MATCHING EXPECTATIONS WITH LIMITATIONS

BY **MICHAEL GOATLEY, JR.**

"Dirty Harry" Callahan uttered one of the most recognized movie lines when he said, "A man has got to know his limitations." What he said applies to sports turf managers too. No matter how hard you try, there is simply only so much one can do, regardless of budget, expertise, location, and so forth. Sports turf managers are some of the most conscientious turf managers around, but are often unable to accept that some things in their sports turf management programs are just not possible. Have you identified YOUR limitations? And maybe more importantly, are your expectations for your sports field compatible with these limitations? Let's consider some of the limitations you face and the ways to manage them.

Consider the grass, the climate, and the sport. What grass works best for your climate, sport, and anticipated use? Are you in a predominantly warm-season, cool-season, or transition zone climate? Bermudagrass is a logical choice for warm climates, and Kentucky bluegrass blends or Kentucky bluegrass/perennial ryegrass mixtures work well in cool-season climates.

Turf managers in transition zones face special challenges. Even after making the most informed decision possible, the grass you select will still have major limitations due to times of field use outside of seasons of growth. For instance, a cold-tolerant Bermudagrass chosen for a transition zone field can usually meet the needs of fall football or soccer. However, what about spring baseball or lacrosse? Now you are faced with having a totally dormant turfgrass for almost the entire spring sport season, or you have to overseed it in the fall with ryegrass, and live with the consequences of the management and competition from the overseeding. No matter how good a turf manager you are, there is no way that you can always be expected to deliver a top-notch playing surface. Your clientele should not expect it and YOU should not expect it either!

Figure 1. A properly timed spring cultivation of a cool-season field can greatly improve turf performance before the stresses of summer.

Focus on expectations that can be managed. Whether you choose Bermudagrass or Kentucky bluegrass, there are very predictable periods of root and shoot growth and carbohydrate production that enable one to make agronomically responsible management decisions. There is a spring "window of opportunity" for cool-season turfgrasses that first opens when soil temperatures at a 4-inch depth are consistently < 50 F. The window remains open until soil temperatures regularly begin exceeding 65 F. This presents a somewhat brief, but possibly very important period for maximizing plant growth (particularly the root system), and is quite often the last chance for establishment or renovation before the stresses of summer are encountered.

Spring cultivation to relieve the physical limitations of soil compaction following fall and winter field use can provide major improvements in growth potential (Fig. 1). The limiting factors in timing spring core aeration events are usually not so much the potential for damaging the turf during cultivation, but instead are proper soil moisture concerns (the soil is often too wet for the aeration equipment to perform properly) and slow recovery potential of the turf if done very early in the window.

The most significant root growth potential for cool-season turfgrasses occurs during early to mid-spring. However, this must be countered by the understanding that soon after the initial surge in root production is over, the plant's growth focus shifts very heavily towards that of producing shoots and leaves, just before the onset of the environmental stresses of the summer.

The key to success in the spring window for cool-season athletic field management is directly related to being reasonable in the timings and levels of fertility and cultivation that are delivered. A program that balances the needs of roots and shoots is best. Promote turf growth that is satisfactory to withstand reasonable field use, but do so responsibly based on the limitations you face with the soil, the grass, and the climate. Water soluble nitrogen levels of 0.25 to 0.5 lbs/1000 square feet can provide very desirable growth responses in early to mid-spring.

However, be wary of carrying significantly greater fertility rates and overly aggressive cultivation programs forward into the more stressful periods of late spring and summer. Heavy spring N fertilization might produce a spectacular looking playing surface, but the great looks can be negated by very poor performance later in the summer months as the plant has neither an adequate root system nor storage carbohydrates available to promote recovery.

The largest window of opportunity for cool season athletic fields is in late summer to early fall. This window opens as soil temperatures first begin to drop to >70 F and ends typically at the first killing frost date. While the shoots are still photosynthetically active, top growth slows due to shorter day lengths and cooling night temperatures, and root development and carbohydrate storage are enhanced. With the heat of the summer passed, the late summer to early fall window presents the ideal time for aggressive fertility, cultivation, and establishment programs.

For Bermudagrass athletic fields, rather than spring and fall windows, there is one large window of opportunity from mid-spring through early fall. Shoot growth gets a jump-start on root production as the grass emerges from winter dormancy, and the levels of root growth and stored carbohydrates actually decline as we enter another active growing season.

Research has shown that the root system of Bermudagrass basically has an annual life span, and that for all intents and purposes, its root system dies and is replaced each spring. The death is not sudden and complete for every Bermudagrass root in your field, but this phenomenon presents an unseen limitation that must be managed carefully. Aggressive spring N fertilization can exacerbate the problems

due to a declining root system, and can further drain what little carbohydrate reserves are available. Refrain from aggressive fertility and cultivation programs until the Bermudagrass canopy has completely greened and the last chance of a killing frost has passed. Then, if water is available in adequate quantity and quality, your Bermudagrass athletic field should be ready for periods of aggressive management and intensive use during the heat of summer. Under such conditions, it is likely that you will promote significant thatch development.

For an athletic field, 0.5 to 1 inch of thatch can actually be beneficial in improving turf wear tolerance and serving as a means of insulation and protection of stems. Still, it is not unusual for a Bermudagrass sports field to have excessive thatch. There is nothing that will rejuvenate the field quicker than an aggressive vertical mowing event in order to reduce the competition of the plants for space, light, water, air, and nutrient (Fig. 2). Within a week, a Bermudagrass field that is properly fertilized and irrigated for recovery will show little sign of the effects of such drastic treatment, and will actually be a healthier stand of grass than it was before cultivation.

For both warm and cool-season athletic fields, the mid- to late spring period presents serious challenges in trying to maintain the balance between shoots, roots, and carbohydrate levels. The following management strategies are important:

• Be smart with nitrogen. Low to moderate levels of N go a long way in the spring on both cool-season or warm-season grasses. It is wise not to begin an aggressive N fertilization program until the turf is actively growing in either case. Always use soil test data to determine if adjustments in soil pH or other nutrient levels are needed.

• Manage traffic. A turf that is trying to recover from the wear and tear of heavy traffic will further expend both newly created and stored carbohydrates in its recovery efforts. The strain on the root system becomes even greater, and the limitation in the root system is not something that the turf can "grow out" of by way of fertility.

• Manage irrigation wisely. Irrigate as needed to promote active growth, but manage the turf on the dry side if possible. This reduces soil compaction tendencies and will encourage the root system to explore for water deeper in the soil.

• Manage compaction wisely. As stated earlier, cool season athletic fields respond well to core aeration in their spring window of opportunity, while it is most prudent to wait until Bermudagrass has completely greened before cultivation.

Figure 2. Aggressive vertical mowing of a bermudagrass field in mid-summer can ultimately improve the overall health of the turf.

Get the most out of N fertilizer

This information was adapted from Turfgrass Fertilization: A Basic Guide for Professional Turfgrass Managers, *prepared by Dr. Peter Landschoot for Penn State's College of Agricultural Sciences.*

The following are suggestions for maximizing the efficiency of your nitrogen fertilizer program while minimizing losses to leaching, runoff, and the atmosphere:

1. Soil test. Applications of phosphorus, potassium, and lime according to soil test recommendations allow more efficient use of N fertilizer by turfgrasses.
2. Apply N in amounts needed by the species you are trying to maintain; more is not necessarily better.
3. On turf, apply N fertilizer in multiple applications over the growing season so as to meet the needs of your turf at the appropriate time, usually mid- to late spring, late summer, and late fall.
4. Returning clippings to turf can cut N use by up to one-third.
5. Don't overwater. Too much water can leach N below root systems and into groundwater.
6. Use slow-release fertilizers when making infrequent, high-rate applications in areas where soils are prone to leaching.
7. Keep N on the grass and not on pavement. Shut off your spreader when moving across maintenance roads, or blow or sweep granules from pavement.
8. Do not apply N under summer dormancy or on frozen surfaces.
9. Water-in urea or ammonium fertilizers, especially when applying in warm weather.
10. Fill and empty spreaders in areas where spills are easily cleaned up. Use this spilled product, don't wash it into storm sewers or elsewhere.

Consider field use and your budget. There is little doubt that no matter what your intentions are in providing the best, safest athletic field possible, the biggest limitations you are likely to face will be related to field use demands and the resources you have. There has been little research available comparing expected field use levels with budgetary considerations, but there now are some definitive data on the subject credited to Michigan State University. A publication entitled "Optimizing Cultural Practices to Improve Athletic Field Performance" does an excellent job estimating how maintenance costs are correlated with the number of simulated soccer games on an athletic field where acceptable turf cover is maintained.

Any turf manager fighting a battle with administrators and others regarding budgetary issues that limit their ability to provide an acceptable playing surface should be armed with a copy of this report. This information predicts the return on the investment in maintenance practices, something any administrator or municipal official should be anxious to see. It can be found at www.turf.msu.edu (bulletin E18TURF; authors R. Calhoun, L. Sorochan, J. Sorochan, J. Rogers III, and J. Crum).

There are obviously many more limitations that you will face (for instance space, light, water quality, etc.). Once identified, you should develop strategies not necessarily to eliminate the limitations, but instead, find ways to manage them. "Dirty Harry" was right—you do have to know your limitations. However, your ability to deliver in the face of limitations will certainly make a bold statement regarding your capabilities and your professionalism. ST

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