A CLOSER LOOK AT DOWNSVIEW PARK

Name, location of facility and general information. Downsview is a Canadian national urban park situated on 572 acres in the heart of Toronto. This multifaceted park, including the Downsview Park Sports Centre, offers 80 acres of indoor and outdoor sports fields and also caters to basketball, beach volleyball, squash, racquet ball, rock climbing and green go-carting just to name a few activities. We also house the Canadian Air and Space Museum and have a new 200 acre park with a 9 acre lake, trails, urban forest and urban agriculture in the construction phase. As part of our master plan, we are also developing five sustainable communities.

What types of sports fields are on site? Presently we have 2 artificial FIFA designed soccer fields, 1 CFL football/soccer field, 1 natural soccer field, 4 indoor fields (104'x165'), indoor floor hockey and 2 indoor beach volleyball courts.

How many employees are involved with turf care at this facility? We have a 4 person park maintenance crew who look after the sports centre facility and the rest of the park and 4 administrative staff who look after permitting and day-to-day operations of the Hangar facility which is part of the sports centre.

How many acres of turf are maintained at this facility? How many acres of sports turf? Maintained turf sits at about 250 acres. Of that, approximately 12 acres comprise our event centre, 40 acres our developing urban forest, 10 acres are sports fields and the remainder is under construction.

What percentage of this acreage is irrigated? Approximately 2% of the site administered by a two waterwheel type of irrigation.

What is the primary type of turfgrass? Name of varieties. We are using two mixes: 1) 25% Chicago II Kentucky bluegrass, 25% NuBlue Kentucky bluegrass, 35% J-5 Chewings fescue and 15% Top Gun perennial rye; and 2) 33% Top Gun perennial ryegrass, 33% Top Gun II perennial ryegrass and 34% Goal Keeper perennial ryegrass.

Is yearly overseeding part of your sports turf maintenance program? We began our overseeding program in 2009 using a slit type seeder. We seed both spring and fall and mid-season if needed.

How many times do you fertilize? As needed. We perform soil analysis throughout the season, but in general treat our sports fields and event centre 3-4 times, and general park areas once a year.

Do you aerate? Topdress? We have a heavy clay/loam soil and compaction is always an issue, so we aerate 4-6 times or more if needed. We try to topdress, but this usually only happens in localized areas.

The Pesticides Ban. Comments. Because we are a federal facility, we do not fall under the provincial ban. That said, we are working towards being a sustainable site and use little or no pesticides. The only chemical we do use (under 10L) is glyphosate. Over the past two years, we have been using and testing organic fertilizers, mycorrhizae and other natural controls and nutrients.

Are community user groups involved or have they been involved in the construction/maintenance of this facility? In what manner? We have regular meetings with the community and as needed ones for special projects.

How many hours per year are the fields permitted? Who permits them? Are the fields ever closed during the season to give them a rest? How much input do you have in the amount and timing of use? The Hangar Operations staff permit our facility with close to 9,000 hours on our indoor fields and 2,800 hours on our outdoor fields. We host over 150,000 event goers at our event centre.

Figure 5: Guelph Turfgrass Institute Irrigated Youth Soccer Fields (Photo: Peter Purvis)

Is Overseeding With Supina Bluegrass a Viable Option?

Kathleen Dodson, M.Sc., Dr. Eric Lyons, Dr. Katerina Jordan & Dr. Francois Tardif
Department of Plant Agriculture, University of Guelph

OTS HIGHLIGHT
Continued from our front cover.

and used as a turfgrass in Germany since the 1930s (Stier, 1998). The German name Lägerrispe, which translates in English to "where the cows lay," reflects the ability of this grass species to withstand tremendous traffic pressures and still thrive (Sorochan and Rogers, 1998). *P. supina* is a turfgrass that has fallen out of favour in North America mainly due to its lime green colour and numerous dark seed heads in the spring as both of these characteristics are at odds with the aesthetic needs of sports field managers (especially in the United States).

With the changing attitudes towards turf management, *P. supina* appears to be an ideal candidate for highly trafficked and shaded turf areas. Supina bluegrass' growth strategy is what ecologists refer to as a competitive-ruderal. Competitive ruderal plants have a high capacity for biomass production and can quickly fill in a disturbed area within the plant community (Grime, 1977). Supina bluegrass tends to grow laterally with a dense canopy, while also producing numerous seed heads that enter into the soil seedbank and colonize other disturbed areas of the field (Sorochan and Rogers, 1998). Its aggressive, stoloniferous growth habit, relatively late fall dormancy and early spring green-up make it an ideal candidate for competing with early germinating spring weeds. One such weed, prostrate knotweed (*Polygonum aviculare* L.) is becoming a more common weed on athletic fields in southern Ontario.

Prostrate knotweed is an annual weed that is typically associated with areas of high traffic and compacted soils. Due to its low-growing prostrate growth habit and patch-forming long stems, it can be a tripping hazard causing unsafe playing conditions. This weed is particularly dominant because it begins to germinate early just as temperatures start to increase in the spring. This is where supina bluegrass comes in as a potential competitor for germinating prostrate knotweed seeds.

Expense & Future Potential

Supina bluegrass is relatively expensive seed, with an average price of $12-15/kg ($25-35/lb), as most of it is produced only in Germany. It is a small statured plant and requires different seed production systems than the typical system of the Pacific Northwest of the United States where most of our grass seed is produced. Currently there are only two cultivars of supina bluegrass available on the market, but recent research from Pecettie and colleagues (2011) has led to the recent collections of new germplasm from the Italian Alps. These samples are currently being stored and classified for increasing the genetic diversity of this species. This means that there is hope for future cultivar choices that may be more drought tolerant, darker green and/or more affordable.

Overseeding Trials

Currently there are two studies underway examining the efficacy of overseeding with supina bluegrass at the Guelph Turfgrass Institute. The first is examining the idea of companion overseeding which would allow a turfgrass manager to fill in the bare spots of turf with a fast germinating species (PR), while still being able to add in a more wear tolerant but slower germinating species over time (supina bluegrass). The second study is looking at the viability of overseeding solely with supina bluegrass and comparing it to perennial ryegrass on in-use fields in southwestern Ontario.

Table 1: Characteristics of grass species that can be used for overseeding in Ontario. (?) = Unknown or more evidence needed

Characteristics	Kentucky Bluegrass (Poa pratensis)	Perennial Ryegrass (Lolium perenne L.)	Supina Bluegrass (Poa supina Schrad)
Traffic tolerance: established	High	Moderate	High
Traffic tolerance: seedlings	Poor	Moderate	(?)
Vegetative reproduction	Rhizomes	None	Stolons
Self-seeding	No	No	Yes
Germination speed	Slow	Fast – 1wk	Slow
Cost of seed	Expensive	Inexpensive	Expensive
Spring green-up	Cultivar dependant	Cultivar dependant (?)	Early
Dormancy	Late	Early	Late
Colour	Dark green	Dark green	Lime green
Temperature tolerance	Good	Susceptible	Good

Figure 1. The SISIS wear machine developed by SISI and STRI is equipped with cleats on rollers. The rollers have differential slip in order to tear the turf and cause cleat damage, similar to athletes playing. (Photo: Alex Porter)

Figure 2. Plots having received (A) no overseeding, (B) overseeding once at full rate (1x/season) and (C) overseeding at 1/3 of the rate (3x/season) on June 20, 2010.

Figure 3. Plots having received (A) no overseeding, (B) overseeding once at full rate (1x/season) and (C) overseeding at 1/3 of the rate (3x/season). Last seeding date was September 14, 2010. Photo taken on October 12, 2010.

The companion overseeding trial is evaluating five seeding rates, seeding frequencies, and height of cut in order to determine the optimum method of introducing and maintaining a field overseeded with supina bluegrass. Keeping in mind the current expense of supina bluegrass seed, creating an overseeding companion program may provide turfgrass managers with a viable way of overseeding with high amounts of seed to maintain a uniform field while introducing supina bluegrass into the turfgrass sward. The seeding rate of PRG was maintained constant while five different rates of supina bluegrass were used (Table 2). Comparison of the impact of overseeding once per year to overseeding the same amount of seed three times per year is also being evaluated. The trial is being maintained at two different heights of cut, 3.8 cm (1.5 in) and 7.6 cm (3 in), to determine the ideal height for playing fields overseeded with supina bluegrass. All treatments are being compared with a non-overseeded control at both mowing heights.

The overseeding rate trial is currently underway at the GTI research station. Traffic is applied with a SISIS wear machine (Fig. 1) to simulate six football games per week on the research plots. The plots are evaluated monthly for species composition, quality, colour and density.

Table 2. Overseeding rates of perennial ryegrass and supina bluegrass.

Seeding Rate	Perennial Ryegrass	Supina Bluegrass
1	6 kg/100m^2	0 kg/100m^2
2	6 kg/100m^2	0.5 kg/100m^2
3	6 kg/100m^2	1 kg/100m^2
4	6 kg/100m^2	2 kg/100m^2
5	6 kg/100m^2	4 kg/100m^2

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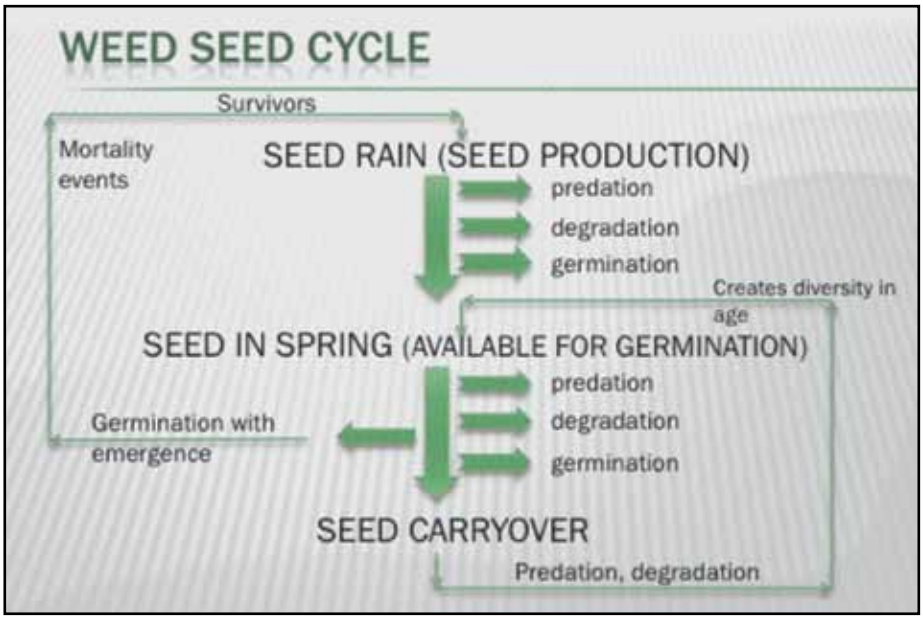
Figure 4. The weed seed cycle: green arrows represent potential seed flow patterns. Adapted from Buhler, D.D. et al., 1997.



Preliminary Results

Initial results indicate that overseeding does help with overall uniformity of the turf sward; however, frequency of overseeding seems to play a major part in maintaining that uniformity. One month after the first overseeding, the overall wear is more prevalent in the plots that received no overseeding. Plots that received overseeding had very little wear and mean turfgrass species counts of 99% (Fig. 2). What is interesting is that the three-time treatment at this point had only received one third of its scheduled seed total. However if we fast forward to the end of the season, the one time overseeding treatment has more wear and 96% turfgrass species coverage (Fig. 3). So the take-home message is that overseeding does work, but being able to do it more frequently would be more advantageous to the overall quality of the sward.

As turfgrass managers, we need to consider that our sports fields are part of a larger ecosystem. Nature provides a diverse array of plant species that may establish during a disturbance. If we can find a turf species that mimics a weed's strategy for establishing in disturbed areas, overseeding can allow the desirable species to compete with the naturally occurring weed seed in our turfgrass swards.

Looking at the weed seed cycle shows that weeds are such great competitors due to the fact that they typically produce large amounts of seed, including seeds that are able to carry over into future growing seasons (Fig 4.). Supina bluegrass is known for its ability to self-seed during its first two growing seasons. It is also able to dominate turfgrass swards within three years when seeded in proportions as low as 10% supina (Sorochan and Rogers, 1998).

Current evaluation of the soil seedbank of the overseeded rate trial plots are showing that overseeding with *Poa supina* does cause the seeds of this species to be stored in the soil at much higher rates than perennial ryegrass seed. This may indicate that during the upcoming spring there will be more opportunities for supina to become established in the field rather than the early germinating prostrate knotweed.

The second supina bluegrass study began September 2010 on the in-use soccer fields at the GTI (Fig. 5) and will be continued on other in-use fields in the surrounding area over the next two growing seasons. These trials will examine the feasibility of overseeding with supina bluegrass alone, and examine the viability of this kind of overseeding program in southern Ontario.

While the current research at the GTI is an exciting examination of a new overseeding opportunity for turfgrass managers here in southern Ontario, it is important to remember that until our research on this little known species is complete, using supina bluegrass is likely not your best option at this time. However, current research has shown that overseeding with the relatively inexpensive perennial ryegrass seed will continue to provide uniform, playable and safe athletic fields. It is also important to try to remediate some of the underlying conditions that lead to invasions of prostrate knotweed and other weeds in the first place – specifically compaction. Remember that there is no silver bullet in turfgrass management that will cure all problems, however with a combination of well-timed cultivation activities and overseeding we can still provide safe, green fields for our athletes both young and old to enjoy for years to come.

Written by Kathleen Dodson M.Sc., Dr. Eric Lyons, Dr. Katerina Jordan and Dr. Francois Tardif. Kathleen would also like to thank Dr Ken Carey and Alex Porter for all their help with her experiments thus far.

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SPECIES	SUPPLIER			
	Agrium Advanced Technologies (AAT Direct Solutions)	**Bishop Seeds**	**Graham Turf Seeds Ltd.**	**Ontario Seed Co.**
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Texas/Kent. Blue Hybrid	Bandera			
Poa trivialis	Darkhorse Pulsar	Bariviera	Maximum Sabre III	Sabre
Poa supina	Supernova		Supra Nova	
Poa compressa	Poa Reptans True Putt	Canada Blue	Reubens	Canada Blue Reubens
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Fescue: Blue	Azay Blue		SR 3200	
Fescue: Creeping Red	Mystic Shoreline Slender	Aberdeen Boreal	Audobon Boreal Crossbow SR 5210 SR 5250 Trapeze	Aruba Audobon
Fescue: Chewings	Silhouette	Ambassador Bridgeport II	J-5 Jamestown IV King James SR 5100 SR 5130	J-5 Jamestown II
Fescue: Hard	Bornito Spartan II	Chariot Heron Oxford	Aurora Ecostar Rhino SR 3100 SR 3150	Ecostar
Fescue: Sheeps	Azay Sheeps	MX86	Marco Polo Quatro	Marco Polo
Fescue: Tall	Crossfire II Mustang 3 Watchdog	Coronado Gold Fury Millenium	Grande II Darlington Talladega Toccoa	Arid III Inferno
Bentgrass: Creeping	Futura Fairway Futura Pro Penn A-4 Penncross Tyee	18th Green A-4 Penn A2 Penn G2 Penn T1 Penncross Penneagle Penneagle II Pennlinks Pennlinks II Pennway	007 Alpha Extreme 7 L-93 Penn A-4 Penncross Penneagle II Pennlinks II Penntrio Providence SR 1119 SR 1150 Tyee	Dominant Plus L-93 Penn A-4 Penn G-6 Penn Trio Penncross Coated Penncross Penneagle II Pennlinks II Pennway Providence T-1
Bentgrass: Colonial	SR7150	Highland	SR 7150	Highland
Bentgrass: Velvet	Greenwich		SR 7200	
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Texas/Kent. Blue Hybrid	Bandera	Bandera	DuraBlue Longhorn Solar Green SPF 30 Thermal Blue Thermal Blue Blaze	
Poa trivialis	Colt Darkhorse Racehorse	Darkhorse	Bariviera Laser Sabre III Sun-Up	Bariviera
Poa supina	Supernova		Supranova	
Poa compressa	Poa Reptans True Putt	Reubens	Reubens	Canada Blue
Ryegrass	Affinity Blazer 4 Cutter Cutter II Express II Fiesta 3 Fiesta 4 Quebec Shining Star Transist 2000	Exacta 2 Fiesta 4 Quebec	All*Star 3 Amazing GS Apple GL Gator III Grand Slam II HomeRun Keystone II Palace Presidio Primary Priority RPR Regenerating Stellar GL	Accent II Affirmed Barebeta IQ Passport Plateau
Fescue: Blue	Azay Blue		MX 86	
Fescue: Creeping Red	Boreal Garnet Jasper II SeaLink	Boreal Garnet Jasper 2	Boreal Cardinal Crossbow Florentine GT LiFine Navigator Seabreeze GT Trapeze Wendy Jean	Aberdeen Boreal
Fescue: Chewings	Silhouette Victory II Windward	Silhouette Windward	Bridgeport II Compass Jamestown IV Longfellow II Shadow II	Ambassador Bridgeport II
Fescue: Hard	Gotham Spartan II	Bornito	Aurora II Aurora Gold Chariot Hardtop Heron Rhino Ridu	Chariot Heron Oxford
Fescue: Sheeps	Azay Sheeps	Azay	Bighorn GT Quatro	MX86
Fescue: Tall	Bladerunner Crossfire Mustang 3 Team Jr.	Mustang 3	Avenger Coyote II Darlington Raptor II RTF Rhizomatous Sitka Spyder LS Tahoe II	Coronado Gold Fury Millenium
Bentgrass: Creeping	Cato Futura Pro Futura Fairways MacKenzie Mariner Penn A-4 Penn G-1 Penncross Pennlinks	Aggressor Pro Aggressor Tournament Declaration MacKenzie Penncross	Independence Memorial Penn A-4 Penn G-2 Penncross Penneagle II Pennlinks II Seaside II Shark	18th Green A-4 Penn A2 Penn G2 Penn T1 Penncross Penneagle Penneagle II Pennlinks Pennlinks II Pennway
Bentgrass: Colonial	Exeter SR 7150	Highland	Glory Highland	Highland
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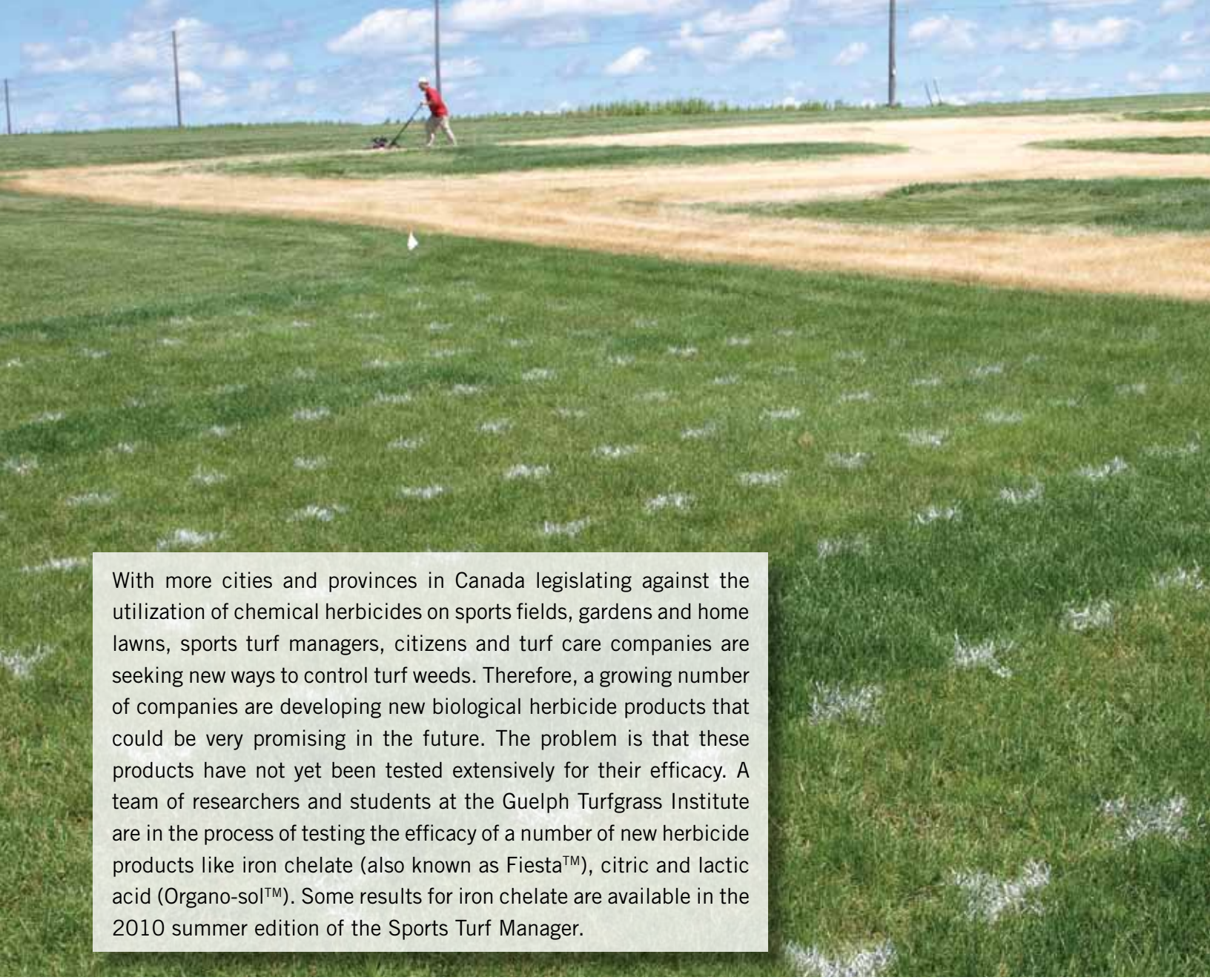

With more cities and provinces in Canada legislating against the utilization of chemical herbicides on sports fields, gardens and home lawns, sports turf managers, citizens and turf care companies are seeking new ways to control turf weeds. Therefore, a growing number of companies are developing new biological herbicide products that could be very promising in the future. The problem is that these products have not yet been tested extensively for their efficacy. A team of researchers and students at the Guelph Turfgrass Institute are in the process of testing the efficacy of a number of new herbicide products like iron chelate (also known as Fiesta™), citric and lactic acid (Organo-sol™). Some results for iron chelate are available in the 2010 summer edition of the Sports Turf Manager.

What is the Future for Corn Gluten Meal Based Products for Controlling Weeds?

Dr. François Hébert & Dr. Eric Lyons, Department of Plant Agric., University of Guelph

In 2010, we began a number of trials with the objective of evaluating the efficacy of corn gluten meal (CGM) and its liquid derivate (hydrolyzed corn gluten meal) as a pre-emergent herbicide. Corn gluten meal is the protein fraction of corn extracted from the wet-milling process and is used mainly for animal feed. Unlike Fiesta™ and Organo-sol™, CGM is not a new product on the market. In the early 1990s, scientific research found that CGM inhibited root elongation of many broadleaf weeds like dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), Canada thistle (*Cirsium arvense*), smooth crabgrass (*Digitaria ischaemum*), catchweed bedstraw (*Galium aparine),* curly dock (*Rumex crispus*), purslane (*Portulaca oleracea*), redroot pigweed (*Amaranthus retroflexus*) and giant foxtail (*Setaria faberi*). The solubility of this product was poor, which limited broad scale application due to the large amount of this product required to ensure efficacy[1].

OTS HIGHLIGHT
Presented February in Guelph, Ontario.

Researchers discovered that the protein fraction of gluten meal was responsible for the inhibition of root elongation of plants


Photo 4

Photo 1


Photo 2

Photo 1. Corn gluten meal, greenhouse experiment. **Photo 2.** Air sprayer, field experiments. **Photo 4.** Clover cover in the overseeding experiment. Notice the darker green colour in the gluten meal (2x) plots.

and decided to further develop the technology to increase its efficiency. They found that hydrolyzed corn gluten meal (HCGM), which is prepared with a proteinase from a bacterial source, had a higher inhibitory activity to the root growth of germinating seeds than CGM and is highly water soluble making it more adequate for a broad scale use. With new regulations, it is imperative to develop weed management alternatives for turfgrass managers in Ontario and this has renewed the focus on biological herbicides like CGM and HCGM.

A number of trials were implemented in 2010 to test the efficacy of both CGM and HCGM as a pre-emergent herbicide. We began with a simple greenhouse experiment to test the effect of those products on germination and survival of both weed and grass species. On the field, we wanted to test the efficacy of corn gluten meal and hydrolyzed corn gluten meal in a turf establishment and on an existing turf stand. For all the experiments we have tested two rates of both CGM and HCGM (label and 2x rate) and compared these products with a positive control (Bensulide) and a negative control where only water was applied.

Greenhouse Experiment

We found a significant decrease of survival rate after germination for all weed species for the CGM treatments, but there was no difference between application rates. Six weeks after seeding, survival rate and germination in the corn gluten meal treatment, compared to the control, was 58% lower for prostrate knotweed, 92% lower for dandelion, 74% lower for white clover and 85% lower for black medic. However, the low dissolution rate of corn gluten meal could have limited the physical space available for seed germination (Photo 1). For the hydrolyzed corn gluten meal, we did not find any suppressing effect. For grasses, neither product reduced survival rate after germination of grass except for Kentucky bluegrass (*Poa pratensis*) seeded one week after treatment application.

Grass Establishment

In the field, three grass species were seeded: Kentucky bluegrass, perennial ryegrass and a fine fescue mix (*Festuca spp.*) on a bare tilled and leveled area. Corn gluten meal was applied by hand and hydrolyzed corn gluten meal was applied with an air sprayer at a rate of 20 ml per second (Photo 2). We did two experiments, one in the spring and one in the summer of 2010. For the spring trial, we found a reduction of weed cover for the CGM treatment regardless of the amount applied for fine fescue. But even if the reduction was statistically significant, there was a

Researchers discovered that hydrolyzed corn gluten meal, prepared with a proteinase from a bacterial source, has a higher inhibitory activity to the root growth of germinating seeds than corn gluten meal and is highly water soluble.

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