



» **FIGURE 1.** A dormant but extremely dense Riviera bermudagrass field in early December 2012 at Wilson Memorial HS, Waynesboro, VA (photo courtesy of Jimmy Rodgers).

Inside look at the turf team at Virginia Tech

INSTEAD OF A TRADITIONAL ARTICLE* on the STMA President for this month's issue, I asked for the opportunity this year to tell you a little bit about the turfgrass program at Virginia Tech and some of the great work my colleagues are doing that might apply to you.

Team: a number of persons associated together in work or activity. Being a part of a team certainly does not guarantee success, but teams that continually strive to improve and work together (i.e. demonstrate teamwork) will most likely perform at the top of their abilities. Nearly every month, *SportsTurf* features an award-winning team of sports turf managers recognized as 'Field of the Year' winners. A common theme in these articles is the value of teamwork. I received exceptional mentoring regarding the importance of a team and teamwork as a young faculty member at Mississippi State University from Dr. Jeff Krans. Since those formative years in my professional career, I have made it a point to emphasize to my colleagues how much I value being a part of a team. Something that gives the members of the turfgrass program at Virginia Tech great satisfaction is how our clientele refer to us as the VT Turf Team. And nowhere have I said being part of a team is easy—securing the information for this article and getting a cover photo of the team was akin to herding cats!

The VT Turf Team's collaboration across departments, programs, and colleges in our teaching, research, and extension programs has been cited by many administrators as a model for other programs at Virginia Tech to emulate. Our VT Turf Team is also much more than just the faculty, staff, and graduate students in our traditional academic programs, but it also includes our staffs that manage all VT athletic and recreational sports fields. Our athletics turf and recreational sports programs support turfgrass research, participate in our research field days, and are con-

stantly "on call" for field and facility tours, something very important to our fund-raising and student recruiting activities. We also proudly claim as team members a large number of allied extension agents, private individuals, industry, and professional association cooperators around the state that assist us with financial support, on-site research opportunities, and the hosting of a variety of outreach programs.

I want you to meet a few of my VT team members and I asked them to join me in providing a brief highlight of some of our sports turf-related research projects. These reports are but very small parts of their research programs, and if you have further questions of my colleagues regarding this or other projects they are leading, please be sure to get in touch with them by way of the contact information available at www.vt.edu.

BERMUDAGRASS EXPANSION ON VIRGINIA SPORTS FIELDS—Mike Goatley. Virginia's transition zone climate makes it possible to grow either cool-season or warm-season grasses on athletic fields, but none of them very well. Either type of grass is going to regularly struggle from an extreme summer or winter season. A part of my applied research program is variety evaluation and my turfgrass program manager, Whitnee Askew, and I have spent a great deal of time assessing bermudagrasses that we believe are well suited for athletic field

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use in our climate. The data continually indicate what great potential the latest generations of cold tolerant vegetative and seeded bermudagrasses have for sports fields.

Depending on your perspective (see Dr. Askew's research brief below), bermudagrass is either an outstanding sports turf grass OR it is one of the world's worst weeds. For sports turf, bermudagrass offers transition zone sports field managers the opportunity to take advantage of the exceptional density and aggressive growth rate of this grass. In particular, these grasses have now made their way onto athletic fields throughout the Valley and Ridge region of Virginia at elevations of 2,300 feet or higher. As for any natural grass field, they still must be used and managed appropriately to meet expectations, but with proper traffic management, these fields are providing exceptional playing surfaces even as dormant turfs.

The one point of caution I bring to any facility considering a conversion is the intensive mowing requirement of bermudagrass in the summer. However, if this maintenance

requirement is properly addressed, the end result is usually a more uniform playing surface and fields that require much less irrigation and pesticide use than comparative cool-season fields.

The most recent success story in Virginia's Shenandoah Valley is Wilson Memorial HS where football coach (and VSTMA member) Jeremiah Major seeded Riviera bermudagrass the summer of 2012. Jeremiah and his team delivered an exceptional field by the season opener in August, but even more impressive was the quality of his turf well into the playoffs in late November (Figure 1). The performance and condition of these fields certainly captures the attention of opposing coaches, players, and parents and has led to many fact-finding inquiries about a grass that they previously considered only to be a serious weed.

BERMUDAGRASS/WIREGRASS CONTROL—Shawn Askew. Dr. Askew has statewide responsibilities for developing weed management systems in turfgrass. He

conducts weed control, herbicide physiology, and weed ecology experiments in all types of turf including athletic fields. His graduate students are currently working on several projects that may impact weed management in athletic fields.

In Virginia's climate, bermudagrass is both a desirable turf and a weed. Dr. Askew and his graduate students have worked hard over the past 8 years to develop selective bermudagrass control programs for cool-season turf, especially for Kentucky bluegrass athletic fields. Fenoxaprop + triclopyr programs were developed years ago in North and South Carolina and work great for tall fescue turf. In lower height turf and Kentucky bluegrass, the ester formulation of triclopyr can be extremely injurious to Kentucky bluegrass turf and fenoxaprop is much more injurious to immature turf of any species when compared to mature turf. Both of these phenomena can be problematic for athletic field management where Kentucky bluegrass and lower mowing heights are com-



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>> FIGURE 2. White tissue symptoms that normally occur from the topramezone treatments (center plot is topramezone alone) are reduced or nearly eliminated and bermudagrass control increases dramatically when topramezone is tank-mixed with triclopyr (plots on left or right) (photo courtesy of Shawn Askew).

mon and immature turf will always be present due to the need to manage wear areas.

Dr. Askew’s research suggests that fenoxaprop + triclopyr should only be used in early spring or late fall where immature turf is less prevalent and should be replaced with mesotrione or mesotrione + triclopyr at low rates during stressful periods of summer. Applications of either mesotrione or fenoxaprop mixed with triclopyr can effectively control bermudagrass in cool-season grasses. Just remember to reduce triclopyr rates in hot weather and on Kentucky bluegrass, switch from fenoxaprop to mesotrione both to save money and reduce potential damage to the bluegrass during stressful summer weather, and concentrate on fall treatments to get the best kill (repeat treatments at a 3-4 week interval).

Two new herbicides that are currently under investigation by Dr. Askew’s group include topramezone and metamifop. Both herbicides show great promise for selective bermudagrass control and topramezone could be registered within the next year (Figure 2). Both herbicides work better when mixed with triclopyr but offer superior turf safety and bermudagrass control to other herbicides currently on the market. No herbicide, however, will control bermudagrass alone but must be mixed with other herbicides and applied 4-6 times per year in a program approach to bermudagrass eradication.

TURF TOLERANCE TO RIGID TURF PROTECTION SYSTEMS—Erik Ervin.

Dr. Erik Ervin is a Professor of Turfgrass Physiology in the Crop and Soil Environmental Sciences department of Virginia Tech and has primary responsibilities in teaching and advising in the undergraduate program. This research brief summarizes work supported by VT Athletics and the U.S. National Park Service and was completed in 2012 by M.S. student John Roysse.

The presidential inauguration, the national book festival, the solar decathlon, and a U2 or Dave Matthews Band concert: what do these events have in common? They are all multi-day set-up and take-down events (often involving cranes) that take place on natural turfgrass surfaces (e.g.,

the National Mall and MLB fields) with thousands of attendees. Many times the activities are so intense that major turf death occurs and complete re-grassing is required. Managing or softening the conditions that cause major turf loss, however, is preferred. Unfortunately, there have been almost no scientific studies investigating the positives and negatives of current practices.

In 2010 and 2011 we conducted multi-season event cover simulation trials to determine how long a mature tall fescue turf (2.5 inch mowing height on a silt loam soil) could survive and what some of the controlling factors might be (e.g., light, compression resistance, soil moisture, temperature). Two commercially available rigid high-density polypropylene covers were compared to plywood-alone or plywood over Enkamat (Table 1). Terratite is a single-sided, white, translucent cover with foot pads and air holes used primarily for seating or foot-traffic protection, while Matrax LD is a double-sided, white, translucent cover with no air holes used primarily for vehicle-traffic protection. Each spring, summer, or fall season covers remained on the turf for 2, 4, 6, 8, 10, 12, 14, 16, 18, or 20 days giving us a look at turf persistence and recovery every 2 days during a 3-week period (Figure 3). Using linear regression we were able to estimate how long tall fescue could be covered (and driven over daily with a truck) and not have more than 40% turf loss (Table 1).

We found that light availability played a major role in turf persistence and recovery. The translucent Terratite and Matrax prod-

Table 1. Light transmission, average maximum high temperature under cover, and the predicted days until 40% or greater tall fescue loss following covering of various turf protection systems in summer or fall/spring.

Cover name	Light transmission	High temperature under cover Mean across 2 summer seasons (°F)	Number of days under cover before >40% turf loss, tall fescue	
			Summer ¹	Fall/Spring ¹
Terratite	25%	108	10	>20
Matrax LD	5%	100	12	>20
Plywood over Enkamat	0%	101	1	5
Plywood	0%	104	1	5

¹Average high air temperatures during the two summer test periods was 94°F, while that over the four spring and fall test periods was 70 °F.



>> **FIGURE 3.** Differential tall fescue response after covering for 6 days in the fall with Matrax/Terra-trak (top) or Plywood+Enkamat (bottom) (photo courtesy of John Roysel).



>> **FIGURE 4.** Spring Dead Spot on a Riviera bermudagrass athletic field in Rocky Mount, VA (photo courtesy of David McCall).

ucts allowed 5 to 25% of photosynthetically active radiation through to the leaf blades when measured at solar noon. During cooler spring and fall periods this resulted in almost complete turf persistence and recovery even when covered for the entire 20-day test period, while both plywood treatments allowed for only 5 days of cover. During summer, extra light transmission through Terratile resulted in significantly higher temperatures reducing turf persistence to 10 days compared to 12 days for Matrax. Plywood or plywood over Enkamat resulted in almost complete turf death after only 2-4 days of cover in the summer. Our results were clear and consistent: Use of a rigid cover that allows some photosynthetically active light to reach the turf canopy is of primary importance, with air exchange and compression resistance being important, but secondary.

SPRING DEAD SPOT (SDS) MANAGEMENT IN BERMUDAGRASS –

David McCall. David is a research associate and PhD candidate in the Plant Pathology, Physiology, and Weed Science Department of Virginia Tech. He has primary responsibilities in turfgrass pathology.

In Virginia, where a growing number of athletic facilities have transitioned to improved varieties of bermudagrass, the most frequent disease-related question I hear is “What can I do about my Spring Dead Spot?” As most who have managed bermudagrass know, spring dead spot (SDS) is the most common and damaging disease of bermudagrass (Figure 4.). Not only is the disease highly unsightly, but a se-

vere patch can be depressed to bare ground, often half an inch or more below the surviving turf stand. This can play havoc on playability and increase the chance for athlete injury.

For decades, a standard recommendation for suppressing SDS has been to use ammonium sulfate as a primary nitrogen source throughout the summertime. This was based on research on one of the pathogens, *Ophiostoma herpotricha*, which is most commonly found throughout the Great Plains and other Midwestern states. The general belief was that all species of the causal agent (there is also *O. korrae*, most common in Southeastern US, and *O. narmari*, most common in Australia and New Zealand) would respond the same to nitrogen sources. However, research from the

turfgrass pathology program at North Carolina State clearly demonstrated that *O. herpotricha* and *O. korrae* responded differently when clean bermudagrass was inoculated. *O. herpotricha* responded as expected, and was suppressed with ammonium sulfate. *O. korrae*, on the other hand, did not respond to this, but did to calcium nitrate. While the impact on disease activity is not fully understood for each species, we do know that sulfur-based nitrogen sources will lower pH in the upper rhizosphere, and most nitrate sources have little effect on pH.

Because of the widespread problem for turf managers in Virginia, field research trials were initially established on sites with severe SDS epidemics in the spring of 2010 to see how quickly this new guideline may reduce disease. Trials were established on one soccer field (Southwestern Virginia), two golf course fairways (Central Virginia and the Eastern Shore), and one research plot at the Hampton Roads AREC in Virginia Beach. Plots with pre-existing SDS were fertilized with ammonium sulfate (21-0-0), calcium nitrate (15.5-0-0), or soluble urea (46-0-0). Two additional management strategies were applied to test confounding effects of nitrogen source. Plots were split to test whether fall applications of fungicides can speed the recovery of SDS. Interaction with late summer vertical mowing was also examined.

While the NC State research showed dramatic results for new patch development, incorporating various nitrogen sources into pre-existing conditions in our trials has not

Table 2. White grub counts in 2011 Turfgrass Soil Insecticide Efficacy Trials, Tazewell Co., VA.

Treatment/Formulation/ Application Timing ¹	Application rate (amt product/acre)	White grubs per sq ft (± SEM) ²
Untreated check	—	24.13 (3.48) a
DPX-HGW86 20 SC April	8.0 fl oz	23.25 (5.22) a
Merit 75 WP April	6.4 oz	22.00 (4.26) a
Zylam 20SG July	32.0 oz	19.00 (3.42) ab
Allectus GCSC April	4.5 pints	9.00 (1.63) b
Acelepryn 1.67 SC July	8.0 fl oz	2.00 (1.08) c
DPX-HGW86 20SC July	8.0 fl oz	0.75 (0.48) c
Acelepryn 1.67 SC April	8.0 fl oz	0.00 (0.00) c
Merit 75 WP	6.4 oz	0.00 (0.00) c
¹ Early application: 20 April; late application: 19 July		
² Means within a column followed by the same letter are not significantly different at P < 0.05 according to LSD tests.		

reduced disease as rapidly. To date, results from site to site have been highly inconsistent, but no fertility regimen in combination with other management strategies has proven to be a silver bullet. What appears to be effective in one plot may have little to no response in the next. This inconsistency led to us to wonder whether each site had mixed populations of the SDS pathogen. If both species of *Ophiosphaerella* are present at one site, then no one nitrogen source would suppress the disease. One of the treatments included both ammonium sulfate and calcium nitrate, but this still has not adequately suppressed disease. While the current research will continue for at least 1 more year, we are shifting our primary focus to understanding the population dynamics across the state and within a given field. In collaboration with the Plant Disease Clinic at Virginia Tech, we are working to develop a rapid identification test that will allow turf managers to know what is causing the majority of their SDS problems. While SDS suppression strategies are still evolving, we are growing increasingly confident that our work will improve sports turf managers' ability to make well informed and site-specific management decisions.

WHITE GRUB CONTROL - Rod Youngman. Dr. Youngman is an extension entomologist with statewide responsibilities in integrated pest management in turfgrass, field corn, and forage crops.

White grubs have been the major focus of my applied research and extension outreach programs in Virginia. These root-feeding larvae feed on all of Virginia's sports turf grasses from mid-spring until killing frost, but they cause the most damage on cool-season athletic fields during the heat of summer. Damage from a heavy infestation of grubs is often made worse by the burrowing of foraging animals and birds such as skunks, raccoons, and crows. The damage can literally make fields unfit for play due to the surface damage and the subsequent poor footing of damaged turf (Figure 5).

The results of this research (Table 2 indicate several important findings regarding chemical grub control. The mid-April applications of the experimental DPX and Merit 75 WP (imidacloprid) treatments did not perform well, but at the late application (same rates) they ranged among the top per-



>> **FIGURE 5.** Damage to a Kentucky bluegrass/perennial ryegrass athletic field from skunks foraging for white grubs.

formers. DPX-HGW86 is being positioned as a rescue treatment by its company. Although the traditional grubicide Merit no longer has the staying power (April-August white grub control) it once enjoyed, the performance of its July application is directly in line with the white grub life cycle. White grub egg-laying typically begins mid-July and peaks the first-second week of August in our area. Acelepryn (chlorantraniliprole) provided excellent grub control in either early or late season applications; the season-long grub control from its April application and its additional control prospects for turf caterpillars makes this a very promising insecticide for many turf uses.

In addition to continuing work in this area, we have also started evaluating entomopathogenic fungi and nematodes as biological control agents against annual white grubs. If successful, these combinations might greatly expand our options in biological grub control.

DALLISGRASS CONTROL IN BERMUDAGRASS - Jeffrey Derr and Adam Nichols, Hampton Roads Ag. Res. and Ext. Center. Dallisgrass *Paspalum dilatatum* is a warm-season perennial that spreads by short rhizomes as well as by seed.

Dallisgrass clumps expand over time due to rhizome growth. Its wide blades and tall seed heads make the weed especially apparent in bermudagrass turf. Dallisgrass is a troublesome perennial grass in a number of turf situations, including sports turf. It invades both warm and cool-season turfgrass,

where there are limited control options. MSMA, the most commonly used herbicide for dallisgrass control, currently can only be used in golf courses, sod production, and rights of way areas. It is unclear what turf labels will exist for MSMA in the future. Additional control options are needed for this weed in turf.

We have been investigating herbicides, herbicide combinations, and herbicide application timing for dallisgrass control in bermudagrass. The herbicides tested include Revolver, Celsius, Tribute Total, and Monument. We have included MSMA for comparison. All of these herbicides will injure dallisgrass, although this weed will recover from single applications. Label restrictions prevent making more than two applications per season for some of these products. We have rotated herbicides in our repeat applications to stay within label restrictions. We have tested multiple spring, multiple fall, and spring followed by fall applications. We



>> **FIGURE 6.** Dallisgrass is very noticeable in bermudagrass due to its wider blades and tall seed heads.

compared broadcast applications to spot treatment. For certain herbicides, a higher dose can be applied using a spot treatment, although only about one quarter of the total turf area could be treated using these doses.

Two applications of Celsius plus Revolver in spring provided 45% dallisgrass control in summer, but the dallisgrass com-

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pletely recovered by fall. Applying a single Celsius plus Revolver treatment in spring followed by a single Celsius plus Revolver treatment in the fall also did not provide acceptable long-term control of this weed. Two applications of Celsius plus Revolver in fall, two applications of Celsius plus Revolver in spring followed by two applications of Monument in the fall, or two spring applications of Monument in spring followed by two applications of Celsius plus Revolver in fall are all providing 80% or greater dallisgrass control going into winter, comparable to that seen with multiple applications of MSMA. Multiple fall applications of Tribute Total have injured dallisgrass, but have not provided acceptable long-term control. Injury to the

bermudagrass was noticeable but not unacceptable, especially at higher doses, for certain of the herbicides tested, and longer lasting in the fall.

We will be following these trials in the spring to determine if dallisgrass can outgrow the effects of these treatments. With the products available for dallisgrass suppression in bermudagrass, it appears that multiple spring and fall applications will be needed for acceptable dallisgrass control. Applications may need to be timed to spring when dallisgrass greens up and resumes growth in spring, as well as treatments in the fall to weaken the plant going into winter. Adjunct addition, including ammonium sulfate and methylated seed oil, may also be beneficial in these spray programs.

Those reports come from a few of my VT Turf Team colleagues. I encourage you to also get to know your state or regional college and university turf teams and familiarize yourself with the work that they are doing. You never know when a turf emergency might arise where you could use another set of eyes and ears to help you solve a problem. Your support of these programs makes you a part of the team and teamwork is always a key to success.

*Martin Kaufman, CSFM was to be the new STMA President but when he took a new position last year he was forced to resign per association bylaws so Dr. Goatley agreed to stay on the job through 2013. ■