Sports Turf Manager
FOR BETTER, SAFER SPORTS TURF. SUMMER 2012. VOL. 25. NO. 2

School Sports Field Trials: Year One

Ken Pavely, Sales Manager, Lawn Life

A joint project involving Dol Turf Restoration, the Simcoe District School Board and Sports Turf International, together with supporting partners DCS Agronomics, Vanden Bussche Irrigation, FS Partners, and Sylvite took off in full flight during the 2011 growing season. There is a dearth of data which demonstrates the relative effectiveness of varying aeration methods now used by the industry.

The objectives of the trials were to analyze the effectiveness of aeration methods on two different sites, and evaluate the results of applying several slow release nitrogen materials at varying rates.

Site 1 was Bradford District High School, where a new field was constructed and completed in the spring of 2009. Site 2 was Banting Memorial in Alliston, an established field that was renovated in 2005. Both sites have similar Category 3 soil root zones. The major difference was the presence of organic matter, where the existing Banting site had double the amount due to its longer time since establishment.

The challenges school sports fields face are well known. Often with no down time, these fields are used five days a week, as well as evenings and on weekends. Physical education classes usually take place outside as soon as weather allows, long before the time when a field should be opened to allow for adequate drainage from winter precipitation and frost. To add insult to injury, summer permitting by sports groups compounds the damage and pressure.

THE CHALLENGES SCHOOL SPORTS FIELDS FACE ARE WELL KNOWN.

The aeration equipment, supplied by Dol Turf Restoration, included a large and small Verti-Drain, Verti-Quake, mechanical core aerator, shatter tine and sport tine units, aeravator, pull type core aerator, and a Waterject unit.

As a side demonstration on the new Bradford site, a Veemo dethatcher was run over a section of the newly sodded field with one to three passes.

OTS HIGHLIGHT

Continued inside on pages 9-10.

The fields were sectioned off into plots 3000 ft^2 in size, running from goal post

Inside Features

ground gear for athletes

UBU SPORTS

sports surfacing specialists

THE STUFF CHAMPIONS ARE MADE ON

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Sports Turf Manager

FOR BETTER, SAFER SPORTS TURF. SUMMER 2012.

Summer - May all your weeds be wildflowers. ~Unknown

Inside this issue...

REGULAR COLUMNS, DEPARTMENTS & SMALL FEATURES

Deadline for Fall 2012 Sports Turf Manager: September 8

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!

Sports Turf Manager

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President's Desk

BY PAUL GILLEN

Well, we're a long way into the growing season after a mild winter and spring. How many of you are now paying the price trying to keep up with the growth? We're hearing a lot about the accelerated weed pressure and the limited resources available to deal with it. Safe and Playable is a tough mandate when the constraints are beyond your control, but we all have to keep trying.

We have at least one politician in Ontario who tried to do something about it. The Private Member's Bill sought to ease the restrictions for pesticide use allowing it with a licence of a prescribed class. Alas, politics took precedence and the bill was defeated, but it did serve to bring the problem to the forefront. This is in contrast to the British Columbia situation where the standing committee examining the proposed ban in that province reported back to the legislature that there was no good scientific evidence to support a total ban. Common sense does exist out there; too bad it doesn't cross provincial boundaries.

SAFE AND PLAYABLE IS A TOUGH MANDATE WHEN CONSTRAINTS ARE BEYOND YOUR CONTROL

Non-Irrigated Soccer Field
Castlebury Park, Guelph, ON
Photo taken two days after mowing
Photo: Brian Scott, Lead Hand, Turf, City of Guelph

We are pleased to be able to bring you more highlights from the Ontario Turfgrass Symposium. This annual winter conference always produces the latest technology and research updates and we are proud to be a sponsoring partner.

As we move through our 25th anniversary year each magazine issue examines some of the highlights of your association from the past. The importance of sports turf in our communities has grown exponentially over the years, and we have been there every step of the way. Mark your calendar for the 25th Annual Field Day, September 20 at The Soccer Centre in Vaughan, as well as the 25th Anniversary Banquet, October 25 at Victoria Park East Golf Club in Guelph. Details of both will be on the website soon.

The second edition of the *Athletic Field Construction Manual* is now available. This has been revised and updated with important supplemental information.

We have been working with our Atlantic Director Gord Horsman to offer the Sports Turf Managment & Maintenance Course there this fall. The course is scheduled to run from October 29 to November 1 at the Moncton Coliseum, Moncton, New Brunswick. Stay tuned to the website for registration details.

Finally, a reminder that your 2012 membership invoices are now past due. If you haven't submitted your payment yet, please make this a priority – it's your association.•

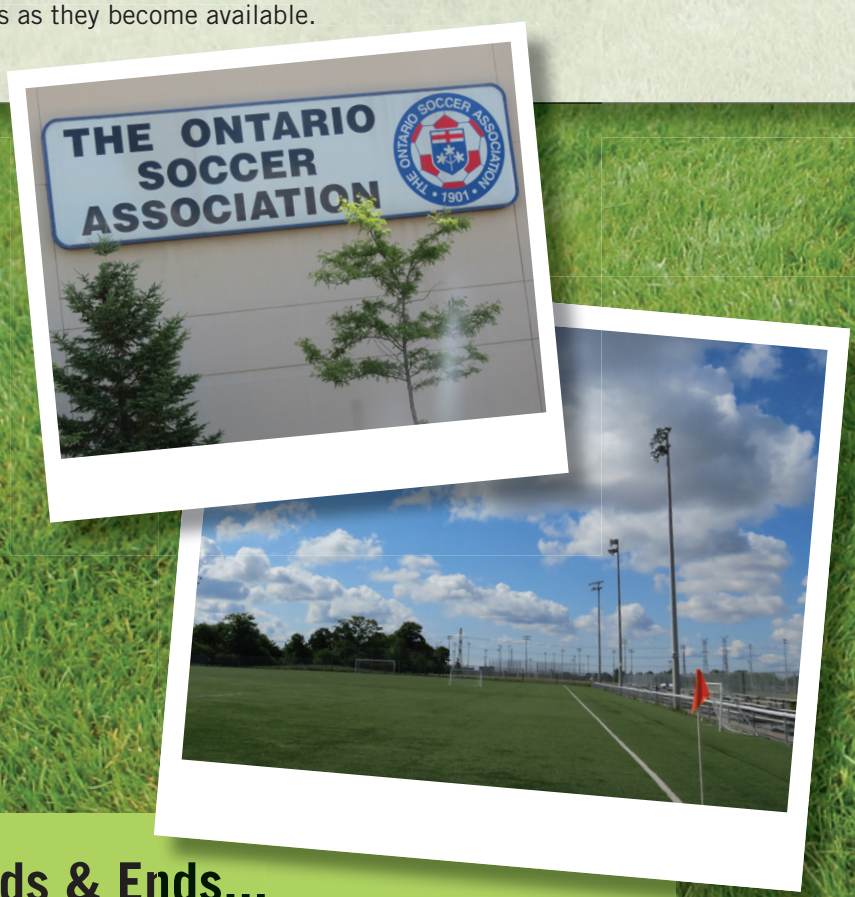
Sports Turf Association Announces Venue for its 25th Annual Field Day

GUELPH, ON. The Soccer Centre, home to The Ontario Soccer Association, The Soccer Hall of Fame and Museum, and all of Ontario's provincial leagues, will host the Sports Turf Association's 25th Annual Field Day, September 20, 2012.

The Centre is Canada's leading competition, training, education and exposition soccer facility. It is like no other in the country featuring a 130,000 square foot field house that can accommodate three indoor soccer fields or one full size 11-a-side game. In the winter months, a 25,000 square foot bubble encompasses one third of the outdoor field creating additional training space. The Soccer Centre has two international size outdoor grass fields, one international size outdoor artificial turf field, a sports therapy clinic, restaurant and lounge, and is located on a 25 acre parcel of land that is easily accessible from Ontario's major highways.

The Field Day Committee is in the midst of applying the finishing touches to this year's program.

For topnotch turf education and the opportunity to network with colleagues and industry suppliers, save the date and plan to join us on September 20 where they VOLLEY IN VAUGHAN at The Soccer Centre, 7601 Martin Grove Road. Visit www.sportsturfassociation.com for all the details as they become available.



New & Returning Members

James Douglas
Douglas Associates Landscape Architects
Ottawa, ON

John Bautista
Dol Turf Restoration Ltd.
Bond Head, ON

Gavin Worden
Turf Care Products Canada Ltd.
Newmarket, ON

Edward McCloskey
Covertech Industries Limited
Toronto, ON

Greg Narmour
World Class Athletic Surfaces
Leland, Missouri USA

Dean McDermid
Steve Matunin
Town of Markham, ON

Scott Donald
Township of King
Nobleton, ON

Odds & Ends...

TURF TRADES EMPLOYMENT ADS

Are you advertising a position or job searching? Visit us online at www.sportsturfassociation.com and click on Turf Trades. Cost is $75 plus HST for STA members for a 2-month listing.

STM EDITORIAL CONTENT

Opinions expressed in articles published in the *Sports Turf Manager* are those of the author and not necessarily those of the STA.

CORRECTION

The author statement was inadvertently omitted from the article What Lies Beneath BMO Field in the Spring issue of *Sports Turf Manager*. Our apologies to the writer Robert Heggie, Turf Manager, BMO Field. We regret the error.

SPORTS TURF ASSOCIATION

Our roots run 25 years deep.

"Information is a source of learning. But unless it is organized, processed, and available to the right people in a format for decision making, it is a burden, not a benefit." **William Pollard**

A Retrospective on Resources

The Sports Turf Manager, known as the *Sports Turf Newsletter* until 1995, has been published on an ongoing basis since 1997. It keeps sports turf professionals up to date with leading research, STA programs and activities, industry information and coming events.

Members of the Sports Turf Association and the greater turfgrass industry have access to complete back files of the publication through a partnership between the STA and Michigan State University's Turfgrass Information Center (TIC). The online digitized archive allows readers to browse year-by-year or search by word to retrieve PDF files of articles. Looking for information published in the *Sports Turf Manager*? Visit www.sportsturfassociation.com/Publications/Sports Turf Manager/Archive and begin your search!

Sports Turf Association members enjoy complete subscriber access to the TIC's Turfgrass Information File, the most comprehensive publicly available collection of turfgrass educational materials in the world. Follow the Michael J. Bladon Educational Link to the Turfgrass Information File. Login at www.sportsturfassociation.com for access to the 'Member's Only' section of the website.

TIC'S TURFGRASS INFORMATION FILE IS THE MOST COMPREHENSIVE COLLECTION IN THE WORLD


October 1987 Volume 1 Issue 1

SPORTS TURF NEWSLETTER

1987 Board of Directors

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TREASURER Robert Allen
DIRECTOR John Watson
CONFERENCE CHAIR Annette Anderson

President's Message

WELCOME! To Our New Members

Report on the Athletic Turf Field Day (Held at the University of Guelph, June 18, 1987.)

1987


SPORTS TURF Newsletter

VOLUME 3 ISSUE 1 MARCH 1990

...for better, safer Sports Turf

EVENTS CALENDAR

PRESIDENT'S MESSAGE

IN THIS ISSUE

1990


SPORTS TURF Manager

VOLUME 8 ISSUE 1 MARCH 1995

...for better, safer Sports Turf

PRESIDENT'S MESSAGE

IN THIS ISSUE

1995

SPORTS TURF MANAGER

...for better, safer Sports Turf

JUNE 1997

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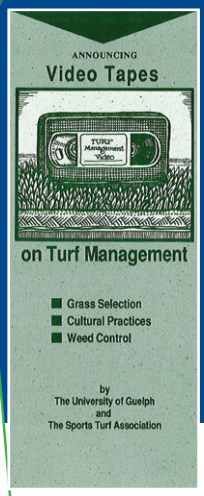
3 Did You Know?
4 Spring Maintenance and Irrigation
6 Machinery for Turf Rollers

President's Message

1997

CELEBRATING 25 YEARS

1991



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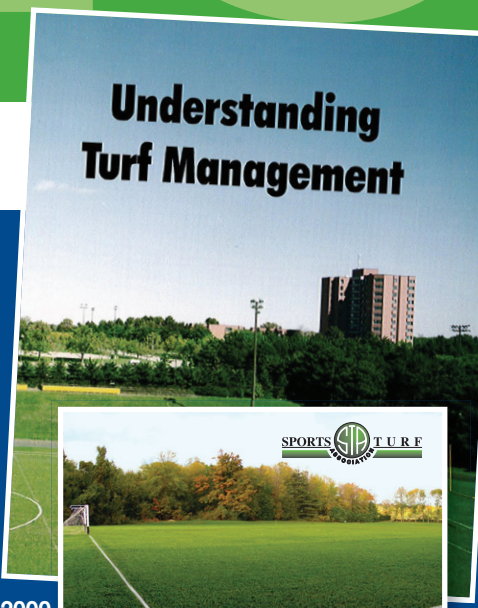

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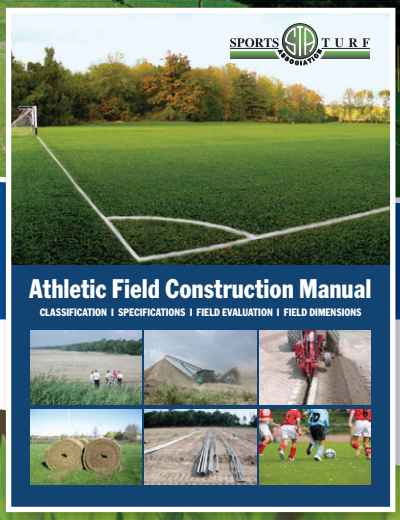
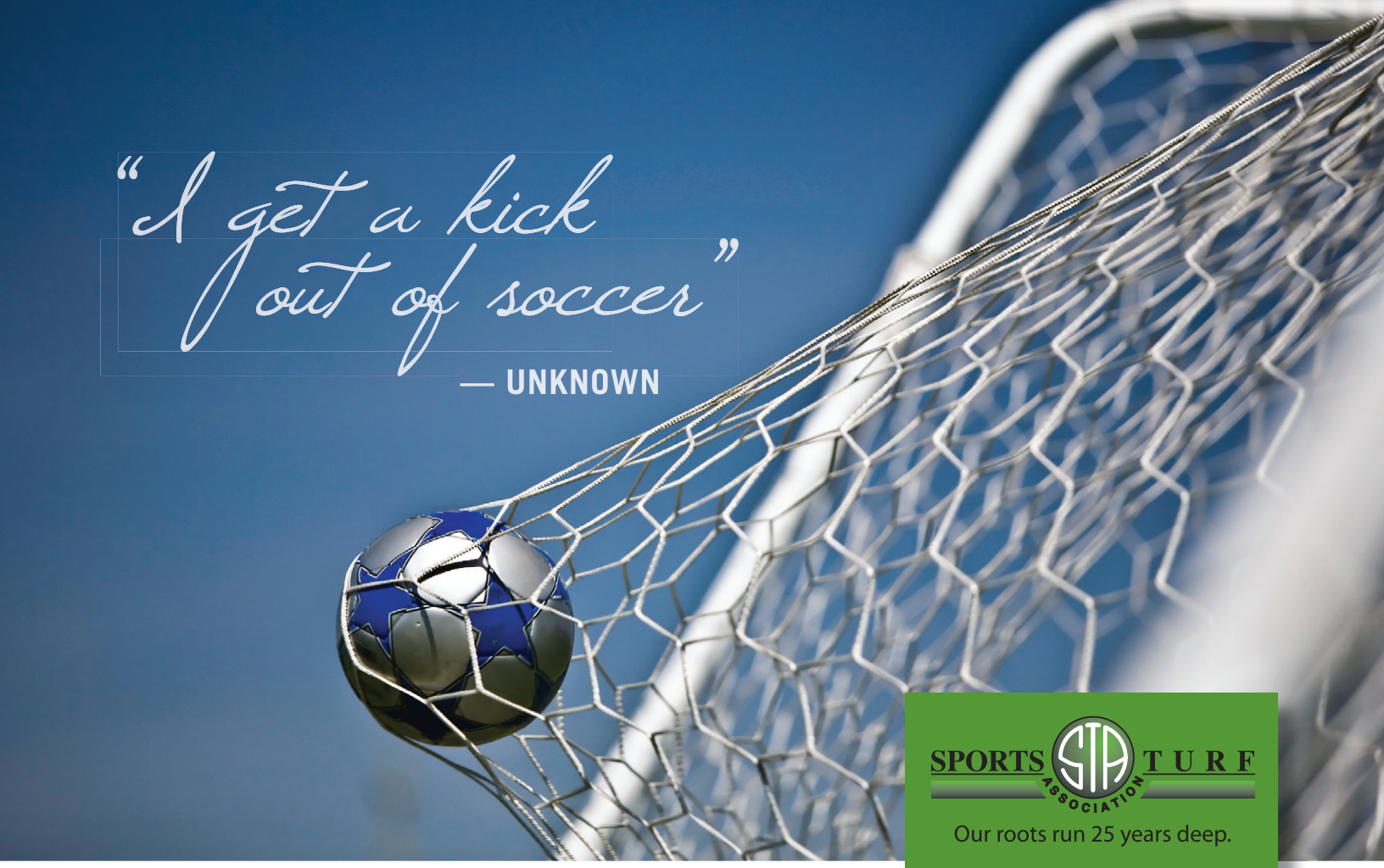


2008

2003

2007

2010



Event Calendar

ASSOCIATION EVENTS ARE HIGHLIGHTED IN GREEN

July
Irrigation Association – Smart Irrigation Month
www.irrigation.org

August 23
Guelph Turfgrass Institute Summer Research Field Day & 25th Anniversary
Guelph, ON www.guelphturfgrass.ca

September 20
Sports Turf Association 25th Annual Field Day
The Ontario Soccer Centre, Vaughan, ON
519-763-9431 www.sportsturfassociation.com

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, NB 519-763-9431
www.sportsturfassociation.com

School Sports Field Trials: Year One

continued from page 1

OTS HIGHLIGHT
Presented February, 2012
Guelph, Ontario.

to goal post. Plots covered both the centre of the fields (where the bulk of play takes place), and the shoulders. Three replications were done to ensure an adequate cross section of data.

Aeration Methods and Year 1 Results

In June and August, each aeration unit was taken over the field in a single pass on three plots. Control plots were randomly placed to adequately measure the differences.

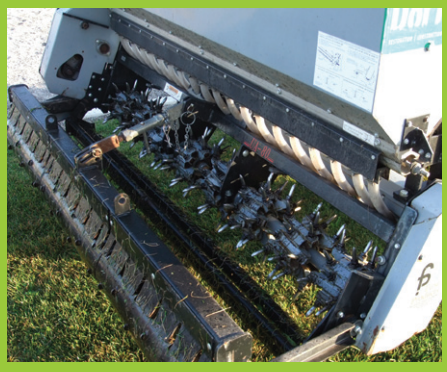
In addition to the aeration units, the Veemo did its best to remove thatch from the field.

The results were gathered by two different methods, Mechanical Penetrometer, and Triax GMAX tester.

For those unfamiliar with GMAX testing, this unit is used to measure surface compaction on synthetic turf fields.

Triax GMAX tester

IN JUNE AND AUGUST, EACH AERATION UNIT WAS TAKEN OVER THE FIELD IN A SINGLE PASS ON THREE PLOTS.

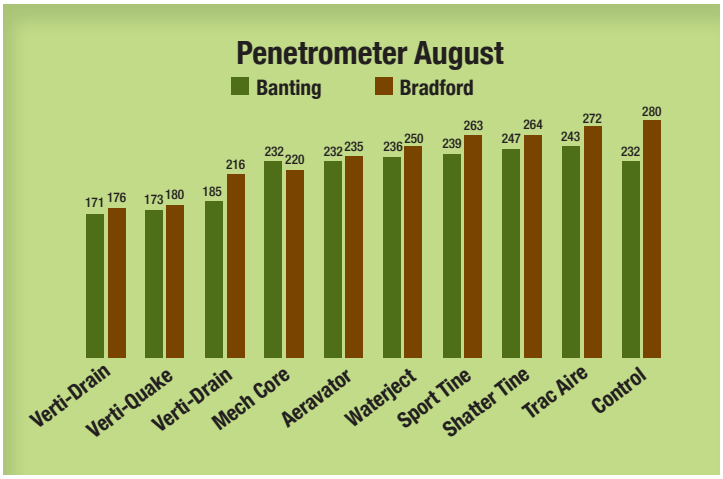


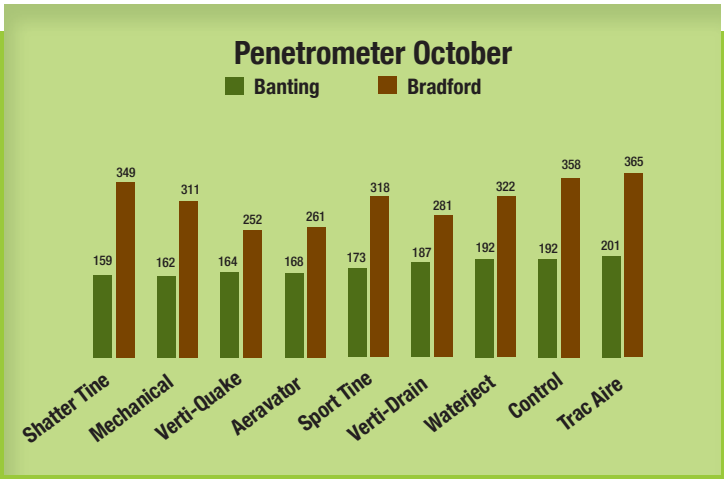
Releasing a 20 lb missile from a 24” height, the force is measured electronically, and provides a precise number showing compaction.

While GMAX measured compaction at the surface, the mechanical penetrometer measured soil compaction at a 4” depth.

First Year Results

- The established field with the higher organic matter content (Banting) had less compaction
- Lower moisture levels in the August measurement showed higher levels of compaction as compared to October
- Two methods of aeration consistently outperformed the rest, those being the Verti-Drain and Verti-Quake
- Differences in the two fields point to a higher organic mass percentage in the older field. •

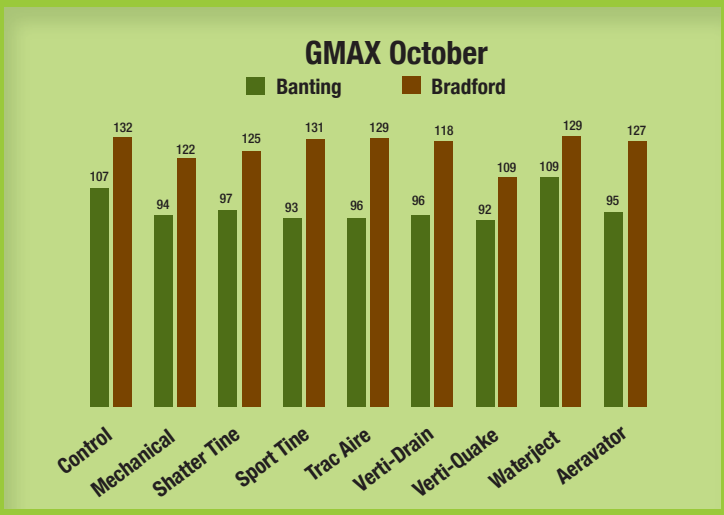




2012 WILL BE THE SECOND AND FINAL YEAR OF THE TRIAL.

Soil Profiles

These soil profiles taken after the dethatching provide graphic evidence of just how much thatch can be removed with such a unit. It is important to note that fertilizer should be applied immediately after to facilitate turf repair and restoration.



"SWEET FLOWERS ARE SLOW AND WEEDS MAKE HASTE"

WILLIAM SHAKESPEARE

Wasaga Beach Sports Park
Photo: Town of Wasaga Beach

OTS HIGHLIGHT
Presented February, 2012
Guelph, Ontario.

How to Influence the Sports Field Maintenance Budget

John Lohuis, MBA, CMM III

Why is this topic important? Securing budget resources for sports field and parks infrastructure and maintenance needs strong evidence-based arguments to warrant investment by decision-makers.

Current and Past Fiscally-Based Service Reviews

More than ever, in the midst of the European debt crises that influence government policies across the world, public and private organizations are reviewing their mandates, their scope of operations as fiscal resources become ever more stretched. The days of "silo-based thinking" and protecting budgets and resources solely for defined and specialized interests are coming to an end.

How can turf managers provide proof that their work provides "value for money"? Successive citizen reform movements and questions raised by California's "Proposition 13", the Ontario NDP's "Social Contracts and Rae-Days", the Ontario Conservative government's "Common Sense Revolution" and now even the frustrated 20-something's "Occupy Movement" frame some fundamental shifts in societal perceptions about services and trust in large multi-national corporations and government.

Parks services have enjoyed relatively high levels of citizen support in recent years. Consistently, parks and trails are considered to be amongst the most appreciated municipal services with citizen approval survey ratings topping 80-90%

THE DAYS OF "SILO-BASED THINKING" AND PROTECTING BUDGETS AND RESOURCES SOLELY FOR DEFINED AND SPECIALIZED INTERESTS ARE COMING TO AN END.

(Ref: polls by Environics, Pollara, and 2005 City of Calgary), equivalent to or higher than fire services, libraries and police services.

Moving to an Experience-Based Economy and Maslow's Hierarchy of Needs

Society has moved from an agrarian to the industrial/manufacturing age, then to a service-based economy, and now we may be moving into yet another phase, the "experiential economy", where citizens, beyond making a living through traditional means, want opportunities to "experience" a variety of opportunities accessible to them.

Maslow's Hierarchy of Needs reinforces the concept that beyond basic needs such as food, shelter, and clothing, society desires moving "up the hierarchy" toward self-fulfillment and expression of their ultimate desires. So how does this relate to turf budgets?

Parks, outdoor sports, trails and open spaces have many advantages in relating toward societal self-fulfillment and new experiences. They are generally accessible at the time and place an individual desires. People have an innate need for clean land, water, air and ultimately connection with the land and nature. In a world that is increasingly dominated by electronic gadgets and "smartphones holding

employees on a leash", a walk in the park, bicycling on a trail, taking your dog to a leash-free zone or enjoying a sunset vista and so many other choices can be available to offset obesity, boredom, social isolation and need for relaxation and to reconnect with your natural human rhythm. Properly designed, sports fields should not be considered single uses that bar regular citizens from access and spawn numerous physical infrastructure not necessarily in keeping with local citizen perceptions of quality spaces. Minimizing use of fencing but use of more natural features and barriers may assist in great multi-use capabilities and harmonization of objectives within shared active and passive park areas.

Capitalizing on the Natural Advantages of Parks, Trails and Public Spaces

So what are the kinds of "evidence-based investments" that may buttress requests for turf maintenance resources? People who go to outdoor spaces want an experience that is memorable to their own needs. Rarely can parks staff communicate the number of people visiting parks, when they do so and the value people place upon such visits. Recently infra-red installations can monitor numbers of visitors on pathways to begin to quantify park visitation *(Source: City of Mississauga, 30+ indoor and outdoor installations)* which allow departments to compare total visitation, cost and time of visitation.

Outdoor spaces have the advantage of changing seasons, exposures to nature, the ability to exercise while you are "multi-tasking" your senses! But what spaces become attractive to these desires?

For many years, the PPS movement *(Eleven Principles for Creating Great Public Spaces, The Project for Public Spaces, 2009)* confirmed that successful spaces that have a minimum of 10 different activities or areas of interest within eyesight, have a much higher rating of acceptance and quality. Framing of quality spaces requires the integration of skills amongst parks professionals that include parks/sports turf managers, horticulturalists, arborists and those invaluable parks staff that are "jacks of all trades" facilitating park uses for everything from small to large special events, concerts, picnics, tourism and intensive urban squares.

But how does the average parks professional gauge what are appropriate investments? Does the turf manager get a chance to speak to those who design parks and sports fields? Do turf staff work closely with horticultural and arboricultural staff to decide what kinds of experiences park and sports field users desire to the point that the human senses, seeing, hearing, feeling, tasting (food concessions) are brought together consciously to relate to meeting the desires of park, trail and specialty space users?

PEOPLE WHO GO TO OUTDOOR SPACES WANT AN EXPERIENCE THAT IS MEMORABLE TO THEIR OWN NEEDS

Find Out What Clients Really Want

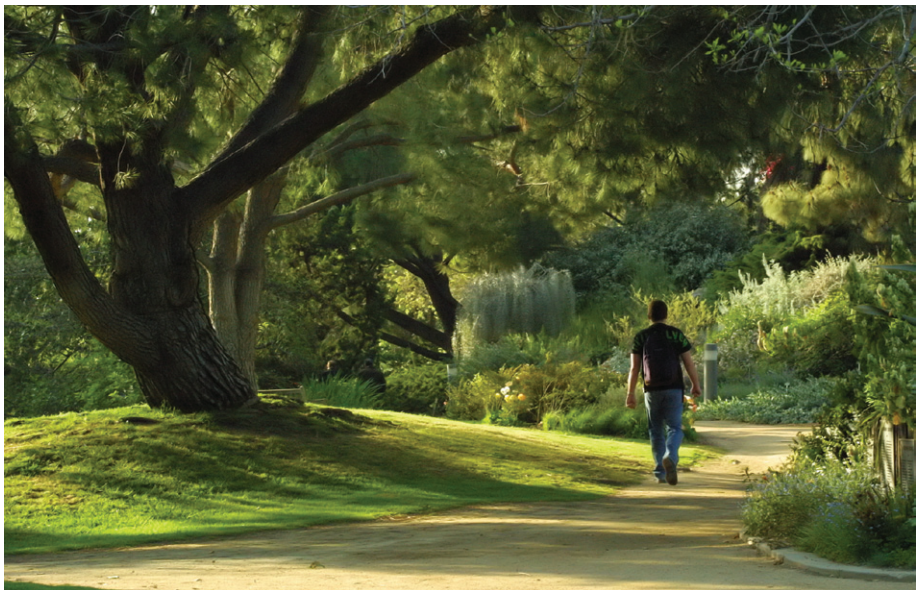
More than ever, parks and turf managers need to reach out to their clientele beyond the traditional user-paying sports groups, to ethnically-diverse populations, to varied age-groupings, to people of different incomes, and use research to ask the actual client what their experience was through a variety of means.

Elected officials have important and difficult jobs. Most of the time these officials want to be re-elected. Elected officials are less likely to cut services that receive detailed and positive feedback from constituents that their needs and wants are being satisfied.

So turf managers need to outreach to community groups or to clientele that they are paid to satisfy and meet the "physical cues" that are important.

In many places, parks may often feature one or two park benches, an under-used playground structure, fenced-in sports field, no pedestrian or trail linkages and little else to make a park "more public". Indeed, in such places, people on park benches are viewed with suspicion, as they must be vagrants, intoxicated or homeless to occupy such a place. Such "parks of desolation" are likely to be viewed as less safe, more forbidding and less valued by citizens.

Contrast that experience with parks that feature "place-making" philosophies ensuring with professional parks managers using multiple disciplines and all of the "toolkits" available to create and sustain outstanding quality parks. Such parks have variety of vegetation, healthy mature trees, attractive pedestrian and cycling options, spaces designed to encourage human



socialization, and feature water, texture, colour, natural features, smells and vistas, cultural and heritage interpretation and preservation and habitats for wildlife.

Park managers need to find ways to document how many users are in parks, using what features at what times. Find ways to ask users what they really value about various aspects of park spaces, trails and features. Link park best practices, benchmarking and continuous improvement to matching your ability to provide what people really want and gain partners who will advocate on your behalf.

Use the incredible example of busy urban spaces such as New York's Central Park which now uses a conservancy model to ensure that citizens in that city do not have to live in "concrete jungles" and can still have picnics, view wildlife, enjoy grass and shade of trees just a walk away from office towers, subways and intensified urban environments.

Ensure that your public parks and spaces emphasize natural and vegetative solutions that harmonize within a multi-use environment. Minimize situations that can be perceived as "ugly aging physical infrastructure – such as rusting sports field fences keeping non-sport users out". Gain the trust of a wider constituency by offering your services to community groups, set up open houses and invite citizens who would like to get back in touch with the land and may need your advice on good cultural practices.

Dr. John Crompton, distinguished professor at Texas A & M University *(Source: Repositioning Parks & Recreation – The Key the Field's Future Vitality: 2009 Video)* has documented that time after time, investments in quality parks, trails and trees more than offset such investments by increased property assessments, reduced crime rates, greater public presence and feeling of safety, respect and pride in parks by local neighbourhoods.

Parks professionals no longer should be perceived as "open space maintenance custodians". Natural turf, arboriculture and horticulture frame important public spaces and provide colour, texture, cooling and relief from hard surfaces, so prevalent in today's communities.

Full public and professional input to sustainable parks and open designs will move toward understanding and delivering upon what citizens really want and are willing to support financially. Parks staff need the voice of many "communities" to advocate the cause of quality public spaces, places and parks but that can only be done by parks staff willing to step out from rigidly-defined job roles and to get out there to find out what park users "really want". •

OTS HIGHLIGHT
Presented February, 2012
Guelph, Ontario.

Rhizomatous Tall Fescue and Regenerating Perennial

Rhizomatous Tall Fescue (RTF) and Regenerating Perennial Ryegrass (RPR) have been discussed quite a lot in the turf industry. There are three questions asked: 1.) What is RTF and RPR? 2.) Are they different from conventional tall fescue and perennial ryegrass? and 3.) Can they be used for sports fields?

Rhizomatous Tall Fescue (RTF)

Before we can look at RTF in sports fields, we need to examine tall fescue itself, because not all the tall fescue is the same. Tall fescue [*Festuca arundinacea* Schreber; or *Lolium arundinaceum* (Schreb.) Darbysh.; or *Schedonorus arundinaceus* (Schreb.) Dumort.] is actually a species complex of three different and distinct morphotypes. The three morphotypes are: 1.) Continental (CTF); 2.) Rhizomatous (RTF); and 3.) Mediterranean (MTF). Each of these morphotypes differs significantly morphologically, genetically, physiologically and geographically. It has been proposed that these hexaploid (2*n*=42) tall fescues evolved separately on the north and south sides of the Alps and Pyrenees Mountain Ranges. Part of this proposition is also based on the fact that there is often a lack of observed infertility between crosses of the three ecotypes.

Continental tall fescue (CTF) is the morphotype in which the majority of the turf and forage varieties originate. This northern morphotype evolved in Europe, mainly north of the Pyrenees and the Alps. The other two morphotypes (Rhizomatous and Mediterranean) evolved independently south of the Alps and Pyrenees Mountain Ranges. The southern ecotypes range from Iberia (Spain, Portugal), Northern Africa, and Italy. Also, the RTF and MTF harbor endophytes that are genetically, biochemically and morphologically distinct from *N. coenophialun* which is found consistently in the Continental (northern) ecotype.

CONTINENTAL TALL FESCUE (CTF) IS THE MORPHOTYPE IN WHICH THE MAJORITY OF THE TURF AND FORAGE VARIETIES ORIGINATE.

CTF is winter dormant, summer active, with or without short rhizomes (but inconsistently produces these rhizomes), and contains the *Neotyphodium coenophialum* endophyte. The ancestors of the Continental types are theorized to be *Festuca fenas* Lag. (syn.= *Festuca arundinacea* subsp. *fenas* (Lag.) S. Archang.) (2*n*=28) and meadow fescue (*Festuca pratensis* Huds.) (2*n*=14,28).

The Rhizomatous (RTF) morphotype is found mainly in the Pyrenee Mountains, northern Spain and Portugal. This morphotype is distinguished by the presence of longer and higher number of rhizomes (than either the Continental and Mediterranean ecotypes), summer and late fall active, more active in fall and winter than Continental morphotype in mild temperate climates, but less than Mediterranean morphotypes. The ancestors of the RTF morphotype are theorized to be a *Festuca* fenas-like species and meadow fescue, because the endophyte, morphology, distribution and physiology of the RTF are different from the Continental type. Also, the high degree of sterility often observed in progeny of crosses between RTF and CTF is an indicator that the ancestry of the RTF group is probably different from the Continental TF.

Joseph K. Wipff, Ph.D., Turfgrass Breeder and
Devesh Singh, M.S., Director of Research
West Coast Research Center, Barenbrug USA, Inc., Albany, Oregon

Ryegrass for Sports Fields?

The Mediterranean (MTF) morphotype ranges south of the Alps and Pyrenees, from Iberia (Spain, Portugal), Northern Africa, and Italy. This morphotype is distinguished by being winter active but lack of winter hardiness, summer dormancy, with or with short rhizomes (but inconsistently produces these rhizomes). Currently there are no Mediterranean types known to be used in turf. The few varieties of the Mediterranean ecotype commercially available are used for forage. The ancestry of the MTF is very different from the other two morphotypes (RTF and CTF), with the putative ancestors being even different species than those ancestors of RTF and CTF.

As mentioned, the Continental (CTF) morphotype is the group from which the majority of all turf and forage varieties originate. There are only a few turf varieties known to have been developed from the Rhizomatous tall fescue morphotype germplasm. The Royal Barenbrug Group has released 'Labarinth' (US 6,677,507 B2 patent) and the following varieties developed under that patent: Barspider, BAR Fa7676, BAR Fa 9125, and BAR Fa 9017.

Studies have demonstrated that the RTF morphotype makes significantly more rhizomes and longer rhizomes than CTF morphotypes, even on different soil

THE ANCESTRY OF THE MTF IS VERY DIFFERENT FROM THE OTHER TWO MORPHOTYPES (RTF AND CTF), WITH THE PUTATIVE ANCESTORS BEING EVEN DIFFERENT SPECIES THAN THOSE ANCESTORS OF RTF AND CTF.

Table 1. Number of Rhizomes per Tall Fescue Plant at two locations: Albany and Boardman, OR. 30 plants measured.

	Average
Labarinth	10.2
Kentucky 31+	1.0
Rebel II	0.9
Silverado	0.5
Bonanza	0.6
Shortstop	0.4
Bonsai	0.2
Rebel Jr	0.3

The LSD values for comparing two varieties within the same sampling period and two sampling periods within the same variety at 5% level of significance is 2.4 rhizomes/plant.

Table 2. Average Length* of Rhizomes per Tall Fescue Plant at different Sampling Periods (averaged across two Locations). 30 plants measured.

	Average (cm)
Labarinth	7.3
Rebel Jr	5.0
Silverado	4.8
Shortstop	4.6
Kentucky 31+	4.3
Bonanza	4.2
Rebel II	4.1
Bonsai	3.5

The LSD values for comparing two varieties within the same sampling period and two sampling periods within the same variety at 5% level of significance is 1.9 cm.
*Average data from only plants with rhizomes

types (Table 1 and 2). Rhizome studies have also be conducted on RTF and those CTF varieties that can produce some rhizomes. In one study nine varieties were measured: Labarinth (RTF); F1B (RTF); Blade Runner (CTF); Grande (CTF); Grande II (CTF); Titan (CTF); Titan LTD (CTF); Rendition (CTF) and Barrington (CTF). Twenty-five plants per replication (3 replications) were measured (75 plants per variety) for one year. The characters measured: 1) Number of rhizomes per plant; 2) percentage of plants with rhizomes (at least 1); 3) percentage of plants with more than one rhizome; and 4) average length of rhizome. The results showed that the RTF morphotypes made significantly more rhizomes (at least 20 times more than the CTF rhizomatous varieties), higher percent of plants with rhizomes and longer rhizomes (Tables 3, 4 and 5). The RTF morphotypes will continue to make rhizomes even when mowed as turf.

Since RTF and CTF are different morphotypes we can now ask the question of how the RTF morphotype does on sports fields. Studies have also been conducted on the use of RTF ecotypes on sports fields at the University of Illinois. One of the studies evaluated RTF®, CTF, and Kentucky bluegrass (KBG) sod under mechanical traffic simulations. The traffic machine is a modified Brinkman weighing ~2,000 lbs which

RTF HAS BEEN WIDELY BEEN USED ON SPORTS FIELDS IN USA AND CANADA.

applies both shear force and vertical compression to a depth of ~1/2 inch. Traffic was applied once a week with several passes per week for the month of August. The results were that intense traffic does reduce quality of all the entries studied, but that the RTF® + KBG and KBG sods were the best for traffic and the RTF® without KBG was as good as CTF + KBG. So, the rhizomatous tall fescue morphotype can be used in sports field situations. RTF has been widely been used on sports fields in USA and Canada. It has performed very well and users are re-purchasing RTF® as it performs for them. The root system and the rhizomes make a more stable rootzone on sand based sports fields. This means that less damage is done to those types of fields. RTF® is an asset for sand based sports field situations. For more information go to barusa.com.

Regenerating Perennial Ryegrass (RPR)
Stoloniferous perennial ryegrass
[*Lolium perenne* L. subspecies *stoloniferum* (Lawson) Wipff]

Regenerating Perennial Ryegrass (RPR) is a subspecies of perennial ryegrass that produces stolons. Stolons can be classified into two types: determinate- and indeterminate-stolons. A determinate-stolon is an above-ground horizontal stem which roots at the nodes and does not produce aerial shoots indeterminately, but the apical apex will eventually terminate with an inflorescence (e.g., referred to herein as *Lolium perenne* subsp. *stoloniferum*). An indeterminate-stolon is an above ground stem which roots at the node and from which shoots are produced progressively

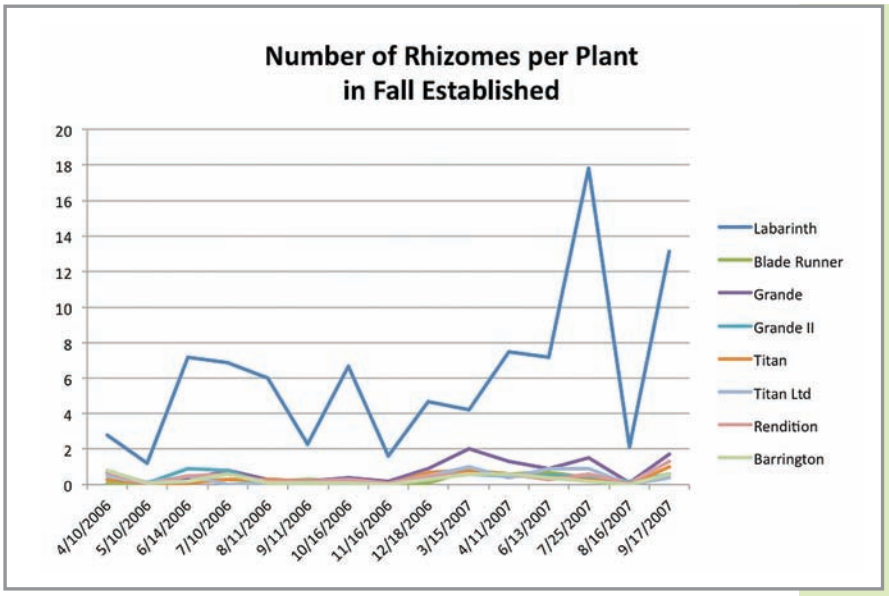


Table 3. Only Labarinth RTF® exhibited a significant number of rhizomes throughout year.

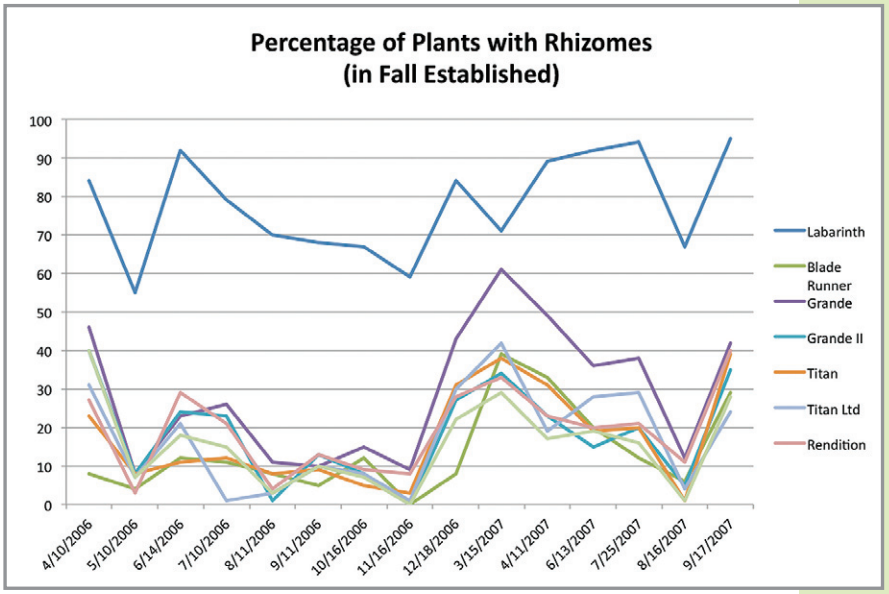


Table 4. Labarinth RTF® plants consistently exhibited greater rhizome production that the other varieties.

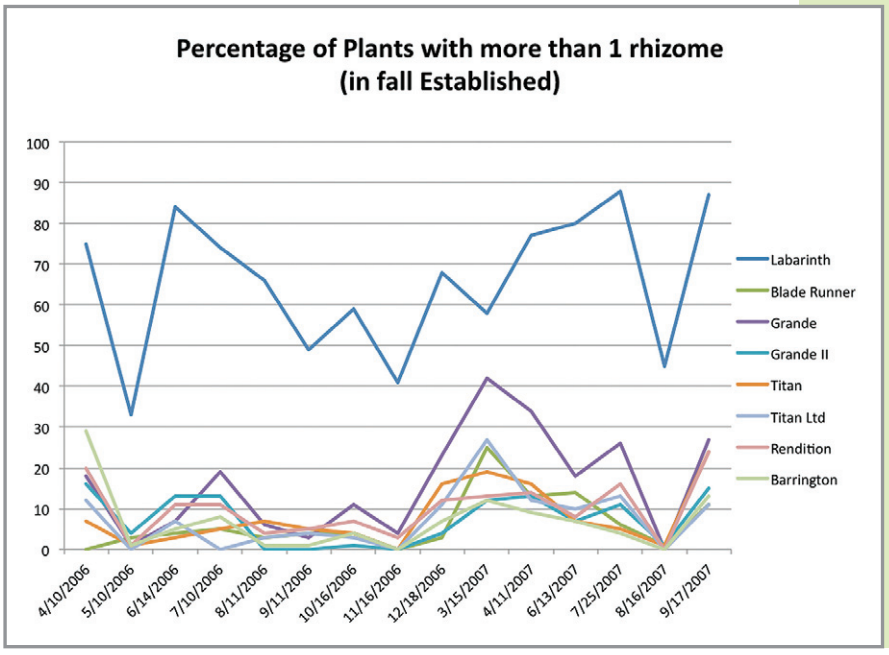


Table 5. Labarinth RTF® produces more rhizomes per plant that the other varieties.

and this horizontal stem will never terminate with an inflorescence, but apical apex remains vegetative (e.g., bermudagrass and creeping bentgrass). See Figures 1 and 2.

Perennial ryegrass is an important species for sports fields. Though perennial ryegrass is one of the most wear tolerant cool-season (temperate) turfgrasses available, the demand for more wear tolerance has increased due to increased use of sports fields, parks, golf courses, and recreational areas. Improvements in summer wear tolerance have been achieved previously indirectly by increasing shoot density. Winter wear on European sports pitches has been reduced partly by empirical evaluation of wear-resistance of ryegrass varieties using artificial wear machines with studded rollers and using those varieties most wear-resistant. These were only evaluations done on finished varieties to determine if some may happen to have some wear tolerance. However, no selections were performed and no new wear-resistant varieties were developed from these studies. Traffic simulation is mainly performed to evaluate the wear-resistance of already released cultivars (e.g., for athletic field research). So, traditionally, especially in the USA, traffic tolerance is only a characteristic determined once a variety has been commercially (or about to be) released, and not part of its developmental history. Whether a variety (not developed for traffic tolerance) has some traffic tolerance, is no indication that it can actually recover from traffic injury. In fact, we see that these varieties are not able to recover from the traffic damage. So, it is critical that perennial ryegrass being used on a sports field is bred from the beginning under traffic stress. Which is exactly the way the RPR, with a strong recuperative ability was discovered; under long term, intense, traffic stress.

The importance and benefit of RPR is only realized because it was developed under intense traffic stress. Subjecting millions of genotypes, for many years,

Figure 1 and 2. Regenerating perennial ryegrass is a subspecies of perennial ryegrass that produces stolons. Here, stolon of *Lolium perenne* subsp. *stoloniferum*.

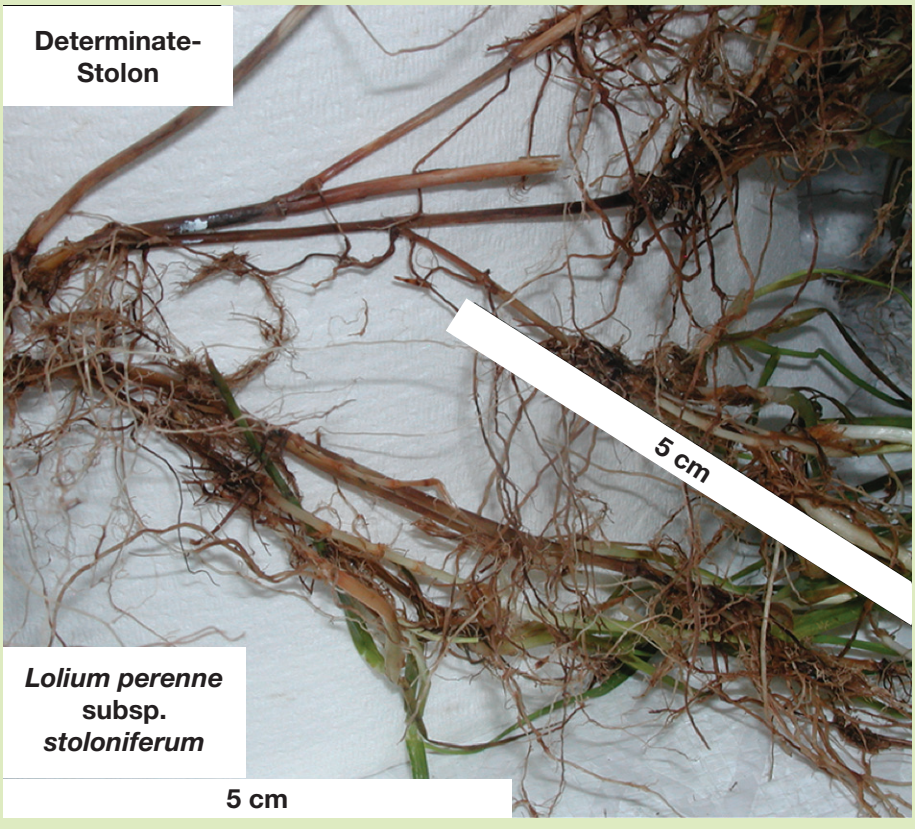


Figure 3. The RPR in traffic wear trial. RPR (right) and non-RPR (left).

to intense traffic wear reduced the population to approximately 3,000 initial selections. From these initial 3,000 selections only five populations of RPR were discovered. This type of selection not only translates into better traffic tolerance, but also positive recovery potential from traffic damage because of its stoloniferous habit. Our studies have shown that just because a ryegrass is stoloniferous, does not mean it can recover from an intense traffic event. What we found out was that only the stoloniferous varieties that were developed for traffic tolerance were able to recuperate from an intense traffic event. Though other ryegrass varieties can have some unintended traffic tolerances, they could not recover from the wear and actually have a negative recuperating potential (i.e. they don't recover.). This means that after the traffic simulation was completed, varieties were then studied for their ability to recuperate from the intense traffic wear, the varieties not developed for traffic tolerance actually continued to decline and did not recuperate from the traffic damage. Whereas, those developed under intense traffic selections protocols (i.e. RPR) did recuperate and in fact increased in coverage (Figure 3). As the turf canopy is opened up by traffic, RPR begins to produce stolons to fill in the open areas. This was first reported from research performed at The Ohio State University.

So, is RPR for sports fields? Yes, it was developed from day one for sports fields. RPR has been since day one mostly used on sports fields and golf courses with tremendous success. A lot of sports turf managers are sending feedback as to how much they like the performance and the wear tolerance of the RPR.

For more information visit barusa.com.•

A power screen for mixing of the soil and sand materials

Photo: ENVision-The Hough Group Limited

Preparation of a Sand: Soil Mix – Procedure and Pitfalls

R.W. Sheard, Professor of Soil Science (retired), University of Guelph

The construction of Category 1, 2 and 3 athletic fields, as outlined in the Sports Turf Association's *Athletic Field Construction Manual*, calls for a certain percentage of silt plus clay in the root zone. The site where the field is to be constructed may have an excellent top soil which the architect is reluctant to discard preferring to mix the existing top soil with sand to achieve the requirements of the category of field that is to be built.

Several points are necessary to consider in making the use of the in situ soil a success.

The first point is the sand and soil cannot be adequately mixed on site. Attempting to mix by layering the sand on the surface and rototilling it throughout the 30 cm depth of root zone will not be successful because the depth is beyond that workable by a rototiller and the sand will continue to be concentrated near the surface. The appropriate procedure is to strip the top soil off the site and stock pile it prior to mixing with the sand. The selected sand and appropriate volume of sand are then blended together by passing over a power screen. Stripping the top soil and the necessary sub soil allows the final grade to be established and the drainage system correctly installed.

The second point is the mixing must be based on particle size analysis of the sand and soil by an accredited laboratory. Standard dry sieve analysis must be done on the sand source and the particle size distribution should fall within the specifications as outlined in the *Manual*. The soil sample, however, must be analyzed by the standard procedure for soil texture which provides estimates of the percentage sand, silt and clay in the soil. During this

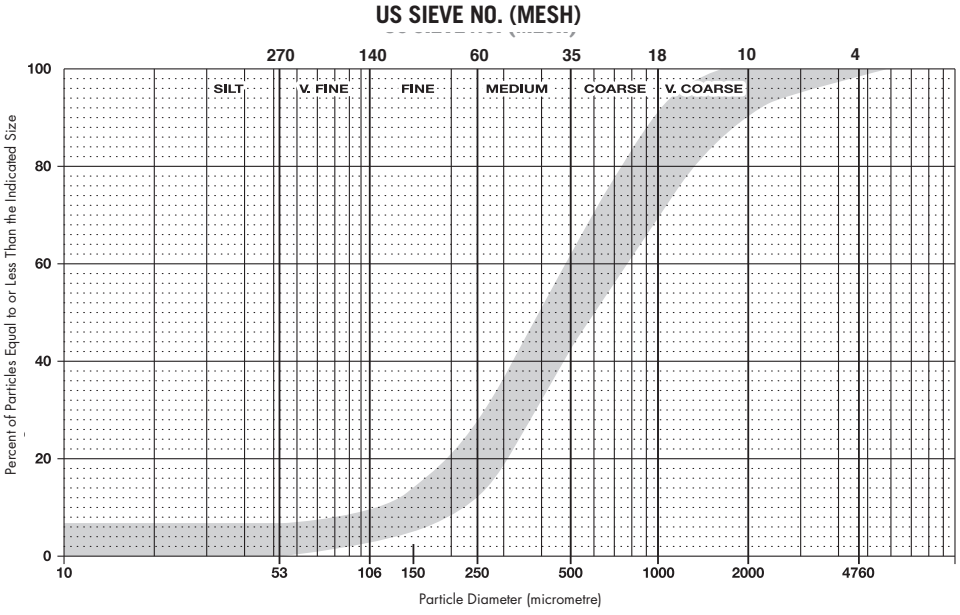


Table 1. The particle size distribution envelope for the root zone mix of a Category 1 athletic field. *Athletic Field Construction Manual*, Sports Turf Association, 2012.

procedure the aggregation or soil structure is destroyed so that all the individual soil particles are estimated. The use of the dry sieve analysis on the soil sample would result in high estimates of fine and very fine sand as the soil aggregates would appear in these size fractions. This is particularly true for soils which are well aggregated due to a high organic matter and/or clay content.

The laboratory should also be requested to do sieve analysis on the sand fraction in the soil using the same mesh sizes as used in the dry sieve analysis of the sand. The size distribution of the sand fraction in the soil should conform to that for the sand portion of the mix. Soils which are a fine sandy loam or a course sandy loam texture can result in poorly performing mixes if the sand in the soil makes up a large proportion of the total sand component of the final mix.

The third point is the volume of sand and of soil must be based on calculations using the data obtained from the laboratory analysis. The calculations use an iterative procedure which means repeating the calculations until the desired result is obtained.

The following example illustrates the iterative procedure.

Assume the soil sample has 77.4% sand and 27.6% silt plus clay and that the sand has 2.5% silt plus clay. In order to meet the requirements for a Category 2 field and to maximize available water assume the final mix should contain 20% silt plus clay and 80% sand.

For the first iteration assume a 1000 g trial mix is made containing 250 g of sand and 750 g of soil. The mix would have the following distribution of particles from the two sources.

- In the sand there would be 250 x .025 = 6.25 g silt + clay and 243.75 g of sand.
- In the soil there would be 750 x .276 = 207 g silt + clay and 543 g of sand.
- This would provide a mix with 213.25 g of silt + clay and 786.75 g of sand or 21.3 % silt + clay and 78.6% sand.

For the second iteration assume a 1000 g trial mix is to be made having 275 g of sand and 725 g of soil.

- In the sand there would be 275 x .025 = 6.87 g silt + clay and 268.13 g of sand.
- In the soil there would be 725 x .276 = 200.1 g silt + clay and 524.9 g of sand.
- This would provide a mix with 206.8 g of silt + clay and 793.0 g of sand or 20.6 % silt + clay and 79.3 % sand.

Realistically further iteration would be unnecessary.

In practice, the measuring of the two components to place in the mix is done by volume, not by weight. Therefore it is necessary to convert the above weights to volume which is done by multiplying the weight by the dry density of the material. The dry density of the stockpiled sand can be assumed to be 1.75 g/cm^3 and that of the non-compacted soil in a stock pile to be 1.1 g/cm^3. The volume of sand to use in a unit of mix would be 275/1.75 = 157 cm^3 and the volume of soil would be 725/1.1 = 659 cm^3. The volume ratio for the sand/soil mix would be 157:659 or approximately 1 part of sand to 4 parts of soil. The assumption of the densities of the two materials as they would appear in a stock pile is why further iteration calculations would be unnecessary.

It is interesting to note that most of the sand in the mix comes from the soil. This is why the particle size distribution of the sand fraction of the soil is a critical laboratory requirement.

The preferred procedure for mixing is with a front end loader and a power screen. Four buckets of soil followed by one bucket of sand would be passed over the screen. The power screen also has the advantage of removing stones and other debris which may be present in the soil from the site.

The architect should verify the particle size distribution of the mix by making a small trial mix of four pails of soil and one pail of sand. A sample from this trial mix is sent to the laboratory for regular particle size distribution of sand, silt and clay. The laboratory should be requested to do sieve analysis on the sand portion. This analysis is critical to determine if the sand in the soil approximates the particle size distribution required of the sand sample.

Some inexpensive laboratory analysis, a few simple calculations, power screen mixing of the determined ratio of sand and soil, and a root zone mix which conforms to the specifications of the STA's *Athletic Field Construction Manual* is ready to be spread on the field.•

The Sports Turf Association Publishes Second Edition of the

Athletic Field Construction Manual

GUELPH, ON. The Sports Turf Association announces the publication of the second edition of its popular *Athletic Field Construction Manual*, a staple reference for those in the sports turf industry.

The manual, written by Dr. R.W. Sheard in conjunction with an editorial committee of professionals, brings uniformity to the construction of grass athletic fields.

"The reputation of the first edition published in 2008 has led to its approaching out-of-print status", said Dr. Sheard. "Rather than simply reprinting, we took advantage of the opportunity to make subtle revisions to this edition".

The opening pages have been restructured to improve readability. Classifications based on the root zone material for categories three and four have been more adequately defined, as have the tolerances for grade control and depth of the stone layer and root zone material. Additional changes are of only a clarifying nature.

The second edition of the *Athletic Field Construction Manual* is now available for purchase in both print and electronic PDF format.

Visit www.sportsturfassociation.com to order your copy today!

Tom Margetts, Independent Soil and Turf Consultant, Innovative Agronomics Inc.

Evaluating Athletic Fields Through Agronomic Testing

You Can't Manage What You Don't Measure

Rushing an athletic field project without a true understanding of your goals and objectives can often times end in a disappointing result.

Too often athletic field construction is treated in this way. We meticulously generate and review tender documents and review contractor proposals without really considering the destination or how this new field will fit into our program.

Many fields already exist in the turf manager's inventory. Few inventories contain the necessary information to allow them to be placed in a realistic classification system. Such an inventory system should permit an evaluation of how each field fits into an overall use program.

There are many challenges when it comes to field turf management and "hours of use" is definitely at the forefront. The physical components (sand, silt, clay) of an athletic field root zone are directly related to its ability

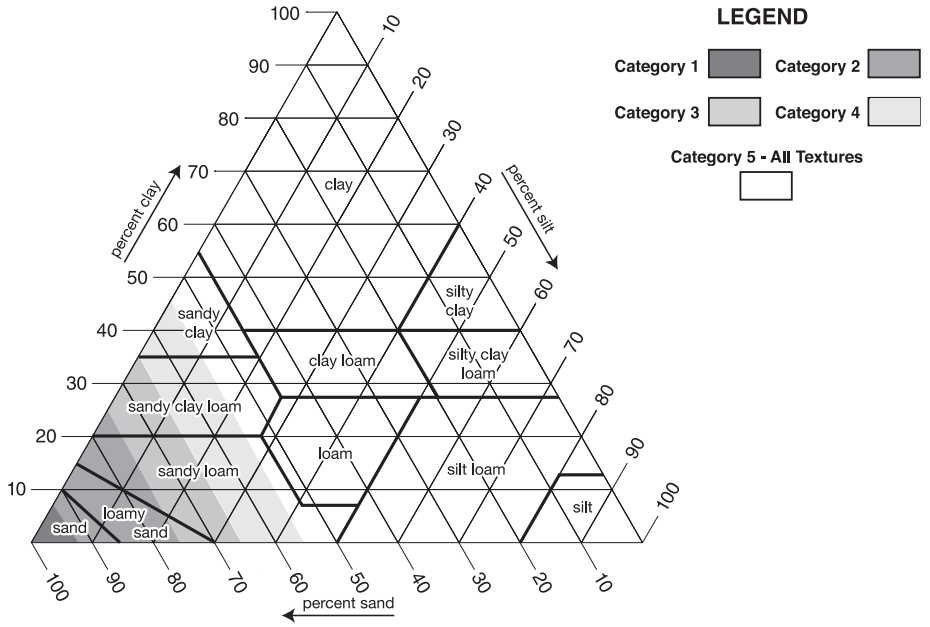


Figure 1. Use of the textural triangle to assign root zone soils to the field categories based on the particle size of the soil. *Athletic Field Construction Manual*, Sports Turf Association, 2012.

to withstand traffic and determine to a large degree its tolerable "hours of use".

The following discussion is geared towards information which can be gathered from existing fields for greater understanding of how to get the most out of the athletic fields you currently manage. "You can't manage what you don't measure" and now is the time to evaluate athletic fields to get a true understanding of what is realistic and what isn't. Agronomic testing strategies from an accredited laboratory can provide accurate information and allow making of the decisions required.

There are many components that go into an athletic field evaluation and placing the field in the appropriate category as defined in the Sport Turf Association's *Athletic Field Construction Manual* (Figure 1). Many of these can be determined and supported through independent laboratory testing and professional interpretation.

Physical Soil Testing

Understanding the physical components of the athletic field root zone will allow putting a program in place specific to the field's potential and limitations. Physical testing is a laboratory audit to determine the size of the particles that make up the root zone and the ratio in which they are found (Figure 2). The determination of sand, silt and clay with total silt plus clay can be related back to the field's:

- ability to tolerate traffic
- level of maintenance required
- recovery from rain events and inclement weather
- drainage capabilities
- potential for compaction
- ultimately determine tolerable "hours of use"

Each physical particle of the root zone has a size related to it. The ratio in which the different sized particles are found is

Brookside Laboratories, Inc.

**** PHYSICAL ANALYSIS REPORT ****

File Number : 53747
** Date of Analysis **
Start Date : 6/3/2010
Completed : 6/7/2010

Submitted By: Innovative Agronomics Inc. Reviewed by:

Lab Number 0578
Sample Description

1

Particle Size Analysis			USGA Specs
Clay <.002mm	%	5.3	<= 3.0%
Silt .002mm - .05mm	%	27.9	<= 5.0%
Sand .05mm - 2.00mm	%	65.3	
Gravel > 2.0mm	%	1.5	
Org Mat (360 deg C ash)		4.51	

Sand Fractions

Sieve Size #	mm		% Retained	
10 -	2.0	Fine Gravel	1.5	2.0mm <= 3.0%
18 -	1.0	Very Coarse Sand	3.4	2.0mm + 1.0mm <= 10%
35 -	.500	Coarse Sand	7.9	
60 -	.250	Medium Sand	18.4	0.5mm + 0.25mm >= 60%
100 -	.150	Fine Sand	15.4	0.15mm <= 20%
140 -	.106	Very Fine Sand	8.6	0.106mm + 0.053mm <= 5.0%
270 -	.053	Very Fine Sand	11.6	

Figure 2. Laboratory Physical Analysis Report

CATEGORY	PERMITTED DAYS	PERMITTED HR/DAY	PERMITTED HR/SEASON	CONSECUTIVE DAYS OF USE
1*	90	5	450	2
2	110	5	550	3
3	140	5	700	4
4	180	2.5	450	4
5	180	2.5	450	5

Figure 3. A guideline for the permitting hours of the five categories of athletic fields.
Athletic Field Construction Manual, Sports Turf Association, 2012.

BASICALLY, EVERY ASPECT OF A TURF MANAGEMENT PROGRAM SHOULD BE CONNECTED TO THE PHYSICAL MAKEUP OF THE ROOT ZONE.

directly related to the amount of pore space the root zone has. All root zones are made up of a percentage of capillary (micro) pores and non capillary (macro) pores. Sand based fields (Category 1) will have a high percentage of non capillary pores which allows them to be free draining, resist compaction and have a low nutrient holding capacity. This almost always translates into higher maintenance. Soil based root zones will have a higher percentage of capillary pore space that will hold water for a longer period and provide a more nutrient rich environment for turf growth.

Basically, every aspect of a turf management program should be connected to the physical makeup of the root zone. It requires knowledge of a field's ability to tolerate inclement weather in relation to drainage, how prone it is to compaction and its porosity. Physical testing and interpretation can provide these answers and can save both time and money in your turf programs.

Hours of Use

The physical components of the root zone are directly related to tolerable "hours of use". Most municipal athletic

lb/A

BROOKSIDE LABORATORIES, INC. 54581-5
SOIL AUDIT AND INVENTORY REPORT

Name _____ City _____ State _____

Independent Consultant Innovative Agronomics Inc. Date 5/19/2011

			QUAD 1 d 6 in FIELD 1	QUAD 1 d 6 in FIELD 3	QUAD 2 d 6 in FIELD 1	QUAD 2 d 6 in FIELD 3
Sample Location						
Sample Identification						
Lab Number			0517-1	0518-1	0519-1	0520-1
Total Exchange Capacity (ME/100 g)			14.04	15.68	15.36	14.10
pH (H_2O 1:1)			a 8.0	a 7.9	a 8.1	a 8.1
Organic Matter (humus) %			1.47	1.95	1.66	1.73
Estimated Nitrogen Release		lb/A	49	59	53	55
ANIONS	SOLUBLE SULFUR*	ppm	27	33	36	27
PHOSPHORUS	MEHLICH III	lb/A P as P_2O_5				
		ppm of P				
	BRAY II	lb/A P as P_2O_5				
		ppm of P				
	OLSEN	lb/A P as P_2O_5	23	23	9	18
		ppm of P	5	5	2	4
EXCHANGEABLE CATIONS	CALCIUM*	lb/A	4620	5014	4960	4464
		ppm	2310	2507	2480	2232
	MAGNESIUM*	lb/A	400	518	490	490
		ppm	200	259	245	245
	POTASSIUM*	lb/A	140	166	158	162
		ppm	70	83	79	81
	SODIUM*	lb/A	76	104	94	102
		ppm	38	52	47	51
BASE SATURATION PERCENT						
Calcium %			82.26	79.94	80.73	79.15
Magnesium %			11.87	13.76	13.29	14.48
Potassium %			1.28	1.36	1.32	1.47
Sodium %			1.18	1.44	1.33	1.57
Other Bases %			3.40	3.50	3.30	3.30
Hydrogen %			0.00	0.00	0.00	0.00
EXTRACTABLE MINORS						
Boron (ppm)			0.44	0.56	0.49	0.82
Iron** (ppm)			20	32	23	23
Manganese** (ppm)			< 1	< 1	< 1	< 1
Copper** (ppm)			1.29	1.58	1.36	1.37
Zinc** (ppm)			0.70	0.73	0.63	0.57
Aluminum (ppm)						
OTHER TESTS	Soluble Salts (mmhos/cm)					
	Chlorides (ppm)					

d - specific depth a - alkaline soil

* Ammonium Acetate Extractable (pH of 8.1)
** DTPA Extractable

Figure 4. Laboratory Soil Audit and Inventory Report.

fields experience high usage, potentially beyond their tolerance in relation to the maintenance program. Categorizing the athletic fields becomes very powerful information to deal with pressure from user groups, operating and capital replacement budgets. It provides the turf manager a tool to justify budget requests or defend how the conditioning matches quality.

For example, compare a sand based vs soil based root zone. *The Athletic Field Construction Manual* offers guidelines that indicate a Category 1 (sand based) field will tolerate 450 hours of use per season. The Category 3 (soil based) field will tolerate 700 hours of use per season (Figure 3).

This is where understanding the tolerable use is very important. Category 1 athletic fields are basically really big golf greens built to very tight specifications. They are designed to host a selected number of high level sporting events and be "game ready" quickly after inclement weather. They have a high amount of non capillary (macro) pores and can become unstable if the root matrix (tensile strength) is lost from the turf surface. This is not a situation a municipal turf manager needs to deal with in the middle of a busy season, without high inputs and resources.

Category 3 (soil based) athletic fields are the "work horse" of the bunch and have a better, well rounded soil structure. The Category 3 field has a good balance of capillary and non capillary pores for water holding capacity and adequate drainage. They will require less intensive maintenance and have the ability to withstand abuse under good preventative maintenance. However a soil based athletic field can be quickly destroyed if play or maintenance is allowed within a short period of time after heavy rainfall.

Root Zone Layering

Physical soil testing can also target layering issues within the root zone. Layering can result from inconsistent materials or on-site blending during the construction phase. Every time a layer is introduced in the root zone there is a reduction in the efficiency in which the soil drains and exchanges oxygen from the surface. Layering problems are also created as a result of improper topdressing material selection. The topdressing material should be compatible with the physical components of the root zone. Test the upper and lower portion of the root zone if layering is suspected and test the topdressing material as well. With professional interpretation this laboratory data can be brought together to determine the best corrective measures and topdressing program moving forward.

Incompatibility of sod is another source of root zone layering. This can occur from sodding during construction or ongoing repairs and renovations during the season. Sod with a finer soil component than the material below can create an unfavourable interface that holds water, promotes shallow rooting and creates a slippery, unsafe playing surface. Conduct physical soil testing to determine the sand, silt, clay and particle size analysis on your sod layer and compare it to the root zone material under it. You may be very surprised!

EXCESSIVE SOIL COMPACTION, POOR INFILTRATION AND OXYGEN CAN LIMIT THE BEST TURF PROGRAMS.

Nutritional Soil Testing

Proper soil chemistry is an important part of the success of a turf program. Independent nutritional soil testing can determine elements that are deficient such as phosphorus, magnesium, and potassium. They can also determine excessive values and strategies for reducing fertilizer inputs (Figure 4).

A soil test will not accurately measure nitrogen. Nitrogen is a very important component to turf growth rate and resiliency. Understanding the demand and reviewing past maintenance records will determine if Nitrogen rates are adequate. Testing frequency can vary; a client once said "If you are surprised by your soil test results, you likely aren't testing enough".

The Total Exchange Capacity (T.E.C.) of the root zone is a measurement of the root zone's ability to hold nutrients. This information will be found on most nutritional soil test results. Soil based root zones typically have a much different T.E.C. than sand based root zones. This information can assist the turf manager in determining how the elements should be applied in order to get the most out of the fertilizer program.

Compaction Testing

Excessive soil compaction, poor infiltration and oxygen exchange can limit the best turf programs. Athletic fields get used and they get used a lot! Research suggests that a root zone in excess of 300 psi taken from a penetrometer (compaction meter) will hinder root development. Aeration and cultural practices are extremely important in an athletic field program. Understand the root zone compaction at the surface and different interval depths. Subsurface compaction layers can go unrecognized without an evaluation with this type of equipment. The physical components of the root zone will be either resilient or prone to compaction. Over compaction from maintenance or use shortly after a rain event "squeezes" the soil particles together, destroys the soil structure and reduces the size and amount of pore space. As a result there is a loss in the balance of air and water creating a poor environment for root health. The result will be weak turf and the remedy will need to be deep tine aeration.

Summary

"You can't manage what you don't measure", so collect the information and make the necessary changes to your cultural management. Fit the information for each field into one of the categories described in the *Athletic Field Construction Manual* and establish a file of the data for each field. From this information establish the tolerable "hours of use", the maintenance required and the potential problems of drainage and compaction. •

OTS HIGHLIGHT
Presented February, 2012
Guelph, Ontario.

Figure 1. A broadcast application of granules containing *Phoma macrostoma* on research demonstration plots in Saskatoon.

Phoma macrostoma: An Update on the New Turfgrass Bioherbicide

K.L. Bailey, Agriculture & Agri-Food Canada, Saskatoon, SK
and S. Falk,
The Scotts Company,
Marysville, OH

For several years, the fungus *Phoma macrostoma* has undergone extensive evaluation by Agriculture & Agri-Food Canada and The Scotts Company to see if a bioherbicide could be developed to control broadleaved weeds in turfgrass. In 2009, the Summer issue of *Sports Turf Manager* reported on its discovery as a potential bioherbicide, and some of the research demonstrating its efficacy and crop safety.

Last June (2011), the Pest Management Regulatory Agency approved a conditional registration for *Phoma macrostoma* to be used domestically and commercially for control and/or suppression of weeds such as dandelion, scentless chamomile, English daisy, white clover, black medic, Canada thistle, chickweed, broadleaf plantain, and ragweed. The bioherbicide may be used safely on a variety of turf types such as Kentucky bluegrass, bent grass, perennial or annual ryegrasses, fescues, bromegrasses, timothy, and Bermuda grass.

CONTINUING RESEARCH HAS EXPANDED OUR KNOWLEDGE OF HOW THE BIOHERBICIDE WILL PERFORM IN THE FIELD.

The fungus is formulated into granules which may be applied to either newly-seeded or well-established lawns from a ready-to-use applicator for spot treatments or by broadcasting the granules as either pre-emergent or post-emergent applications. The product may be applied anytime from spring through fall, but it works best when the mean day time air temperature is hovering above 20°C (15-30°C range) and the soil is relatively moist. The product does not need to be "watered-in" but some precipitation or irrigation (up to 1-3 inches) within 24-72 hours after application would be beneficial particularly if the soil is not friable or moist.

Continuing research has expanded our knowledge of how the bioherbicide will perform in the field. Studies have shown that extreme moisture events around application will reduce the level of weed control attained, especially on sandy soils. The bioherbicide may be applied at the same time as commercial granular fertilizers which may result in a 10-15% enhancement in weed control.

Currently, *Phoma macrostoma* is undergoing scale-up development to be able to efficiently produce commercial quantities, thus a commercial launch is still a few years away. •

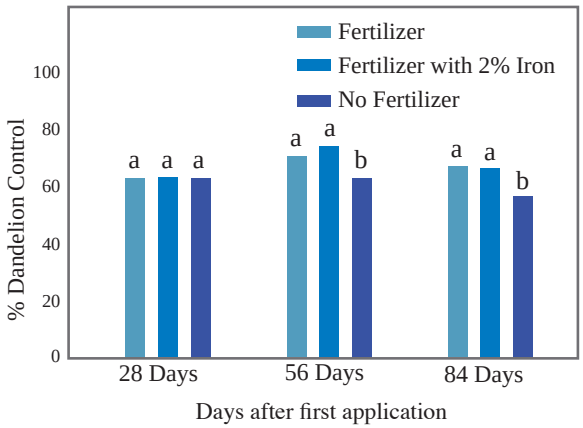


Figure 2. Granules of *Phoma macrostoma* were applied at the 1X rate with or without commercial fertilizer granules at Marysville, Ohio. The use of fertilizers with the bioherbicide improved weed control later in the season. (Different lower case letter show significant difference among treatments using an LSD test at P= 0.05.)

Additional Reading:
- Zhou, L., Bailey, K.L., and Derby, J. 2004. Plant colonization and environmental fate of the biocontrol fungus, *Phoma macrostoma*. Biological Control 20: 634-644.
- Bailey, K.L., Pitt, W.M., Derby, J., Walter, S., and Taylor, W. 2010. Efficacy of *Phoma macrostoma* a bioherbicide for control of dandelion *(Taraxacum officinale)* following simulated rainfall conditions. The Americas Journal of Plant Science and Biotechnology 4 (Special Issue 2): 35-42.
- Bailey, K.L., Pitt, W.M., Falk, S., and Derby, J. 2011. The effects of *Phoma macrostoma* on nontarget plant and target weeds species. Biological Control 58 (3): 379-386.
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Editor's Note: The referenced article in the Summer 2009 issue of Sports Turf Manager may be accessed online at www.sportsturfmanager.com/Publications/SportsTurfManager/Archive.

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