



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. ■