

The *Sideline* Report

Iowa Sports Turf Managers Association

June 2011



The Table of Contents

3	A Letter from the President -Tony Senio
4	Athletic Field Traffic - Dave Minner, PhD - Andrew Hoiberg
6	Turfgrass Office Update -Jeff Wendel, CGCS
7	Avectra 101 - Membership Directory - Sarah Hodgson
8	Irrigation Audit Workshop
10	Understanding Your Soil - Brent Smith
12	Field Day is BACK!
14	Diamond Pro Baseball Workshop Recap - Troy McQuillen
16	Nutrient and Pesticide Losses - Gregory E. Bell - Kyungjoon Koh

**Publishing August 2011 Issue;
Articles and Advertisements are due July 1,
2011**

**For more information regarding articles and
advertising rates contact the editor.**

Sarah Hodgson, Sideline Report Editor

17017 US Highway 69, Ames, IA 50010-9294

Email: sarah@iowaturfgrass.org

Phone: 515-232-8222

Fax: 515-232-8228

Advertisers

United Seeds, Inc.	2
Golf and Sports Turf Service	3
River City Turf and Ornamental	3
Blue Grass Enterprises	5
Iowa Athletic Field Construction	6
Floratine Central Turf Products	10
Cover Sports USA	11
Turf Surface Athletics	11
Pace Supply	14
Bush Sports Turf	15
Covermaster	20

We would like to say thank you to all the companies that have placed an ad in this month's issue of the Sideline Report. Your support for the Iowa Sports Turf Managers Association is very much appreciated.

UNITED SEEDS INC.

Perfect in Any Field




Granted by the Crop Improvement Association, we are an approved conditioner to custom mix certified blue tag varieties to your specifications. For the highest quality certified Blue-grasses, Fescues and Perennial Ryegrasses for your sports field call us today!!

SURE SHOT™
Kentucky Bluegrass Blend



GRID IRON™
BLUEGRASS RYEGRASS MIX



ELITE SPORTS™
RYEGRASS/BLUEGRASS MIX



GRID BLUE™
KENTUCKY BLUEGRASS BLEND



5 Iron™
Perennial Ryegrass



1800 Dixon Ave
Des Moines, IA 50316
800-365-6674
www.unitedseeds.com

UNITED SEEDS INC.

A Letter from the President - Grass Grows By Itself

By Tony Senio



I've written about many things in this publication over the years; the greater meanings of life, my lack of hunting successes, the struggles of leading our church's youth group, the wisdom of cartoons, putting on winter weight, and of course the love affair with my snow shovel to name a few. Hopefully you've gleaned some entertainment from them. I doubt very much you've found them to be of any use. Regardless, I'm sure you've noticed that writing about soil tests, seeding rates and anything else that has to do with growing grass is not really my thing. The rest of the pages of The Sideline Report are filled with well-qualified writers on these subjects. I feel as though I'm qualified to do so, I just usually choose not to. Until today!

My quote of the day calendar on May 12 had this little nugget: "Sitting quietly, doing nothing, spring comes, and the grass grows by itself" - The Gospel According to Zen.

Ahhhh...Zen Master...That is deep. You just need a seed, a pinch of soil, a drop of rain and a ray of sun and you've got grass, right? Well maybe in Old Man Zen's yard - but in my 'yard' and in your 'yard' there are uniformed warriors of various skill levels, wearing shoes soled with metal daggers, wielding alloyed sticks and gloves made from the hide of a bovine. These warriors run at great speeds, changing directions suddenly, they jump, they slide, they twist and turn. They spend hours in our 'yard' almost everyday, in rain or drought, in the heat or the snow and when the sun sets and the meek return to their homes, these warriors use artificial light to continue their conquest well into the darkness. When the day's battle has ended and the warriors leave to nurse their wounds and recover, there we stand, left behind to make our 'yard' look like nothing ever happened, knowing full well that they'll be back again all too soon for another duel.

We'll give the Zen-Head partial credit. Grass may grow by itself, but we both know that as soon as you throw a user-group out there, you better grow better grass.

Finally to my point. If you're reading this that probably means you are an ISTMA member. If you're an ISTMA member that probably means you want to grow better grass. How do you do that? Reading this publication (other than my ramblings) is a good start. But the real learning, I believe, comes from attending the workshops - where you can see, feel and smell grass growing. You can talk to and interact with peers. You can ask questions and make new friends. Look, I'm not selling you anything here, this is a non-profit organization led by volunteers. I am trying to help you be better at your job. I'm trying to get you the most benefit out of your membership. We are already past one workshop this year. I learned more at that workshop than any other one I've been to so you missed out if you weren't there. You have two more chances this season. Don't miss out again!

One more grass quote for the road...

"I like it when a flower or a little tuft of grass grows through a crack in the concrete. It's so %@\$# heroic!" - George Carlin. Now that's Zen!

- *Deep Tine & Core Aeration*
- *Core Removal*
- *Topdressing*
- *Seeding*
- *Sod*
- *Chemical & Fertilizer Applications*
- *Reel Sharpening*
- *Athletic Field & Golf Course Renovation*
- *And Construction*

Golf & Sports Turf Service



(515) 570-4995
Watters Landscaping
LLC

www.gstsw.com

Dennis Watters, Owner



Dan Klindt

Seed
Fertilizer

Chemicals
Ice Melters

563-370-2515

dklindt@goldstarfs.com

Athletic Field Traffic

Manage the “field within a field” with “windows of opportunity”

Dave Minner, PhD, ISU Professor and Extension Turfgrass Specialist

Andrew Hoiberg, ISU PhD Graduate Assistant

This article was developed to address many of your specific requests dealing with excessive traffic on “multiple use fields” with fixed budgets. The recommendations can apply to many field use scenarios, but we developed the table specifically for high school athletic fields with fall football and spring soccer.

Develop an effective regrassing strategy in worn areas of intensely used football and soccer fields by strategically managing the “field within a field”. For a moment forget about the painted lines that mark out the field and simply look at the overly worn areas where the existing mat of grass has been removed and bare soil is exposed. Concentrate extra effort and resources into these intense use areas to restore the grass base. Worn areas between the hash marks, in the team bench area, and in the goalie box could range between 15,000 to 30,000 square feet for each field. Topdressing, seed, and fertilizer are the basic building blocks of any regrassing program. If you can’t afford them for the entire field then simply concentrate these vital components into the “field within a field” areas where they are mostly needed; about 1/3 of the entire managed field area. Any place that has less than 50% desirable turf cover, or more than 50% exposed bare soil, should be designated for more intense management. Many field managers are adopting the practice of higher than normal seeding rates and multiple seedings throughout the year and our research at Iowa State University supports this practice to speed cover in worn areas.

Because athletic fields are usually in high demand it is important to schedule maintenance around those ever vital “windows of opportunity” where you can make a difference. Listed below are some specific seeding, topdressing, and cultivation strategies to manage intense traffic areas with limited down time on the field.

High school football combined with spring soccer presents a difficult situation because traffic is being applied in the fall and spring during the best time for reestablishing grass from seed. High school stadium fields and multiuse fields often fall into this category because the only time when the fields are not being used is from June to late August. Basically this means that you are forced into a summer seeding program that is not the most favorable time to seed. So rip that page out of the text book that says not to seed in the summer and let’s adopt a different strategy. This one I call my “don’t be bare” strategy; any time that turf has been sufficiently worn to expose bare soil presents a good day to seed. And, in some cases seeding before the turf wears enough to expose soil may have benefits. Here are some seeding terms and strategies to put in your toolbox.

Dormant seeding – a late fall seeding usually applied in November well after frost has started and before the ground starts to freeze. This seeding is typically done in combination with aerification and topdressing as a means of “putting the field to bed” for the winter.

The idea is that this late seeding will not germinate until the following spring, late April through May. I’m often asked: “how late in the fall season should I wait to do a dormant seeding to be sure that the seed doesn’t germinate and then get killed by winter?” My answer used to be, wait until just before the ground freezes, and that could be near Thanksgiving. Our research showed that seeding anytime between September 20 and December 7 still resulted in successful establishment of turf by the following summer. The seeding period from October 15 to 30 had 20% less turf cover by the following summer but all the other seeding times resulted in 100% turf cover. Seed planted after October 1 usually does not produce emergence of visible plants. Our recommendation now for “dormant seeding” is to aerify, seed, and topdress as near as possible after your last football game in the fall; and that usually occurs sometime in November.

Cleating-in seed – broadcasting seed just before a game and letting the players “cleat-in” the seed was an old school method used before mechanical seeders and aerifiers were readily available. It still works today but we suggest that less than 40% of your annual seed allotment be planted by “cleating-in”.

Mechanical seeders – There is a wide selection of spiking, slicing, and aerifying seeders that are available so you won’t have to rely only on the “cleating-in” method. I prefer multiple methods for seeding throughout the year or used all at the same time. The Aera-vator solid tine machine and Triwave slicing machine are examples of heavy machines that insure seed is planted sufficiently through any existing turf and into the soil, especially on hard ground. If your equipment leaves seed on top of the bare soil, don’t expect it to establish. These machines can also be used during the playing season with minimal disturbance to the playing surface. To make the most out of your short “window of opportunity” consider using multiple seeding methods to ensure that every square centimeter of ground has a plant establishing in it. You just don’t have sufficient time to wait for grasses to spread and fill in. I like to also think about seeding at multiple depths or in layers. You don’t need to actually adjust your equipment for multiple depths. Seed planted in an aerifier hole is important because the crown develops below the soil surface in a protected chamber that is less likely to be trampled to death, but there is still a lot of space between the aerifier holes that still needs to be planted. Next use the slicer or drill seeder to plant grass in a dedicated channel that gives good seed to soil contact. But still there may be space left between the aerifier holes and the drill rows. Fill the rest of the space by broadcasting the seed and burying it with topdressing. Use two or all three of these seeding methods when you really want to produce fast coverage in a limited amount of time. The order is up to you, but I prefer to broadcast seed first, then topdress, then drill, then aerify, then drag, then fertilize; you’ll have grass coming from every direction.

- continued on next page

Suggested seeding and renovation strategies for intense traffic areas of fields experiencing traffic from fall football and spring soccer.

Date	% of total annual seed allotment	KB lb/1000 sqft	PR lb/1000 sqft	Topdress*	Seed Method	Comments
Apr	20		10		Cleat	Broadcast and cleat-in seed so that it will be in place as soil temperature increases.
May		2	10		Cleat	
Jun	20	2	20	0.25"	Aerify, drill, broadcast	Field closed, best time for reseeding. Split seed between multiple seeding methods. Broadcast half of seed, then drill seed the other half. Then topdress and drag to cover all seed.
Jul	(divot mix)				by hand	Mix 30 lbs of perennial ryegrass or 5 lbs of Kentucky bluegrass with 1.25 tons of sand to cover 1000 sq.ft. of divots.
Aug	30	3	30		Solid tine aerify, spike, drill seed	Use a seeding method to incorporate as much seed as possible without displacing existing turf plants. This is an important seeding time because it plants seed that will establish as the field begins to wear thin.
Sep	20	2	20		Broadcast seed and cleat-in	Broadcast seed with 0.5 lb Kentucky bluegrass or 5 lbs of perennial ryegrass before each of the first 4 games of the season.
Oct						
Nov	10	1	10	0.25"	Hollow aerify, drill, broadcast	Dormant seeding and topdressing puts the field to bed for winter. Field appearance at Thanksgiving will be the same at the start of the spring soccer season in April.
Total	100	10	100			

* Topdress material – use coarse sand or substitute half of the sand volume with compost. If a 50/50 volume mix of sand/compost is not possible then apply separately and use hollow tine aerator to mix materials together with soil.

Broadcast and Bury – as mentioned above this method is usually in conjunction with aerification. The main thing to realize is that seed left on the surface is seed that seldom establishes. Cover the seed with sand or compost. If your watering system is limited then compost will hold moisture and provide better germination.

Divot mix – Mix seed, sand, and compost to fill smaller areas of the field when mechanical seeding is not needed. This doesn't require any specialized equipment and it sounds labor intensive so many managers overlook this important method of maximizing turf cover. Mix 30 lbs of perennial ryegrass or 5 lbs of Kentucky bluegrass with 1.25 tons of sand to cover 1000 sq.ft. of divots. Divot mix can be used with pregerminated seed to speed germination during the playing season or used without pregermination when filling any bare spots during a good window of opportunity like June. Don Knock, the Athletic Director at Gilbert High school organizes the football team during summer weight training to fill divots in June and July. In about an hour 15 guys can hand deliver a pickup load of divot mix to fill those critical areas to insure that you start the season with 100% turf cover. He uses a Gator to shuttle 5-gallon buckets efficiently to a crew of muscles, shorts and flip flops. It's high school, so they make a game out of everything and question everything. In the end, the job gets done, the players take pride and ownership of the field, and for one hour they understand a little more about your job; how good is that.

We developed the following table below because many of you have a fixed seeding budget. Use our recommended annual seeding rates (lbs/1000sqft) or apply your own annual seeding allotment based on our percentages throughout the season. For example, if your annual allotment is 60 lbs of perennial ryegrass/1000 sqft, then multiply 60 lbs by 20% to get 12 lbs of perennial ryegrass seeded per 1000 sqft in June.



Blue Grass
Enterprises, Inc.

We are boldly confident our Master Blend Sod and our RTF® Sod will save you both time and money while giving you the best looking and best performing athletic field.

www.bgsod.com
319.842.2165

MASTER BLEND
KENTUCKY BLUEGRASS



Iowa Turfgrass Office Update

Jeff Wendel, CGCS

Thanks to everyone who supports the Iowa Turfgrass Institute, the Iowa Turfgrass Office and the Iowa GCSA, ISTMA and IPLCA. Your membership and event attendance is critical to the programs, public education efforts and to the very existence of these groups.

The following is a list of summer events, please mark your calendars! Thanks again to all who can support these events. For complete information visit: www.iowaturfgrass.org. You can click on the red 'Online Directory' link and then click 'upcoming events' in the left margin to register for these programs.

The Extension Fundraiser event is very important to Dr. Minner's effort visiting Turfgrass Managers across Iowa, it is an Iowa GCSA event, but benefits all Turfgrass Managers, so please get a team together and participate!

Iowa GCSA Extension Fundraiser

June 28th- Westwood Golf Course - Newton

Host Superintendent - Nick Cummins

Call 515-232-8222 for Hole Sponsorship Information

8:30 AM Registration

9:00 AM Shotgun Start

Lunch by Luke Dant, Syngenta Professional Products

GCSAA Cooperative Research Presentation - Dr. Minner, ISU

Cost \$50.00 Includes golf, cart, education and meal

This Workshop will prepare you to become a certified landscape irrigation auditor and includes the CLIA manual from the Irrigation Association. Open to all, but space is limited so register today.

ISTMA Irrigation Workshop

June 29 & 30 - Iowa State University

Host: Tim VanLoo, CSFM

Lynda Wightman, Hunter Industries

Train to become a Certified Irrigation Auditor

Field Day Classic

July 13th - Jewell Golf & CC - Jewell

Host Superintendent - Brian Abels

9 AM Education - Dr. Minner

10 AM Registration & Lunch

11 AM Shotgun Start

Dinner & Raffle following Golf

Tee Sponsors are **SOLD OUT** for this event.

Please call 515-232-8222 if you have items you can donate to the Raffle!

Turfgrass Field Day is back. This event is separate from the 'All Horticulture' Field Day held on July 19th, so get out and support the return of this event. Come out to support ISU and Drs. Christians, Jones & Minner. Call the Iowa Turfgrass Office if you are a conference exhibitor who is interested in display space at Field Day.

Turfgrass Field Day

July 21st - Horticulture Research Station - Ames

Host: Marcus Jones, PhD

8 AM Registration - Coffee & Rolls

9 AM Field Plots & Demonstrations

10 AM Optional Pesticide Applicator Training (additional fee required \$20)

11 AM Turfgrass Weed, Insect and Disease ID tour

12:15 Lunch

Cost is \$30

If you have trouble with online registration, please call the office at 515-232-8222 and we will help you get set up to use the online registration software. Also, remember you can access the secure sites from the Online Directory, just click on the link to the left titled either Iowa GCSA Secure Site or ISTMA Secure Site.



Sports Field Construction Sports Field Renovation Consulting and Field Design Infield Mixes Sod
Seed Top Dress Deep Tine Aeration Laser Grading Irrigation Drainage Native Soil Fields
Sand Base Fields Amend Soil Fields Base Builders Synthetic Turf Fields

iaathletic@iowaathleticfields.com

Phone: 515.832.7962 Fax: 515.832.4838



Finally there is no need to hang on to that pesky membership directory that is taking up space in your desk drawer. Iowa Turfgrass Institute is very excited about the new Online Membership Directory. This new feature will allow you to look up people within the associations and contact them when you are on the go or just sitting in your office.

To access the Online Membership Directory you can go to www.iowaturfgrass.org and click on Online Membership Directory highlighted in red, or go to the ISTMA homepage and click 'Manage your Membership'. The links will prompt you to sign in with your primary email and password. Please call the Turfgrass Office if you are having problems signing in. Once logged on, click either Individual Directory or Organization Directory tabs on the left hand side of that page. It will bring you to a page that will look similar to the picture.

From here you can make your search as specific as you would like it to be. If you type the % symbol into any of the available fields, it will bring up everyone in the directory in alphabetical order from all associations. If you would simply like to search for other ISTMA Members you can click the ISTMA box and then click search. Another nice option is you can make the search very specific to meet your needs. If you know you are going to be traveling to a certain town, you can simply type in the town name and search. It will then bring up Members from all the associations in that town. If you would only like ISTMA members from that town then also click the ISTMA Box before selecting search.

The Organization Directory works the same way just with some of the search options a little different. For instance, if you still have your Pocket Program from conference, you can type in a company's booth number into Conference Exhibitor Box. It will bring up information and a contact person for that company. Please remember that a company's profile will look different than individual profiles.

I encourage you to go to the Online Membership Directory and search around a little bit. Please also check to see if your information is correct. If it isn't you can go to 'My Information' and then to [[Edit Information](#)]. If you have a website that you would like to add please email me at sarah@iowaturfgrass.org and I will post it for you.

Sarah Hodgson

Turfgrass Irrigation

Auditing Workshop

Jack Trice Stadium, Ames, Iowa

June 29 & 30, 2011

The Iowa Sports Turf Managers Association is pleased to announce our summer 2011 Irrigation Workshop. The Workshop will be a day and half of irrigation teaching, training, and preparation to take the Certified Landscape Irrigation Auditor's test.

If you want to get ahead in Sports Field Management and show your employers and peers that you know how to get irrigation done right, attend this workshop on Auditing Your Irrigation System. Lynda Wightman, CLIA, Hunter Industries will be teaching the 1.5 day class, which will give you the knowledge you need to become a Certified Landscape Irrigation Auditor through the Irrigation Association. Achieving certification will:

- Increase your job opportunities (possible salary increase)
- Qualify you to become an EPA WaterSense Partner (more credentials for your field)
- Demonstrate your commitment to efficient water management

The ISTMA Irrigation Workshop will include the Irrigation Auditor's Manual from the Irrigation Association and study materials to prepare you to become a Certified Landscape Irrigation Auditor. Becoming certified shows two things as a Turfgrass Manager; you're the expert in irrigation and you're committed to water conservation.

The class will prepare you to:

- Collect site data
- Identify problems that cause poor uniformity
- Conduct a field irrigation audit
- Calculate uniformity
- Determine an accurate irrigation schedule

Classroom presentations coupled with an irrigation audit on Jack Trice Field; time to get wet and have fun!

Thanks to our Sponsors! Visit www.iowaturfgrass.org/events for registration information and more details. A complete list of sponsors and links to their websites is available on the ISTMA web pages.

You can register online at: www.iowaturfgrass.org/istmahome.htm or call 515-232-8222. Cost is \$50 dollars and includes workshop, breaks, Wednesday lunch and an Irrigation Auditors Manual from the Irrigation Association. Program runs Wednesday from 8 – 5 and Thursday from 8 – Noon.

ISTMA would like to thank the following Industry Partners in their support of this event



Commercial Turf & Tractor

Iowa Sports Turf Managers Association
Turfgrass Irrigation Auditing Workshop – June 29 & 30, 2011
Jack Trice Stadium - Ames, Iowa
Featuring Lynda Wightman, CLIA, Hunter Industries



The Iowa Sports Turf Managers Association invites you to a 1 ½ day workshop at Jack Trice Stadium on the Iowa State University campus to educate and prepare you to become a Certified Landscape Irrigation Auditor.

Day 1 – June 29th

8:00 Registration

Noon - Lunch

8:30 - 4:30 Program

- Learn the steps of an audit process
- Conduct audits (in real life!)
- Calculate a simple schedule using audit data
- Feeling overwhelmed with all of the new information

Day 2 – June 30th

8:00-12:00 Program

- Review the concepts of the first day
- Learn scheduling methods
- Calculate a complete schedule to be used in the controller
- Learn other methods of auditing for areas not specific to sports fields (smaller landscape zones)

Registration cost is \$50.00.

Includes: Registration, Irrigation Auditor's Manual from the Irrigation Association, and Wednesday lunch.

Hotel Reservations can be made at the Ames Holiday Inn (515-268-8808) or the Ames Hampton Inn and Suites (515-239-9999). Please mention you are with the ISTMA to receive a special room rate!

Registration Form

ISTMA Turfgrass Irrigation Auditing Workshop– June 29 & 30, 2011

Name: _____

Company: _____

Address: _____

City _____ State _____ Zip _____

Phone: _____

Email: _____

Registration Deadline is June 22, 2011

\$50.00 includes Irrigation Auditors Manual, Registration and Wednesdays lunch.

PAYMENT METHODS:

BY MAIL: PLEASE MAKE CHECKS PAYABLE TO: **Iowa Sports Turf Managers Association**
MAIL REGISTRATION & PAYMENTS TO: Iowa Turfgrass Office, 17017 US Hwy 69, Ames, IA 50010-9294

BY FAX: Credit card payment OR Purchase Order *ONLY*- Fax 515-232-8228

Type of Card: __Mastercard __VISA Purchase Order# _____

Credit Card # _____ Exp. Date _____

Card Holders Name (Please Print) _____

Signature _____

515-232-8222

jeff@iowaturfgrass.org
sarah@iowaturfgrass.org

Understanding your Soil?

Brent Smith, Floratine Central Turf Products

Like many things in life... How do you know where you want to go, if you don't know where you are? There are many aspects to our profession in Sport Turf Management that require periodic evaluation to determine if we are doing the correct things to better our playing surfaces and make sure we are getting the most 'bang for our available buck'. Soil testing is one of the 8 (or so) Key Elements to developing a successful Turf Management Program. It is always important to remember that we are only as strong as our weakest link. Proper management practices (watering, over-seeding, aeration, communication, ect.) other than fertility are just as critical to the success of any 'Program'. We spend a significant portion of our available budgets on fertility, soil amendments, wetting agents, and pesticides. The minimal cost of soil tests will more than pay for themselves in product savings through proper diagnosis of needed inputs.

Soil testing allows you to diagnose the factors that are reducing the plants ability to obtain its biological objective (production of proteins), and to prescribe a plan to compensate for the soil limitations. Some of the more advanced soil tests not only give you the soil nutrients, but give indications on Water Movement / Penetration, Nitrogen Release characteristics (to better time N applications) and so on, to better understand what is happening in the soil and therefore to make better educated decisions on what inputs are really needed.

As important as all this information is, it can also be overwhelming, confusing, and frequently misused. It is fair to say that virtually nothing reported, particularly on a soil analysis, is as simple as it might appear because every single item of information presented is inter-related with the other information. For example, Water movement (or Saturation Index) will have an impact on leaching of nutrients, but also is an indicator of gas exchange, which in turn has an impact on microbial activity... as you can see it can get confusing in a hurry. To complicate the matter the soil solution is an ongoing chemical reaction that is changing all the time. Every input (fertilizers, water, pesticides) has an impact and will affect all other aspects of the soil. An intelligent approach is to use soil testing with on-site physical observation to diagnose problems and prescribe short and long-term solutions to nutrient and soil limitations.

Two Rules of Essentials regarding nutrients: 1. Too little or too much will lead to problems with turf performance and/or death of the plant. 2. Nutrients must be soluble or available to the plant. To be soluble means that the nutrient is not bound to the soil particles (through compaction, chemical imbalance, pH, ect..) and the plant can access and utilize the nutrient. There are many factors that affect weather nutrients are available or not. Current soil testing methods can determine not only the nutrient content in the soil, but if it is available for plant use. It is also important to note that even if the availability of a given nutrient is considered good, the nutrient must be in proximity to the roots for the plant to absorb it. As root systems become compromised during summer decline, it may be necessary to adjust the depth at which samples are taken in order to look

at the soil medium in which the plant is growing. It will take the guesswork out of what type, how much, and when to apply fertilizer, soil amendments and wetting agents.

A great many solutions, particularly long-range ones, can be best determined from soil tests if some basic interpretation concepts are understood and reasonable intelligence is applied to the information. Remember: *First*, there is very often an enormous difference between soil-present and plant-available elements. *Second*, you are looking at the content and characteristics of the soil (and the plant), and they are both a complicated chemical reaction in progress. Every factor involved in this ongoing reaction is interrelated and interdependent. The sum total of all factors allows or limits the availability of vital nutrients and moisture to the plant. Over 95% of turfgrass problems are related to insufficient or excess nutrient and moisture. Along with the naked eye and some good 'common' sense, soil analyses are among the most valuable tools available for diagnosing these existing and impeding problems in plant strength and health.

Like I stated earlier... How do you know where you want to go, if you don't know where you are?

Any questions or comments feel free to contact me anytime.

Best Regards,

Brent J. Smith
563-210-1616
thestrongestturf@hotmail.com
www.floratinecentralturf.com



FieldSaver.® Save your field from rain and wear.



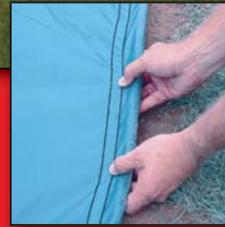
Full Field Tarps



Spot field tarps with grommets or weighted edge



Mesh Infield Protector System



Also in 6 oz. poly

FieldSaver® rain tarps are best-in-field for any field!

Special offers ONLY at www.CoverSports.com/ISTMA

For price quotes, sizes and fabric specs, visit www.CoverSports.com/ISTMA

sales@coversports.com • 800-445-6680 • www.coversports.com



We make covers for all athletic surfaces

#1 Conditioner On America's Most Playable Fields

TURFACE ATHLETICS™

Visit www.turface.com to find:
NEW Heritage Red
Training and field
maintenance tips



Find us on
Facebook
facebook.com/Turface

For Product and Distributor Info: 800-207-6457 Or visit www.turface.com

Iowa Turfgrass Field Day Program

July 21, 2011

Field Day is back! It will be held at the ISU Horticulture Farm in Ames, Iowa. Coffee, donuts and Lunch will be provided. PAT will be offered with an additional cost.

Field Day registration \$30

Field Day registration plus PAT \$50**

** PAT is not offered at a stand alone rate of \$20. Must be purchased with a Field Day Registration

8:00 am Registration (coffee & donuts)
8:45 am Introduction - Registration Tent

GCSAA Certification
Application has been made for GCSAA
Education points.
Check www.iowaturfgrass.org for details.

Time	RED- PAT	BLUE	WHITE
9:00	Please attend either Blue or White Tour. PAT will begin promptly at 10:00 You must sign in for the Pesticide Training!	NCR Bentgrass - Dr. Christians	Summer Seeding - Andrew Hoiberg
9:15		Natural Fertilizers - Quincy Law	Moss, Worms & Algae - Dr. Minner
9:30		Herbicide Study	Apps for Turfgrass Mgrs - Dr. Jones
9:45		Fertilizers/Traffic Study - Andrew Hoiberg	GPS Sprayer - Tim VanLoo, CSFM
10:00	Drift & Non Target	Repeat - NCR Bentgrass - Dr. Christians	Repeat - Summer Seeding - Andrew Hoiberg
10:15	Pesticide Stewardship	Repeat - Natural Fertilizers - Quincy Law	Repeat - Moss, Worms & Algae - Dr. Minner
10:30	Right of Way - Dr. Hartzler	Repeat - Herbicide Study	Repeat - Apps for Turfgrass Mgrs - Dr. Jones
10:45	Phytotoxicity - Dr. Minner	Repeat - Fertilizers/Traffic Study - Andrew Hoiberg	Repeat - GPS Sprayer - Tim VanLoo, CSFM
11:00	Turfgrass Insect, Weed & Disease ID Tour		
12:15	LUNCH		

* Blue and White Tours repeat starting at 10:00am. Please feel free to switch from Blue to White at 10:00am or mix and match talks to fit your interest between 9 and 10 and join PAT at 10:00am. The Turfgrass Insect, Weed & Disease ID Tour will include Red, White and Blue Tours.

** **To receive PAT credit an extra fee of \$20 will be applied to the \$30 registration fee for Field Day.** Please attend the Blue or White Tour talks from 9 to 10 and join the RED-PAT tour at 10:00.

Iowa Turfgrass Field Day

July 21, 2011 - Registration

Company Name _____

Address _____

City _____ State _____ Zip _____

Phone Number _____ Fax Number _____

E-Mail _____

Field Day Registration Fee Includes lunch	\$30.00
Field Day Registratin with PAT** <small>** PAT credit WILL NOT be given unless the extra \$20 fee is paid</small>	\$50.00

Field Day Registration: Please list names of all attendees.

Name	PAT? - Add \$20	Name	PAT? - Add \$20		
_____	Yes No	_____	Yes No		
_____	Yes No	_____	Yes No		
_____	Yes No	_____	Yes No		
_____	Yes No	_____	Yes No		
_____	Yes No	_____	Yes No		

Register Online at: www.iowaturfgrass.org/events.htm
Number Attending _____

Donation to Turfgrass Research _____
 Total Cost _____

Payment Methods

Please return this form along with payment.

Make checks payable to: Iowa Turfgrass Institute

Return form and check to: Iowa Turfgrass Office • 17017 US Hwy 69 • Ames, IA 50010-9294

FAX Credit Card or Purchase Order: 515-232-8228

Purchase Order: # _____ Check: # _____

Credit Card Type: Mastercard Visa

Credit Card # _____ Expiration Date _____

Card Holder's Name _____ Signature _____

Contact Information

Iowa Turfgrass Institute jeff@iowaturfgrass.org	515-232-8222 sarah@iowaturfgrass.org
--	---

ISTMA Burlington Bees Baseball Workshop

Troy McQuillen, Kirkwood Community College

The ISTMA presented their first of three workshops for the 2011 season at Community Field in Burlington IA home of the Burlington Bees. T.J. Brewer CSFM hosted the day's activities by welcoming the 58 participants. T.J. presented a brief history of the ballpark, informed all participants about the day activities, and introduced the day's speakers.

Tom Burns- a well respected grounds keeper and now with Diamond Pro as a sales/professional consultant began the day discussing the many ways to set-up infield skin materials for baseball and softball fields. Tom with the help of Jesse Cuevas - longtime groundskeeper from Rosenblatt baseball stadium presented some advice for selecting, maintaining and customizing different skin materials. Tom and Jesse had many tips about pre-game and post-game skin maintenance along with the importance of water management for skin materials.

The day continued with skin maintenance suggestions from legendary sports turf manager and professional George Toma. George shared some historical perspectives of preparing skins, and how far skin materials and maintenance have come from the earlier days on baseball field preparations. Jesse Cuevas shared with the group more skin maintenance practices for preparing big events along rain delays. George Toma and Jesse all shared with

the group the many skin prep tools and machines that are beneficial in preparing all different types of skin materials. The speakers encouraged the attendees to try some of these practices at their own facilities and see how they benefit their maintenance practices. Attendee Paul Swafford stated "This first workshop was very informational and well worth my time. I learned a lot such as the difference between vitrified and calcined clay conditioners along with the tips for the types of dirt available for your field"

Prior to lunch George Toma shared a presentation about his life's experiences as a groundskeeper. George had many images that described his unique methods behind preparing some of the worlds professional fields. George captured images from Super Bowls, Olympic stadiums, college bowl games, world cup soccer, and many baseball events. George's unique experiences gave the audience a perspective to how things have changed over the years for groundskeepers.

Following lunch it was back to the Tom and Jesse show where the afternoon was focused on mound reconstruction, mound maintenance, and mound materials. Tom and Jesse shared common problem areas with mounds and what turf managers can do to help make repairs more efficient.

Next, Iowa Sports Turf managers Michael Murphy and John Newell discussed with the group how they prepare sports fields for multiple levels of play. Both presenters brought a great perspective about their specific facilities and what level of maintenance goes into each field.

The afternoon agenda continued with T.J Brewer discussing some of his fundamentals for keeping the turf healthy on his baseball field. T.J shared his philosophy of yearly soil testing to see exactly what nutrients are needed for maintaining healthy turf throughout the growing season. T.J also stresses his success with an aggressive aeration program, and how he manages turf wear areas. George Toma piggybacked on T.J.'s presentation discussing some of his successful experiences with turfgrass management.

To finish-up the day Steve Bush and company for Bush Sports Turf Company presented the latest in GPS technology for sports fields. Steve gave the group a preview of the laser equipment available in the industry, then followed-up introducing the latest in GPS technology.

Steve also introduced the newest in technology with his "Rover" This machine can survey a field's surface and relay it back to GPS software to make the adjustments necessary to provide the most accurate playing surface. T.J Brewer had the following comments "What a great day. We had great weather and an awesome lineup of speakers! If everyone else took away at least half as much as I did then we all learned a lot. I would like to thank everyone for taking the day to visit my facility and learn from some of the best! It was great to see all of you. I would like to thank our sponsors: Agrium

Pace Supply

TURF & LANDSCAPE

Your one source for Turf, Landscape, & Sports Field Products

YOUR LOCAL AUTHORIZED

DEALER



EFFECTIVE, EFFICIENT, PORTABLE.
Put water where you need it, on any sports field!
1-800-396-7917
www.pacesupplyia.com
pacesupply@southslope.net

Advanced Technologies, B&D Enterprises, Bush Turf, Floratine Central Turf Products, Pace Supply, PZAZZ Resort Hotel, Syngenta, TurfWerks, and World Class Athletic Surfaces! I would especially like to thank Diamond Pro for all they did providing for a successful day! I would also like to thank all who spoke at the event: George Toma, Tom Burns, Jesse Cuevas, John Newell, Michael Murphy, Steve Bush, and B&D Enterprises for their renovation of our mound.”

The ISTMA would like to Thank T.J Brewer for hosting yet another successful workshop. Please register for ISTMA’s next workshop at Iowa State University June 29th, and 30th. Registration and workshop details are posted at www.iowaturfgrass.org/istmahome.htm



DESIGN SERVICE
CONSULTING
FIELD CONSTRUCTION
IRRIGATION & DRAINAGE
FIELD RENOVATION

BUSH

SPORTS TURF

877-787-2676

SportsTurf
MANAGERS ASSOCIATION

WWW.BUSHTURF.COM

The advertisement features a large, stylized image of a baseball stadium with a baseball game in progress. The text is overlaid on the image, with the company name 'BUSH' in large, bold letters. The background shows a wide view of the field and stands.

Nutrient and Pesticide Losses Caused by Simulated Rainfall and Sprinkler Irrigation

Gregory E. Bell and Kyungjoon Koh

SUMMARY

We collected simulated rainfall runoff and sprinkler irrigation runoff simultaneously from bermudagrass turf managed as golf course fairway for two years, 2006 and 2007. Automatic samplers were used to collect runoff from four research plots, 20 feet wide by 80 feet long (6 by 24 m) on a 5% slope. The samples were collected in 5-minute intervals during runoff from four simulated rainfall and irrigation events and tested for nutrient (N and P) and pesticide (flutolanil, 2,4D, and chlorpyrifos) losses. Chemical losses in runoff from 90 minutes of precipitation applied 24 hours after nutrient and pesticide application and 48 hours after soil saturation were low compared with the amount of fertilizer or pesticides applied. The type of precipitation, simulated rainfall or sprinkler irrigation, used to produce runoff had no effect on fertilizer or pesticide losses.

- Pesticide and nutrient losses from bermudagrass turf were low compared with the amount applied.
- Pesticide and nutrient losses from simulated rainfall did not differ from runoff losses caused by sprinkler irrigation.

Research in crop production and turfgrass has identified grasslands, turfgrass stands, and grass buffer strips as impediments to nutrient and pesticide transport in runoff (Cole et al, 1997; Gross et al 1990, 1991; USEPA, 1997). Dense grass stands have unique characteristics that encourage water to infiltrate soil and impede and filter runoff (Easton et al, 2005; Moss et al, 2005). Research has also demonstrated that the runoff-reduction characteristics that naturally occur in a dense turfgrass stand are not sufficient to prevent the substantial runoff caused by major storm events (Bell and Koh, 2009).

Urban turfgrasses are usually managed to provide relatively high aesthetic and functional value. Maintenance applications of fertilizers and pesticides required to satisfy consumer expectations followed by major storm events can result in unsatisfactory product transport to surface water features. Normally, surface runoff from turf has little environmental impact (Cohen et al, 1999). However, because maintenance applications of nutrients and pesticides are required to maintain color and density at commercially or socially acceptable levels, there is a danger that some portion of a recent nutrient or pesticide application may combine with surface water runoff and flow into adjacent water features.

Nutrient Runoff

An important environmental hazard caused by nutrient runoff is eutrophication (Daniel et al, 1998). Low levels of nitrogen (N), mostly in the form of nitrate (NO_3^-), and dissolved reactive phosphorus (DRP), including H_2PO_4^- , HPO_4^{2-} , and PO_4^{3-} , can cause algal blooms resulting in a loss of oxygen in surface water. This process is called eutrophication. Eutrophication is responsible for the “dead zones” in the Mississippi Delta and the Chesapeake Bay as well as numerous lakes and other water features throughout the world. At least one

state, Minnesota, has passed legislation that restricts the application of phosphorus fertilizer to turfgrass (Rosen and Horgan, 2005). Nitrate in surface water at concentrations as low as 1 ppm (part per million) may lead to eutrophication (NOAA/EPA, 1976). High NO_3^- levels in drinking water are also a human health hazard. The United States Environmental Protection Agency (USEPA) has established a drinking water standard of 10 ppm for NO_3^- -N (USEPA, 1976).

Generally, about 99% of the phosphorus (P) in soils is unavailable for plant growth (Brady, 1990). Fertilizers are thus important as a source of plant available P. Most inorganic fertilizers, however, are highly soluble and if not properly applied, increase the risk of P loss to surface runoff (Gaudreau et al, 2002).

Dissolved reactive phosphorus can contribute to eutrophication at concentrations as low as 25 ppb (parts per billion) (Burton and Pitt, 2002) and is typically the limiting factor for eutrophication of surface water (Sharpley et al, 2000).

Nutrient transport in surface runoff is affected by factors including rainfall or irrigation amount, intensity and duration of rainfall or irrigation, soil moisture, soil texture, slope, fertilizer application rate, and fertilizer formulation (Easton et al, 2005).



Pesticide and nutrient losses from simulated rainfall did not differ from runoff losses caused by sprinkler irrigation.

Pesticide Runoff

Pesticide loss from turf depends on factors such as pesticide chemical properties, soil type, turf species, thatch, application timing, and weather conditions (Easton et al, 2005; Raturi et al, 2003). Pesticides may be transported to surface water through runoff or eroded sediment. Cohen et al. (1999) analyzed water quality data from eighteen studies on golf courses in the United States and one study in Canada. Thirty-one pesticide chemicals were detected in surface waters, nine exceeded maximum allowable concentrations for aquatic organisms, and five exceeded maximum contaminant



Nutrient transport in surface runoff is affected by factors including rainfall or irrigation amount, intensity and duration of rainfall or irrigation, soil moisture, soil texture, slope, fertilizer application rate, and fertilizer formulation.

levels for drinking water. The average concentration of the pesticides ranged from 0.07 to 6.8 ppb. Transport of pesticides such as 2,4-D [(2,4-dichlorophenoxy) acetic acid], dicamba (3,6-dichloro-2-methylphenoxy-benzoic acid), and mecoprop [(±)-2-(4-chloro-2-methylphenoxy)-propanoic acid] in runoff from turfgrass can be significant if the soil is saturated and rainfall duration and intensity is high (Smith and Bridges, 1996). Smith and Bridges (1996) for instance, found that 9, 14, and 13% of the applied 2,4D, dicamba, and mecoprop, respectively, from hybrid bermudagrass [*Cynodon dactylon* (L.) x *C. transvaalensis* Burt-Davy] during four simulated rainfall events over an 8-day period, was lost to runoff. Researchers have concluded that the greatest mass and concentration of pesticides in runoff from a turf area occurs during the first significant runoff event after pesticide application (Cole et al, 1997; Smith and Bridges, 1996; Ma et al, 1999) and that the amount of pesticide loss is primarily related to its solubility (Smith, 1997).

Turf as a Deterrent to Runoff

Krenitsky et al. (1998) compared natural and man-made erosion control materials and turfgrass. They found that tall fescue (*Festuca arundinacea* Schreb.) sod was an effective material for delaying the start of runoff and decreasing total runoff volume. Gross et al. (1990, 1991) studied nutrient and sediment losses from turf and found that turfgrass alone (without buffers) effectively reduced nutrient and sediment losses compared with bare or sparsely vegetated soil. Linde and Watschke (1997) found that sediments in runoff were low even after vertical mowing of creeping bentgrass (*Agrostis stolonifera* L.) and perennial ryegrass (*Lolium perenne* L.) turf. Wauchope et al. (1990) investigated pesticide runoff from bare soil plots compared with grassed plots and determined that the bare plots required one third less precipitation to produce the same amount of runoff and yielded twice as much sediment as the grassed plots.

Harrison et al. (1993) determined nutrient and pesticide concentrations in runoff from sodded Kentucky bluegrass (*Poa pratensis* L.). Plots were fertilized with N, P and K in a maintenance program typical of golf course turf in the northeast United States. Irrigation at rates of 3 inches per hour and 6 inches per hour for one hour was applied one week prior to and two days following fertilizer applications.

The researchers reported that nutrient concentrations in runoff remained low throughout the experiment and generally were no higher

than the concentrations found in the irrigation water. However, the N concentrations in runoff were as high as 5 ppm and dissolved P concentrations were as high as 6 ppm. Both N and P nutrient concentrations were above those that can cause eutrophication of surface waters. The researchers concluded that under the conditions studied, nutrient runoff from established turfgrass areas was low due to low runoff water volume and was not affected by establishment method.

Gross et al. (1990) studied nutrient and sediment loss from sodded tall fescue and Kentucky bluegrass plots. The plots were sodded on land that was previously cropped to tobacco (*Nicotiana tabacum* L.). Slope at the site was 5 to 7%. Plots were fertilized with either urea dissolved in water as a liquid application or urea as a granular application at a rate of 4.5 pounds N per 1000 square feet per year. Control plots were not fertilized. Nutrient and sediment losses were low for all replications. The researchers concluded that nutrient and sediment runoff from turfgrass areas is low, especially when compared with the previously cropped tobacco runoff study. Gross et al. (1991) studied runoff and sediment losses from tall fescue stands of various densities under simulated rainfall conditions. Plots were established at seeding rates of 0, 2, 5, 8, and 10 pounds per 1000 square feet in September 1986. Simulated rainfall was applied at intensities of 3, 4, and 5 inches per hour in June 1987. The highest runoff volume was observed from the non-seeded plots at each of the rainfall intensities applied. Runoff volume was not statistically different among the seeding rates. The researchers also recorded visual quality, density, and tiller counts. They concluded that even low-density turfgrass stands can significantly reduce surface water runoff from well-maintained turfgrass areas.

Kauffman III and Watschke (2007) studied phosphorus and sediment runoff from creeping bentgrass and perennial ryegrass following core aeration. They concluded that the DRP concentrations found in the runoff and the minimal soil erosion that occurred should not be considered a serious threat to surface waters. When turfgrass is healthy and dense it is an effective deterrent to off-site transport of nutrients and pesticides in runoff. Easton et al. (2005) reported that the establishment of turfgrass on bare soil increased soil infiltration by more than 65% over a two-year period. As shoot density increased, infiltration rate increased and runoff decreased. Nonetheless, turfgrass sites can contribute to nutrient and pesticide losses to surface water in concentrations greater than recommended. It is the turfgrass manager's responsibility as environmental steward to practice management techniques that limit runoff transport of potentially dangerous nutrients and pesticides. We used a rainfall simulator and typical sprinkler-type irrigation system for turf to create runoff and measured runoff losses of nutrients and pesticides to determine how much product was lost to runoff during a severe precipitation event. We also wanted to determine if the two precipitation systems differed in the amount of nutrients and pesticides lost to runoff, and whether or not the application rate of the products caused a significant difference in the amount product lost.

- continued on page 14

Nutrients and Pesticides Losses continued

Experimental Methods

This research was conducted on the Oklahoma State University Turfgrass Runoff Research Site, Stillwater, OK on a Norge silt loam (fine-silty, mixed, active, thermic Udic Paleustolls) with an infiltration rate of less than 0.5 inches per hour. The runoff site was divided into whole plots of event containing subplots of simulated rainfall and sprinkler irrigation replicated twice. The subplots (simulation and irrigation blocks) consisted of two experimental units each that measured 20 ft (6 m) wide with a uniform 5% slope that measured 80 ft (24 m) long. The site was graded and sodded with 'U-3' bermudagrass in the summer of 1998 and has been used for runoff research since 2000. An in-ground sprinkler-type irrigation system (Photo 1) that delivered a precipitation event of 1.61 inches per hour (41 mm h⁻¹) was used to force runoff on the irrigation plots. A rainfall simulator (Photo 2) designed after the Coody-Lawrence patented system (Coody and Lawrence) and adjusted for peak sprinkler performance by Mark Carroll at the University of Maryland (Carroll et al, 2006) was used to supply simulated rainfall at 1.51 inches per hour (38 mm h⁻¹). The simulator system consisted of S3000 pivot spinner sprinkler heads (Nelson Irrigation, Walla Walla, WA) suspended on gooseneck risers attached to 3 in (76 mm) aluminum pipe supported by a steel superstructure (Photo 3). Our irrigation system could not supply sufficient water to operate the irrigation system on two plots and the simulator system on two plots simultaneously so the simulator was supplied with water through a fire hydrant fed from a reservoir by gravity flow. The Christiansen's coefficient of uniformity (ASAE, 1993) for the simulator averaged 78% compared with 80% for the irrigation system. To maintain experimental precision the two plots that generated precipitation using the simulator system in 2005 were exchanged to receive irrigation in 2006 and the two plots that received irrigation in 2005 received simulation in 2006. The turf was mowed at 0.5 inches (13 mm) three times per week to simulate golf course fairways.

Rain events were simulated on 8 Jun 2006, 18 Aug 2006, 17 Jul 2007, and 22 Jul 2007. The site was irrigated to runoff 24 hours before fertilizers and pesticides were applied to help maintain consistent antecedent soil moisture for each event. Samples were collected at this time to test for residual pesticides but none were ever found. Simulated rainfall and irrigation were applied 24 hours after fertilizer and pesticide application to create runoff and sustained for 90 minute after runoff began. Runoff samples were collected until runoff stopped which consistently occurred 15 minutes after irrigation or simulation ceased. Isco 6700 portable samplers (Isco, Lincoln, NE) with ultrasonic modules (Isco 710) mounted over each Parshall flume were programmed to collect samples in 5-minute intervals and to measure runoff flow rate in 1-minute intervals.

Nutrient and pesticide applications

In addition to N from urea and P from triple superphosphate, a fungicide, flutolanil (Prostar, Bayer Environmental Science, Research Triangle Park, NC), a broadleaf herbicide, 2,4D plus mecoprop plus dicamba (Trimec Classic, pbi/Gordon, Kansas City, MO), and an insecticide, chlorpyrifos (Dursban, Dow Agrosciences, Indianapolis, IN) were applied prior to each event. The 2,4D was applied at 0.24 pound (lb) active ingredient (ai) per acre (ac), mecoprop at 0.12 lb ai/ac, and dicamba at 0.02 lb ai/ac. These herbicide application rates

were very low to allow for comparison with trials at other sites where creeping bentgrass (*Agrostis stolonifera*) was used as fairway instead of bermudagrass in similar studies. Chlorpyrifos was applied at 1.00 lb ai/ac. Flutolanil applications were made at high rates and varied by event to investigate the relationship between flutolanil applied and flutolanil lost in runoff. Nitrogen and P applications varied by event for the same reason and were determined by random selection of spreader settings.

Analytical Procedure

Water samples were analyzed for NO₃-N and NH₄-N using colorimetric methods by automated flow injection analysis and DRP using the phosphomolybdate colorimetric procedure employed by Murphy and Riley (1962). The detection limit was 0.01 ppm for each nutrient in the runoff water samples. The average background levels of nutrients in the irrigation water samples were 2.7 ppm for total N (NO₃-N + NH₄-N) and 5.8 ppm for DRP and in simulated rainfall samples 2.5 ppm total N and 7.0 ppm DRP. The concentration of NO₃-N, NH₄-N, and DRP in the precipitation was measured during each event and subtracted from the measured concentrations in collected runoff before statistical analyses were performed.

Pesticide determination was performed using a Model 500 HPLC (Dionex, Sunnyvale, CA). Components included a Supelco Discovery C18 HPLC column (Sigma-Aldrich, St. Louis, MO) and a UV-VIS detector. Flutolanil and chlorpyrifos were analyzed using a mobile phase of 70% acetonitrile and 30% water. The mobile phase flow rate was 1.5 ml min⁻¹ and absorbance was measured at an analytical wavelength of 230 nm.

Mecoprop and 2,4D were separated using a mobile phase of 60% 0.025 M KH₂PO₄ buffered at pH 2.2 and 40% acetonitrile. The mobile phase flow rate of the acid pesticides was 1.0 ml min⁻¹ and absorbance was measured at an analytical wavelength of 230 nm.

Comparison of runoff losses during rainfall simulation and irrigation

The irrigation system produced precipitation at 1.61 inches per hour and the simulator produced precipitation at 1.51 inches per hour. This difference in precipitation rate caused a slight difference in runoff rate as well. Runoff from the irrigated plots averaged 0.93 inches per hour and runoff from the rainfall simulator plots

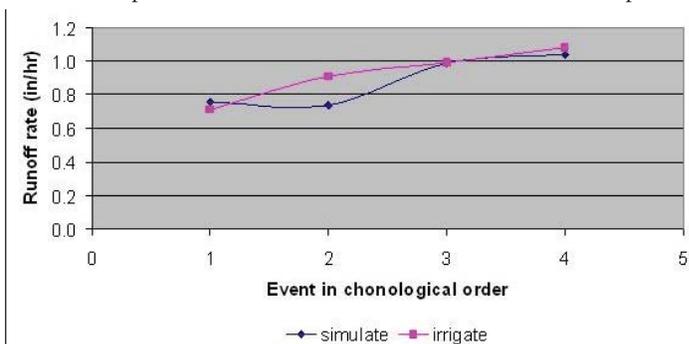


Figure 1. Mean runoff from four simulated rainfall events in 2006 and 2007 produced from a rainfall simulator (n=8) and a turfgrass irrigation system (n=8)

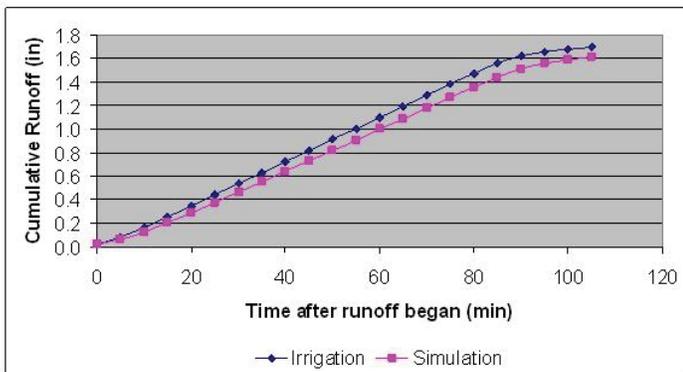


Figure 2. Mean runoff from four precipitation events in 2006 and 2007 produced by a rainfall simulator (n=8) and a turfgrass irrigation system (n=8). The irrigation system produced precipitation at 1.61 in/hr and the simulator produced precipitation at 1.51 in/hr accounting for the slight, but statistically significant, difference in cumulative runoff between irrigation and rainfall simulation.

averaged 0.88 inches per hour. However, the differences in runoff flow rate between irrigation and simulation were not significant. The amount of runoff that occurred during individual precipitation events differed in spite of considerations such as uniform plot size and slope, individual flume calibrations and steps to maintain uniform antecedent soil moisture designed to improve consistency (Figure 1). Differences in water pressure primarily from the gravity-fed rainfall simulator resulted in variation among runoff flow rates by event (Figure 1) but these differences were not significant nor was there significant interaction between precipitation sources and events. However, the clear difference in precipitation rate between the irrigation system at 1.61 inches of precipitation per hour and the simulator system at 1.51 inches per hour caused a significant difference in cumulative runoff between the two systems (Figure 2). Consequently, the runoff flow rates recorded for irrigation were adjusted downward by a factor of 1.51/1.61 prior to analysis of cumulative nutrient and pesticide losses.

A total accumulation of 1.67 inches of irrigation runoff was lost from a single plot during each event. A total accumulation of 1.59 inches of runoff was lost from each rainfall simulator plot. After adjusting by multiplying irrigation runoff by a factor of 1.51/1.61 total irrigation runoff was reduced to 1.57 inches making total runoff losses from irrigation and rainfall simulator nearly equal. Approximately 2.5% of the N applied was lost in irrigation runoff and the same amount (2.4%) was lost to simulation runoff. The total P lost was approximately 20.1% of that applied to the irrigated plots and 16.6% of that applied to simulated rainfall plots. Neither

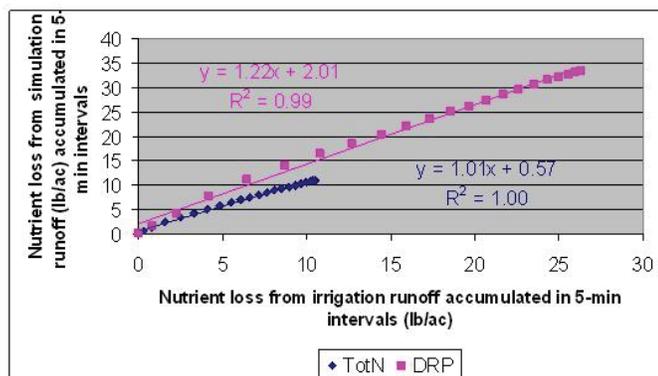


Figure 3. A Comparison of nutrients lost to simulation and irrigation runoff accumulated in 5-minute intervals.

P loss nor N loss from irrigation and simulation were significantly different nor did losses differ for any pesticide. The concentrations of 2,4D collected in irrigation runoff accounted for 1.1% of that applied and accounted for 0.8% in simulation runoff. Approximately 3.5% and 3.1% of the mecoprop applied and 12.3% and 15.7% of the dicamba applied (analyzed for only one event) were lost to irrigation and simulation runoff, respectively. Chlorpyrifos was lost to irrigation runoff at 0.28% of that applied and lost to simulation at 0.14% of that applied. Approximately 15.1% and 15.7% of the flutolanil applied was lost to irrigation and simulation, respectively. None of these results differed significantly by precipitation type demonstrating that irrigation or simulated rainfall applied to bermudagrass turf did not differ in their influence on runoff or nutrient and pesticide losses.

Comparisons of product applied with product lost in runoff

The amount of P applied did not significantly affect the amount of P lost to runoff. The amount of N applied also did not significantly affect the amount of N lost nor did the amount of flutolanil applied significantly affect the amount of flutolanil lost. However, the work does suggest that the amount of nutrient or pesticide applied has some effect on the amount lost. Averaged over all plots and events (n=16) regardless of precipitation type 0.2% of the chlorpyrifos, 15.4% of the flutolanil, 3.3% of the mecoprop, and 1.0% of the 2,4D was lost in runoff. Dicamba losses were only assessed for one event (18 Jun 06) and amounted to 14.0% of that applied. Dicamba was the most soluble pesticide applied and although it was only applied in a very small amount 14.0% of it was lost in runoff demonstrating how easy it is to lose a highly soluble product to runoff. Of the remaining pesticides, chlorpyrifos has poor solubility, flutolanil has medium solubility, and mecoprop and 2,4D have high solubility. With the exception of flutolanil, pesticide losses in runoff followed what would be expected according to pesticide solubility with chlorpyrifos having very low loss rates and mecoprop and 2,4D demonstrating higher losses. However, it must be remembered that flutolanil was applied at very high rates (mean = 4.4 pounds per acre) and mecoprop (0.09 pounds per acre) and 2,4D (0.17 pounds per acre) were applied at very low rates. In fact, 49 times more flutolanil was applied than mecoprop and 26 times more flutolanil than 2,4D. It is likely that the large difference in application rates affected the high loss rates of flutolanil and the low loss rates of mecoprop and 2,4D. Consequently, the fact that application rates did not significantly affect the cumulative losses of nutrients and pesticide applied does not necessarily indicate that application rate did not influence the amount of product lost. More likely, there are other contributing factors that collectively interfered with a direct relationship between product applied and product lost. Perhaps future research will determine more about additional factors that need to be considered when attempting to determine the amount of product likely to be lost to a measured runoff event. In the meantime, high application rates should be considered more likely to generate high runoff losses than low application rates. Although runoff research has demonstrated that high losses of nutrients and pesticides from turfgrass systems are unlikely, the relatively huge losses of P (18.4% of applied) and flutolanil (15.4% of applied) in this study demonstrate what can happen when nutrients and pesticides are applied 24 hours after soil saturation and a severe rainfall event occurs 24 hours after application.

For citations of this literature please contact the editor at sarah@iowaturfgrass.org

EVERGREEN™ Turf Blankets... ...trusted around the world!

“Results Outstanding..., Could Not Believe...”

wrote **Dann Daly**, Park Maintenance Supervisor,
Parks & Recr. Dept., North Smithfield, RI

- Earlier spring green-up
- Faster seed germination
- Deeper root development
- Delays dormancy in fall
- Ideal winter blanket
- 3, 7 & 10 yr. warranty covers
- Best for quick turf repairs
- Available in any size

**Want to know more?
CALL TOLL FREE
1-800-387-5808**

**COVERMASTER™
COVERMASTER
COVERMASTER**
MASTERS IN THE ART OF SPORTS SURFACE COVERS



Covers for football and soccer fields are also readily available.



Covered... Uncovered...



It works on the greenhouse principle, every time!

EXCESS HEAT ESCAPES THROUGH THE PATENTED VENTING SYSTEM
AIR, WATER AND HEAT PENETRATE THE COVER, WARMING THE SOIL
INCREASES ROOT DEVELOPMENT

© 2011, Covermaster, Inc.

covermaster.com

E-MAIL: info@covermaster.com



COVERMASTER INC., 100 WESTMORE DR. 11-D, REXDALE, ON, M9V 5C3 TEL 416-745-1811 FAX 416-742-6837

ISTMA 2011 Board of Directors

Tony Senio
President & At-Large Director
University of Iowa
3 S. Ridge Ct.
Coralville, IA 52241
319-430-5333 (work)
tonysenio@yahoo.com

Jason Koester, CGCS
Vice President & Northeast Director
Grinnell College
1917 6th Ave
Grinnell, IA 50112
319-231-9254 (cell)
jkkoster@yahoo.com

Jeff Bosworth
Northwest Director
Drake University
1422 27th St.
Des Moines, IA 50311
515-202-8847 (work)
jeff.bosworth@drake.edu

TJ Brewer, CSFM
Southeast Director
Burlington Bees
2712 Mt. Pleasant St.
Burlington, IA 52601
515-360-8979 (cell)
thusto1@hotmail.com

Chris Schlosser
Southwest Director
Iowa Cubs Baseball
One Line Drive
Des Moines, IA 50309
515-243-6111 (work)
chriss@iowacubs.com

Tim Van Loo, CSFM
Central Director
ISU Athletics
1800 S. 4th St. Jacobson Bldg,
Ames, IA 50011
515-509-8035 (cell)
vanlooti@iastate.edu

Mark Heick
At-Large Director
City of Iowa City
119 Thomas Dr.
West Branch, IA 52358
319-643-5095 (work)
markheick@yahoo.com

Josh Shull
Exhibitor Director
TurfWerks
5225 NW Beaver Dr.
Johnston, IA 50131
515-577-5642 (work)
joshshull@turfwerks.com

Steve Bush, CSFM
Exhibitor Director
Bush Sports Turf
6800 78th Ave.
W. Milan, IL. 61264
309-314-1000 (work)
steve@bushturf.com

Dr. Dave Minner
Ex-Officio Director
Iowa State Universtiy
141 Horticulture Hall
Ames, IA 50011
515-294-0046 (work)
dminner@iastate.edu

Jeff Wendel
Executive Director
Iowa Turfgrass Office
17017 US Hwy 69
Ames, IA 50010
515-232-8222 (work) 515-232-8228 (fax)
jeff@iowaturfgrass.org

Sarah Hodgson
Newsletter Editor
Iowa Turfgrass Office
17017 US Hwy 69
Ames, IA 50010
515-232-8222 (work) 515-232-8228 (fax)
sarah@iowaturfgrass.org