizes the strength of the turfgrass and encourages lateral spread of the grass plants. After overseeding in the fall, raise the cutting height to two inches to promote winter hardiness and protect bermudagrass during winter play.

Watering

Generally, most fields need to be watered every three days or so from June through September, and as needed the rest of the year to keep the soil moist. Applying at least one inch of water per week will help to maximize turfgrass growth. If you overseed, or spot-seed thin areas, you'll want to water lightly and frequently at first to promote germination of the new turfgrass.

Weed Control

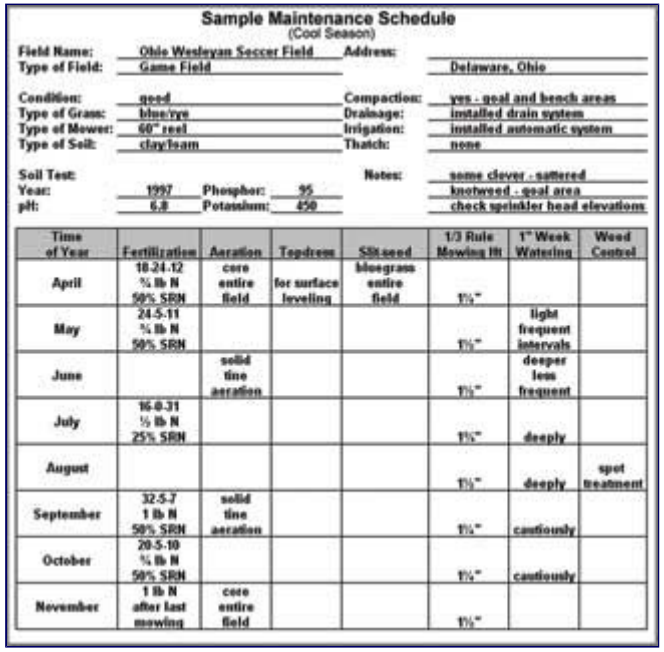
Healthy turfgrass has a lot less weed trouble than weak turf. You can use a postemergence herbicide with MSMA and 2,4-D for spot-treatment of weed problems beginning in June, but don't use any herbicides when the temperatures are very hot or very dry.

Transitional Zone Maintenance

Maintenance programs in the transitional zone depend on your type of turfgrass. If the field has warm season varieties like bermudagrass, follow warm-season maintenance practices, but be aware the cooler weather in the transitional zone makes the growing season shorter. If the field has perennial ryegrass or Kentucky bluegrass, use the practices that are common for the North, but remember that your turfgrass will start growing earlier in the spring and keep growing later in the fall.

Northern (Cool Season) Maintenance

Cool season turfgrasses grow strongly in the spring and early summer, go dormant in the hottest part of the year, and then have another strong growing season in the late summer and fall. Northern maintenance programs have to account for this cycle. Figure 3 is a sample of a northern maintenance program that you can adapt to the needs of your facility in the North.



Sample Maintenance Schedule
(Cool Season)

Field Name: Ohio Wesleyan Soccer Field
Address: Delaware, Ohio
Type of Field: Game Field

Condition: good
Compaction: yes - goal and bench areas
Type of Grass: blue/rye
Drainage: installed drain system
Type of Mower: 60" reel
Irrigation: installed automatic system
Type of Soil: clay/loam
Thatch: none

Soil Test:
Year: 1997 Phosphor: 95
pH: 6.8 Potassium: 450
Notes: some clover - scattered
knotweed - goal area
check sprinkler head elevations

Time of Year	Fertilization	Aeration	Topdress	Slitseed	1/3 Rule Mowing Ht	1" Week Watering	Weed Control
April	18-24-12 ¾ lb N 50% SRN	core entire field	for surface leveling	bluegrass entire field	1½"		
May	24-5-11 ¾ lb N 50% SRN				1½"	light frequent intervals	
June		solid tine aeration			1½"	deeper less frequent	
July	16-0-31 ½ lb N 25% SRN				1½"	deeply	
August					1½"	deeply	spot treatment
September	32-5-7 1 lb N 50% SRN	solid tine aeration			1½"	cautiously	
October	20-5-10 ¾ lb N 50% SRN				1½"	cautiously	
November	1 lb N after last mowing	core entire field			1½"		

Figure 3. Cool Season Maintenance Program View full Size Image

Fertilization

A cool season field should get no more than 30 percent of its annual nitrogen needs in the spring, with the rest applied in the fall. If you fertilize too heavily in the spring it can cause excessive shoot growth and restrict the growth of strong roots, which are important to the health of the turf. At the first fertilization of the spring, put down a “starter fertilizer” like 18-24-12, to help get new plants established. In the summer apply a half-pound of nitrogen and a full pound of potassium to protect the plants during the heat of the summer and to help resist disease.

Applying most of the nitrogen in the fall helps the turf recover from the stresses of competitive athletics. The very best time to apply nitrogen is right after the last mowing of the season while the grass is still green. At this point, shoot growth slows, but the roots continue to grow. The extra nitrogen you put down will be stored by the root system and will help the turf green up early in the spring, as well as helping it withstand summer stresses the next year.

This field was mowed when the soil was wet, causing visible ruts in the playing surface.

Aeration

Aerating frequently with different equipment at different times will help make the turf stronger. In April, we recommend core aerating the entire field, followed by topdressing with sand (and slit-seeding, if the budget allows).

Later in the year, use solid tine aeration to reduce compaction without leaving cores all over the field, and core-aerate again at the end of the fall playing season.

Topdressing and Slit-Seeding

Performing these two processes together really improves the health of the turf and helps to level the surface for better ball response. If you do these steps for a couple of years, you'll be surprised at how much difference it makes.

Mowing

Most northern zone fields are a mixture of Kentucky bluegrass and perennial ryegrass. The ryegrass starts growing first in the spring, so it's a good idea to set your mowing height at about one and one-quarter inches so sunlight can reach the bluegrass underneath. When the bluegrass starts growing in the middle of the spring, raise the height by a quarter inch. The cutting height should be at its highest in July.

About a month before the fall playing season starts, gradually begin reducing the cutting height to get the field to the desired height for competition. Remember not to cut off more than one-third of the grass plants at a time.

Reducing the cutting height gradually lets the turf adjust to the lower cutting height in time for games. When the playing season ends, keep mowing as long as the grass is growing. If you let the grass grow too long and leave it that way over the winter you increase the risk of snow mold. (Don't scalp it in the fall, either. That can expose the crowns of the plant to winter weather and weaken the turfgrass.)

If you plan to cut the grass shorter than two inches we recommend that you invest in a reel mower.

Watering

In the spring, it's good to water lightly but frequently to help nurture new grass plants. As the season progresses, you can gradually decrease the frequency and increase the amount you apply each time you water.

If the fall season is dry, irrigate with an eye on the weather forecast. It's usually better to keep the turf a little dry than too wet during the playing season. That reduces the chance that sudden heavy rains could severely compromise competition.

Weed Control

As a rule, blanket weed treatments on a soccer field are not usually recommended. To have a really good field, a field should be re-seeded annually, which means pre-emergents are unwise, since they stop grass germination. Even post-emergents, which kill weeds after they appear, shouldn't be applied until the new plants are fully established. When the turf is being kept healthy, weed infestation is usually fairly easy to control. One spot treatment a few weeks before the playing season will usually control the weeds until long after the last game. If you run into a nasty infestation that seems to call for a blanket application, make sure the turfgrass and the weeds are actively growing, and that the soil has at least normal moisture levels. Don't apply herbicides any time the turf is under drought stress.

Practice Fields

In northern areas, the program outlined in Figure 3 will support daily practices with minimal turf damage. (The ideal situation is to have more than one practice field and to alternate practices.) A team with one practice field usually uses that facility for about 100 practices in the course of the season, so there are usually several bare spots by the last practice. Aerating and fertilizing these bare spots doesn't help much. A better strategy is to apply one pound of nitrogen monthly from April to July, so the turf is good and strong before the practices start. With careful mowing, watering and this kind of aggressive fertilization, the field will stand up just fine to the demands of the season.

Overseeding helps to fill in the thin spots. We like to overseed with a three-way perennial ryegrass blend at the end of September, putting down about 15 pounds of seed for each 1,000 square feet. Especially bad areas can be spot-seeded in October. You'll get better seed germination by spreading one-quarter inch of sand over the field after overseeding. This topdressing promotes seed-to-soil contact.

About the Author

Jim Puhalla is the president of Sportscape International, Inc., a firm specializing in the design, construction, and renovation of sports fields and related facilities, with headquarters in Boardman, Ohio and operations in Dallas and Southeast Michigan. He is also an author, with Mississippi State University professors Jeff Krans and Mike Goatley, of the book Sports Fields: A Manual for Design, Construction and Maintenance (Copyright 1999, Ann Arbor Press, Inc., Chelsea, Mich.), and a forthcoming book on baseball and softball fields to be published by John Wiley & Sons, Hoboken, N.J.

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