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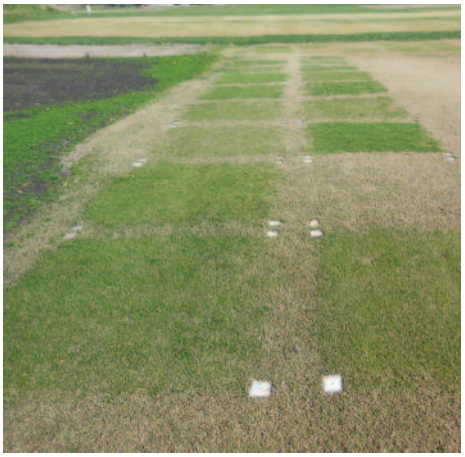

▲ **Top: OVERSEEDING** is largely for cosmetic purposes but the cool-season grass also provides some wear tolerance and recovery.

▲ **Bottom: ANNUAL RYEGRASS**, left, compared to perennial ryegrass, right.

Winter overseeding athletic fields update: 2013

BERMUDAGRASS provides one of the best playing field surfaces throughout many parts of the United States. When properly maintained it forms a uniform, dense, attractive and durable turf. Its strengths are that it readily tolerates close (< 1") cutting heights resulting in a "fast" surface players and coaches like. During the warmer months of summer it is a fast grower. This provides wear tolerance and rapid self-repair of divots from creeping rhizomes and stolons. This dense matrix of stems and roots also provides surface stability, good traction characteristics and an overall stable base for footing.

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Like all grasses, it is not perfect, and there are negatives. Being a warm-season grass, active growth slows as the days shorten in late-summer or mid-September. As the first hard frosts of autumn approach, bermudagrass begins to lose its vibrant green color and it slowly turns to a golden straw-brown color. In addition to this color loss, rapid growth stops resulting in decreased wear tolerance and less rapid recovery.

Probably one of the biggest weaknesses and one that limited wide-spread adoption in prior decades was the risk for severe winter-kill. Turf managers were reluctant to use a grass that "might" need replanting each year. With the development of very winter hardy cultivars and the ability to rapidly establish bermudagrass from seed, it is now used in many areas where it once was never considered.

To offset some of the aforementioned negatives and to satisfy the public's desire for green grass "all the time," bermudagrass field managers often overseed with a cool-season grass. Overseeding is largely for cosmetic purposes but the cool-season grass also provides some wear tolerance and recovery in trafficked and heavily divoted areas. In recent years many different overseeding strategies and philosophies have emerged. The purpose of this article is to highlight and share some of these thoughts and considerations.

WHAT TO PLANT?

Historically, the grass of choice for winter overseeding has been the ryegrasses. This group includes annual, perennial and "inter-

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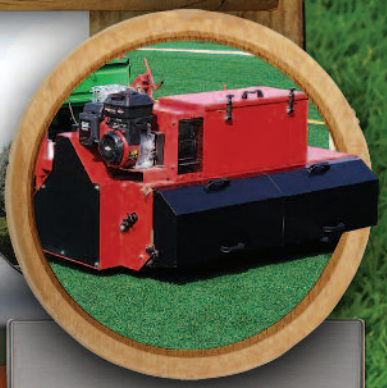

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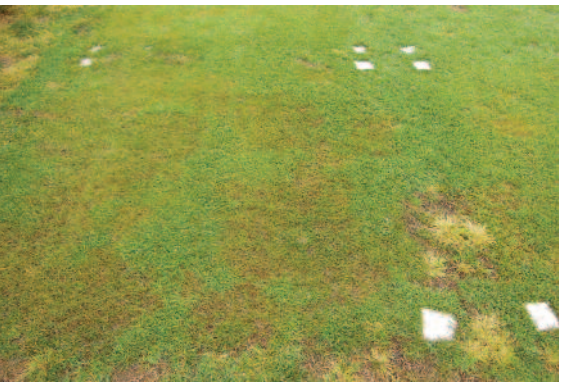


▲ **OVERSEEDED** species competing with bermuda during spring transition.

▲ **UP-CLOSE VIEW** of a ryegrass seed germinating.

mediate" ryegrasses. The ryegrasses have a large seed size, with significant endosperm (food reserves), which helps them germinate fast and mature quickly when planted under ideal conditions. Generally, most managers select and plant good quality perennial ryegrasses for winter overseeding, especially where they plan to chemically remove the overseeding. There are, however, alternatives that can be considered.

Annual ryegrass is one of the options among the ryegrasses and appears to be attractive from a price point, 25-40% less than a high quality perennial ryegrass. Most annual ryegrasses tend to form a lower quality turf than the perennial ryegrasses, even when well established. Many people do not like the light-green/yellow-green color and the turf may be prone to becoming "stemmy" with poor mowing quality/leaf shredding. Lastly, annual ryegrass is sensitive to harsh winter conditions and will die quickly with the onset of summer heat, making it somewhat unreliable. Although breeders continue to improve and advance this grass, it may best be left for use in places where appearance is not paramount like utility lawns.

Some researchers have been evaluating the tetraploid ryegrasses for overseeding with some success. These ryegrasses are sometimes referred to as "intermediate" ryegrasses and have turf quality characteristics similar to the perennial ryegrasses but their heat tolerance is not very good, somewhat similar to an annual ryegrass. This lack of heat tolerance helps as the turf stand transitions back to bermudagrass during late-spring without the need for chemical transitioning.

What about other species and options? Turf breeders continue to advance all species with the help of feedback from turf managers and desirable characteristics. In some parts of the country I have heard of managers exploring the incorporation of Kentucky bluegrass into their bermudagrass. The goal I am told, is to create a polystand of warm and cool-season spreading, self-repairing grasses that would ebb and flow throughout the growing season. This mixture of bermudagrass and bluegrass might allow for greater intense use across all seasons, spring, summer, autumn, while providing moderate green color all season without a need to overseed/interseed. This technique has not been well evaluated in research trials and it is possible that over a period of years the turf could become very patchy due to segregation. This approach may have some merit where appearance is not paramount and is not a suggested option for stadium fields.

The turf-type tall fescues are another species that has not been well explored, particularly the very narrow leaved ones. The seed size of tall fescue is similar to perennial ryegrass and germination, emergence and establishment is about the same, but ever so slightly slower. Further, with some of the new turf-type tall fescues the visual (color/density) and mowing characteristics are similar to perennial ryegrass or a Kentucky bluegrass. One advantage to using tall fescue is it is not quite as susceptible to gray leaf spot compared to perennial ryegrass. Tall fescue does, however, have very good heat and drought tolerance and would need to be chemically removed the following spring.

The final point I should make is to remember, like anything, you get what you pay for! Purchasing a higher quality ryegrass that germinates quickly and has good turf characteristics (color, leaf texture, density) would in most circumstances be preferred over a less expensive species that has poor seed quality. These less expensive, lower quality seed lots tend to have a greater potential for annual bluegrass (*Poa annua* L.) contamination and that introduces a whole group of other future problems.

HOW MUCH SEED?

If you look up published seeding rates for any grass species the values are normally based on the assumption that you will be seeding on bare soil with the intended purpose of an ornamental lawn, etc. As we all know athletic

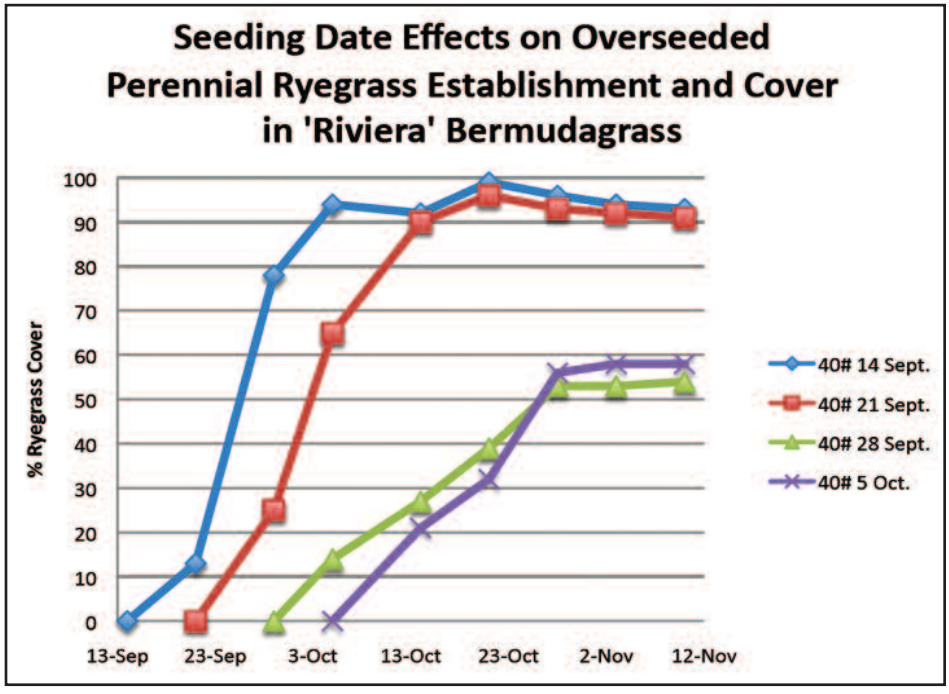


Figure 1

fields serve a very different purpose than an ornamental lawn. The sometimes intense traffic, particularly in concentrated areas like between the hashes, sidelines, goal mouths, and field entry/exit points along with the mechanical forces involved in close mowing and foot traffic, can be a harsh environment for a turfgrass seedling to develop and survive. As one of my colleagues has said, the adage "more is better" bears some truth when it comes to winter overseeding, and I agree.

For athletic field overseeding, it is recommended that the seeding rates be double or many times more than normal, simply because a great deal of seedling mortality is expected. For example, a common seeding rate for perennial ryegrass on bare ground is about 5 pounds of seed per 1000 ft2 or 220 pounds per acre. For general overseeding purposes a rate of 2 to 4 times as much or 400 to 800 pounds per acre is not uncommon. Without these higher seeding rates you risk producing an overseeded turf that may have a patchy appearance. This can be worse than not overseeding at all.

For overseeding on American football fields used at the collegiate and professional level it is not uncommon to use extremely high rates, doubling those aforementioned rates to 1500-1600 pounds per acre. Some of our research at Purdue on winter overseeding indicated that these very high rates, 40-50 pounds per 1000 ft2 or 1600 pounds per acre, appear necessary if the goal is to produce a dense, closely mowed that will persist. Remember, these fields are subject to very intense traffic compared to soccer, etc. The athletes at this level are larger, more aggressive in the way they move on the field, and basically there is much more potential for large divots. Compounding the overseeding challenge for us in north central Indiana is that we have a very short window to achieve good establishment. Thus, the strategy is seed heavier early, then top off the stand throughout the season. Remember, if these very high seeding rates are used you will most certainly be considering chemical removal if you want the bermudagrass turf to fill back in quickly the following spring.

The other consideration is that if you are using these extremely high seeding rates it is important to regularly scout for disease. If an "Indian summer" persists resulting in prolonged late-summer heat and humidity these seedling diseases will be more of a concern. Loss during late-season establishment can really set back any overseeding program. You should have appropriate plant protectants available for either preventative or curative control. It is also important to at least be aware and scouting for potential seedling mortality from gray leaf spot. This disease is a very real concern wherever ryegrass is planted and can be particularly devastating to seedling ryegrass. The symptoms are very similar to drought stressed turf, so keep a watchful eye.

WHEN TO PLANT?

The ideal time to plant cool-season grasses for optimum germination and the fastest establishment is late-summer through early to mid-fall. The most important factors affecting overseeding success are sustained soil temperatures and seed-soil contact. Rather than put a hard and fast planting date on overseeding, some published guidelines suggest monitoring air and soil temperatures. For example, some books suggest initiating overseeding when night-time temperatures are consistently around 50F or soil temperatures at 4 inches are in the mid 70'sF. These are good guidelines and in many cases it is probably better to be slightly early than too late when initiating overseeding.

A suggested planting date or monitoring soil temperatures can be a bit of a moving target and sometimes as a field manager you are stuck with a seeding window dictated by field use schedules. If you have a choice, starting earlier is highly suggested and then topping off throughout the rest of the season. This is particularly true if you are pushing the northern edge of growing bermudagrass in the transition zone. One thing I have learned is that the farther north you are, it is amazing how quickly the soil temperatures can drop and limit establishment success. We have been evaluating perennial ryegrass overseeding dates and it continues to surprise me how much of a difference even a few weeks makes once you get into late-September in West Lafayette. It is essentially the difference between achieving roughly 90% ryegrass versus 60% when planted the last week of September or the first week of October, even at a very high seeding rate, 40 pounds of seed per 1000 ft2 (Figure 1).

Continued on page 44

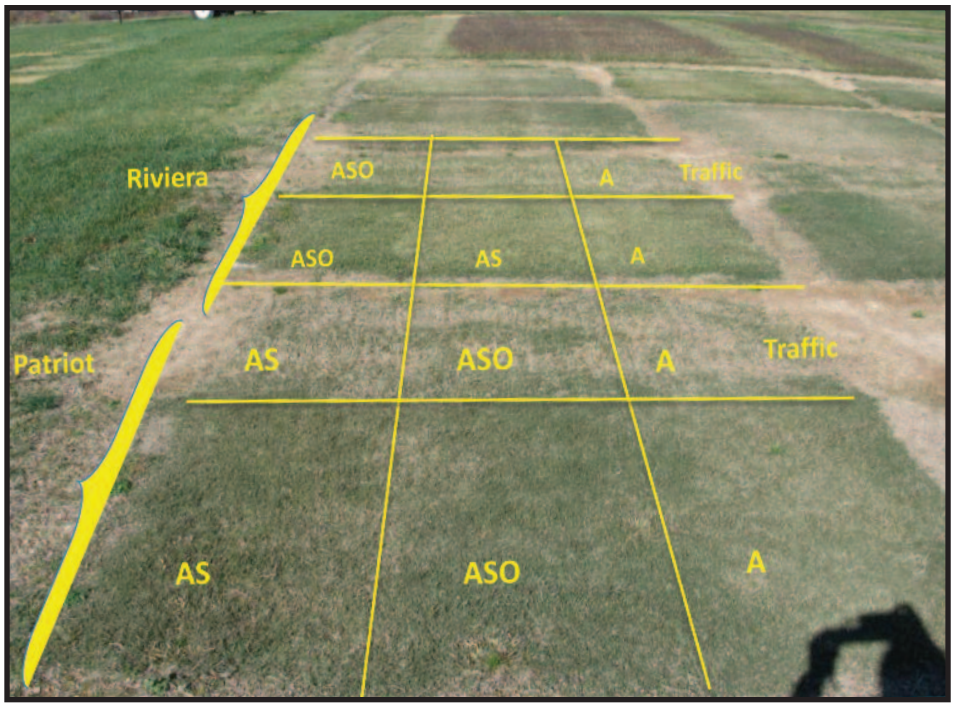
Improving

bermudagrass fall traffic tolerance and spring recovery through fall fertilization

BERMUDAGRASS is considered one of the most desired turfgrass species for athletic field use in the United States. Bermudagrass's aggressive growth habit of stolons and rhizomes offers stability and traffic tolerance to maximize player performance with the ability to recuperate from wear stress. Mostly grown in the southern half of the United States, bermudagrass growth north of the transition zone is limited by cold winters. However, with improved cold tolerant cultivars, bermudagrass management in the transition zone and north is becoming more common. When grown in colder climates the bermudagrass enters dormancy sooner, meaning that if a green turf is desired, the field must be overseeded with ryegrass.

Bermudagrass traffic tolerance and outstanding recuperative ability during its active growing periods have allowed bermudagrass athletic fields to become multi-sport facilities. The intensive use of these fields increases the importance of proper cultural practices such as irrigation, cultivation, pest management, and fertilization to obtain maximum bermudagrass performance. Nitrogen (N) fertilization is especially important in order to optimize bermudagrass growth. A typical bermudagrass fertilization program includes N applications up to one pound of soluble N per 1000 square feet per active growing month. Research has shown this amount of N can supply bermudagrass with adequate nutrients without losing valuable resources to the environment during these active growing periods. But what about fall N fertilization applied outside the optimal windows of application to bermudagrass? Can it improve fall traffic tolerance and spring recovery of bermudagrass athletic fields?

Research has shown this amount of N can supply bermudagrass with adequate nutrients without losing valuable resources to the environment during these active growing periods.



▲ **PICTURE TAKEN OCTOBER 29, 2010**. Two months after traffic initation and one month after last fertility application.

RESEARCH METHODS

The research was initiated in June 2010 at Virginia Tech's Turfgrass Research Center using plots established by sprigging Patriot, Riviera, and Wayland bermudagrass. Patriot and Riviera are both commercially available cultivars, while Wayland is an experimental ecotype selected at Virginia Tech for its rapid spring green-up and spring dead spot tolerance. The research has continued into 2013. Irrigation was applied to promote active growth; the plots were mowed three times weekly at 1.25 inches, and N (urea, 46-0-0) was applied at 1 lb N/1000ft2 per month on the first day of June, July, and August. The fall fertilization treatments extended N applications into September and October resulting in a possible total of 5 lbs N/1000 sq ft for the season (October fertilization treatments are split into two ½ lb N/1000 sq ft applications on 2 week intervals in case a killing frost event might negate an application). Beginning on approximately August 30 of

JOHN MASCARO'S PHOTO QUIZ

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Brown "X" shaped area
Turfgrass area: Football practice fields
Location: Cincinnati, OH
Grass Variety: Patriot bermudagrass overseeded with ryegrass

Answer to John Mascaro's Photo Quiz on Page 33

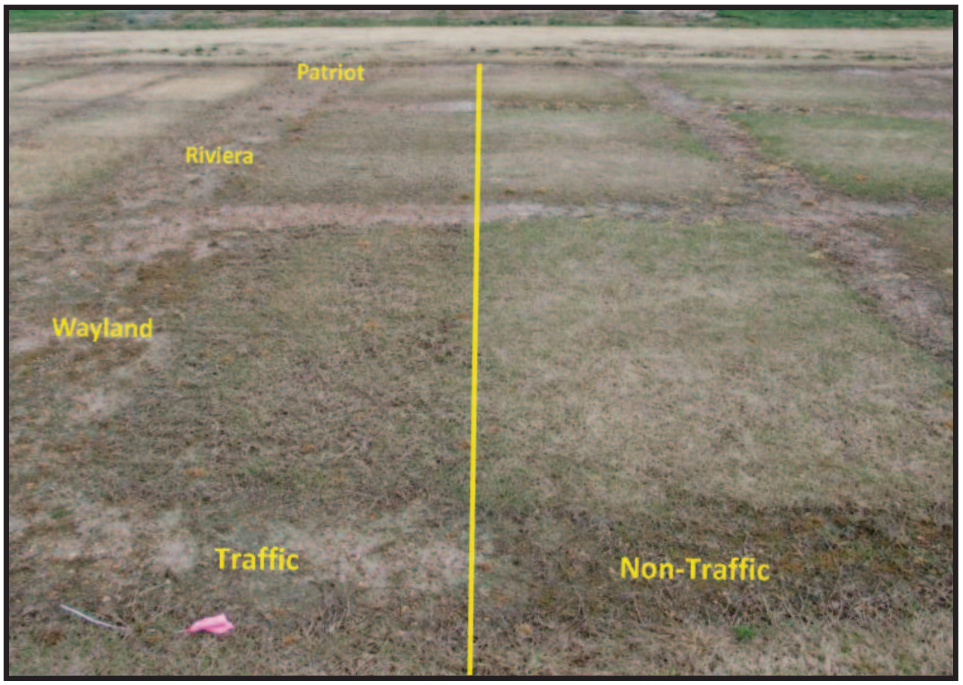
Background illustration courtesy of istockphoto.com

	% turfgrass cover							
	----------18 Oct. 2010----------				----------1 Nov. 2010----------			
	A	AS	ASO	LSD	A	AS	ASO	LSD
Traffic	67.1b *	73.0a *	75.4a *	2.9	70.8b *	77.5a *	77.5a *	2.9
No Traffic	100	100	100	-	100	100	100	-
Means within the same row and measurement date followed by the same letter are not significantly different at p = 0.05.								
Means within the same column and measurement date separated by a * are significantly different at p = 0.05.								

▲ **Table 1: VISUAL PERCENT TURFGRASS COVER RATINGS** of three bermudagrasses as influenced by traffic and fall N fertilization programs (Aug (A), Aug+Sept (AS), or Aug+Sept+Oct (ASO)) in their establishment year.

	% bare ground							
	----------12 April 2011----------							
	'Wayland'	'Riviera'	'Patriot'	LSD	A	AS	ASO	LSD
Traffic	34.2a *	31.3a *	20.8b *	6.7	34.2a *	25.8b *	26.3b *	6.7
No Traffic	0	0	0	-	0	0	0	-
Means within the same row and measurement variable followed by the same letter are not significantly different at p = 0.05.								
Means within the same column and measurement variable separated by a * are significantly different at p = 0.05.								

▲ **Table 2: VISUAL PERCENT BARE GROUND RATINGS** of trafficked and non-trafficked bermudagrasses ('Wayland', 'Riviera', and 'Patriot') prior to spring greening as influenced by fall N fertilization programs (Aug (A), Aug+Sept (AS), or Aug+Sept+Oct (ASO)) or cultivar in their establishment year.



▲ **PICTURE TAKEN APRIL 12, 2011** during spring green-up illustrating the percent bare ground of the trafficked plots as compared to the non-trafficked plots. 'Patriot' had less bare ground than the other two cultivars.

each year, simulated traffic was applied at a level of six events per week using a Brinkman traffic simulator, with traffic ending during the first week of November in order to simulate a typical fall high school football schedule.

The lower bare ground ratings of fall fertilization will also lead to faster spring green-up and recovery, allowing for a longer active growth period to increase traffic tolerance for the upcoming sports season.

RESULTS

Establishment year data will be emphasized for this report. Rate of establishment was monitored by tracking visual percent turfgrass cover throughout the weeks following establishment. Two weeks after planting in June 2010, Patriot achieved 50% coverage whereas the other two cultivars had not reached 40% coverage. All grasses reached 95% or greater turfgrass cover by August 6, with Patriot covering the quickest, followed by Riviera and Wayland. The establishment rate of Patriot gives it an advantage over the other two cultivars because Patriot will have time to form a dense canopy to better withstand the fall traffic. This was shown to be true by percent turfgrass cover ratings taken on October 18, 6 weeks after initial traffic treatment. Percent turf cover of trafficked plots was significantly higher in Patriot than Riviera which was significantly higher than Wayland. Compared to the 100% covered non-trafficked plots, trafficked Patriot had 75.8%, Riviera had 72.5%, and Wayland had 67.1% coverage. Patriot tolerated more traffic in its first growing season, suggesting it would be the premier choice for high-use fields during the first football season. The greater traffic tolerance of Patriot compared to the other grasses is further supported by visual percent bare ground ratings prior to spring green-up. Data taken April 12 show Patriot to have significantly less bare ground than Riviera and Wayland which both had greater than 30% bare ground. Even though Patriot has less bare ground in early spring, Wayland and Riviera greened

up faster throughout spring until late spring where there were no differences.

The fall fertilization treatments did not yield the same distinct treatment differences as reported for the various cultivars shown. Table 1 shows visual percent turf cover of the three cultivars influenced by traffic and fall nitrogen fertilization programs. Percent turfgrass cover of trafficked September-ending and October-ending fertilization plots was similar on ratings taken 6 and 8 weeks after initial traffic treatment. However, on both the rating dates, the extended fertilization showed significantly higher percent coverage than the August-ending fertilization. These findings suggest applying fall N will increase fall traffic tolerance. Spring turf density was also increased from fall nitrogen applications due to the significantly lower bare ground percentages in early spring. Both September and October-ending fertilization events decreased to below 27% bare ground, whereas the August-ending fertility treatment had greater than 34% bare ground (Table 2).

The lower bare ground ratings of fall fertilization will also lead to faster spring green-up and recovery, allowing for a longer active growth period to increase traffic tolerance for the upcoming sports season. Extended fertilization provided benefits that persisted beyond the current season.

As the research has continued on what are now well-established plots, the degree of treatment responses from the fall fertilization is somewhat less as compared to the establishment year. There are still recorded differences in turf density in the fall and spring rating periods, but the genetic differences in the cultivars result in differing greening and growth rates exceeds the treatment responses due to the fall fertilization. We recommend that transition zone managers strive to keep bermudagrass actively growing as long as they can in the late growing season, but that they use lower levels and split applications of N so that the nutrient is used efficiently and there is little potential for nutrient leaching or runoff.

Establishment and overall growth rates/traffic tolerance are ranked Patriot > Riviera > Wayland. Extending N fertilization treatments into September and October increased fall percent turfgrass cover in trafficked plots for all cultivars, decreased early spring bare ground ratings, and accelerated spring greening. While all three cultivars tend to have better fall and spring turf coverage ratings from extended fall fertilization, the differences in traffic tolerance seem to be more related to differences in inherent growth rates and turf density than fertilization treatments as the plots mature. ■

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WHEN FUNGI ATTACK

YOU, MY GOOD MAN OR WOMAN, are on a roll. It's August 1 and your fields are pristine. The players don't make a single negative comment about its condition, and even better the boss gives you that rare compliment for how it both looks and plays. It's time for a celebratory beer(s). Now it's August 2, and you notice a small brown patch the size of a softball near midfield. No big deal, it's probably just a tad dry, and you increase the irrigation a bit to compensate. You take the weekend off, come back on August 5, and you have most certainly fallen off that roll. Not only has the one patch expanded to the size of a basketball despite increased irrigation, but new patches seem to be popping up all over the place. You make sure to get a fungicide application down that day, but a week later your prized field went from pristine to the surface of the moon. Instead of compliments from the athletes and your boss the athletes are turning ankles and you're receiving stern warnings. What the heck happened?

▼ **Figure 1: GRAY SNOW MOLD** following snow melt in the spring can seriously hamper spring sports activities in temperate climates.

Maintaining athletic fields under today's demands with today's budgets can seem daunting, and usually one of the last things on a manager's mind is the possibility of disease. While diseases of athletic fields don't require the same intense preventative techniques as those found on golf courses, there are a few that can be serious if you aren't paying attention. Since everything is better in list form; here are my top 5 diseases of athletic fields (cool-season turf edition):

5. SNOW MOLD

This disease (*Typhula incarnata, T. ishikariensis, Microdochium nivale*) is higher up the list for those in harsher winter climates, and not even close to the list in many climates. Snow mold is actually an umbrella term referring to three distinct diseases: gray snow mold (*T. incarnate*), speckled snow mold (*T. ishikariensis*), and pink snow mold/Microdochium patch (*M. nivale*). Snow molds rarely kill turf, but can leave significant damage following snowmelt that can severely impact the playability of a field in the early spring (Figure 1). Snow mold can be minimized by avoiding late fall fertilizations heavy in fast-release nitrogen. However, if avoiding late fall fertilization is not practical or the snow cover in the winter routinely persists for 2 or more consecutive months, a preventative fungicide application may be warranted. Many fungicides will provide effective snow mold control when applied preventatively; including but not limited to most members of the strobilurin and demethlyation inhibitor (DMI) class of fungicides (Table 1).

4. RUST

Though reports of aggressive rust (*Puccina* spp) (Figure 2) are becoming more prevalent in certain parts of the country, this disease remains a relatively minor disease for most athletic field managers (except if a team's white uniform is orange after the game [Figure 3]!). Rust is most severe on