

Incidentally, of these four varieties Riviera and Yukon are available as seed. More specific information on bermudagrass varieties currently being tested at North Carolina State can be found at www.turffiles.ncsu.edu.

With regards to seeding bermudagrass, recent research conducted at the University of Arkansas has shown that dormant seeding of bermudagrass can achieve significantly better results than traditional late spring-early summer seeding. In their study, bermudagrass was seeded on February 15, March 15, April 15, and May 15 at rates of 1 and 2 lbs pure live seed per 1000/sq.ft. Rate of establishment was evaluated until all plots reached 100% cover. The results of this study indicated that dormant seeding dates of February 15 and March 15 exhibited greater turfgrass coverage on every rating date from June 3rd until full establishment. Similar work will be performed this year at the NCSU Sandhills Research Station near Pinehurst, NC to see



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FIELD SCIENCE

how well dormant seeding performs in North Carolina. This research could directly impact management strategies of athletic field superintendents across the state that may be trying to establish or fill in thin areas with seeded bermudagrass.

In addition to variety selection, implementation of a proper management program is vital to the success of growing bermudagrass in the transition zone. Healthy bermudagrass is not only necessary to withstand the wear and tear from games and practices, but it is also a key in successfully transitioning your field into and out of winter. Successful bermudagrass management programs need to place impor-

tance on all of the primary cultural practices like fertilization, irrigation, and mowing as well as secondary cultural practices such as aerification, topdressing, pest management, etc.

Although fertilization is necessary in any turfgrass setting, it is particularly important on athletic fields due to the high amount of traffic they receive. Actively growing bermudagrass typically requires 1 lb. of nitrogen per 1000/sq.ft. per month during the growing season. This rate is simply a guideline and can be adjusted depending on factors like budget, desired quality, and amount of use. For example, low budget fields that receive small to medium amounts of play can

typically get by with 1 lb. of nitrogen per 1000/sq.ft. every 4 to 6 weeks.

High profile fields like college athletics or fields that receive a lot of play may need 1 lb. of nitrogen every 2 to 3 weeks. At the end of the growing season, it is not uncommon for athletic fields in the southeast transition zone

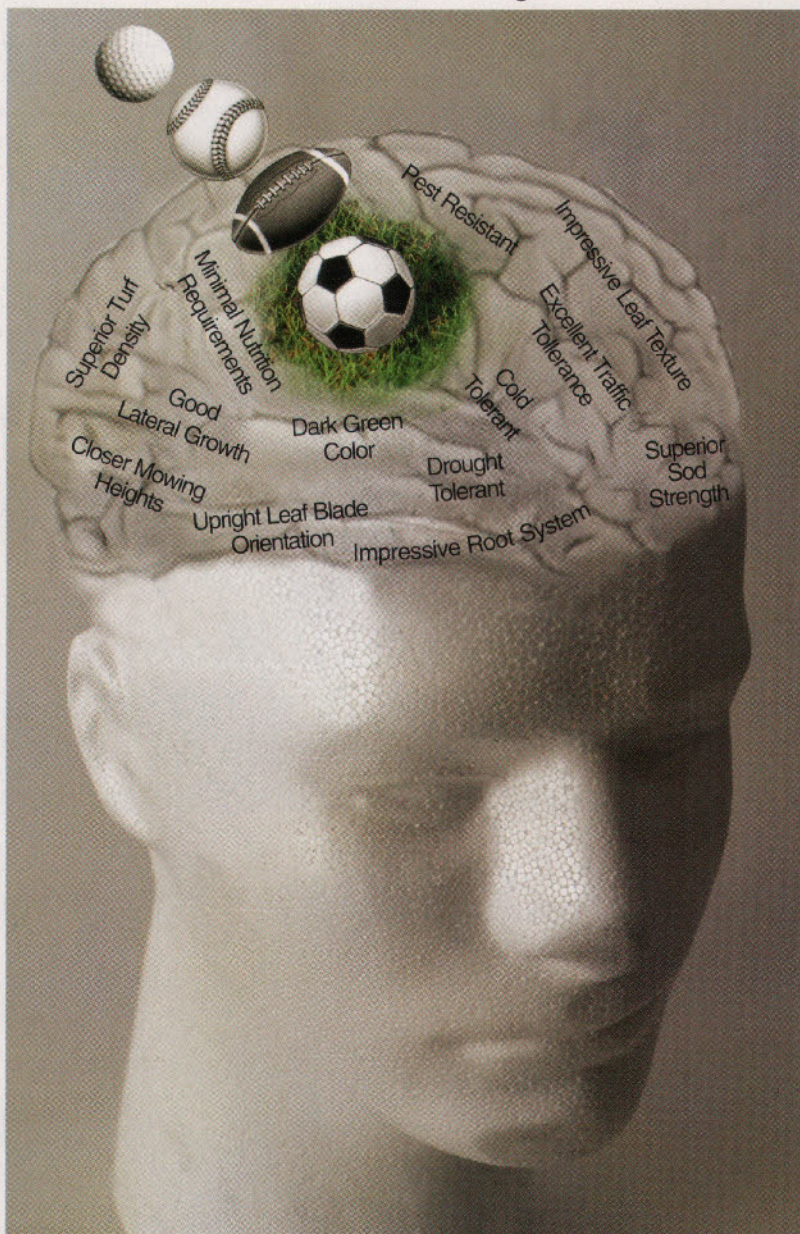
to receive anywhere from minimal amounts of nitrogen applied up through 10-12 lbs. nitrogen per 1000/sq.ft. Higher rates within a given range are for regions where the growing season may be longer or where pressure from traffic is high. Also, newly established areas may require slightly higher (50%) rates during the establishment period.

In addition to rate, another fac-

tor that needs to be considered is nitrogen source. The amount of nitrogen a field receives should come from a combination of quick release and slow release sources. Quick release sources are great to apply prior to field events for an instant growth and green-up response. Slow release sources are more often used for general maintenance. Combining both of these sources helps to ensure the bermudagrass is not going through any part of the growing season with inadequate nitrogen. Also, light, frequent applications of fertilizer are suggested when attempting to rejuvenate an area thinned by pest or environmental stress.

Simply mowing a field three times a week produces better quality turf that is more resilient under traffic than a field that is mowed once a week.

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In addition to nitrogen, it is also important to make sure you have sufficient phosphorous (P) and Potassium (K) available for plant growth. Turfgrasses, including bermudagrass, often use N, P and K in a 4:1:2 ratio. This means that for every 4 parts N a turfgrass plant uses, it needs 1 part P and 2 parts K. Also, whereas N is important for shoot growth, P is often associated with adequate root growth. Unlike N however, P does not readily leach out of the turfgrass root zone,

Potassium (K) is the last primary nutrient of importance in fertilization programs. It is second only to nitrogen in the amounts required to sustain turfgrass growth. Also, potassium fertilization is often associated with increased stress tolerance. Two major stresses found on athletic fields in the transition zone are traffic and cold stress. Adequate levels of potassium assist the plant in both of these areas. In fact, many athletic field superintendents in the transition zone



especially on native soil fields. This affects management in the fact that it typically isn't necessary to apply P every time you apply N in your fertilization program. Many turf managers may use a complete fertilizer for their first summer fertilization (2-3 weeks after spring greenup) and then use a straight nitrogen source such as ammonium nitrate (34-0-0) or ammonium sulfate (21-0-0) for their following treatments. Any additional phosphorous should be applied based on soil test recommendations.

will apply 1 lb. K per 1000/sq.ft. around late August to early September. This insures there are adequate levels of K for the plant to utilize just prior to entering dormancy. As with phosphorous, soil test results can be useful in determining the actual amount necessary for good growth.

Other nutrients such as calcium (Ca), magnesium (Mg) may be needed if the soil test indicates that to be the case. Micronutrients like iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B),

"Riviera's superior wear tolerance and recuperative ability have given us a quality training surface all year long, helping take the Lobos to the NCAA title game for the first time in history."

"With Albuquerque being a mile high in elevation and in the high desert, we normally experience temperature swings from 30 to as much as 40 degrees from nighttime lows to daytime highs. With these extremes, our game field was left with only 25% of its original bermudagrass variety turf after the winter. We also found it difficult to keep turf coverage on our cool season training field after five weeks of summer camps and over 85 days of 90+ degree heat."

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--Brent Neighbor

*Sports Fields and Grounds Manager
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molybdenum (Mo), and chlorine (Cl) are rarely deficient in managed turf. These nutrients are typically already present in the soil or applied as a by-product in lime and complete fertilizers in high enough quantities to prevent deficiency. However, if you are at all concerned about deficiencies of these nutrients a simple soil or plant tissue test is a good way to determine if they are an issue.

Irrigation

Irrigation is another primary cultural practice important in managing bermudagrass athletic fields. Water should be applied approximately

much more resistant of wear and tear from traffic. Simply mowing a field three times a week produces better quality and is much more resilient under traffic than a field that is mowed once a week.

In addition to mowing frequency, mowing height is also important. The proper mowing height for bermudagrass ranges from 0.5 inches to 1.5 inches with 1 inch being a good standard for most athletic fields. It may also be a good idea to raise the mowing height as fall approaches to provide insulation to the growing points. This is especially true in the upper portion of the transition zone. Also, raising the mowing height obviously results in more leaf tissue. This extra leaf tissue will allow the plant to photosynthesis more and therefore produce more food to store for the winter. As a result, the plant will be healthier and hardier going into winter giving it a better chance to survive any harsh weather.

In addition to the primary cultural practices, secondary cultural practices like aerification, topdressing, and pest management (weeds, diseases, insects) are important in managing high quality bermudagrass. Aerification is particularly important on fields that receive high amounts of play in order to alleviate compaction in the root zone. Aerification is also often coupled with topdressing on native soil fields to modify the turfgrass root zone in an effort to prevent further compaction. The importance of adequate aerification in high-use areas cannot be overstated and in an ideal setting should be done as often as field use and budget allow. Information on all of these practices can be found on the NCSU turffiles website. Although all of these management practices are important, the spring application of pre-emergence herbicides is particularly worth noting for athletic fields that may be thinned or weakened by heavy traffic.

Pre-emergence herbicides are typically applied in late winter or early spring for control of many summer annual weeds, particularly annual grasses including smooth crabgrass and goosegrass. Popular pre-emergent products include benefin, dithiopyr, oxadiazon, pendimethalin, and prodiamine. (These are common names and are often sold under various trade names.) Although

Keep in mind that application timing with Oxadiazon is crucial as it is only absorbed by emerging shoots; therefore, if an application is made after weed seed germination, it will not be effective.

one inch below the existing root system to encourage deeper rooting. This will require you to take a soil probe and pull a sample to determine the depth of the root system. It is best to run the system and check the depth to determine how long it takes to reach that depth. Actively growing bermudagrass typically requires about 1 inch of water per week. A good way to test your irrigation system is by placing pie pans across your field at random intervals. This will assist you in determining how much water you are applying during a certain time period. It is also a good way to check for uniform coverage.

Of all of the primary cultural practices, the importance of proper mowing is probably the most often overlooked. Recent research at Texas A & M has demonstrated that regular, frequent mowing of bermudagrass at the proper height results in finer, denser turf that is

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each of these products offers acceptable control when properly applied, one should consider the herbicidal mode of action. Most of these products, including benefin, prodi-amine, and pend-imethalin are members of the dinitroaniline (DNA) herbicide family.

Members of this family of herbicides are mitotic inhibitors, which inhibit plant cell division. Unlike the name "pre-emergent" suggests, they do not actually prevent weed seed germination. Instead, as weed seeds germinate and grow through the herbicide treated barrier, emerging shoots and roots absorb the herbicide. Consequently, the plant absorbs and translocates the herbicide resulting in death of susceptible weed species.

The reason this is important to bermudagrass athletic field managers is herbicides in this family can cause an effect known as "club-rooting" of bermudagrass due to the herbicide mode of action. When bermudagrass absorbs and translocates these herbicides, turfgrass cell division is also inhibited similarly

to susceptible weed species resulting in clubbed roots that are not able to peg down as they would in a non-treated area. This decreased rooting or lateral spread inhibition may result in less recovery after heavy traffic events, and less lateral growth in areas you may be trying to grow-in or establish. If you think club-rooting may be a problem on your field, simply pull up a few bermudagrass stolons and see if they are rooted. If they are not, they will easily pull up and you will see the herbicide effect (clubbed roots) on the bermudagrass roots.

Oxadiazon

If this is a concern for your field, oxadiazon may be a suitable alternative. Oxadiazon belongs to a different family of herbicides and is only absorbed by emerging shoots, not roots. Although it is not labeled for use in home lawns, it is labeled for use on athletic fields when applied by professional pesticide applicators. Oxadiazon is more expensive but

offers great control of summer annual grassy weeds without inhibiting the lateral spread or recoverability of bermudagrass. However, keep in mind that application timing with Oxadiazon is crucial as it is only absorbed by emerging shoots; therefore, if an application is made after weed seed germination, it will not be effective.

Managing athletic fields in the transition zone can be tricky in and of itself. Throw in the fact that many fields are severely limited by budget restraints coupled with demands for high use and it really gets tricky. Therefore, it is always important to keep up to date with what is going on within the turfgrass industry in your particular region.

Art Bruneau is a Turfgrass Management Professor and Turf Extension Specialist at North Carolina State University.

Casey Reynolds is an NCSU Turfgrass Research Associate and NC Certified Turfgrass Professional. ■

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Can you identify this sports turf problem?



Problem: Wet turf
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Location: Davenport, IA
Grass Variety: Ryegrass/Bluegrass

**Answer to
 John Mascaro's Photo
 Quiz on Page 45**

*John Mascaro is President
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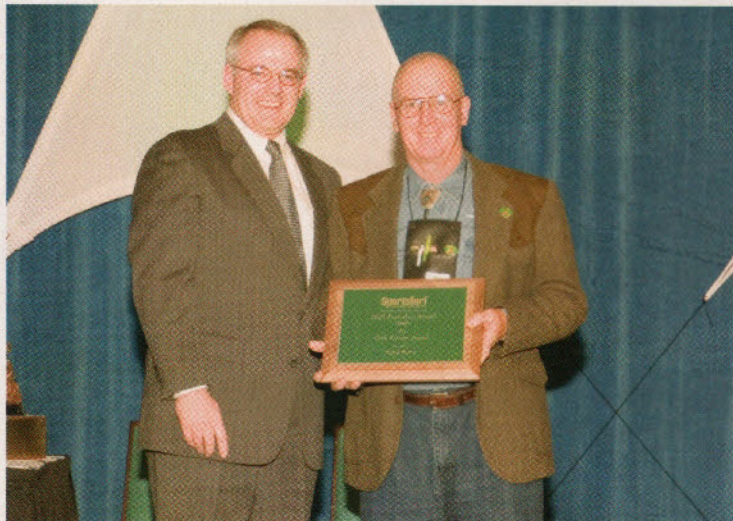
Different ways to skin a cat

By Floyd Perry

At the recent 2006 STMA conference in Orlando, much of the parlor and hallway conversation revolved around communication between groundskeeper and coach, groundskeeper and supervisor and in general, the specific duties surrounding our responsibilities on the job.

Whether we as professional groundskeepers, possess a CPR card for safety and liability or advance our job skills through a pest control class for extra CEU's, much of the general population identify our profession primarily as mowers of turf. That needs to change!

One method I believe progressive groundskeepers can use to demonstrate their individual skills on their property, is to create visual interest. As I visit various parks, recreation centers or school campuses, I'm very impressed with the types of suggestive and helpful signage used. I honestly believe to change the typical "guy on the street" attitude towards facility maintenance personnel, our profession needs to create positive images of our facilities that can elevate our professional image.



STMA President Mike Trigg, CSFM, presents the Dick Ericson Award to Floyd Perry at January's banquet in Floyd's hometown, Orlando, FL.



One groundskeeper in Grain Valley High School in Missouri enlisted the help of four interested fathers and created a football playing surface for their 2000 homecoming comparable to an NFL playoff field prepared for television viewing. Their high school has only 520 students, but you would never know that from seeing their facilities.

The men and women in our groundskeeping industry are some of the most creative, innovative, and industrious folks on the payroll; all they need is some quality support and encouragement. At times, an "atta boy," "thank you," or "nice job" goes a long way.

Communication is a two-way street. Take your before and after photos, create your reference documentation, and more important, create awareness of your work ethic by presenting a quality image on your property so your efforts will be recognized even when you are off the clock.

Floyd Perry, Jr., is president of Grounds Maintenance Services in Orlando. He received the STMA's Dick Ericson Award in January, which honors a sports turf manager who positively impacts the sports turf industry and exhibits effective team leadership. He can be reached at 407-903-1220. ■