

## Penn State

**Effects of Trinexapac-ethyl Applications on the Divot Resistance of Kentucky Bluegrass on Soil-Based Fields.** In the January 2009 issue of *SportsTurf*, we presented the results of a study evaluating the effects of trinexapac-ethyl (TE) applications and cultivation practices on the divot resistance of Kentucky bluegrass grown on a sand-based rootzone. We found that by applying TE monthly from May through July and then stopping applications once the season began, divot size was reduced by up to 20%. Based on our results, applications of TE can serve as a pre-stress conditioning treatment before the football season by getting the turf ready for play through increases in tiller density and root mass.

We are currently conducting a follow-up study to see if the same effects occur on a silt-loam soil rootzone. Initial results indicate similar effects from TE applications; however, improvements are less than those observed in the sand-based rootzone trial. Applying TE from May through July decreased divot size by approximately 5% on silt-loam soil. Continuing applications of TE through October neither increased nor decreased divot resistance. A combination of vertical mowing and core cultivation in the spring was found to be as effective at improving divot resistance as TE applied from May through July.

Nine cultivars of Kentucky bluegrass were also included in the trial so that we could evaluate the divot resistance of cultivars commonly used on athletic fields. 'Julia' and 'Princeton 105' (P105) were the most divot resistant cultivars, with divot size approximately 15% smaller than the most divot prone cultivar, which was 'Cabernet'. Divot resistant cultivars in the original sand-based study were 'Limousine', 'P105', and 'Rugby II', while the most divot prone cultivar was Midnight. Based on the results of both studies, divot resistance on fields used only in the fall can be improved by applying TE in the months leading up to the season and by selecting divot resistant cultivars.

*Thomas Serensits, Andrew McNitt, and Dianne Petrunak, Crop and Soil Sciences*

**Synthetic Turf Research at Penn State's Center for Sports Surface:** Beginning in the spring of 2010, Penn State's Center for Sports Surface Research will embark on a comprehensive series of studies focusing on the safety and playability of synthetic turf. With support from FieldTurf, research will focus on current issues related to synthetic turf such as surface temperature and injury prevention.

A multi-disciplinary team of experts from several world-renowned Penn State research departments such as biomechanics and toxicology will play an active role in the research process and provide scientific, unbiased results. Additionally, athletic trainers from Penn State will serve as a valuable resource, bridging the gap between research and the athletes themselves. Graduate students from both agronomy and kinesiology will be assigned projects, allowing for collaboration between disciplines.

Playability parameters such as traction and field hardness will be evaluated and compared to a number of natural turfgrass systems, such

as sand-based and soil-based fields containing Kentucky bluegrass, perennial ryegrass, and bermudagrass. Because of the widespread popularity of synthetic turf and a lack of extensive research, information obtained from the various studies that will take place will offer consumers current information that would otherwise be unavailable. Information about the Center for Sports Surface Research at Penn State as well as up-to-date synthetic turf and natural turfgrass research conducted at Penn State can be found at <http://ssrc.psu.edu/>.

*Andrew McNitt, Thomas Serensits, and Dianne Petrunak, Crop and Soil Sciences*

## Ohio State

The turfgrass program at OSU is lucky in that we have tremendous financial, product and equipment support from both the turfgrass industry and also our state turf associations (Ohio Sports Turf Managers, Ohio Turfgrass Foundation, and Ohio Lawn Care Association). One of the most important things our state associations did recently was to undertake a survey to see what the turfgrass industry is worth to the state of Ohio:

- The key findings of that survey were:
- 3 billion dollars in direct economic output
- 4.6 billion dollars in total economic output
- Over 41,000 employed
- Over 4 million acres of turfgrass maintained
- 841 million dollars spent on turfgrass maintenance supplies
- 639 million dollars in labor costs, payroll taxes
- 338 million dollars in contracted services

These findings have given our industry a big boost and just recently the Ohio Senate has recognized our industry further by voting to designate the last week of May "Ohio Turfgrass Week."

**Dispersible Granular Technology.** This year we have worked a lot with The Andersons Group on their new dispersible granular technology. One of the products we have worked with is "Governor," which is a granular form of the plant growth regulator trinexapac-ethyl (TE). The purpose of developing a granular form of TE is to make it more available to turf managers that don't have spray equipment. The research has been undertaken to evaluate application methods and efficacy of the product. Results so far have been very favorable, especially using the formulation that includes a 4-0-0 fertilizer. Even under drought conditions, the product has suppressed growth ~50% while maintaining healthy turf and promoting color and density, like the liquid versions of TE.

**Organic and Synthetic Fertilizers.** Two issues we are looking at with regard to turf fertilizers are the removal of phosphorus (P) from maintenance fertilizers and the trend towards using natural sources of fertilizer, such as manures and composts. We started a study in 2008 in collaboration with The Ohio Lawn Care Association to evaluate 14 sources of fertilizer (synthetic, natural and combined), with some of the fertilizers containing no P. Overtime we are measuring soil organic

content, nutrient status and turf health. The study will also address cost of nitrogen source versus turf quality. For example, corn gluten meal costs \$4.50/lb N versus \$1.25/lb N for urea, but factors to consider include soil health and turf quality obtained by these nitrogen sources over time.

**Stoloniferous Ryegrass.** Another company we collaborate with is Barenbrug Inc. and over the years we have evaluated grass cultivars, blends and mixes in relation to establishment and quality and stress tolerance. In 2007 we established a new study looking at several perennial ryegrass cultivars that have aggressive tillers and stolons. While the term “stoloniferous ryegrasses” probably makes a few eyes roll, we did in fact find that to be the case. In addition to the stolon counts, the cultivars were mowed at three different heights (1-inch, 1.5 inch and 2-inch) and subjected to intense traffic. I’m sure Barenbrug will be releasing the data soon.

**Seed to Play in 4 Weeks.** In addition to the spreading ryegrasses, we also looked at Barenbrug cultivars that germinate and established rapidly. In conjunction with Syngenta we did a study to see what the minimum timeframe would be from seed to play for perennial ryegrass, tall fescue and Kentucky bluegrass. In short, the study was conducted on native soil and Tenacity herbicide (Mesotrione) was applied to the bare soil at the time of seeding in June. An identical study with

no Tenacity applied showed that spring and early summer seedings fail and quickly become infested with crabgrass, goosegrass and yellow nutsedge. Turf was considered playable when there was 100% ground cover and adequate traction (determined by the lateral TST and Canaway Rotational Shear testers). Results showed that it is possible for perennial ryegrass to be playable in four weeks, with tall fescue and Kentucky bluegrass playable in six weeks. The application of Tenacity at the time of seeding prevented any weeds from coming in and provided a clean seedbed for the duration of the study. This was by no means a low-maintenance program and required irrigation, applications of starter fertilizer and regular mowing. In fact, one of the key practices for quick establishment is mowing as soon and as often as possible after germination.

**Fungicides that Improve Turf Health.** In collaboration with Syngenta a study was repeated in 2009 that we were fairly excited about in 2008. What we found in 2008 was that applications of Subdue fungicide had “non target” effects on turfgrass establishment. Subdue was applied to half of the study as a preventative for pythium seedling disease, with the other half receiving none. No pythium was observed on either side of the study but the Subdue had a positive effect on establishment speed, color, density, height and % tissue nitrogen. The study in 2009 included both Subdue and Heritage

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fungicides and the same results were observed. These non-target effects are significant and could be used by a turf manager to quickly enhance establishment and quality.

For more info on our Sports Turf Program, see our website: [Buckeyeturf.osu.edu](http://buckeyeturf.osu.edu)

Our annual field day report is at: [http://buckeyeturf.osu.edu/pdf/2009\\_Field\\_day\\_book.pdf](http://buckeyeturf.osu.edu/pdf/2009_Field_day_book.pdf)

*Pamela J. Sherratt & Dr. John R. Street, Horticulture and Crop Science*

## Clemson University

### Optimizing the Spring Transition with Cultural and Trifloxysulfuron Treatments.

Bermudagrass is often overseeded with perennial ryegrass to hide its dormant brown color and improve its winter playability. However, prolonged overseeding cover shades and potentially deteriorates the bermudagrass base.

Cultural treatments are often implemented to aid in providing a desirable spring transition back to the bermudagrass base. Though, without a favorable climate, cultural treatments alone often fail to consistently provide a desirable spring transition.

Transition aid chemicals are often needed to ensure sufficient bermudagrass recovery time. Unfortunately, chemical treatments alone often yield spring transitions with unacceptable lapses in turf quality.

Therefore, combining cultural and chemical control options appears to be the best approach to achieving a desirable spring transition while sustaining acceptable turf quality.

The objective of this research was to evaluate combinations of mowing height, fertilizer rate and application timing and rate of trifloxysulfuron (Monument, Syngenta) to determine which practices would optimize the spring transition and ensure continuous acceptable turf quality.

A 12-week study was conducted from mid-April to July 2006 and repeated in 2007 on an established stand of Tifway 419 hybrid bermudagrass overseeded with a perennial ryegrass blend at 7 pounds/1,000 square feet pure live seed.

Cultural treatments 0.5 or 1.0 inch mowing heights and 0.375 or 0.75 pound nitrogen/1,000 square feet/week fertility rates were initiated on April 11, 2006 and 2007. Trifloxysulfuron (Monument 75WG) was applied at 0.1 or 0.3 ounce/acre in mid-April or mid-May of each year with a nonionic surfactant added at 0.25% by volume.

Turf quality, percent perennial ryegrass/bermudagrass, clipping/root weights, and bermudagrass shoot counts were taken throughout the study.

Both years, cultural practices alone failed to provide an acceptable transition to the bermudagrass base and had to be coupled with trifloxysulfuron to achieve a complete, timely spring transition. Although there was not a consistent treatment over both years, plots treated with the low rate of trifloxysulfuron in May (0.1 ounce/acre) at 0.5-inch mowing height and fertility treatments of 0.75 pound nitrogen/1,000 square feet/week maintained acceptable turf quality and spring transition throughout 2007.

*Raymond K. McCauley, Bert McCarty, Ph.D, Haibo Liu, Ph.D, Joe E. Toler, Ph.D*

## North Carolina State

### Evaluating the effects of athletic field paint on turfgrass growth processes.

This study is covering many of the basic growth aspects such as photosynthesis and water relations, as well as practical aspects associated with painting turf. Data indicates there are some marked differences due to paint color and dilution. Study conditions include a combination of control-chamber work and field evaluations. We believe data generated in these studies will allow us to make recommendations on paint use as it relates to turfgrass health.

*Grady Miller, Casey Reynolds, and Scott Brinton, Crop Science Department*

Another current research area includes **evaluating the use of green turf colorants as an alternative to overseeding warm season turfgrasses.** A recently concluded field study conducted in Raleigh, NC evaluated the effects of 12 green turf colorants on dormant

bermudagrass and zoysiagrass. This study aimed to not only determine the effectiveness of the 12 turf colorants to provide acceptable green color when applied to dormant warm season turfgrasses, but also determine the longevity of these colorants.

Visual turf color ratings were taken as well as digital photographs of treatments and color matching was conducted using Pantone® PMS numbers. The 12 different color brands provided varying color and longevity when applied to the turfgrass. The Pantone PMS number data illustrated how some products tend to change color over time. This research indicates that some turf colorant products can offer an aesthetically pleasing and cost effective alternative to overseeding. A journal article has been submitted for publication consideration with the results of this study.

As a compliment to this concluded study, we have several additional studies planned for 2009-2010 involving green turf colorants. These studies include a look at several turfgrass and environmental parameters that may impact the application, effectiveness and longevity of green turfgrass colorants.

*Grady Miller, Scott Brinton, Kyle Briscoe, NCSU Crop Science Department*

## University of California, Riverside

### Evaluation of Bentgrass Cultivars for Putting Greens in Southern California

The objective is to evaluate 19 creeping bentgrass cultivars and one velvet bentgrass cultivar on a sand based putting green under simulated championship conditions. The green was mowed at 0.135 in, Primo Maxx applied, rolled daily, and a traffic simulator used to apply metal spike traffic. Highest rank cultivars in the study were L-93, Brighton, Mariner, Dominate Plus, Penn G-6, Seaside II, and Penncross.

*James Baird, Botany and Plant Sciences*  
**Assessment of Turfgrass Water Management Systems.**

The objective is to evaluate a series of new technologies for potential water savings while maintaining quality turf. Weighing lysimeters

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