



## It's bermudagrass

### for Purdue's Ross-Ade Stadium

By Zac Reicher, Cale Bigelow, and Al Capitos

It was announced in February that bermudagrass would be used on Purdue's Ross-Ade Stadium starting this fall. We have been fielding questions about this topic since the middle of last year's football season, so here is an update:

#### What happened?

Unseasonably warm weather last summer and fall dramatically decreased Kentucky bluegrass rooting in athletic fields throughout the Midwest. Cool-season turfgrass root growth virtually stops once soil temperatures reach 80-85F, which is why seasonal root loss occurs throughout the summer.

Root growth normally resumes as soil temperatures cool in September. However, temperatures approaching 90F were recorded in West Lafayette as late as early October, and soil temperatures in a south-facing concrete bowl like Ross-Ade remained in the lower 90's. Shallow roots combined with shear forces from Division I athletes were the primary cause of poor stadium turf last fall, in spite of the best efforts and hard work of stadium staff.

Compounding the problem was our high sand content rootzone, which had been renovated in 2004 and lacked significant organic matter buildup. This organic matter increases over time helping stabilize granular sand-based rootzones. Like most major stadiums, Ross Ade was originally constructed and recently renovated using a greater than-85% sand profile to produce a firm, dry surface and reduce the possibility of rainouts.

Compared to native soil-based fields, sand-based fields do not hold together well if a dense root system is absent. The clarity of hindsight, suggests that we probably should have incorporated more fines (5-7% sandy loam) in the upper profile during the 2004 renovation, but we did not expect a summer like 2005 so soon. The field probably would have performed adequately if it could have matured for another year or two.

Though a number of major college fields were resodded during the season, we decided not to resod because thick-cut soil-based sod would have to be used. This would have improved the field in the short-term, but would have to be removed at the end of the season or it would have compromised the long-term performance of the field by severely reducing drainage through our high sand rootzone. It was decided

Above: Landscapes Unlimited workers remove turf from the Ross-Ade Stadium in mid-May. The KORO Field TopMaker machine seen here precisely removes the grass layer while leaving most of the rootzone in place and undisturbed. (Purdue University photo/Tom Campbell)

immediately after the season to resod the field, the only question that remained was how to proceed.

## Making a choice

Kentucky bluegrass, artificial infill turfs, and bermudagrass were all considered for the new surface. Kentucky bluegrass was almost immediately eliminated because sod would have to be laid by Thanksgiving for adequate rooting and the best performing field by next August. Kentucky bluegrass sodded onto a sand profile takes 8 to 10 months to root solidly and it must be in place before winter dormancy to maximize spring rooting. Processing the proper paperwork and arranging for sand-grown bluegrass sod just could not be accomplished fast enough after the decision was made to rebuild. Additionally, the first four games are at home in 2006 further reducing the chances for Kentucky bluegrass to perform satisfactorily next fall, especially if 2005 growing conditions repeat.

Artificial infill turf systems were seriously considered, especially with the scheduled replacement of the outdated artificial turf of the indoor practice facility beginning this spring. However, the coaching staff and athletes currently prefer to play on natural grass. Concern about long-term maintenance, durability, summer heat load, and yet-to-be-determined statistics on player safety eliminated the infill turfs from consideration.

Bermudagrass was chosen, partially by preference and partially by default. The football staff expressed their desire for a closely mowed, "fast" field and a desire to use Ross-Ade for occasional August practices. Of the options, bermudagrass was a natural recommendation. The vigorous network of stolons and rhizomes and recent genetic improvements in bermudagrass have created attractive cultivars that green-up quickly in spring, spread aggressively during summer, and retain their color well into the fall. Additionally, this recommendation was supported by three years of research in West Lafayette evaluating several cultivars for their winter hardiness and ability to tolerate simulated football traffic.

The cultivar Patriot will be the bermudagrass used on Ross-Ade. Compared to many other bermudagrasses, Patriot has survived and thrived in NTEP test plots in two northern test climates (West Lafayette, IN and Blacksburg, VA). It has been planted and successfully grown in many heavily used high school, college and National Football League stadiums and practice facilities.

Gary Wilber, vice president of Oakwood Sod Farm, said, "We certainly are honored that Purdue University has chosen Patriot bermudagrass for their football stadium. We have put a lot of effort into trying to produce a quality product, but it would not have been possible without Oklahoma State and their Turfgrass Development Team led by

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Dr. Charles Taliaferro. Although Dr. Taliaferro retired in December, his contributions such as Patriot bermudagrass will be appreciated for many years to come. Additional improvements of bermudagrass in the future will be a direct result of his past commitment as well."

Sodding was done in mid-May to allow the bermudagrass to knit, root and produce a tough, playable surface by August, barring an unseasonably cool summer. The southern exposure and the lack of air movement in the stadium create the perfect environment for bermudagrass to thrive and be protected from winter desiccation. Additionally, there is little concern of summer diseases in bermudagrass.

"Of course bermudagrass is not without risk in these areas, there is still a substantial danger of winterkill and spring dead spot disease. An understanding and balancing of the risk vs. benefits is always in order and I believe that the Purdue folks have thought this through," says Dr. Dennis Martin, professor and turf specialist at Oklahoma State, which patented Patriot.

"The bermudagrass will grow vigorously in summer, allowing for preparation of a high quality surface with which to start the season. Also the bermudagrass has better wear resistant initially, when green than cool-season grasses. The knitting effect of the vigorous stolons and rhizomes will help with stabilization of the surface," says Dr. Martin. "If overseeding with cool-season grasses is performed, this provides the color and continued leaf growth in the late season once bermudagrass growth shuts down and damage to the bermudagrass is no longer being repaired by the plant due to cold weather. In spring, once temperatures are reliably into the 80s, etc., the bermudagrass will begin booming again.

"Transition aid herbicides can be used to effectively remove the remaining cool-season grass base and bermudagrass can again recuperate over the summer. Even if some winterkill is present, Patriot should be able to recover rapidly once temperatures are warm enough and provided the management program is geared toward bermudagrass and provided the competition from the cool-season grass is removed," Dr. Martin says. "Provided that winterkill doesn't occur on a catastrophic scale, enough bermudagrass is left to regrow."

Dr. Martin says, "It is important that anyone converting to bermudagrass in such a northern location know the risks involved and that they carefully considered whether the risks are worth the benefits. When we say we have created bermudagrasses with improved or 'excellent' winter-hardiness, we are saying that it is 'excellent' relative to non-improved bermudagrass. 'Excellent' in this case is not on the level of "excellent" among the Kentucky bluegrasses."

The field will be overseeded with perennial ryegrass starting in September to insure an attractive playing surface for the last few games. The ryegrass will be killed with a herbicide shortly after the season to maximize bermudagrass survival during the winter. Winter survival is certainly a concern, but even if winterkill does occur, replanting in mid-May will return the field to playable conditions by mid-summer.

## Update from 5/17/06

After nearly a week of steady rain in West Lafayette and across the region, work was finally able to continue on the Ross-Ade and South



The field renovation at Ross-Ade is providing meaningful, practical experiences for Purdue's turf students. (Tom Campbell/Gold & Black Illustrated)

football practice field renovations. The existing Kentucky bluegrass/perennial ryegrass turf in Ross-Ade was removed May 17 with a Koro machine. The machine is essentially analogous to a milling machine used to remove pavement on roadways. It precisely removes the grass layer while leaving most of the rootzone in place and undisturbed. Once the grass is completely removed the rootzone will be laser leveled and thin cut Patriot bermudagrass sod will begin being installed as early as next week.

On the South practice field the new grade for what has been transformed into a more or less flat field, compared to the severely crowned previous field. An updated irrigation system will be installed as soon as the ground dries sufficiently to resume trenching. Once the irrigation system is in place 2-inch perforated tile lines will be installed running east/west and overlain by a sand-trench system running north/south. To duplicate the grass surface in Ross-Ade, Patriot will also be installed.

On May 4 the 'Patriot' bermudagrass sod was inspected at Oakwood Sod Farm located on the sandy soil of the Eastern Shore of Maryland. Aside from a late-spring frost that had slightly discolored the turf, the grass looked very healthy for this time of year and appeared ready for harvest and installation.

The Purdue Turf Program has been very involved with the entire process. A fact-finding trip to the Baltimore Ravens practice facility and Virginia Tech further supported our bermudagrass recommendation. We are thrilled about the decision to keep natural turf in Ross-Ade and maintain the functional Prescription Athletic Turf (PAT) system.

We also have to compliment the entire turf staff for their outstanding work on Ross-Ade, as well as their willingness to work with the turf program and provide meaningful, practical experiences for our turf students.

*Zac Reicher and Cale Bigelow are turfgrass specialists at Purdue University, and Al Capito is the athletic turf superintendent for the university. Portions of this article first appeared in the newsletter for the Midwest Regional Turf Foundation, Midwest Memo. The editor added other material and quotes. ■*

# Biostimulants: changing technologies and perceptions

By Eric Schroder

**B**iologicals are hardly new to grass, since the natural growth habit for all grasses has always involved partnerships with various beneficial soil microbes, says Michael J.

Kernan, PhD, a scientist with Plant Health Care, Inc.

“The intense management practices used by some professionals, however, often involve harsh treatments, resulting in the complete disruption of natural ecological partnerships,” Dr. Kernan says. “This creates turf that is totally dependent on continued human management, and largely unable to endure normal environmental stresses like drought, disease pressure, and reduced fertility. Consequently, the need for intense management increases along with labor and costs.”

“With the new generation of microbial products, there is movement away from a preoccupation with the numbers (counts) of organisms in a jug,” says Robert N. Ames, PhD, senior staff scientist for Advanced Microbial Solutions. “These new generation microbial products concentrate more on biochemistry and functional capability of a community of microorganisms. Less emphasis is placed on how many organisms can perform a specific task; and more on how many tasks can the product perform.”

Dr. Ames continues, “Soil microorganisms respond to biochemical signals that control cell division and many other functions. Just like people, bacteria raised in a confined, laboratory environment will function very differently than when they interact with a large and diverse community. Microbial community fermentation technologies have been developed that condition these microorganisms for functioning in a soil environment. When introduced into the soil, the organisms, along with their biochemical ‘bag of tools,’ are fully prepared to go to work.



**Kyle Waters shows root depth and mass 30 days after resodding. He credits weekly biostimulant applications.**

“Community fermentation products perform a variety of functions within the soil, including reducing compaction and salinity, improving soil structure and water holding capability, and improving plant nutrient availability,” says Dr. Ames. “Reducing compaction and speeding up the grow-in process for bare spots are significant needs in sports turf management. If the underlying cause of poor turf growth is soil compaction, then products that stimulate turf growth without addressing compaction do not provide a solution to the problem. Some fermentation products can reduce compaction by working within the soil to improve structure.

"Once the soil problems are alleviated, then rapid growth is needed to close in the turf. This growth process is not merely stimulation of shoot development, but must be complemented with improvements in soil structure and nutrient availability," Dr. Ames says. "These soil improvements relate directly to strong root development, which relates directly to good shoot growth and coverage. Again, this is the basis behind newer fermentation products: improve the soil and plant growth responds accordingly."

"Recent advances in science have led to the commercial development of biological products that provide many of the beneficial microorganisms that help grasses thrive under stressful conditions," says Dr. Kernan. "Such products include mycorrhizal fungi and beneficial rhizosphere bacteria, which can significantly increase water and mineral absorption, provide sustainable soil fertility, improve soil texture, reduce thatch buildup, and in combination with a comprehensive program, can help reduce disease pressure."

"Furthermore, biological treatments can restore some of the natural growth characteristics of turf, and can provide noticeable resistance to various environmental stresses," says Dr. Kernan. "This leads to a smoother transition between warm and cool season grasses and a reduced reliance on the more expensive fertility and pest management treatments. Of course, you will want to maintain your chemical fertility and pesticide treatments. But your turf will not be

completely dependent on these inputs when it has biological partners to support its needs for water, minerals, and stress defense.

"Grasses associate symbiotically with the most common group of mycorrhizal fungi, called 'VAM' fungi," Dr. Kernan says. "These fungi significantly improve water and mineral uptake for their host plants. Additionally, various beneficial soil bacteria colonize the root zone of grasses, where they perform various fertility-enhancing functions. In turf settings under intensive management programs, VAM fungi and beneficial bacteria tend to be scarce. As a result, such turf is quickly undermined by stressful conditions and requires a lot of care. A few simple treatments can reverse this trend, changing a wimpy, stress-intolerant turf into a hardy, stress-resistant turf."

### How to incorporate

There are many different types of microbial products, but not every product will fit comfortably into a sports turf management program," says Dr. Ames. "Products that need special handling, mixing, or other conditions for use would be less desirable than products with fewer restrictions. High quality fermentation products will often have a very long shelf life and they do not require special refrigeration or mixing with other ingredients. They can be mixed with herbicides and most fertilizers. Compatibility with fertilizers

## John Mascaro's Photo Quiz

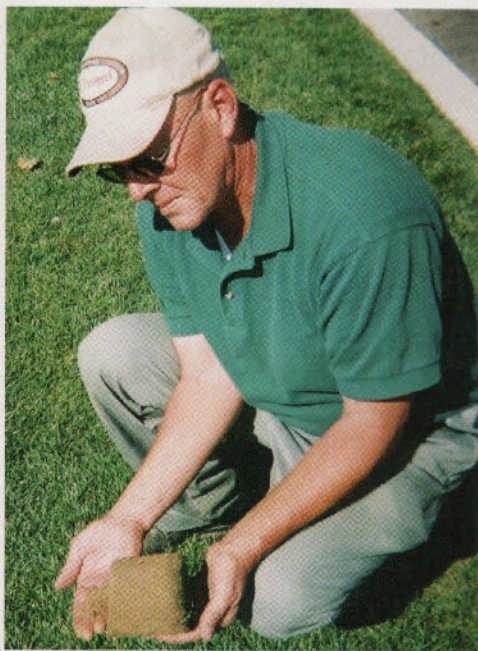
# Can you identify this sports turf problem?



**Problem:** Brown Lines on Turf  
**Turfgrass Area:** Athletic Field  
**Location:** Eastern United States  
**Grass Variety:** Bermudagrass overseeded with rye

**Answer to  
John Mascaro's Photo  
Quiz on Page 37**

*John Mascaro is President  
of Turf-Tec International*



**Fred Behnke, CGCS, displays a plug removed from a bentgrass putting green treated with a biological-based fertility product.**

makes these products much easier to combine with existing management practices.”

“Many people are under the common misperception that using biologicals necessitates the abandonment of a chemical management program,” says Dr. Kernan. “This is not correct. Biologicals represent new management tools that can be incorporated into an existing fertility program based on chemistry. Good chemistry and good biology can work together, hand in hand. While there are some chemical and biological treatments that are incompatible *if mixed in the same tank* (like fungicides and mycorrhizal fungi inoculants), both such treatments can be used with care and proper timing.”

“Biot stimulants, and microbial products in particular, should not be broadly grouped as all functioning the same,” says Dr. Ames. “University data should be available to support claims of improved soil conditions and turf growth, despite the claims of some ‘experts’ that no value is provided. Manufacturers of microbial products, or any type of biostimulant,

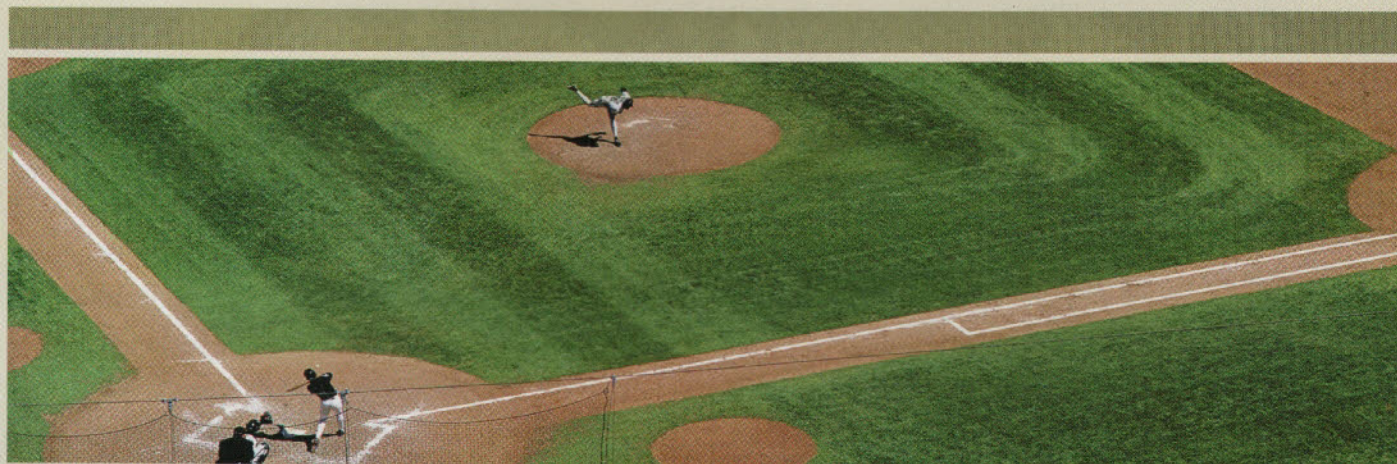
should be able to provide data to support product claims as well as provide guidance for product evaluation.”

### User comments

Philip Boutwell, a parks and rec supervisor for Lee County, FL (Ft. Myers) and an STMA member, has used both Focus and Launch biostimulants from PBI/Gordon once a month for nearly 4 years. “Both help with stress recovery and green-up,” says Boutwell. “Focus especially helps keep the green color going during dry conditions though we’re finally getting some rain after a very dry winter.”

Water restrictions add to his dry conditions. Boutwell says his community is now under permanent water restriction and has been for more than a year.

Boutwell uses the biostimulants mostly for his infield and sidelines at the Lee County Sports Complex, home to the Gulf Coast League’s Twins (Rookie League), and only occasionally in the outfield.



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**"IF YOU ASK 10 GUYS WHAT WORKS FOR THEM YOU'LL GET 10 DIFFERENT RESPONSES," SAYS CLAY. "IT TAKES MORE THAN ONE SEASON TO FIND OUT WHAT BENEFITS YOU'RE GETTING FROM SOME PRODUCTS."**

Dan Oschner, head groundskeeper for the Single A Dayton Dragons, uses both liquid and granular form biostimulants, all of them from ROOTS. "I have seen good results with other products but when I came to Dayton last year the ROOTS program was being used and I liked the results," he says. Products include TurfVigor, KCS, Fe8, Turf Food, and EndoRoots.

"I like to use these products every 10-14 days if possible, based on the schedule," Oschner says. "Reality doesn't allow that so we get them down, although not always together, whenever we can. We double up the

application around home plate and other high traffic areas, especially of the KCS product."

Again, at this level, budget restrictions are not an issue. "Within reason, my budget provides for all my wants and needs," says Oschner.

"I use many Floratine products for my turfgrass and even on my flowers," says Kyle Waters, director of sports turf and grounds at the Home Depot Center in Carson, CA. "I apply Astron, Perkup, Protesyn and, in the summer months following the X-Games resodding. I use Per-4-Max weekly on the stadium field along with my foliar N, P and K program.

"I especially like using these products before and after concert dates to help with stress caused by covering the field for days at a time," Waters says. "After using them for 3 years now I see a huge benefit in the health and strength of the turf following weekends where we have as many as 4-5 soccer games or covering the field for 14 days, which happened last summer. The pre-and-post-concert plan involves Perkup for calcium, Protesyn, Turgor, and lots of potassium from FG-20 and PK Fight.

"On the eight practice fields out front I use Largo 3000 each month with my Primo applications every 30-45 days," he says. "I have seen a huge increase in root length and mass on the stadium field since using Astron and Per-4 Max. Last year after the new sod was laid for X-Games we were able to achieve good depth and mass in only 30 days from weekly Per-4-Max applications. After I overseed in the fall I switch over to Astron for the cool season and saw similar results in my ryegrass.

"I was very skeptical in the beginning about the benefits but after using them for 3 years I would not ever take them out of my turf and water management programs," Waters says.

Mark Clay, a 25-year turf veteran and now the sports field manager for Alltel Stadium in Jacksonville, also uses biostimulants. "I've tried all the products and they all have pros and cons," Clay says. "You need to find one that works for you in your area. It takes trial and error and using test plots.

"If you ask 10 guys what works for them you'll get 10 different responses," says Clay. "It takes more than one season to find out what benefits you're getting from some products."

"Last summer we started using Focus and Launch as recommended by George Toma. We had resodded our field at Alltel and had received sod that was right off the farm and not really sportsturf sod," Clay says. "We really had to beat up that grass through verticutting, mowing low, and brushing it to get the grain out, and the bio products we used throughout the process to help the turf recover."

Clay says initially he used Focus at a rate of 8 ounces per 1,000 square feet every 14 days for 2 months then cut back to that amount once a month during the season. "To stimulate the roots, we used Launch at 7 pounds per 1,000 square feet once a month after we sodded," he says. "We don't use any of these products in the offseason." ■

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