Sports Turf Manager
FOR BETTER, SAFER SPORTS TURF. AUTUMN 2012. VOL. 25. NO. 3

Problems Facing Sports Field Managers:

Refining Cultural Practices To Better Manage High Traffic Sports Fields

Brad Park, Rutgers University

One of the most significant problems facing turf managers responsible for sports fields and grounds at schools and municipalities is maintaining adequate turf cover on high traffic sports fields. Maintaining dense cool season turfgrass cover on sports fields has numerous benefits beyond aesthetic appeal including improving player safety, stabilizing soil and reducing summer annual weed encroachment, particularly summer annual weeds like crabgrass, goosegrass and prostrate knotweed that ultimately revert to bare soil in fall.

There are numerous reasons why even highly competent sports field managers may have difficulty maintaining turf cover on highly used – or "abused" – fields. These reasons may extend beyond the sports field manager's control including installation of field lights (i.e. day AND night-time field use), not having the option to hold events on a synthetic field where natural turf field space is minimal, limited budget and labor resources, and user groups and management unwilling to take fields out-of-play when turf cover and/or weed encroachment justify renovation and time is required to allow new turf to fully establish.

CULTIVATION HAS TRADITIONALLY BEEN DEFINED AS A SUPPLEMENTARY CULTURAL PRACTICE BUT CAN PLAY A PRIMARY ROLE IN THE MANAGEMENT OF HIGH TRAFFIC SPORTS FIELDS.

Conversely, many schools and towns struggle with implementing primary turfgrass management cultural practices; the result is a more rapid decline in turf cover during periods of intense traffic. Primary cultural practices are mowing, fertilization, and irrigation (Turgeon, 1999). Cultivation (i.e. aerification) has traditionally been defined as supplementary

OTS HIGHLIGHT

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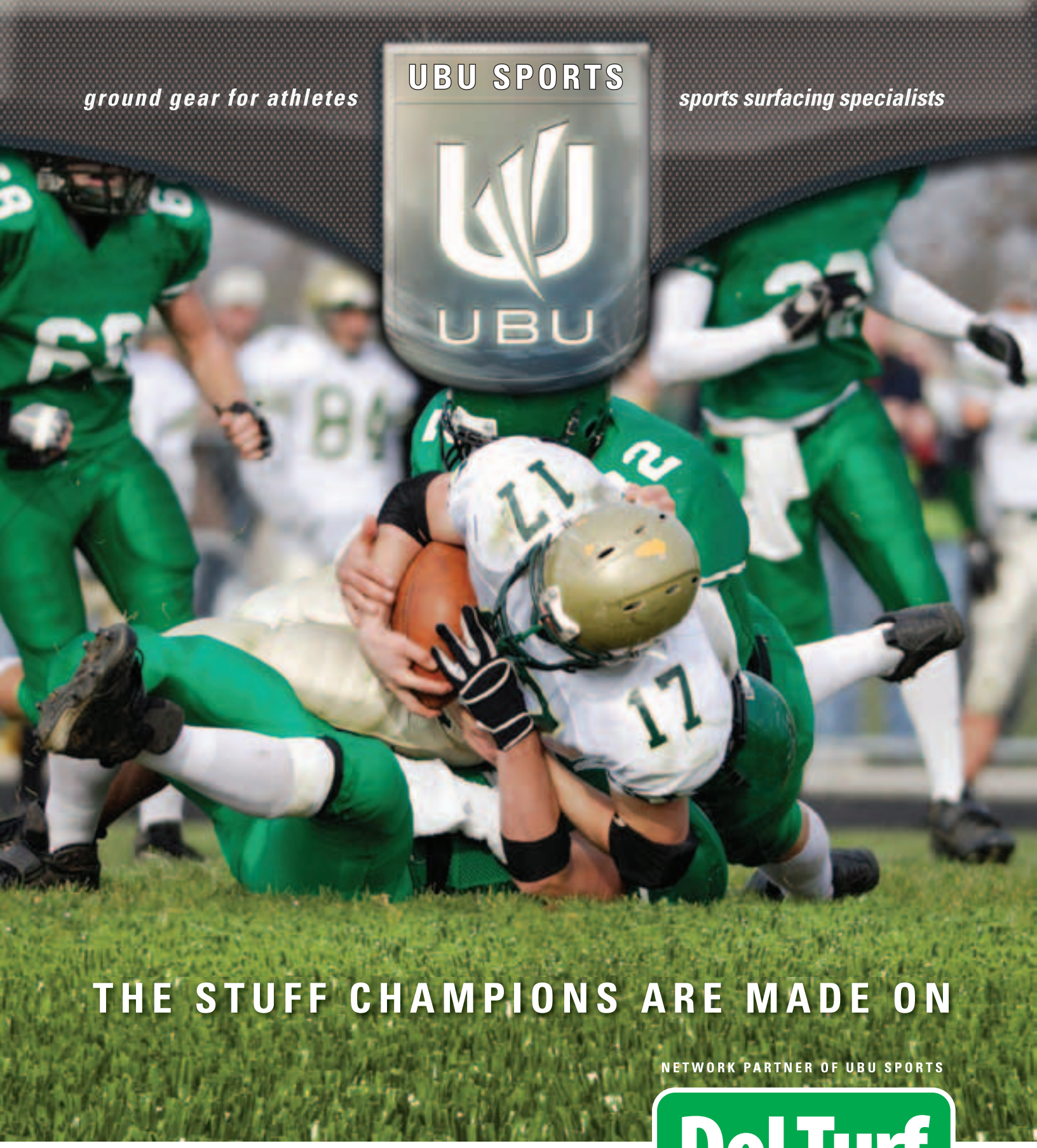
Inside Features



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Autumn is a second spring when every leaf is a flower. ~Albert Camus

Inside this issue...

REGULAR COLUMNS, DEPARTMENTS & SMALL FEATURES

Deadline for Winter 2012 Sports Turf Manager: October 27

WHAT'S ONLINE
www.sportsturfassociation.com

Sports Turf Manager
Searchable online digitized archive to complete backfiles of the magazine.
In the "Publications" section.

Turfgrass Information File
Michigan State University via the Michael J. Bladon Link. In the "Members Only" section.

Events
Check the calendar often for current updates!

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President's Desk

BY PAUL GILLEN

WOW – that was one hot summer right across the country. Aside from the burden that high temperatures and low rainfall placed on maintenance personnel, it appears that many areas are now going to have to deal with exceptionally low watertables into the foreseeable future. Let's all hope that Mother Nature will bring the balance back into our environment through the winter.

You have probably read about it before now, but I want to personally welcome our friends at the Western Canada Turfgrass Association (WCTA) into the STA family. The strategic partnership signed earlier this summer will result in substantial benefits to both organizations in the educational opportunities for the production and maintenance of safe and playable sports turf. It was a pleasure to host WCTA President Tab Buckner and Executive Director Jerry Rousseau at our 25th Annual Field Day in Vaughan, Ontario. The following day our visitors toured the University of Guelph sports fields with Facility Manager Bill Clausen and the Guelph Turfgrass Institute research plots with Eric Lyons, Associate Professor of Turfgrass Science.

Founding and current STA Presidents Michael Bladon (L) and Paul Gillen at the 25th Annual Field Day

Speaking of the Field Day, our sincere thanks to the sponsors, exhibitors, speakers and the organizing committee for your support, without which none of this could happen. Look for highlights of the day in this issue.

The STA Robert W. Sheard Scholarship for 2012 has been awarded to Ross Baron. Ross hails from Vancouver, British Columbia and is currently entering his second year in the University of Guelph's Associate Diploma in Turfgrass Management Program. Ross has just completed a summer internship with The Washington Nationals. His scholarship essay submission *Natural and Synthetic Sports Surfaces: A Comparative Discussion* is included in this issue.

The scholarship is one tool that your association uses to recognize excellence in the next generation of sports turf managers. In addition, we are currently working on a "Sports Turf Manager of the Year" award, the details of which will be rolled out in 2013. Stay tuned for further information.

You will by now have received your invitation to our 25th Anniversary Banquet scheduled for October 25 in Guelph, Ontario. The committee has planned an affordable and entertaining evening and we hope that all members, past and present, will make every effort to come out and see old friends and associates. Please contact the STA office for any additional information you may require.

The Atlantic region is hosting the STA's four day Sports Turf Management & Maintenance Course October 29 to November 1 at the Moncton Coliseum, Moncton, New Brunswick. It will also be delivered April 29 to May 2, 2013 at the University of Guelph, Guelph, Ontario.

Our planning for the Ontario Turfgrass Symposium in February is well underway – the dates are February 20 and 21, 2013.

Visit the website for up-to- date information on all of our events and programs.

We hope to see everyone on October 25!

WCTA and STA Announce Strategic Partnership

WCTA President Tab Buckner, Executive Director Jerry Rousseau, Advisor to the STA Board of Directors Eric Lyons, and STA Director Bill Clausen at the University of Guelph

GUELPH, ON. The Western Canada Turfgrass Association (WCTA) and Sports Turf Association announced in July the formalization of a partnership agreement between the two organizations.

The WCTA mandate includes the promotion of further education, turfgrass research and the exchange of information related to turfgrass management and recognizes within its membership a Sports Turf Managers Group. By partnering with the STA, these members will now have greater access to specialized education, professional development and resources in this sector niche.

The Sports Turf Managers Group will be able to complement the benefits offered by their regional association by enjoying reduced membership rates in the Sports Turf Association, the non-profit professional association dedicated solely to the promotion of better, safer sports turf. Moving forward, the WCTA will be the conduit for STA membership originating in the provinces of British Columbia and Alberta. The associations will explore joint educational and professional development opportunities.

The agreement recognizes the Sports Turf Association as the national body for the promotion of better, safer sports turf in Canada and the Canadian International Affiliate Organization of the USA-based Sports Turf Managers Association.

WCTA President Tab Buckner is enthusiastic about the new partnership stating, "This is a major step forward in uniting Sports Turf Managers across the country and will undoubtedly have a positive effect on everyone in the industry."

Paul Gillen, STA President, concurs, "The synergy created by this relationship will result in better educational and training opportunities for all associated with the industry".

About WCTA

The WCTA is a not-for-profit association founded in the late 1950's by a small group of turf managers who were interested in becoming better at their profession. Today, over 700 members represent a diversity of sectors such as golf courses, sports fields, school boards, municipalities, sod farms, nurseries, landscapers, lawn bowling greens, mechanics, horticulturists and industry suppliers, all supported through a variety of member services and education delivery programs. One of the WCTA's primary mandates is to raise and distribute funds for a variety of turfgrass research projects.

About STA

2012 marks the quarter-century milestone of the Sports Turf Association. Its roots go back to 1987 when after a brain storming session at the University of Guelph a broad segment of the turf industry endorsed its need. Of particular concern at that meeting was the need to minimize and avoid injury to participants using athletic fields where they relate to sports turf. Twenty-five years later the Sports Turf Association continues to promote better, safer sports turf through innovation, education and professional programs.

New & Returning Members

Lana Rizzuto
Lakehead University
Thunder Bay, ON

Wayne Lauzon
City of Cornwall, ON

Michael Ross
Rain Bird International

Rob Van Wees
All Green Sod Growers
Hampton, ON

Jerry Rousseau
Western Canada Turfgrass Association
Hope, BC

Tab Buckner
Township of Langley, BC
Western Canada Turfgrass Association

Ross Baron
University of Guelph, ON
Robert W. Sheard Scholarship Recipient

Chuck Judson
Sean Dougherty
Town of Lincoln, ON

Mel Milanovic
Nathan Robinson
Town of Innisfil, ON

SPORTS STA TURF ASSOCIATION

Our roots run 25 years deep.

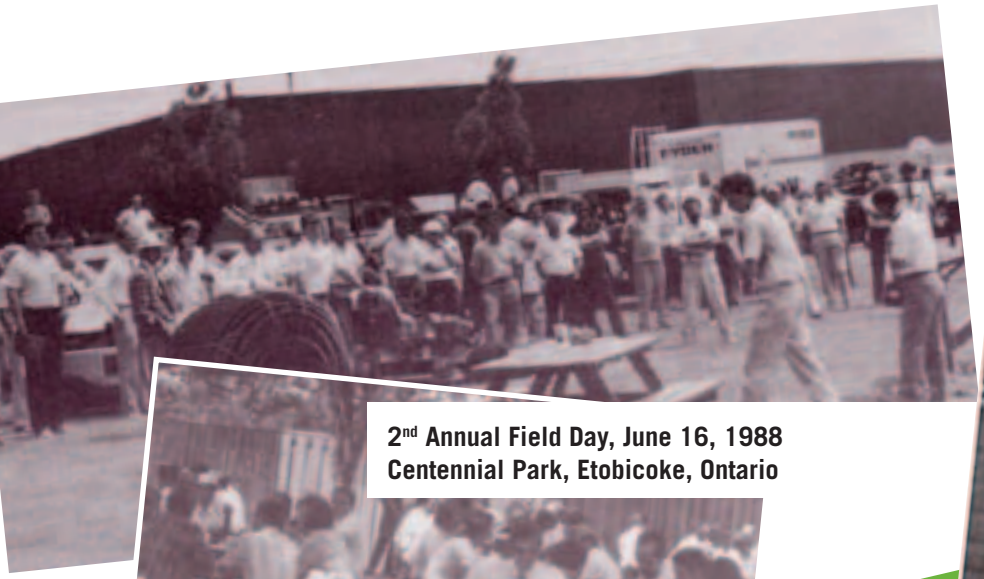
"Education is learning what you didn't even know you didn't know." – Daniel J. Boorstin

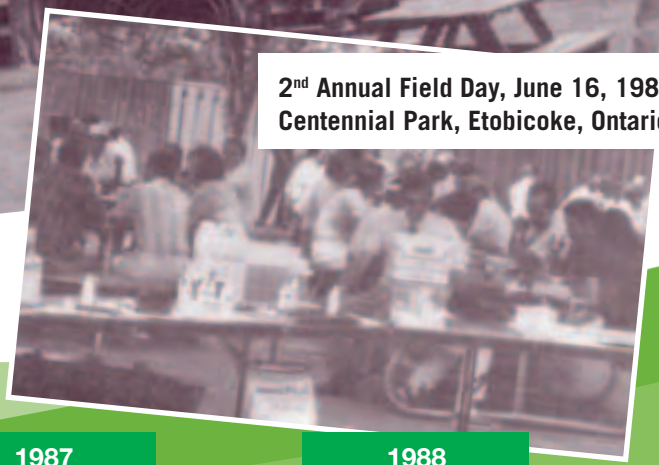
Supporting Sports Turf Managers... be they new or tried and true!

The Sports Turf Association is dedicated to the promotion of better, safer sports turf through innovation, education and professional programs. In order to further this goal and to encourage, support and provide leadership to those considering a career in the sports turf industry, the STA established a scholarship program in 1993 and has since awarded 30 scholarships.

The STA Scholarship was renamed the STA Robert W. Sheard Scholarship in 2007 in recognition of Dr. Sheard's immeasurable contribution and support provided to the association over two decades.

Visit the STA website for Scholarship Policies, Application Requirements, and the Application Form. Deadline for applications is May 1.





2nd Annual Field Day, June 16, 1988 Centennial Park, Etobicoke, Ontario

The President of the Sports Turf Association presents Ms. Lorelie Eckel-Braun with her STA Scholarship Award.

1987

1st Annual Field Day, June 18, at Alumni Stadium, University of Guelph, Ontario.

1988

1993

Establishment of the STA Scholarship program.

1994

Presentation of the first STA Scholarship to Lorelie Eckel-Braun, City of Kitchener, graduate of the University of Guelph Turf Managers' Short Course.

CELEBRATING 25 YEARS

2011

1st Atlantic Field Day July 21, at the Moncton Coliseum and CN Sportplex, Moncton, New Brunswick.

2012

25th Annual Field Day, September 20, at The Soccer Center, Vaughan, Ontario.

2012

Ross Baron, student in the University of Guelph Diploma in Turfgrass Management Program, recipient of the Robert W. Sheard Scholarship, the 30th such award.

Sports Turf Association Scholarship Recipients 1994 – current

University of Guelph
Turf Managers' Short Course
Lorelie Eckel-Braun (1994)
Tommy Joe Coffey, Jr. (1995)
Gordon Noble (1995)
Stuart Roberts (1996)
Kim Nihls (1996)
Robert Crump (1997)
Derek Jazic (1997)
Perry Davie (1998)
Gordon Bruce (1998)
Howie Kumagai (1999)
Karen Richter (2000)
John D'Ovidio (2001)
John Peek (2002)
Tennessee Propedo (2003)
(No recipient in 2004)
Jeff Fortune (2005)

University of Guelph
Ontario Diploma in Horticulture
Kevin McLeod (1997)
Duncan Graham (1998)
Brian Brown (1999)
Robert Gill (2000)
Gerald Rees (2001)
Craig Hinschberger (2002)
Glen Kralka (2003)
Randy McCord (2004)
John Marshall (2005)
Wayne Wong (2006)

Robert W. Sheard Scholarship
Ian Ferguson (2007)
Timothy Armstrong (2008)
(No recipient in 2009)
Bradley H. Young (2010)
(Robert) Guy Mackie (2011)
(John) Ross Baron (2012)

Event Calendar

ASSOCIATION EVENTS ARE HIGHLIGHTED IN GREEN

October 25
Sports Turf Association 25th Anniversary Banquet
Guelph, Ontario 519-763-9431
www.sportsturfassociation.com

October 29 – November 1
Sports Turf Association
Sports Turf Management & Maintenance Course
Moncton, Coliseum, Moncton, New Brunkswick
519-763-9431 www.sportsturfassociation.com

2013

January 8 – 10
Landscape Ontario Congress, Toronto, Ontario
www.locongress.com

January 15 – 19
Sports Turf Managers Association
Annual Conference & Exhibition
Daytona Beach, FL
www.stma.org, www.sportsturfassociation.com
Note: STA members can register at STMA rates!

January 28 – February 22
University of Guelph Turf Managers' Short Course
Guelph, Ontario www.tmsc.open.uoguelph.ca

February 20 & 21
Ontario Turfgrass Symposium "Cultivate Your Mind"
University of Guelph, Guelph, Ontario www.turfsymposium.ca

March 3 – 5
Western Canada Turfgrass Association
50th Annual Conference & Trade Show
Penticton, British Columbia www.wcta-online.com

Problems Facing Sports Field Managers

Continued from page 1

OTS HIGHLIGHT
Presented February, 2012
Guelph, Ontario.

cultural practice but can play a primary role in the management of high traffic sports fields. Regular overseeding of field centers and goal creases can often "make or break" the presence of turf cover in these locations; thus, the practice of overseeding is arguably an additional primary cultural practice for high traffic sports fields.

Mowing

Unfortunately, there are institutions mowing large, multi-acre sports fields and adjacent grounds locations with rotary mowers equipped with single 5 ft wide mowing decks. During spring and early summer months when turf growth is most rapid, it can be extremely challenging to mow frequently enough with small mowers at a desired cutting height without scalping. Removing too much turfgrass leaf tissue in one mowing weakens the turf and results in excess clippings left on the surface, which if not physically removed (a labor-intensive process), can lead to severe turf thinning and weed encroachment. Turfgrass that lacks density and is infested with summer annual weeds tends to be less traffic tolerant.

Wide-area, multi-deck rotary mowers with cutting swaths ranging from 11 to 16 ft are available and can greatly improve the efficiency of mowing large expanses of turf. It is unfortunate to observe some institutions ready to invest in new equipment pass on acquiring larger mowing equipment for the reason that "the maintenance department already has a mower" albeit a 5 ft wide machine. Investment in wide-area mowers can reduce the labor time spent on mowing and allow these resources to be allocated to increasing the frequency of overseeding, fertilization, or other cultural practices.

Fertilization

School and municipal sports fields are commonly under-fertilized and subsequently exhibit limited growth and poor recuperative capacity, attributes that do not favor good turf cover under high traffic.

Public agencies often rely on contractors to apply fertilizers to sports fields. Following a public bidding process, landscape and sports field firms are awarded contracts to perform various tasks, including the application of a defined quantity of nitrogen (N) per unit area, typically over multiple applications. In some cases, fields scheduled to receive an ample supply of N display insufficient growth and have an off-color appearance, classic indicators of turfgrass in need of N. While not all contractors will "short" the school or town on N quantities, many contractors apply N as liquid applications and it is difficult for school and town representatives to fully audit what is in the contractor's spray tank.

Granular-formulated fertilizers can allow for better auditing of contractor-applied fertilizer applications as well as allow for more N to be applied per individual application with lower potential for turfgrass leaf tip burn compared to liquid fertilizers. For example, to apply 0.75 lbs N/1000 ft^2 to an 80000 ft^2 football field and surrounds using a fertilizer that is 25% N (e.g. 25-0-0), it will require 240 lbs of fertilizer (e.g. five 50 lb bags of 25-0-0). Bags can be counted following the application to ensure that the appropriate quantity of fertilizer has been applied and thus, high traffic sports fields are better able to recuperate from damage.

Figure 1. High traffic sports fields are prone to severe turf loss particularly in locations such as the area between the hash marks on a football field. *Photos: Brad Park*

Figure 2. Mowing at too low of a cutting height too infrequently will lead to turf scalping, excessive clippings, and ultimately unacceptable sports field conditions.

Irrigation

Automatic irrigation systems are an important tool in the management of sports fields and are highly preferable to water reels and certainly non-irrigated sports field and grounds sites.

Too often, however, automatic systems are simply set on a program and then ignored resulting in some fields becoming saturated with water and a subsequent loss in turfgrass traffic tolerance. Water-saturated sports field soils may be a result of irrigation programs being allowed to run immediately following rain events or systems set to deliver a quantity of water that the sports field soil does not have the capacity to accept. In either case, the sports field manager must regularly assess soil moisture (i.e. buy a soil probe!), view weather data, and know the ability of his/her sports field to accept varying quantities of rainfall and irrigation in order to program the automatic irrigation system accordingly.

Cultivation

Poor design and construction methods can accelerate turf loss on sports fields. If designed with inadequate surface pitch and/or manipulated when wet, even those soils that may have supported agronomic crops will be prone to poor drainage and compaction, conditions that are not conducive to growing healthy, traffic tolerant turfgrass.

POOR DESIGN AND CONSTRUCTION METHODS CAN ACCELERATE TURF LOSS ON SPORTS FIELDS.

Deep slicing and deep tine cultivation are methods to alleviate compaction at deeper soil depths, often a result of poor construction procedures. Severely compacted soils may not readily allow a tine to penetrate to a soil depth greater than several inches. In these cases, it can be advantageous to first perform deep slicing. These tools are equipped with heavy-duty rotating knives that cut through and fracture the soil.

Cultivation in turfgrass is more routinely performed with machines equipped with tines (hollow or solid) capable of penetrating to a depth of 3 to 4 inches. Use of hollow tines allows for the removal of a core and can be useful to alleviate shallow soil compaction, manage thatch accumulation, and following core re-incorporation, create seedbed at the surface in preparation for overseeding.

Too often tow-behind, drum-type cultivation units are used across dry compacted sports fields with little or no impact on the surface. Albeit more expensive to purchase and maintain, reciprocating tine coring machines powered by a tractor (i.e. attached to the PTO) equipped with 0.75 to 1.0 inch tines positioned on a tight centering pattern are most effective in alleviating compaction and bringing soil to the surface.

Overseeding

During the course of a traffic-intensive sports season, turfgrass cover in goal creases, field centers, and penalty kick areas will inevitably thin. As turf cover begins to decline, it is important to initiate an overseeding program to introduce new plants. All too often sports field managers wait for nearly 100% bare soil to appear prior to introducing seed. While overseeding at this point is better than taking no action, the process should be started prior to severe damage becoming apparent.

Choosing the appropriate seed for an overseeding program is critical. Many seed mixtures are marketed as "sports turf mixtures" leading field managers and purchasing agents to buy these products for use in overseeding. These mixtures typically contain Kentucky bluegrass and tall fescue and are better suited for establishment projects where there is ample time to wait for the turf to fully establish before use.

Perennial ryegrass seed blends (i.e. two or more varieties of the same turf species) are the best choice for routine overseeding of high traffic field locations as this species will germinate more readily in cooler soil temperatures compared to Kentucky

Figure 3. Granular fertilizer sources are a prudent means to supply ample nitrogen quantities to sports fields.

Figure 4. Good turf cover in high traffic sports field locations like goal creases can be achieved by routine overseeding of perennial ryegrass during the sports season.

bluegrass and tall fescue, making it an ideal choice for overseeding during the fall and early spring sports seasons.

Fields badly damaged resulting from summer sports can be core cultivated to a 4 inch depth in late summer. Following core re-incorporation using a tow-behind drag, a blend of two-to-five perennial ryegrass varieties can be sown using a slit-seeder operated in two directions at a minimum of 5 lbs seed/1000 ft^2 per direction (i.e. total of 10 lbs seed/1000 ft^2). Application of a starter fertilizer and maintaining moisture at the soil (i.e. seedbed) surface will increase the probability of successful establishment.

During the sports season, prior to games and practices, perennial ryegrass overseeding can be performed using a rotary spreader and allowing athletes to "cleat-in" the seed to achieve necessary seed-to-soil contact. In the midst of the sports season, the same rotary spreader can be used to apply seed prior to games and is preferential to repeated use of a slit-seeder as the vertical blades on these machines can potentially injure new seedlings resulting from previous overseeding efforts.

Applying a sufficient quantity of seed is important to achieve overseeding success. A reasonable starting strategy would be to apply 6 lbs seed/1000 ft^2 between the hash marks of the football field prior to every home game. This area on a standard Canadian football field is 16830 ft^2 (330 x 51 ft). To appy 6 lbs seed/1000 ft^2 to this area, it will require two 50 lb bags of seed. If after several games, and potentially other events, turf cover is still diminishing and new seedlings are not establishing, the seeding "rate" can be increased to one or more additional 50 lb bags.

Conclusions

At minimum, turfgrass requires mowing, fertilization, and water. Regular mowing with efficient equipment, supplying adequate fertility, and avoiding the temptation to rely simply on the program "clock" to apply irrigation are basic refinements to primary cultural practices. To maintain turf cover on highly trafficked sports fields, the integration of cultivation and overseeding into existing primary cultural practices will better ensure success. •

Reference

Turgeon, A.J. 1999. Turfgrass management. Prentice Hall, Upper Saddle River, NJ.

Brad Park is Sports Turf Education & Research Coordinator, Rutgers, The State University of New Jersey; a member of the Sports Field Managers Association of NJ (SFMANJ) Board of Directors since 2003; and Editor, SFMANJ Update newsletter.

FIELD DAY HIGHLIGHT

Presented September, 2012
Vaughan, Ontario.

Photo: Peter Purvis, Guelph Turfgrass Institute

Maintaining Turfgrass Coverage Under High Traffic Conditions

K.L Dodson, F. Tardif, K.S. Jordan, E.M. Lyons, University of Guelph

One of the greatest challenges for sports turf managers is to maintain good playing quality throughout the play season. Although there is some question as to how exactly playing quality is defined, Bell and Holmes (1988) found that a player's perception of quality correlates positively with high rates of ground cover regardless of the ground cover population. Bell and Holmes' study indicates that bare ground is the driving factor of the player's perception of reduced quality of the field. If players are just looking for ground cover then why do managers worry about the composition of the field? While some believe the perception of weeds in the sward is purely aesthetic, others argue certain weeds can lead to an increase in injury to players (Larsen and Fischer, 2005a; Sachs, 2004; Raikes et al., 1994). Some weeds of major concern on sports fields are prostrate knotweed, plantain and white clover. White clover in a turf stand can pose a slipping hazard when the field is wet (Sachs, 2004), while knotweed grows in long stems with no anchoring roots that can lead to tripping hazards for athletes. Preliminary results from research conducted at the Guelph Turfgrass Institute in collaboration with the Orthopaedic Neuromechanics Laboratory at York University have shown that plantain species in a stand reduce stability and may lead to increased risk of knee injuries. These weeds are typically indicator species of other underlying problems of the field. White clover for example, indicates low nitrogen availability, while knotweed and plantain often indicate compacted rootzones. Some factors that contribute to bare ground and weed invasion are the construction of the underlying rootzone, the local climate, the amount of play on the field, and how and when maintenance practices are performed (Larsen and Fischer, 2005a).

With traditional herbicides no longer being tools in a turf manager's toolbox, emphasis must be placed on cultural practices and their effects on weed control. Larsen and Fischer (2005b) found that verticutting produced a short-term reduction on weed populations on fairway turf when combined with fertilizers. But in general there have been relatively few studies on how to culturally control weeds in turf (Busey, 2003).

One important cultural practice that may help in maintaining turf coverage during the play season is overseeding. Simply put, overseeding refers to the practice of adding desirable turfgrass seed into an existing sward. The purpose of overseeding is to thicken the stand and increase the total turf population thus increasing the ability of the turf to outcompete weeds and decrease the amount of bare ground and weed coverage on the field.

Why Overseed?

Overseeding athletic fields with perennial ryegrass (PR) or annual ryegrass (AR) has been shown to aid in creating a thicker stand of turf while reducing bare patches (Elford, 2008; Minner et al., 2008; Rossi, 2004). The use of an annual turfgrass seed may indeed aid in maintaining turf during the play season; however if time and money are being spent to overseed it may make more sense to choose a perennial species that has greater staying power. The purpose of our study at the Guelph Turfgrass Institute (GTI) has been to evaluate a potential new species of turfgrass for overseeding, while exploring the effects of overseeding frequency and mowing height on turfgrass coverage, weed populations and bare ground coverage.

Perennial ryegrass is a relatively inexpensive turfgrass that has a rapid germination rate (approximately 7 days) making it the number one perennial turfgrass choice for overseeding in Canada's climatic zone. However with the long Canadian winters, the low winter survival rate of PR can lead to increased bare ground coverage in early spring. Adding a slower germinating species into the sward may help ensure long-term turfgrass coverage.

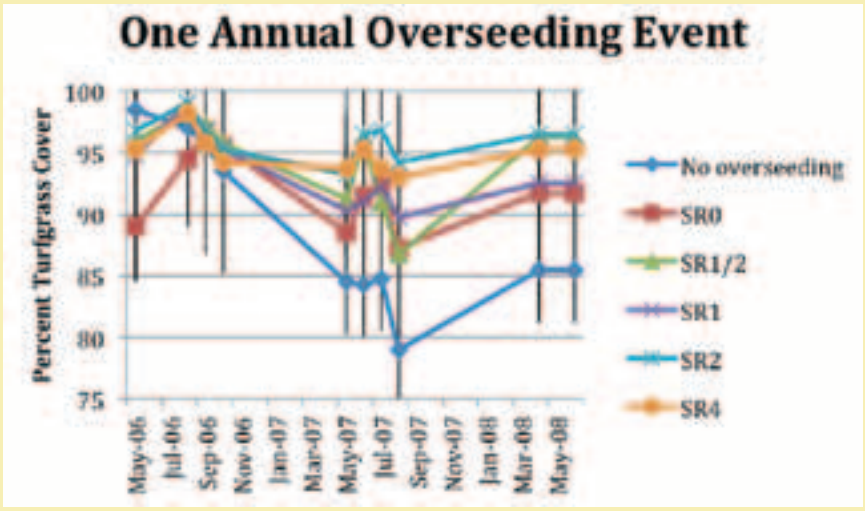
For this study supina bluegrass (*Poa supina*) was chosen as the companion species to overseeding with PR. Supina bluegrass (SB) is native to the European Alps, and has been bred and used as a turfgrass in Germany since the 1930s (Stier, 1998). It has a great ability to thrive under high wear conditions, but its lime green colour and numerous dark seed heads in the spring do not fit with the North American preference for dark green cultivars. However, its stoloniferous growth habit, aggressive growth rate, relatively late fall dormancy and early spring green-up make it an ideal candidate for competing with early germinating spring weeds. Unfortunately the cost of supina bluegrass is high with an average price of $12-15/kg ($25-35/lb). Therefore it is practical to look at the minimum amount of SB that is required to be beneficial in a companion PR overseeding regime. Our companion overseeding trial has been evaluating five seeding rates that include a no overseeding control, an overseeding with perennial ryegrass alone at 6 kg/100 m^2 and then in combination with supina bluegrass at 0.5 kg/100 m^2, 1 kg/100 m^2, 2 kg/100 m^2, and 4kg/100 m^2 (Table 1).

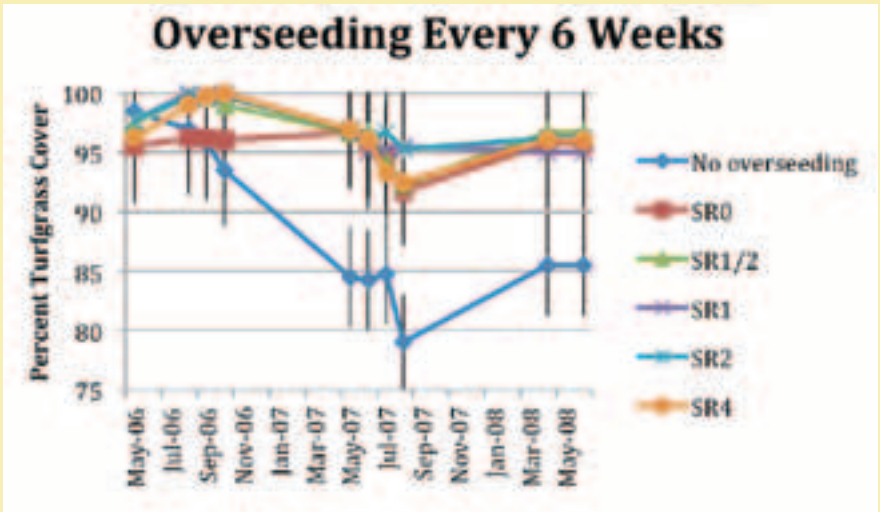
In addition to examining the effects of adding SB into a PR overseeding program the frequency of overseeding was also explored. We compared applying all the seed in one application versus applying 1/3 of the total seed three times throughout the play season. What we found was that applying smaller amounts of seed every 6 weeks during the growing season resulted in greater turfgrass coverage throughout the play season.

Table 1. Overseeding rates of Perennial ryegrass and Supina bluegrass.

Seeding Rate	Perennial ryegrass	Supina bluegrass
SR0	6 kg/100 m^2	0 kg/100 m^2
SR1/2	6 kg/100 m^2	0.5 kg/100 m^2
SR1	6 kg/100 m^2	1 kg/100 m^2
SR2	6 kg/100 m^2	2 kg/100 m^2
SR4	6 kg/100 m^2	4 kg/100 m^2

Figure 1. Turfgrass coverage over time with 5 different seeding rates (Table 1) and a control (No overseeding). LS means calculated using ANCOVA.



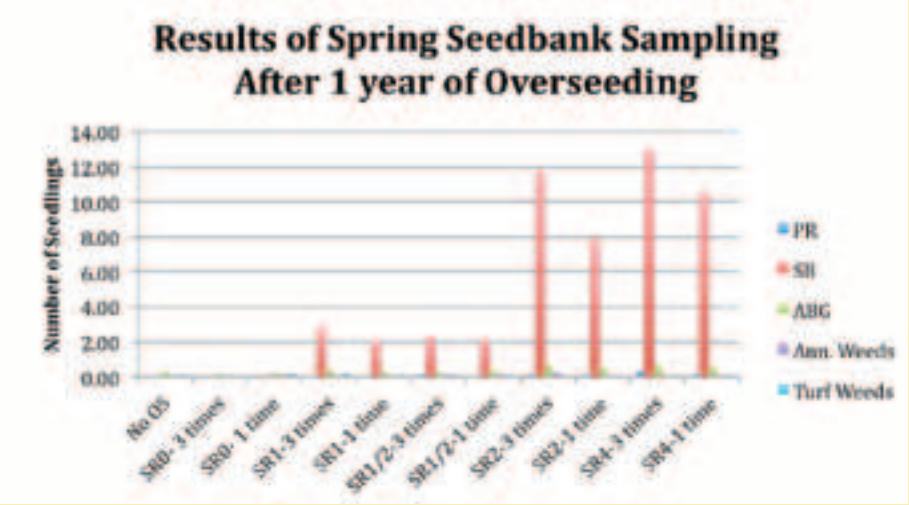


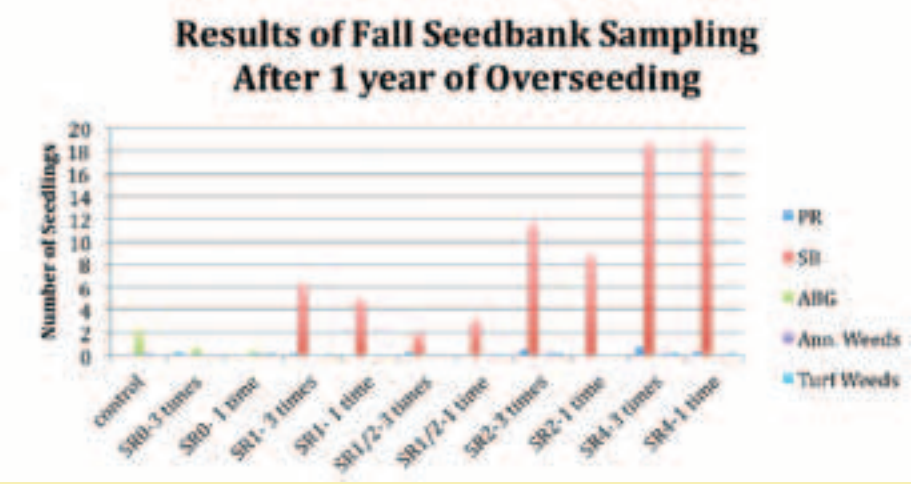
Mowing Height

For most people, basic turf care is mowing. As Turgeon (2002) states "mowing is the most basic of all turfgrass cultural practices." The ability to tolerate regular mowing is a common trait of all turfgrasses, however the ideal height of cut does vary among species (Beard, 1973). The cool season grasses that are commonly planted for athletic fields here in Canada are Kentucky bluegrass (*Poa pratensis*) and perennial ryegrass (*Lolium perenne*), both of which can be mowed at a medium height (40 – 60 mm or ~1.5 – 2.5 inches) (Sheard, 2008). By maintaining an ideal height of cut for each species, you ensure a healthier stand of turf that will resist weed encroachment and other stresses. The appropriate frequency of mowing depends on many factors such as the time of year, moisture availability and fertility. In general, following the one-third rule will ensure that the plant will be able to recover relatively quickly from the stress of mowing. Therefore when planning a mowing schedule it is important to be flexible and willing to adapt to the conditions that have arisen due to weather, fertility, and use. Mowing typically takes up approximately 30 – 40% of a field's maintenance budget, so it is important to understand the simple basics of why mowing is important to athletic field sward continuity (Sheard, 2008).

Our research experiment also examined what height of cut would optimize an overseeding program. We compared two mowing heights within our overseeded plot - 3.8 cm (1.5 inches) and 7.5 cm (3 inches). To maintain the lower height of cut the 3.8 cm plots were mown every 4 – 5 days, while the higher height of cut plots were mown only once a week. While there were no statistical differences between the two heights of cut for turfgrass coverage, there was a difference in smoothness of the plots. The plots that were maintained at the shorter mowing height had a higher quality playing surface when compared with the higher mowing height. Our rating of quality was based on a visual rating that reflected both functional and aesthetic attributes like density, uniformity, smoothness, growth habit and colour (Morris and Shearman, 1998). Whether the observed higher quality is directly linked to mowing height or to frequency and quality of cut is not known from this study, however it does imply that mowing more frequently has a positive effect on turfgrass quality.

Figure 2. Seedbank analysis results after 1 year of companion overseeding with 6 kg/100 m^2 of PR, and 4 rates of SB (Table 1). LS means calculated using ANOVA.





What Happens to the Seed?

One question that is often posed to researchers is, what is happening to the seed that is being applied through overseeding? Does it all germinate? If it doesn't all germinate does that mean it dies? Many of us know about the ubiquitous nature of annual bluegrass and the ability of its seed to maintain viability in the seedbank for more than 6 years (Turgeon et al., 2009); however, very little is known about the survivability of our turf-type turfgrasses in seedbanks. We evaluated the soil seedbank to determine the fate of the seed that we added each season. Soil samples were collected from the research plots using a soil probe both in the fall of 2010, in the spring and fall of 2011 and in the spring of 2012. Plots that received the higher amounts of total seed had more seed surviving in the seedbank. However, in the treatments where both species were overseeded, the dominant species in the seedbank was supina bluegrass. Interestingly the amount of PR that was able to survive in the seedbank increased with increasing amounts of SB overseed (Figure 2). Spring sampling had lower amounts of PR seedlings than the fall sampling, suggesting that in order to get an accurate prediction of what seed in the seedbank may be affecting your field for the upcoming playing season it is better to sample in the spring than the fall.

Wrapping It All Up

When deciding on when and how to overseed, frequency appears to play a more important role than total amount. Figure 1 exemplifies the importance of adding small amounts of seed more frequently. Looking at the perennial ryegrass overseeding example (SR0) shows that with the frequent overseeding there was a greater than 95% turfgrass coverage, while the one time SR0 seeding was at 91% turfgrass coverage. The addition of SB as an overseeding companion did not affect overall effectiveness of overseeding, but appears to play a dominant role in the soil seedbank. That said, it is important on non-irrigated fields to time your overseeding applications so there is enough precipitation to aid in germination if you are overseeding with PR alone. In general, overseeding appears to help in maintaining turfgrass coverage (Figure 3). Also in a non-irrigated environment adding SB into the overseeding mix results in a faster recovery time after periods of long drought. The non-irrigated field at the GTI (Figure 3) recovered faster on the half with SB when compared to the half of the field that had PR alone. Mowing height plays an important role in maintaining turfgrass quality as well, but whether this is due to mowing frequency or height of cut or a combination of both factors is not determinable from the presented data. Seedbank data suggest that overseeding with perennial ryegrass alone does not feed the seedbank; therefore timing of overseeding should occur when environmental conditions are favorable for seed germination.

Figure 3. Non-irrigated field at the Guelph Turfgrass Institute. Left side has been overseeded 3 times with either 0.5kg/100m^2 SB (back half, lime green colour) or 3kg/100m^2 perennial ryegrass (front half), while the right side of the field had no overseeding.

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FIELD DAY HIGHLIGHT

Presented September, 2012 Vaughan, Ontario.

Tom Serensits, Penn State's Center for Sports Surface Research

Synthetic Turf: Research Answers to Common Questions

As the number of infilled synthetic turf athletic fields continues to rise, research related to this newest generation of synthetic turf is becoming increasingly available to consumers. In the early days of infilled synthetic turf, consumers often had to rely solely on turf sales people for information. Unfortunately, not all of the information was accurate and scientific data was often not available. Fortunately, unbiased, scientific research is beginning to address many of the issues and concerns associated with infilled synthetic turf. This article gives an overview of some of the research that we have done at Penn State's Center for Sports Surface Research as well as research done by other agencies. Links to all of the research studies mentioned, along with many other studies, can be found on the research section of our website: ssrc.psu.edu.

Injuries

When we think about synthetic turf and risks, increased injury risk is typically the first thought that comes to mind. While it is true that athletes playing on older styles of synthetic turf (i.e. "traditional Astroturf") suffered more injuries than those playing on natural grass, the majority of injury studies involving infilled synthetic turf do not follow that same trend. Researchers have tracked injuries in football, soccer, and rugby and compared the number of injuries occurring on natural grass and infilled synthetic turf. The majority of the results from these studies show that while certain types of injuries may be more common on one surface than the other, overall injury risk is similar.

Of the 13 published scientific studies comparing injury rate on infilled synthetic turf and natural grass, 11 have concluded that there is no difference in overall injury rate between the two surfaces. Of the studies that found a difference, one conducted on NCAA college football players reported a lower overall injury risk

WHY ARE ATHLETES LESS LIKELY TO SUFFER INJURIES WHEN PLAYING ON INFILLED SYNTHETIC TURF FIELDS COMPARED TO EARLIER VERSIONS OF SYNTHETIC TURF?

Figure 1. We conduct surface temperature research both outdoors and using the laboratory set-up shown here

on synthetic turf while the other found a higher rate of anterior cruciate ligament tears on synthetic turf for NCAA college football players. Links to each of these studies can be found on our website: ssrc.psu.edu. As more of these types of studies are published, we will gain an even better understanding of injury risk on synthetic turf and hopefully a better understanding of the mechanisms that lead to injury and how injuries can be prevented.

Why are athletes less likely to suffer injuries when playing on infilled synthetic turf fields compared to earlier versions of synthetic turf? To answer this question, we must examine what makes infilled synthetic turf different from the earlier generations of synthetic turf. The sandpaper-like surface of those older turf systems tended to "grab" the cleats of a player's shoe and not allow the cleats to "release" as the player's leg turned or rotated. This high amount of rotational traction places a great deal of torque on the ankle and knee, potentially leading to a serious injury. The combination of longer fibers and granular infill material allows for easier "release" of an athlete's cleats from the surface of infilled synthetic turf, lessening the torque placed on the ankle and knee.

At Penn State, we measure rotational traction using a device called Pennfoot. Pennfoot consists of a surrogate leg and foot that can be outfitted with any type of shoe. Over the past seven years, we have measured rotational traction, along with a number of other characteristics, on multiple infilled synthetic turf products along with traditional Astroturf. You can find the results from our studies on our website: ssrc.psu.edu.

Chemical Exposure

One of the most common concerns voiced by parents groups and the like is the potential exposure to harmful chemicals from both crumb rubber infill and carpet fibers. A number of scientific studies, including an extensive study by the City of New York, addressed these concerns by testing for contaminants that may pose a threat to field users through inhalation, skin contact, or ingestion. These tests found the presence of some contaminants; however, the vast majority of studies concluded that there is no elevated health risk associated with playing on infilled synthetic turf. While low levels of contaminants were occasionally present, in most cases, the levels were no different from "background" levels, which are areas tested away from the field that are used to compare with field levels. These results agree with a recent Environmental Protection Agency study that concluded that the concentrations of chemicals in crumb rubber are below levels considered to be harmful to humans.

With the discovery of high lead levels in the fibers of a synthetic turf field in New Jersey several years ago, the presence of lead in synthetic turf has received considerable attention. A closer look at the New Jersey findings shows that the turf on the field tested was an aged traditional Astroturf surface. However, the study prompted the United States Consumer Products Safety Commission (USCPSC) to test for lead

in infilled synthetic turf carpet fibers. The USCPSC concluded that field users were not at risk of exposure to lead because lead levels were very low or undetectable. Additionally, synthetic turf manufacturers have agreed to remove virtually all lead from their products in the future.

Skin Infections

Another health concern that has been in the news over the past several years is the potential to contract skin infections from synthetic turf. Outbreaks of staph infections, specifically methicillin-resistant staph infections (MRSA), have been blamed on synthetic turf as some have argued that that the surface of the turf provides a breeding ground for the bacteria. As a result, many fields are being treated with anti-microbial agents on a regular basis, often at great expense.

Members of our Center for Sports Surface Research conducted a survey of 20 infilled synthetic turf fields and tested them for the presence of staph bacteria. No staph bacteria were present on any field. As part of our study, we also tested other surfaces athletes commonly come into contact with, such as locker rooms and training areas. Staph bacteria were found on blocking pads, weight equipment, used towels, and a stretching table. This tells

WHILE HIGH SURFACE TEMPERATURE HELPS KILL BACTERIA ON THE TURF'S SURFACE, IT ALSO POSES A POTENTIAL HEALTH THREAT TO FIELD USERS.

us that athletes are indeed being exposed to staph bacteria, but that exposure is not coming from synthetic turf.

In a follow-up study, we placed live staph bacteria onto the surface of infilled synthetic turf and monitored its survival over time. On outdoor fields, nearly all bacteria were dead within three hours. Interestingly, more bacteria survived on Kentucky bluegrass than synthetic turf over the course of the study. On indoor fields, the bacteria survived for several days. The difference in survival rate between outdoor and indoor fields is most likely because of higher surface temperatures and UV light exposure on outdoor fields. We also tested the effectiveness of anti-microbial sprays marketed for use on synthetic turf. SportsClean anti-microbial spray and Tide liquid detergent were both equally effective at reducing bacteria survival time on indoor fields (no live bacteria after 24 hours). The overall effectiveness of these products could not be determined on outdoor fields because under sunlight and high surface temperatures, the bacteria died quickly, regardless of whether or not a treatment was applied.

Surface Temperature

While high surface temperature helps kill bacteria on the turf's surface, it also poses a potential health threat to field users. When surface temperatures reach extreme levels, field users may suffer from heat related illnesses, such as dehydration and heat

stroke. On clear, sunny days during the summer, surface temperatures of infilled synthetic turf can reach up to 93° C. A common misconception is that the black crumb rubber infill is to blame for the hot surface. In reality, the carpet fibers are substantial contributors to heat build-up. Our research shows that the surface of traditional Astroturf (no infill) gets just as hot as infilled synthetic turf. We also tested a number of "alternative" infill products and fiber colors and found only small differences in surface temperature when compared with the traditional green carpet infilled with black crumb rubber.

Unfortunately, there is currently no way to cool the surface of synthetic turf for an extended period of time. Watering synthetic turf drops the surface temperature rapidly; however, temperatures begin to rebound in as little as 10 minutes and reach nearly pre-watering levels within several hours. After all, a properly functioning turf system is designed to drain water rapidly; therefore, the cooling effects of any water applied will only last for as long as there is moisture present at the surface. Several alternatives to crumb rubber infill along with fiber coatings claim to lower surface temperature. Our testing has yet to prove that any currently available product provides a significantly cooler surface than a standard infilled synthetic turf field.

Many questions and concerns have been raised as the popularity of infilled synthetic turf continues to increase. These questions have prompted research studies that have attempted to seek out whether or not the concerns are warranted. Scientific research has debunked several of these questions, while other concerns, such as surface temperature, remain valid and require attention. As additional research related to today's generation of synthetic turf is released, consumers will benefit by having more access to scientific research, allowing them to make more informed decisions. •

Figure 2. We test traction using Pennfoot - a device that allows us to compare traction levels on playing surfaces using various types of shoes.

Field Day 2012!

Event Chair Andrew Gaydon (L) with Speakers Kathleen Dodson and Thomas Serensits

The rain threatened but did nothing to dampen the enthusiasm inside The Ontario Soccer Centre where more than 200 participants representing the turfgrass industry joined us where they Volley in Vaughan on September 20.

The excellent speaker program, coupled with the knowledge and expertise shared by our industry suppliers, set the stage for a winning educational forum and networking opportunity for all who attended.

Our thanks for your participation in our 25th Annual Field Day... making it our 25th annual success!

Session Chair Tennessee Propedo (L) with Speaker Ted Chudleigh

Lisa Beatty, CEO, The Ontario Soccer Association, our host venue

Jason Inwood, Manager, Parks Operations, City of Vaughan, our host muncipality

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Natural and Synthetic Sports Surfaces: A Comparative Discussion

Ross Baron, 2012 Recipient of the STA Robert W. Sheard Scholarship

A huge number of municipalities and schools across the country have decided to go in the direction of synthetic surfaces and although I acknowledge the benefits of this choice I also have a few major concerns with it.

Since the beginning of time and the invention of outdoor sports, athletes have played on natural surfaces. The reason wasn't so much a choice by the athlete or the organizer, but by Mother Earth and the environment itself. Turf is the world's most resilient natural surface and covers more than 46.5 million acres of soil in the United States alone. Turfgrass is everywhere; city yards, country fields, recreation parks and golf courses, and the list goes on and on. Most people don't even realize that they are benefiting from turfgrass every day. Turfgrass cleans the air of pollution by converting carbon dioxide to oxygen; in fact, a 50 ft by 50 ft patch of lawn produces enough oxygen per day for a family of four, and the average golf course produces enough oxygen per day for up to 7,000 people! Turfgrass also acts like the atmosphere's natural air conditioner; eight home lawns can produce the same effect as 70 tons of air conditioning. Turf controls dust, noise, and filters rain and surface water of pollutants before it enters our ground water. These are just a few of the many environmental benefits of natural turf and make it quite obvious why it became the world's most highly used surface.

Besides the environmental benefits there are a number of athletic and safety benefits of natural turf as well. Being an athlete since I was a young boy and competing on both natural and synthetic surfaces, I believe I have a good perspective of the differences between the two. I will start off by comparing playing surfaces. I remember playing soccer as a kid on natural fields riddled with pot holes and bumps; the ball would bounce unexpectedly, people would step in divots and twist their ankles, and when it rained it would sometimes turn into a mud pit making the surface undesirable for play. After the game my father and I would drive by the synthetic fields that were newly installed in West Vancouver. They seemed picture perfect in the exact same conditions, they had no mud or potholes. I remember thinking to myself that I would much rather play on a surface that is exactly level and unaffected by rain. It wasn't until my teen years, when the sports I was involved in got more competitive, that I started to play on synthetic surfaces. To my surprise it wasn't at all what I had imagined. The famous quote "Don't judge a book by its cover" definitely applies in this case. Although the surface was level, it was extremely hard and fast. It also contained millions of little black rubber pellets that would fill your cleats and I can't even explain the pain involved when you would take a fall on the rubbery surface. I would sometimes come home after games

with all the skin missing off my arms from "rug burn". When we played in the heat, the temperature was almost unbearable and considerably hotter than a natural turf surface.

Once we had the experience to compare, my friends and I agreed unanimously that a natural turf surface that was maintained properly, with good drainage, regular mowing, irrigation, and an efficient fertility program was a much more desirable surface on which to play. Natural turf is cooler on hot days, the ball rolls a little slower and more naturally, grip is better and it hurts a lot less to take a fall. After researching I found that my friends and I are not alone with this opinion. Almost all European soccer stars won't even consider playing on a synthetic surface because they believe they are more prone to injury. Some stadiums that were converted to synthetic turf in the NFL are now switching back to natural turf because the players unanimously voted that they feel much safer playing on a natural surface.

Now I don't want to sound like I am anti-synthetic. I believe that these fields do serve some purpose; however, I do feel that the

cons outweigh the pros. The first mistake that people often make when considering a synthetic field is thinking that synthetic fields will take care of themselves and have much lower maintenance costs, but this is completely false. Synthetic fields, in fact, have higher maintenance costs then a natural surface. They have to been cleaned regularly for blood, spit, feces, and bacteria as well as regularly top dressed with black rubber pellets, an ongoing cost. They still require irrigation to control temperature. One benefit of a synthetic field is that they can be used much earlier in the season when turf fields are still dormant or vulnerable to damage. Synthetic fields can handle heavy traffic for youth sports but I believe with the right species of grass, fertility programs, overseeding and maintenance programs, natural surfaces can handle the same traffic and have similar stress tolerance with much more environmental benefits.

With the world's "green" movement I do not see how synthetic fields are a move in the right direction for North America. One thing about synthetic fields often overlooked by schools and municipalities is the disposal of the left over material. A synthetic field has a life span of anywhere between six and twelve years

WHEN IT COMES DOWN TO IT, I REALLY THINK IT'S A NO BRAINER.

depending on the use. The cost to remove and dispose of one of these fields can be upwards of $500,000, a cost often forgotten when fundraising or budgeting for the field. Synthetic fields have not been around long enough for the industry to develop a recycling program, and the mass amount of rubber is extremely hard to get rid of. I've read articles about high schools in the United States that did not have the money to dispose of their synthetic field. Their only option was to roll them up and stuff them in their school tennis courts filling them to the rim. This restricts kids from using those facilities, is a terrible eye sore, and is a lingering cost and blatant reminder that one day will have to be dealt with.

When it comes down to it, I really think that it is a no brainer. I understand the benefits of synthetic fields, but if it is possible in our climate to use natural surfaces why would we go in that direction? My generation's goal is to try and reverse what the world has been doing in the past century to our environment with pollution in terms of the industrial revolution, mass production, and our carbon footprint. As a turf manager I can do my part by simply growing healthy turfgrass and feel that it is in my best interest and is my responsibility to pass on my views and opinions on this subject. If we want to make a change and be better citizens for our atmosphere and the planet, we are going to have to go in a different direction than making fake grass. •

THERE IS NOT A SPRIG OF GRASS THAT SHOOTS UNINTERESTING TO ME. **– Thomas Jefferson**

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