July 2005

Green is Beautiful

The Official Publication of Ontario Golf Superintendents' Association

Evaluating Recycled Waters for Golf Course Irrigation

Behind the Green at Augusta National

Headed for Higher Ground

OGSA Tournament Update

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Green is Beautiful

The Official Publication of Ontario Golf Superintendents' Association

COVER PICTURE

Graham Shouldice
at Highland Country Club

photo by John Bladon

OGSA is committed to serving its members, advancing their profession, and enriching the quality of golf and its environment.

President's message

by Paul Scenna
Donalda Club

The ability to communicate effectively is widely regarded as an important skill set in any occupation and our profession is no exception. Often, as superintendents, we are not in direct contact with our customers. Consequently, it is of the utmost importance to convey the intended message to staff, other senior managers and pro shop personnel, who then are capable of correctly relaying information in your absence. Thereafter, monthly newsletters, websites and group emails are effective ways to broadcast information to help back up or to follow up an intended message. We can all have an impact on public perception if, in league, we convey messages which contribute to the betterment of the game and its environment.

Recently, on a broader scope, the OGSA continued its involvement with the Toronto Star Amateur and the sponsoring of its annual media day. This year's event was held at the beautiful Weston Golf Club, where we were able to once again contribute to the media day package. This year, with the cooperation from Syngenta and the CGSA, we were able to include their DVD entitled "The IPM Approach to Golf Course Management". This is a great venue for the association to communicate and influence 70 of the top sports writers and announcers in the province and country. Many thanks to our friend Glenn Goodwin, President and founder of the GTAGA for our continued inclusion in this event. All participants had a great day and got a taste of Weston's new look, which I am sure will impress Arnold Palmer come September. "The Return of the King" will celebrate the 50th anniversary of Arnie's first PGA win which happened on the storied Weston grounds.

"William Sansom"

Distinguished Service Award

The OGSA shall present an award of Distinguished Service, in the name of our first president William Sansom, to an individual or individuals who have made an outstanding contribution to the advancement of the golf course superintendent's profession. The contribution must be significant in both substance and duration and may be regional or national in nature. This contribution must be held in the highest regard and reflect credit upon our profession.

Nomination forms are now available on our Web site, in the "Members Only" section under "Scholarships". If you would like to nominate someone and cannot download the form, call the office and they will mail one out to you.

Deadline is September 1, 2005

"Green is Beautiful" is Printed on Recycled Paper

ONTARIO GOLF SUPERINTENDENTS' ASSOCIATION
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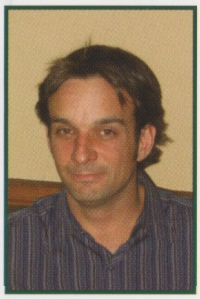
Editor's message



by John Bladon
Nu-Gro Corporation

Summer is here and with a vengeance! We are fortunate to have some outstanding submissions for this July issue of *Green is Beautiful.* Firstly, Ali Harivandi from the University of California has granted us permission to use an article he has penned entitled "Evaluating Recycled Waters for Golf Course Irrigation". Clearly, there are few golf courses using such water here in Ontario, however, there are characteristics and measurements of those characteristics that all waters have in common and the article comes from the mind of one of the world's foremost water experts. Daisy Moore speaks to ornamental grasses in this month's edition of "Off the fairway". Daisy, thanks for reminding us about some grass that doesn't require a five-gang reel mower! This month's Member Profile is on OGSA Life Member, John Hutchinson of Warkworth Golf Club. Recently, I had the pleasure of playing the property that John built with his father and to experience some of his old fashioned hospitality amongst the EOGSA members. John is indeed first rate. Finally, the OTRF golf tournament is set for August 2nd at Eagles Nest in Maple so be sure to mark your calendar. Chris Dew and the OTRF committee have locked up an outstanding location and it offers the opportunity to look at velvet bentgrass in action. This old cultivar is receiving more and more attention of late and deserves a closer look.

Stay cool..... .until August...

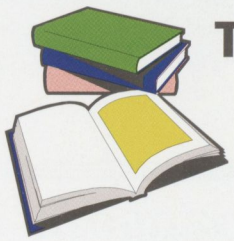
What's new

Katerina Jordan to Join Guelph Turfgrass Faculty

At the opening session of the Ontario Turfgrass Symposium, Ontario Agricultural College, Dean Craig Pearson announced that Katerina Jordan would be joining the Department of Plant Agriculture at the University of Guelph. Katerina is in the process of completing her Ph.D. program at the University of Rhode Island. Katerina has a diverse background with a B.S. in microbiology and an M.S. in agronomy, both from the University of Maryland. Her Ph.D. research involves the study of plant-parasitic nematodes and their antagonists in golf putting greens. She will bring a unique perspective to her turf teaching and research duties at Guelph. Katerina and her husband Sean, a Penn State turf diploma grad and golf course superintendent, will arrive in Guelph later this summer. Please join us in welcoming them to Guelph.

Norman McCollum Announces Retirement

GTI Research Superintendent Norman McCollum has announced his plans to officially retire effective January 1, 2006. Norman's unique contributions to turfgrass research and teaching at Guelph go back 36 years and have touched the careers of students and scientists alike. Among turf managers, he is probably best known for his long time involvement with the annual Turf Managers Short Course providing instruction in turf and weed identification as well as helping to create a welcoming social environment for students in the course. I suspect that in retirement Norm will remain active in his many University of Guelph alumni activities including the annual Associate Diploma Hockey Tournament. Next year, he plans to enjoy his first summer away from the research plots at his summer cottage on the Bruce Peninsula. Please join us in wishing Norman a long, happy and healthy retirement.



Turf Research & Library Donation Fund

OGSA would like to take this opportunity to thank the following members for their continued support of our Library Fund and Turf Research Fund, made through optional donations with their membership dues for the period October 2004 through September 2005.

Your support helps us to provide valuable benefits in education and research to our members.

Library Fund Donations

Robert Ackermann, Weston Golf & CC
Al Schwemler, Toronto GC
Bill Searle, North Gate Farms Ltd.
Marie Thorne, Syngenta

Turf Research Donations

Robert Ackermann, Weston Golf & CC
Randy Booker, Dundas Valley G&CC
John Gall, St. George's G&CC
Cecil Hoekstra, Cherry Hill Club
William Diggins, Country Lane GC
James Dimitriw, Lowville GC
Ken Johnson, Indian Hills GC
Al Schwemler, Toronto G.C.
Keith Stephenson (retired supt)
Scott Wheeler, Forest City National GC

O.T.R.F ANNUAL FUNDRASING GOLF EVENT

TO BE HELD AT EAGLES NEST GOLF CLUB IN MAPLE, ONTARIO

MARK YOUR CALENDAR NOW TUESDAY, AUGUST 2, 2005

Cost:	$230.00/person
Registration:	9:30 am
Shotgun:	11:00 am
Social:	4:00 pm - 5:00 pm
Dinner:	5:00 pm followed by presentations

PLATINUM SPONSOR BAYER ENVIRONMENTAL SCIENCE

Welcome!

O.G.S.A. Welcomes our newest members

Jennifer Antoniak Class F
North Halton Golf & CC

Cameron Fraser Class F
Donalda Club

Dennis Gilchrist Class Supt
Ballantrae Golf Club

Bruce Gillis Class C
Roseland Golf & Curling Club

Paul Grotier Class C
Donalda Club

Stuart Leachman Class Supt
Diamond 'In the Ruff' GC

Brent Riopelle Class F
The Club at Bond Head

Carole Trumble Class A
Katchiwano Golf & CC

Armtec Limited Class E
Ken MacDougall

Golf Greens "Fore" U Canada Class E
Doug Kramer

Jim Hosick Class E
Landscape Architect

From roots to shoots

The Miserable Spring That Was!

by Pam Charbonneau OMAF Turfgrass Specialist

Now that it is July – the miserable month that was May is behind us now. Most golf courses were plagued with cold, dry weather that was not very conducive to spring turf recovery. If you were forced to overseed damaged areas you had both temperature and moisture working against you. In addition, even if your turf came out of the winter well, the weather in May made greens look sick. Most were very off colour with lots of purpling, yellowing and browning due to low temperature stress. The absence of the gentle spring rains meant that the turf just did not have a flush of lush green growth. To add insult to injury golf rounds were also down because of the exceptionally cold weather.

With that behind us, what can we expect for the summer? The Ontario long range forecast is for higher than normal temperatures and lower than normal precipitation. So the temperature conditions will be the reverse of what they were this spring and the precipitation conditions will echo those of the spring. Of course, the weather forecast is almost never right, but assuming it is, there will be more insect pressure than normal this summer and depending on how wet you keep your greens, the disease pressure should be less than normal. If greens are over-watered and the temperatures are hotter than normal, disease of course will result.

Will golf courses help Canada meet our Kyoto Protocol targets?

Believe it or not, there is some good news though if you look at the big picture. On February 16, 2005, the Kyoto Agreement on Greenhouse Gas Emissions came into effect in Canada. Under this agreement, Canada is required to reduce emissions by 18 percent from today's levels. The main greenhouse gas is CO_2 and it comes from the burning of fossil fuels. Plants use CO_2 in the presence of sunlight to produce the sugars and proteins that they need to grow and they also sink carbon into the soil. This process is called carbon sequestration. So, the CO_2 that we produce by burning fossil fuels would normally linger in the atmosphere and contribute to global warming. On a golf course, it is taken up by turf through photosynthesis and trapped in the soil. The good news is that soil scientists from the United States Agricultural Research Service and Colorado State University have studied soil records from sixteen Denver, Colorado area golf courses and found that the soils under turfgrass were a carbon sink comparable to range land or farm land. This is one of the first studies to measure carbon sequestration in the urban environment.

Researchers have found that from the time of establishment of a golf course, carbon sequestration rapidly increases for 25-30 years. The study found that greens and fairways each store nearly a ton of carbon per acre per year. Other turf areas within cities and suburbs like lawns and parks may also serve as CO_2 sinks. Scientists are currently using computer models to better estimate the potential rates of carbon sequestration on golf courses.

So, when you see Rick Mercer on television asking you to take the one tonne challenge, you know that by growing the grass on your golf course you are already contributing to the reduction of greenhouse gases in Canada and your golfing members and pay as you play golfers are too. So there Rick Mercer!

For more information on golf courses as a carbon sink you can visit the following web site:
www.ars.usda.gov/is/AF/archive/jun03/golf0603.htm

OTRF Fundraising Golf Tournament

Mark your calendars for Tuesday, August 2, 2005. You will have the opportunity to contribute to turfgrass research in Ontario, play one of the Toronto areas' newest and most unique golf courses and network with your peers. One of the most interesting things as far as I am concerned, apart from the links style and massive dunes, is the use of velvet bentgrass on the greens at Eagles Nest Golf Club in Maple. So, come see first hand how Brent Rogers and Mike Rossi are taking on the challenge of managing this old species on a new golf course. The cost for the day is $230.00. It is a shotgun format, starting at 11:00 am. There is an after golf social hour from 4:00 to 5:00 and dinner at 5:00. For sponsorship and registration information you can contact Cindi Charters at cindicharters@rogers.com. Don't miss this opportunity to contribute to turf research in Ontario.

University of Guelph update

by Eric Lyons, Assistant Professor
Department of Plant Agriculture, University of Guelph

Game on!!

The field season has started and we have a great deal of research going on at the GTI. First and foremost I want to encourage all of you to fill out our survey on environmental and management factors leading to moss invasion. We have a very capable Masters student from Ireland, Darragh McGowan, working on this study and he needs your help to make this project a success. I encourage you to visit our online survey and help us tackle the problem of moss on golf greens (www.uoguelph.ca/GTI/moss_survey_front.html). The survey has been available since March and we are far from the response levels we need to start shedding some light on the problem. If you have already filled out the survey we thank you and ask you to get your colleagues to spend the time to fill out the survey, whether they have moss or not. This study's success is dependent on your involvement.

In addition to the moss studies, we have many other studies that will be going on this summer at the GTI. The first is a weed trial being conducted by another graduate student Evan Elford. Evan is interested in alternative weed management strategies and his study is looking at the use of perennial ryegrass over-seeding to prevent annual weed invasion into Kentucky bluegrass turf. While his primary research is taking place on athletic fields it is important to remember that a large proportion of our golf courses are planted to Kentucky bluegrass and his methods may provide you with another tool to combat weeds in this environmentally volatile time.

We are testing two new wetting agents in order to accumulate data for registration in Ontario. While this spring has been entirely too dry, it has helped us with these trials. Last summer was too wet to show many differences between the control and treated plots, but with dryness this spring we should be able to see the efficacy of these new products. This is an example of why it is important to see two things in product research:

1) multiple sites or multiple years to show the product is effective over many different climates and areas

2) control plots that account for all the different components except for the active ingredient of the product.

We are also conducting a trial of a new product to control leather jackets at the GTI. In addition we have two different bio-stimulants that are advertised to increase root growth and hardiness in the greenhouse that we are testing in the field at the GTI. It is important to move from the greenhouse to the field to confirm once again the products work under a variety of conditions. Speaking of the greenhouse, we have multiple studies dealing with endophyte enhanced turfgrass and the nutritional aspects of drought tolerance which I will update you on when we have some results.

One study I want to bring your attention to is a new trial in production forestry that is being done next to the GTI. As Pam Charbonneau spoke about in her article, turfgrass and golf courses have been shown by a research group in the Western United States to sequester a large amount of carbon below ground. This has implications towards the Kyoto agreement that Canada has signed and will be subject to. The study taking place is aimed at looking at the carbon sequestration of production forestry over the long term. I have been able to convince the researchers working on the study that a side by side comparison with turfgrass areas would enhance the study. So, as you see the trees start to grow next to the GTI remember that the turf between those plots is also being studied to show the positive environmental impact that turfgrass and golf courses have on our environment In addition to that we are also looking at studying how golf course fairways, turf lined with trees, impact atmospheric carbon levels with the same research group.

Things are looking bright at the university and we have many research projects ongoing. I look forward to seeing you at many of the events this summer. Remember, much of our research is dependent on your input, so please fill out that survey.

Accreditation avenue

by Jarrod Barakett, Superintendent
Deer Ridge Golf Club

IPM Update

Following what turned out to be a very long winter, summer has finally arrived. The extremely brief spring has forced many of us into over-drive. Year after year this reminds us of how important it is to use our winter months to work through as much paperwork as we can. The following golf courses used this time to apply for, and have received IPM Level 1 Accreditation.

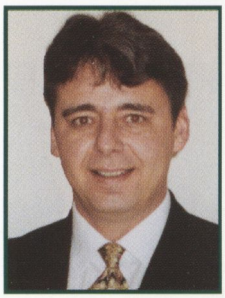
Congratulations to the superintendents at the following golf courses:

Ballantrae Golf Club
Bay of Quinte Country Club
Credit Valley Golf and Country Club
Dalewood Golf and Curling Club
Deer Ridge Golf Club
Deer Hurst Resort
Hamilton Golf and Country Club
Port Colborne Country Club
Rosedale Golf Club
Sarnia Golf and Country
Springfield Golf and Country Club
St. Thomas Golf and Country Club
The Briars Golf Club Ltd
Victoria Park East Golf Club

In addition to the above, there are five golf courses awaiting their results.

It is also worth mentioning, that to date, there are 148 superintendents and/or assistant superintendents who have written and passed the IPM Golf Exam.

Canadian Golf Superintendents Association news



by Bob Burrows
Rosedale Golf Club

The CGSA is pleased to announce the launch of its new website www.golfsupers.com. The new site promises to be more user-friendly and interactive, as well as provide more features to serve members' needs.

Look for job ads posted in the "Members Only" area and please use the communities section where members can ask questions or provide answers. It is a great place to get feedback from fellow members. You can also modify your membership profile, and in the near future, reserve and purchase various services and products and educational offerings.

In order to access the "Members Only" area of the new website for the first time, use your member ID number as your login, then your password is the first four characters of your last name plus your member ID number. Please note, the login and password are not case sensitive. Afterwards, you may select your own confidential login information. Every effort will be made to add new content and keep the site fresh and current, so visit often and give us your feedback on what you would like to see.

In approximately one year's time, the CGSA accreditation program will be nearing full implementation. This does not mean that we have that long to prepare for accreditation, because in reality, we ought to be considering 'continuing education' during our whole career. The CGSA is committed to providing all members with the tools and techniques necessary to help enhance their careers and professional lives. Various ways/means are available to you such as formal courses or seminars, on-line sessions, correspondence courses or home-study programs by previously approved yet independent providers. Please check the above-noted website for more information, which was previously distributed, on accreditation and how it will affect you. We have attempted to allow every member various educational options to fine-tune their own requirements which are affordable, attainable, and relevant to your particular needs. In the end, each of us will fulfill our educational goals and ultimately achieve a professional designation which is an achievement for which we should all be proud. This investment in time and resources is truly an investment in ourselves and in our own careers, which will ultimately pay profitable dividends for our employer, our families, our staff, and the golf facilities with which we are entrusted. Our award winning magazine "Green Master" turns 40 years young this year as the National forum for superintendents across Canada. There can be no doubt it has remained the pre-eminent voice for the golf turf management industry in Canada. Happy birthday to us! For those of you who have a library collection of both trade journals and publications, take some time to dust-off and thumb-through some old back-issues and you will be amazed that many past discussions and challenges are not particularly new to our industry. Topics such as green speed and pesticides were clearly being discussed decades ago. It's comforting to know that we were practicing environmentalists even before the word was invented - but that's not news to us.

If you have not made plans to register for the Fall Field Day at Jasper Park Lodge in Alberta on September 19th, you may already be out of luck. The event tends to fill up almost immediately and certainly faster for such a world-class venue. Our host Superintendent, Perry Cooper, is sure to be excited to host his colleagues.

Thanks to those of you who took some time to complete our ever-popular compensation survey and our comprehensive IPM/BMP surveys. These results are of great benefit to our membership and our industry as a whole. Also, make a note of the regional seminars held in Ontario this fall and winter with dates/locations to be announced shortly. Even though our CGSA headquarters location has moved within Mississauga in early June, the phone/fax/email contact information has NOT changed. We are excited about this physical move, which will bring our capable staff into larger and more functional office spaces. Once they unpack the boxes, you are always welcome to drop-by for a visit. We would be most happy to show you around your association headquarters.

I hope everyone has a successful and productive golf season, and I look forward to seeing many of you in our travels.

The Can Am Challenge

Following a week delay due to the untimely last blast of winter snow, the annual Can/Am Challenge took place on Canadian soil at the Tom McBroom designed Pointe West Golf and Country Club in Amherstberg, Ontario on May 2nd. The Canadian side was hoping to wrestle the cup back from it's American counterparts and OGSA Life Member and Golf Superintendent, Lamont "Monte" Anderson and his team presented the entire field with a magnificently conditioned golf course.

Shortly after registration and fueling up over a buffet lunch, players took on both the course and the elements.

In spite of the occasional blast of hail and strong winds, the event went off without a hitch and despite the Canadian side's best efforts; it saw the Americans retain the cup with a rousing 16-1/2 to 13 point victory. Following golf, the field headed for the warm confines of Pointe West's clubhouse to trade the day's stories, and enjoy a delicious 4-course meal, followed by presentations.

Heartiest of thanks to Monte and the entire staff at Pointe West as they did the Canadian side proud with absolute first-rate hospitality.

We hope to see you all next year on American soil in an attempt to regain the cup!

L-R Chris Andrejicka presents plaque to Host Superintendent, Lamont Anderson

L-R Fritz McMullen, GDGSA Past President accepts trophy from Paul Scenna, OGSA President

2005 Can/Am Results:

1st Gross Canada:	Kelly Barnet and Adam Spence
1st Net Canada:	James Dimitriw and Mark Prieur
2nd Gross Canada:	Randy Booker and Paul Scenna
2nd Net Canada:	Angelo Capannelli and Kevin Scott
1st Gross USA:	Kevin Frank and Scott Gardiner
1st Net USA:	Jay Delcamp and Ryan Moore
2nd Gross USA:	Ron Adams and Jerry Prieskorn
2nd Net USA:	Jerry McVetty and Marty Miller
Closest to the holes:	Duncan Brewer, Paul Brown and Adam Spence of Canada and Ryan Moore of the USA.
Most Accurate:	Greg Anderson of Canada

Pointe West Golf & Country Club

Health & safety

Bits of Safety Information

by Doug Johnson
SAFETAID and Health and Safety Consulting
First Aid and Safety Supplies and WHMIS Training

I thought it might be of interest to some of you to reflect on some of the issues that the Ontario Ministry of Labour is starting to enforce in industry in general, and this includes golf courses.

Here are some things that you should think about.

Did you know that there is a section in the industrial regulation that requires that you ensure that your workers are safe when they are on your property or working for you off the property where they might be in a situation where a vehicle or pedestrian could hurt them? That is right, Section 20 of the Industrial Regulation 851 clearly states that "barriers, warning signs or other safeguards for the protection of all workers in an area shall be used where vehicular or pedestrian traffic may endanger the safety of any worker". And don't laugh. This section was recently used to issue an order to a donut shop/restaurant in Guelph. Basically the order required that any worker exiting the building while on their break had to wear a reflective vest while outside the building in the parking lot. Even if they stepped out to have a smoke! There are 100 new inspectors out and about right now and they are just out of school. It seems they are writing orders for many issues. Are you sure that all your issues have been identified?

One company just had orders written for not doing pre use inspections on ladders and another for not having equipment adequately guarded.

In section 73 of the Industrial Regulation 851 there are provisions for ensuring that ladders are in good working order. Look it up. Are you ensuring that your ladders are functioning properly? Have you taken the time to ensure that you have written documentation to show that your staff is in fact doing a pre use inspection of your ladders?

Is all your equipment properly guarded? Are you aware of all the guarding requirements? For example, do all your automatic shutoff switches work? If an operator gets off a machine does the factory designed shutoff do what it was designed to do? Have you kept written documentation to prove that the systems have been checked?

Guards are designed in many ways including guards on a PTO, or a grinding wheel. Inspectors are hunting for these issues. Make sure that your facility is in compliance.

Just as a matter of interest, are you aware that as a superintendent or assistant superintendent you are responsible for ensuring that the staff reporting to you is protected from the sun? Section 84 of the Industrial Regulation 851 requires that your workers be protected from "radiant heat". This means that you must ensure that the workers are protected by the clothing that they wear or by the use of some other barrier. This could mean sunscreen. This is not to say that you have to provide the sunscreen but it does mean that you have to ensure that it is used.

Some food for thought.

Have a great summer!!

SAFETAID
Your 1st stop in safety!

T. 519-837-0997 • F. 519-837-1996

Member profile

Interview with John Hutchinson,

Golf Course Superintendent and Owner, Warkworth Golf Club

by Scott Horsburgh, Plant Products

Back in 1969, John and his father started to convert a dairy farm into what has now become Warkworth Golf Club in Warkworth, Ontario. At that time, if it was possible, everything on the property was going to be put into use; the pig pen was even converted into the clubhouse, as it had the best roof of all the existing buildings! In the early seventies, John went off to the University of Windsor, where he began his studies to become a teacher. While living in Windsor, he got hired at Essex Golf Club and was permanently bitten by the turf bug. Shorthly thereafter, John furthered his education by attending the Turfgrass Short Course at the University of Guelph, in 1972.

By 1977, John and his father decided to add 9 more holes to their existing nine-hole facility, and in 1978 Warkworth Golf Club opened to the public, as it remains to this day. The Hutchinsons received help with the original planning of the course from Gord Witteveen, who consulted on the project.

During those early days, John also became friends with Hugh Kirkpatrick while he was the superintendent at the Dalewood Golf Club. In addition to his father and joining the OGSA, John lists Hugh as the other largest influence on his life as a superintendent.

John is extremely proud that he was one of the first members of the OGSA from outside of the GTA. To this day, he is a firm believer in the association and considers it a great place to network, exchange ideas and help out your fellow superintendents, even if they are competitors from just down the road. Now a Life Member of the OGSA, John also served on the board as Treasurer and is a member of the CGSA.

Throughout the years as "The Boss" at Warkworth, John remains proud of the fact that he has never had to fire a single employee. He has always preferred to deal with the problem until the problem works itself out. John and his wife Bev have 2 children; daughter, Sarah, age 30, who is a teacher and son, Brad, 27, who is helping to carry on the family tradition at Warkworth. Brad has graduated from the short program at Guelph and is taking over more of the outside duties at the course while his father transitions inside to run the operation. In spite of this change, each day, first thing in the morning and once again in the evening, John still goes out to check the Warkworth "indicator" greens for disease and insects.

During his down time, John enjoys playing the violin and painting. His paintings are hung on the walls throughout the Warkworth clubhouse and are a must see. Finally, John leaves us with this message…

"Show respect for each and every employee, customer and salesperson".

"In the Hot Seat"

• Favourite Major?	Masters
• Favourite piece of turf equipment?	Topdresser
• Ultimate foursome, you and what three?	Mike Weir, Wayne Gretzky and Bill Murray
• Low round and where?	78 at Warkworth GC
• Favourite golf architect?	Tom McBroom
• Favourite golf course?	Warkworth GC in England
• What's in the CD player?	Favorite Violin Tunes
• Favourite meal?	Surf and Turf
• Favourite movie?	Christmas Vacation
• What would you be doing if you weren't in the turf industry?	Teaching School

Pro/Super Challenge

Dalewood Golf & Curling Club, in the picturesque country setting of Cobourg, was host to the 2005 Pro/Super Challenge. The course, originally designed by Robbie Robinson, was built on predominantly flat terrain. The fairways are fairly wide with some being tree lined. Water hazards come into play on eight different holes, and sand bunkers are located on almost every hole in the design. The greens are large, undulating and fast.

Our host superintendent, Trevor Clapperton had the big roller coaster greens rolling lightning quick. The morning was promising with partly cloudy skies but later on the cool breeze came off the lake chilling us down by the time we finished.

After the round we gathered in the clubhouse for cocktails and a delicious roast beef buffet dinner, where most discussions turned to the rough spring season. It was a good chance to network with our colleagues, talk things over and compare notes.

Our thanks to Trevor and his crew for providing us with a great venue for this annual event.

Pro/Super Results

1st Place	Club	Fox Glen	Score 61
	Pro	Kevin Corriveau	
	Super	Kelly Barnet	
2nd Place	Club	Brampton	Score 66
	Pro	Don Lunn	
	Super	Martin Kopp	
3rd Place	Club	York Downs	Score 66
	Pro	Ian Crebbin	
	Super	Paul Dermott	
4th Place	Club	Allandale	Score 67
	Pro	John McCann	
	Super	Brian McCann	
5th Place	Club	Loyalist	Score 67
	Pro	Mike Campeau	
	Super	Jim Burlington	
Closest to the Pin	Pro	Ian Webb	
	Super	Gary Gravett	
Longest Drive	Pro	Fraser McIntyre	
	Super	R.T. Heron	

L-R Jeff Stauffer presents plaque to host superintendent, Trevor Clapperton

Jeff Stauffer presents trophy to winning team from Fox Glen, Superintendent, Kelly Barnet, and Golf Professional, Kevin Corriveau

Golf course highlight

Dalewood Golf & Curling Club

Box 356, Port Hope ON L1A 3W4
Ph: (905) 885-8709 Fax: (905) 885-8709
Email: greens@eagle.ca
Website: www.dalewood.ca
Golf Course Superintendent: Trevor Clapperton

Dalewood Golf & Curling Club *Photo taken by Paul White*

COURSE PROFILE

What county is your club located in?
Northumberland County

Is your club private, semi private, public, resort or municipal?
Semi-private with 560 members

Typical number of rounds
34,000 rounds per year

Typical opening and closing date
April 10 to November 25

How long have you been a superintendent?
8 years

List professional accomplishments
Director of the OGSA

How long have you been an OGSA member?
10 years

How many staff?
3 year round and 12 seasonal staff

Who are your assistants and mechanics?
Assistant: Craig Buttar
Mechanic: Ed Schneider

COURSE STATISTICS

How many holes?
18

What is the yardage from back and forward tees?
6,732 yards from the back tees and
5,123 yards from the front tees

What is the size of driving range and range tee?
Range: 290 yards Tee: 14,000 sq.ft.

How many bunkers?
50

How many times does water come into play?
3 ponds come into play 8 times

Who was the original architect?
Robbie Robinson

What was the year of original construction?
1974

What major tournaments held?
1999 Ontario Junior
2003 Ontario Senior Ladies Amateur

What is the size of your maintenance shop?
7,200 square feet

What type of irrigation system?
Toro LTC with Sitepro

What is the size of greens, tees & fairways?
150,000 sq.ft. of greens
130,000 sq.ft. of tees
23 acres of fairways

What is your predominant grass?
Poa/Bent – greens and tees
Poa/Bluegrass - fairways

What is the predominant soil type?
Clay loam

What equipment do you have in inventory?
2 Jacobsen Greens King 6 triplex
2 Toro 3100 triplex
2 Toro 5400 triplex
1 Toro 3500D Sidewinder
1 Toro 3100D Reelmaster
1 Jacobsen Turfcat rotary
1 15 ft. Progressive rotary
1 Pro Flex 120
2 Jacobsen walk behind mowers
1 set of Jacobsen verti-cut heads for greens
1 set of Toro vert-cut heads for fairways
1 150 gal Smithco sprayer
3 Cushman trucksters
1 Jacobsen truck
1 Toro workman 2110
3 EZ-Go utility carts
3 Yamaha golf carts
1 John Deere 5200 tractor
1 John Deere 1070 tractor with loader
1 International tractor
1 Turfco 1530 widespin topdresser
1 Smithco bunker rake
1 John Deere bunker rake
1 Ryan GA 30 aerator
1 Terra 320 aerator
1 Cushman core harvester
1 Lesco 300 triplex
1 Jacobsen GK 2 with rollers
5 Stihl line trimmers
1 Stihl power broom
1 Billy Goat blower
1 Jacobsen blower
1 Vicon spreader
2 Bannerman hover mowers
1 Brower sod cutter
2 Scotts spreaders

COURSE PROJECTS

What projects have you recently completed?
Bunker and tee renovation in 2002
New irrigation in 2001
Clubhouse renovation in 2000

LONG RANGE PLANS

What long range plans for renovation do you have in the next five years?
Practice facility and irrigation reservoir

CHALLENGES

Are there any particular challenges you face with your property?
Flooding and erosion of river

SUCCESS STORIES

Do you have any success stories?
Installed a bio-engineered cedar crib wall with dogwood planting to reduce erosion of creek banks

Evaluating Recycled Waters for Golf Course Irrigation

by M. Ali Harivandi

Editor's Note: Although this article was written specifically about the use of recycled water for irrigation, all the information is pertinent for all golf course irrigation water quality. This article has been reprinted from USGA - Green Section Record - Nov./Dec. 2004.

To avoid problems, analyze recycled water thoroughly before starting to use it to irrigate a golf course, and monitor it regularly thereafter.

Throughout the United States and in many other parts of the world, an increasing number of golf courses use recycled municipal water for irrigation. Much of the recycled water used for irrigation contains high concentrations of dissolved salts that are potentially toxic to turfgrasses and other golf course plants. Consequently, chemical water analysis and periodic monitoring are key components of sound irrigation management at such sites.

Water analysis done by commercial laboratories provides data on many parameters, most of which are not of great significance for turfgrass irrigation. The most important parameters for this purpose are: total concentration of soluble salts (i.e., salinity); sodium (Na) content; relative proportion of sodium to calcium (Ca) and magnesium (Mg) (Sodium Adsorption Ratio, or SAR); chloride (Cl), boron (B), bicarbonate (HCO3), and carbonate (CO3) content; and pH. The following parameters are also often reported on a water test report and should be reviewed, although none by itself plays a major role in determining the suitability of a given recycled water for irrigation: nutrient content (nitrogen, phosphorus, and potassium), chlorine content, and suspended solids.

SALINITY

All recycled waters contain some dissolved mineral salts and chemicals. Some soluble salts are nutrients and thus are beneficial to turfgrass growth; others, however, may be phytotoxic or may become so when present in high concentrations. The rate at which salts accumulate to undesirable levels in a soil depends on their concentration in the irrigation water, the amount of water applied annually, annual precipitation (rain plus snow), and the soil's physical/chemical characteristics.

Water salinity is reported differently by different laboratories. It is reported quantitatively as Total Dissolved Solids (TDS) in units of parts per million (ppm), or milligrams per liter (mgL-1), or reported as electrical conductivity (ECw) in terms of milimhos per centimeter (mmhos cm-1), micromhos per centimeter (µmhos cm-1), decisiemens per meter (dSm-1), or siemens per meter (Sm-1). Some labs may also report the individual components of salinity (e.g., sodium) in milliequivalent per liter (meqL-1). The following equations may be used to convert results from one set of units to another, thus enabling comparisons of data from differently formatted reports:

(1) 1 ppm = 1 mgL-1

(2) 1 mgL-1 = meqL-1 ¥ Equivalent Weight (see Table 1)

(3) 1 mmhos cm-1 = 1 dSm-1 = 1000 µmhos cm-1 = 0.1 Sm-1
The relationship between ECw and TDS is approximately:

(4) ECw (in mmhos cm-1 or dSm-1) ¥ 640 = TDS (in ppm or mgL-1)

Table 1
Conversion factors: mgL^{-1} and $meqL^{-1}$

Constituent	To Convert mgL^{-1} to $meqL^{-1}$	To Convert $meqL^{-1}$ to mgL^{-1}
	Muliply by	
Sodium (Na)	0.043	23
Calcium (Ca)	0.050	20
Magnesium (Mg)	0.083	12
Bicarbonate (HCO_3)	0.016	61
Carbonate (CO_8)	0.033	30
Chloride (Cl)	0.029	35

Most waters of acceptable quality for turfgrass irrigation contain from 200 to 800 parts per million (ppm) soluble salts. Soluble salt levels above 2,000 ppm may injure turfgrass; recycled irrigation water with salt levels up to 2,000 ppm may be tolerated by some turfgrass species (Table 2), but only on soils with exceptional permeability and subsoil drainage. Good permeability and drainage allow a turfgrass manager to leach excessive salt from the rootzone by periodic heavy irrigations. Sand-based golf greens create the proper soil structure for this form of salinity management.

Table 2

The relative tolerances of turfgrass species to soil salinity (ECe).

Sensitive (<3 dSm^{-1})	Moderately Sensitive (3 to 6 dSm^{-1})	Moderately Tolerant (6 to 10 dSm^{-1})	Tolerant (>10 dSm^{-1})
Annual Bluegrass	Annual Ryegrass	Perennial Ryegrass	Alkaligrass
Colonial Bentgrass	Creeping Bentgrass	Tall Fescue	Bermudagrasses
Kentucky Bluegrass	Fine-Leaf Fescues	Zoysiagrasses	Seashore Paspalum
Rough Bluegrass	Buffalograss		St Augustinegrass

From: M. A. Harivandi, J.D. Bulter, and L Wu. 1992 Salinity and turfgrass culture In: , Tuffgrass D.V. Waddington, R.N. Carrow, and R.C. Shearman (eds.) pp. 207-229. Series No. 32 American Society of Agronomy, Madison, Wisconsin, U.S.A.

Table 2 is a general guide to the salt tolerance of individual turfgrasses. As indicated, soils with an ECe below 3 dSm-1 are considered satisfactory for growing most turfgrasses. Soils with an ECe between 3 and 10 dSm-1 can successfully support only a few salt-tolerant turfgrass species.

Table 3 lists the parameters that should be considered in evaluating irrigation water quality. As indicated, recycled water with ECw values above 0.7 dSm-1 (or 450 mgL-1), present increased salinity problems. Only careful management will prevent deleterious salt accumulation in the soil if water with a high ECw is used for irrigation. Recycled water with an EC above 3 dSm-1 should be avoided or diluted with less saline water before use for irrigation. The salt tolerance of turfgrass and other plants is expressed in terms of the salt content of the soil rootzone [e.g., as indicated in Table 2, Kentucky bluegrass will tolerate soil salinity (ECe, indicating electrical conductivity of soil water extract) at levels up to 3 dSm-1]. Therefore, soil physical characteristics and drainage, both important factors in determining rootzone salinity, must also be considered when deciding about the suitability of a given recycled irrigation water. For example, water with an ECw of 1.5 dSm-1 may be successfully used on grass grown on sandy soil with good drainage (and thus high natural leaching), but prove injurious within a very short period of time if used to irrigate the same grass grown on a clay soil or soil with limited drainage due to salt buildup in the rootzone.

SODIUM

Sodium content is another important factor in recycled irrigation water quality evaluation. Plant roots absorb sodium and transport it to leaves, where it can accumulate and cause injury. Thus, symptoms of sodium toxicity resemble those of salt burn on leaves. Recycled irrigation water with high levels of sodium salts can be particularly toxic if applied to plant leaves by overhead sprinkler, since salts can be absorbed directly by leaves. Sodium toxicity is often of more concern on plants other than turfgrasses, primarily because accumulated sodium is removed every time grass is mown. Among grasses grown on golf courses, annual bluegrass and bentgrass are the most susceptible to sodium phytotoxicity. In their case, mowing may not provide protection, since grasses are generally cut very short (a stress in itself), and any sodium accumulation will comprise a large proportion of the small quantity of remaining leaf tissue.

Table 3 provides general guidelines for assessing the effect of sodium in irrigation water. As indicated in the table, the level of sodium tolerated by non-turf plants varies with irrigation application method. Most landscape plants will tolerate up to 70 ppm (mgL-1) sodium when irrigated by overhead sprinkler.

Table 3

Guidelines for the interpretations of recycled water quality for irrigation.

Potential Irrigation Problems	Units	Degree of Restriction on Use		
		None	Slight to Moderate	Severe
Salinity				
EC_W	dSm^{-1}	<0.7	0.7 to 3.0	>3.0
TDS	mgL^{-1}	<450	450 to 2,000	>2,000
Soil Water Infiltration				
Evaluate using EC_W (dSm^{-1}) and SAR together:				
if SAR = 0 to 3 and EC_W =		>0.7	0.7 to 0.2	<0.2
if SAR = 3 to 6 and EC_W =		>1.2	1.2 to 0.3	<0.3
if SAR = 6 to 12 and EC_W =		>1.9	1.9 to 0.5	<0.5
if SAR = 12 to 20 and EC_W =		>2.9	2.9 to 1.3	<1.3
if SAR = 20 to 40 and EC_W =		>5.0	5.0 to 2.9	<2.9
Specific Ion Toxicity				
Sodium (Na)				
Root Absorption	SAR	<3	3 to 9	<9
Foliar Absorption	$meqL^{-1}$	<3	>3	—
	mgL^{-1}	<70	>70	—
Chloride (Cl)				
Root Absorption	$meqL^{-1}$	<2	2 to 10	>10
	mgL^{-1}	<70	70 to 355	>355
Foliar Absorption	$meqL^{-1}$	<3	>3	
	mgL^{-1}	<100	>100	
Boron (B)	mgL^{-1}	<1.0	1.0 to 2.0	>2.0
Miscellaneous Effects				
Bicarbonate (HCO_3)	$meqL^{-1}$	<1.5	1.5 to 8.5	>8.5
	mgL^{-1}	<90	90 to 500	>500
pH	—	normal range:	6.5 to 8.4	
Residual Chlorine	mgL^{-1}	<1.0	1 to 5	>5

Adapted by: M.A. Harivandi from Westcot, D.W. and R.S. Ayers 1984. Irrigation water quality criteria In: Pettygrove, G.S., and T. Asano (eds.). Irrigation with reclaimed municipal wastewater — A guidance manual. Report No. 841-1wr. California State Water Resources Control Board, Sacramento, California; and from: Farniham, D.S. et al 1985. Water Quality: Its effects on ornamental plants. University of California Cooperative Extension Leaflet. 2995. Div. of Agric. Nat. Resources, Oakland, California.

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SAR (SODIUM ADSORPTION RATIO)

Although sodium can be directly toxic to plants, its most frequent deleterious effects on plant growth are indirect due to its effect on soil structure. It is this latter effect that is most often of concern to golf course superintendents and other professional managers of intensively used turfgrasses.

When irrigation is applied to soil, the best indicator of sodium effect is a recycled water's Sodium Adsorption Ratio (SAR), a value that should be provided in all laboratory water analyses. Although, in general, water with an SAR below 3 is considered safe for turf and other ornamental plants (Table 3), SAR is an important enough factor in water evaluation to merit thorough understanding.

Weak, thin turf is the result of salt accumulation in heavy soils due to use of recycled irrigation water.

The high sodium content common to recycled water can cause deflocculation or breakdown of soil clay particles, reducing soil aeration and water infiltration and percolation. In other words, soil permeability is reduced by a recycled irrigation water high in sodium. The likely effect of particular irrigation water on soil permeability can be best gauged by the water's SAR in combination with the ECw (Table 3).

Generally, recycled water with an SAR above 9 can cause severe permeability problems when applied to fine-textured (i.e., clay) soils over a period of time. In coarse-textured (i.e., sandy) soils, permeability problems are less severe and an SAR of this magnitude can be tolerated. Golf greens constructed with high-sand-content rootzone mixes, for example, can be successfully irrigated with high-SAR water because their drainage is good.

For recycled waters high in bicarbonate, some laboratories "adjust" the calculation of SAR (yielding a number called "adjusted SAR" or "Adj. SAR") because soil calcium and magnesium concentrations are affected by the water's bicarbonate. In simplest terms, Adj. SAR reflects the water content of calcium, magnesium, sodium, and bicarbonate, as well as the water's total salinity. Other labs are adjusting the SAR value using a newly introduced method and report the adjusted value as RNA.

INTERACTION OF SALINITY AND SAR

Salts and sodium do not act independently in the plant environment. The effect of sodium on soil particle dispersion (and therefore permeability) is counteracted by high electrolyte (soluble salts) concentration; therefore, a water's sodium hazard cannot be assessed independently of its salinity. The combined effect of water ECw and SAR on soil permeability is given in Table 3. Note that the table provides general guidelines only. Soil properties, irrigation management, climate, a given plant's salt tolerance, and cultural practices all interact significantly with recycled water quality in the actual behavior of soils and plant growth.

BICARBONATE AND CARBONATE

The bicarbonate, and to a lesser degree carbonate, content of recycled irrigation water also deserves careful evaluation. Recycled waters, as well as well waters, are especially prone to

Application of salty recycled water has caused burn and necrosis of leaf margins.

containing excessive bicarbonate levels. Substantial bicarbonate levels in irrigation water can increase soil pH and may affect soil permeability. In addition, bicarbonate content may make itself obvious during hot, dry periods, when evaporation may cause white lime ($CaCO_3$) deposits to appear on leaves of plants irrigated by overhead sprinklers.

Although high levels of bicarbonate in water can raise soil pH to undesirable levels, it is bicarbonate's negative impact on soil permeability that is more often a concern. As mentioned above, the bicarbonate ion may combine with calcium and/or magnesium and precipitate as calcium and/or magnesium carbonate. This precipitation increases the SAR in the soil solution because it will lower the dissolved calcium concentration.

Table 3 indicates tolerable levels of bicarbonate in irrigation waters. The bicarbonate hazard of recycled water may be expressed as Residual Sodium Carbonate (RSC), calculated as follows:

(5) $RSC = (HCO_3+CO_3)-(Ca+Mg)$

In this equation, concentrations of ions are expressed in meqL-1 [see Equation (2) and Table 1 for conversions].

Generally, recycled water with an RSC value of 1.25 meqL-1 or lower is safe for irrigation, water with an RSC between 1.25 and 2.5 meqL-1 is marginal, and water with an RSC of 2.5 meqL-1 and above is probably not suitable for irrigation.

pH (HYDROGEN ION ACTIVITY)

The pH is a measure of water's acidity and alkalinity and is measured in pH units. The scale ranges from 0 to 14, with pH 7 representing neutral (i.e., water with a pH of 7 is neither acidic nor alkaline). Moving from pH 7 to pH 0, water is increasingly acidic; moving from pH 7 to pH 14, water is increasingly basic (or "alkaline"). pH units are on a logarithmic scale, which means that there is a tenfold change between each whole pH number. Thus, a water with pH 8 is 10 times more basic than a water with pH 7, and 100 times more basic than a water with pH 6. Water pH is easily determined and provides useful information about the water's chemical properties. Although seldom a problem in itself, a very high or low pH warns the user that the water needs evaluation for other constituents. The desirable soil pH for most turfgrasses is 5.5 to 7.0; the pH of most irrigation waters, however, ranges from 6.5 to 8.4. Depending on the soil on which the grass is grown, an irrigation water pH range of 6.5-7 would be desirable. Recycled water with a pH outside the desirable range must be carefully evaluated for other chemical constituents.

CHLORIDE

In addition to contributing to the total soluble salt concentration of irrigation water, chloride (Cl) may be directly toxic to plants grown on a golf course. Although chloride is not particularly toxic to turfgrasses, many trees, shrubs, and ground covers are sensitive to it.

Chloride is absorbed by plant roots and translocated to leaves, where it accumulates. In sensitive plants, this accumulation leads to necrosis — leaf margin scorch in minor cases, total leaf kill and abscission in severe situations. Similar symptoms may occur on sensitive plants if water high in chloride is applied by overhead sprinklers, since chloride can be absorbed by leaves as well as roots. Turfgrasses tolerate all but extremely high levels of chloride as long as they are regularly mowed.

Chloride salts are quite soluble and thus may be leached from well-drained soils with good subsurface drainage.

As indicated in Table 3, recycled irrigation water with a chloride content above 355 mgL-1 is toxic when absorbed by roots, while a chloride content higher than 100 mgL-1 can damage sensitive ornamental plants if applied to foliage.

CHLORINE

Municipal recycled water may contain excessive residual chlorine (Cl2), a potential plant toxin. Chlorine toxicity is almost always associated only with recycled waters that have been disinfected with chlorine-containing compounds. Chlorine toxicity will occur only if high levels of chlorine are sprayed directly onto foliage, a situation likely to occur only where recycled water goes straight from a treatment plant to an overhead irrigation system. Free chlorine is very unstable in water; thus, it will dissipate rapidly if stored for even a short period of time between treatment and application to plants. As indicated in Table 3, residual chlorine is of concern at levels above 5 mgL-1.

BORON

Boron (B) is a micronutrient essential for plant growth, though it is required in very small amounts. At even very low concentrations (as low as 1 to 2 mgL-1 in irrigation water), it is phytotoxic to most ornamental plants, capable of causing leaf burn (Table 3). Injury is most obvious as a dark necrosis on the margins of older leaves. Turfgrasses are generally more tolerant of boron than any other plants grown on a golf course; however, they are more sensitive to boron toxicity than to either sodium or chloride. Most will grow in soils with boron levels as high as 10 ppm.

NUTRIENTS

Recycled waters always contain a range of micro (trace) elements sufficient to satisfy the need of most turfgrasses. They may also contain enough macro (major) nutrients (i.e., nitrogen, phosphorus, and potassium) to figure significantly in the fertilization program of large turfed areas.

Most laboratories test recycled water for nutrient content and often report nutrients in "lb./acre ft. of water applied." The economic value of these nutrients can be substantial. Even where the quantities of nutrients are low, because they are applied on a regular basis, the nutrients can be used very efficiently by plants. If the laboratory report does not include the lb./acre ft. of nutrients, the following conversion formula can be used to determine this value for any nutrient contained in irrigation water:

(6) lb./acre ft. of nutrient = nutrient content (mgL-1 or ppm) ¥ 2.72.

SUSPENDED SOLIDS

Suspended solids (SS) in irrigation water refers to inorganic particles such as clay, silt, and other soil constituents, as well as organic matter such as plant material, algae, bacteria, etc. These materials do not dissolve in water and thus can be removed only by filtration, an essential step for most irrigation systems in which plugged sprinkler head openings and/or valves reduce system efficiency and life.

An extreme example of a salty crust on an area where the turf has disappeared.

Evaluating Recycled Waters for Golf Course Irrigation

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The suspended solids in domestic municipal water sources are negligible and not a cause for concern. However, suspended solids should be monitored in wells, canals, and especially lakes or ponds storing recycled water used for irrigation. Nitrogen and phosphorus in recycled water can lead to algae growth in storage lakes during the winter. Such growth can pose a major concern when the water is introduced into an irrigation system. In addition to the mechanical problems they present for irrigation systems, suspended solids and algae can seal a soil surface, especially on sand-based golf greens and sand bunkers. Solids can fill in air spaces between sand particles, reducing infiltration and drainage, and increasing compaction. Since these effects vary considerably with type of solid, irrigation system, and turfgrass soils, it is difficult to formulate acceptable suspended solid values for irrigation water. The complexity and variability of irrigation waters and systems make effective filtration the most sensible approach to controlling hazards posed by suspended solids and algae in recycled water.

INTERPRETING WATER QUALITY HAZARD

As the preceding indicates, recycled water quality must be analyzed on an individual basis. There are very few recycled water sources that are absolutely unsuitable for turfgrass irrigation. While the discussion presented here can be used as a general guide to help turfgrass managers determine whether a water quality problem exists, the precise nature and magnitude of a potential problem may require more than water analysis. Climate, soil chemistry and physics, use patterns, and turf quality expectations will all contribute both to any problem and to any potential remedies.

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Editor's Note: Although this article was written specifically about the use of recycled water for irrigation, all the information is pertinent for all golf course irrigation water quality.

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OGSA Sponsors "The Fraz"

by John Bladon, Editor

Canadian golf and golfers lost a great friend and supporter in 2000 when the Toronto Star's veteran golf writer Rick Fraser, known to golfing community as "The Fraz" passed away.

To perpetuate his memory, the Greater Toronto Area Golf Association has named it's annual Media Day, which promotes the Toronto Star Amateur and the Toronto Star Women's Amateur, in Rick's honour. This day, organized by Glenn "Goodie" Goodwin of the Star, salutes the sports journalists who have helped make the Greater Toronto Area the number one golf market in North America.

Glenn has been a long and ardent supporter of the OGSA and our continued inclusion in this event allows us the opportunity to communicate with the top writers and broadcasters from the golf and sporting community. Often we talk amongst ourselves and our industry about our successes, however, this event represents a significant opportunity to see some of those stories reach beyond and potentially facilitate a greater understanding of our profession.

This year's event was held at the beautiful Weston Golf and Country Club and host Superintendent, Rob Ackermann, presented us with a superbly conditioned product. Rob and his team, with contractor TDI International, are in the midst of 1.8 million dollar renovation plan which includes complete course bunker reconstruction, the resurfacing, rerouting and curbing of all cart paths and a redesigned practice facility. The field was treated to a peek at the work in progress and the results were impressive. Carrick Design has set a plan in motion that will give Weston a traditional feel and an aura consistent with its age and original intent.

Some of the representation at the 6th annual "Fraz" Media Day included; The Toronto Star, The Toronto Sun, The National Post, The Hamilton Spectator, The Peterborough Examiner, The Barrie Examiner, The KW Record, Score Golf, Golf Canada Magazine, CITY-TV, Rogers Sportsnet, TSN and CBC.

L-R Rob Ackermann, Glenn Goodwin and Paul Scenna, with Rick Frazer's portrait in foreground.

Weston Golf & CC 10th hole without sand added to newly renovated bunkers.

17th hole with new greenside bunkers

Behind the Green at Augusta National

by Nick Ovington, Second Assistant Superintendent, Sunningdale Golf Club

I had never really believed that I would see the Masters from anywhere other than my own living room, watching from a distance the perfect swings and the crucial putts on the carpet-like greens. I never imagined that I could be part of it. However, as they say, if you don't ask, you don't get.' So, I asked…

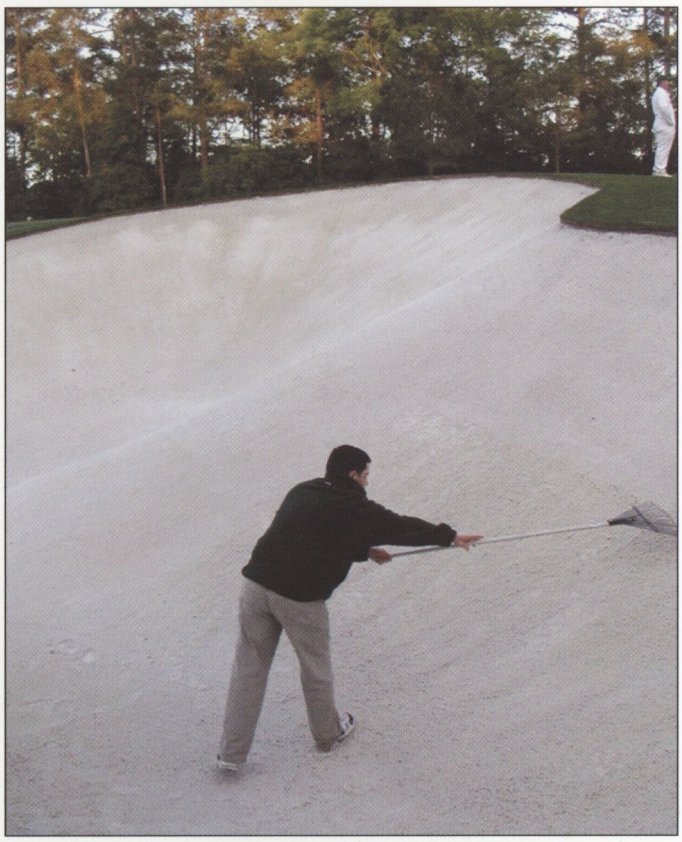
It was a cool fall morning in 2003 and, with my working visa due to expire, I knew my time in Scotland was ending. Working on the St. Andrews Links was an amazing experience, but it only whet my appetite for more such challenges. While chatting with my boss, Gordon Moir, I found myself asking, "How do I get to Augusta?" And that is how my dreams became reality, just like that. He gave me the email address of a contact of his at Augusta. My message was received and replied to promptly, informing me that my name would be entered into the 'bullpen' should a position open on the turf maintenance volunteer list for the 2004 Masters.

Months went by… I had said goodbye to all of my Scottish friends and made my way home to Canada in search of a job. I checked my email account with great frequency (some would say abnormally) before eventually getting the news. My eyes darted across the words, scanning the page, trying to extract more from their meaning. There it was, I was in! I had been selected, along with 49 other international volunteers, to assist the Augusta National greens staff. Home alone and desperate to share the news, I frantically began phoning family and friends.

The planning began and in the midst of finding accommodations for the week, proper attire (we had to bring our own clothes- Beige khakis, white or green golf shirts, and tennis shoes) and arranging how to get to Augusta and back, I was still trying to find myself a full-time job. I was soon hired as Second Assistant at Sunningdale Golf Club, in London, under the direction of Mr. Tim Webb, who kindly allowed me to head off for Augusta during one of the busiest times of the year. "I can't take that from anybody", Tim told me, and he wished me all the best on my week away from a job that I had accepted only three short weeks prior to my departure!

Away, my parents and I went to Augusta that first weekend in April 2004. It was the Sunday morning when it dawned on me that I had actually arrived… I was frantic, looking for the course, only to learn that it was behind the green gates at the corner of Washington and Birckmans Road and I would have to wait. My first crew meeting began that afternoon at 6:00 p.m. I walked in and it felt like a dream. There I was in the turf maintenance department of Augusta National! I was by far the youngest person in that room full of superintendents, suppliers and assistants. A few staff members directed me to the front desk where the secretary handed out the daily task assignment folders for the week. After getting seated, folders in hand, Superintendent, Brad Owen welcomed us. Safety overviews were conducted to make us aware of the potential hazards we may encounter throughout the week. Following this, each team met in designated areas to go over procedures for their specified tasks for the week and to answer any questions that anyone had. I was part of a 13-person bunker team in charge of 11 fairway and 33 greenside traps. In a short period of time, I became confident with the personnel and the routine for the week.

Each morning, myself and 12 other individuals, both volunteer and staff tackled 44 of the most perfect white



sand bunkers that I have ever come across. I found the first two days to be somewhat tedious but I will tell you now, after two years on this assignment, I have a greater appreciation for what it takes to create a perfect bunker. I quickly became acclimated to the staff, and the routine of the tournament week. It was nice to have the first three days of the week to practice and get a feel for what the job entailed, but come tournament days, we were definitely under the gun. "It's go time!" we were told, and we knew it.

The tournament workday begins at 5:30 am, weather permitting. The first task of prepping bunkers took about three hours. We then had a bit of time to grab a snack before heading out to our next assignment. My co-worker and I headed out to "Amen Corner" where we were stationed to tend to the 11th green. In the case of any impediment falling from a tree or being splashed from a bunker, the official would give us the signal and out we would go, ever so proudly. My day ended around 1 pm and at this point, I had the free time to watch some golf as well as pick up some of those sought after hats and shirts that can only be purchased on club grounds. When 4:00 pm arrived, I was back on duty, getting those bunkers into shape after a full day's play. Between the shoveling, rolling, blowing, watering, wet-raking, fan-raking, and brooming, it was quite the ordeal. It is bunker maintenance to the extreme. The day typically ended at about 8:00 pm, depending on what Mother Nature threw at us. This year, we had more rain than last and it forced the vital squeegeeing of wet fairways to have them ready for play.

Thursday through Sunday was invigorating. You could see the focus and determination in the eyes of the players, all of whom wanted to take home the most coveted prize in the game. I was happy with the results of both this year and last. I have wanted Phil to win for a while; he has always been a favourite of mine. Good for Tiger though, he is a worthy champion as well.

In closing, without the support of family and friends, as well as Tim and my co-workers at Sunningdale, I would not have had the opportunity to experience the "Legend of Augusta" and I am thankful.

Above the hole

by Justin Parsons, Student & Intern
Trafalgar Golf & Country Club

Leaving a golf club you have been at for several years is never an easy thing to do. Unless of course that club is a 9-hole public facility in Wawa, Ontario, then I imagine it would be a move met with unbridled bliss. But for the most part, the transition from familiarity to the unknown is about as popular as a 'dry' wedding reception.

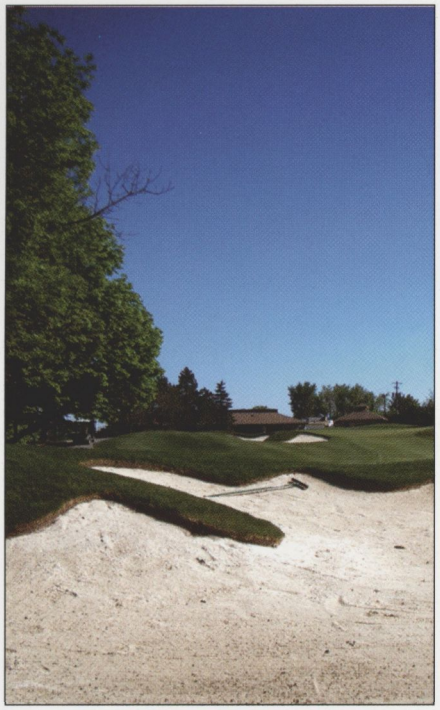
This was exactly the position I found myself in earlier this year when I switched golf courses. The first couple of weeks were rather hard, especially since there is a real 'old boys club' at Trafalgar. And, when I say 'old boys', I mean Matlock and lights out at 7 pm. For some reason, they were not the least bit impressed by my knowledge of urban street apparel or my Seinfeld-esque brand of humour. You can only imagine how difficult I found it to fit in. But, rather than submit to a summer of lunches in my car, I decided to persevere.

I believe one of the keys to being a good superintendent is being able to manage people and that means finding a level on which you can relate to them. Through this connection you will hopefully establish a respect that will facilitate a productive working environment. Needless to say, once the old guys were aware of my dependency on Lakota for back pain relief and my disdain for music played above 42 decibels, they were willing to accept me with open arms. Since then, we have all enjoyed a fruitful partnership. For example, they have shown me all the hot-spots for golf balls resulting from wayward shots and I have shown them how to cut around bunker rakes without getting off the mower. They have also taught me that when it comes to break time, 15 actually means 25 and 30 actually means 45. Even though I haven't quite figured out the formula yet, I can assure you that this is some math I don't mind doing. It's like the quarterback rating in football. Nobody knows how it works, but it sure looks right. Speaking of QB rating, I think there should be some type of weekly rating for all the turf employees. Superintendents could base it on performance, productivity and attitude. What better way to motivate your staff? Each and every Friday afternoon, the crew could gather around the punch clock to determine where they rank. I can see it now, "Oh man! I dropped 10 points! I knew I should have tamped that sod work on 15 tee". Well, it's just a thought.

Headed for Higher Ground

by John Bladon, Editor

London, Ontario is home to some great golf courses. One of the city's oldest and most storied properties sits surrounding the highest point within London and is aptly named. The Highland Golf and Country Club has hosted the likes of the Ontario Ladies Amateur and the Canadian Club Pro Championships as well as the annual Highland Amateur. Originally constructed in 1922, of late, this Stanley Thompson design has undergone some significant changes in an attempt to remain competitive and continue catering to its diverse



clientele. Behind the scenes though, one thing has remained the same.

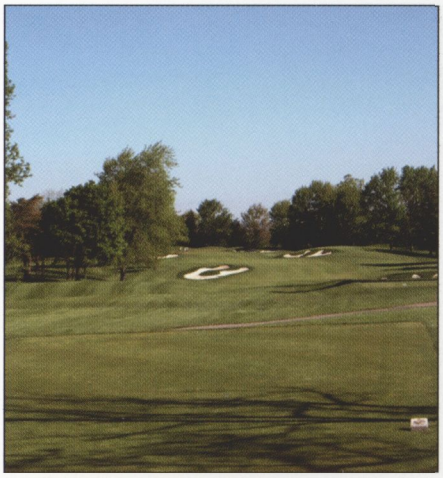
A rarity, in our ever-changing times, is the man who has remained at the helm of Highland's maintenance regime for the past 32 years, Graham Shouldice. As a youngster, Graham caddied at the London Hunt Club until given a job by then Superintendent, Morley Findlay, mowing grass. For two summers, he pushed a rotary mower around trees and bunkers across the entire Hunt Club property and when the task was completed, he started again. Eventually, Graham went on to become a high school teacher and finding great enjoyment in the outdoors and golf, he began spending his summers off working at Highland. After seven summers, when the opportunity arose in 1973 to become Stew Mills' assistant, Graham leapt at the chance. Within a year, he completed the jump to Superintendent and said goodbye to his career as a high school teacher.

Over the years at Highland, the site's clay presented the biggest challenges and in fact, during many a spring, there were specific areas of the golf course that would remain unplayable until May. Miles of drainage tile has been installed throughout the property, under Graham's direction, improving those areas dramatically. Highland's original green sites, with the exception of one, remain intact and have been completely tile drained as well. Coupled with a long history of sand topdressing, the greens now perform similarly to a USGA type construction. Although golf maintenance technology has improved dramatically through Graham's tenure, it has risen with the conditioning demands of the golfer and though designed to make the job easier, Graham suggests in some instances it has made the superintendent's job more difficult.

"We have always remained focused on the simple things, the basics; fertility, drainage and sound cultural practices. Over the years, in spite of all the advancements, they have served us well at Highland." -GS

More than ten years ago now, Highland began putting a financial plan in place for major renovations and Carrick Design was entrusted with conceiving a master plan for the golf course. The long range renovation plan included; tee reconstruction and renovation, bunker renovation and construction, tree inventory and assessment, fairway recontouring, a new double row automated irrigation system and 1100 GPM pumping station, reservoir and transfer pumping station, rerouting of all the golf course traffic including golfers, maintenance and cart traffic.

"We found that the emphasis in the golf community was on adding length and although we did add some length, we actually shortened the golf course with some tee construction as well. The idea



was to update the golf course to meet current standards, but at the same time, transition it into a more playable entity for all types of player."-GS

In the early part of 2004, after much "blood, sweat and tears", the last of the on course renovations were completed with the help of Kitchener firm, Gateman and Milloy. The bunkers were the final phase of this master plan. Existing ones were all renovated and 13 new ones were added, each filled with Ohio 535 sand. This final touch brings a distinct Thompson flavour back to Highland and gives Graham intense satisfaction. After all these years, Graham says he can see the fruits of his labour and wouldn't trade back the time for anything. He suggests he has always been challenged, and is deeply appreciative of the friendships built on the Highland grounds where he and wife Linda have raised three children, two of whom ironically, have ended up on golf scholarships to US universities.

Deserving of it's lofty London perch, Highland Golf and Country Club appears prepared to remain competitive for many years to come and has embraced some of its rich history in the process. Over the past 32 years, the man behind its maintenance regime has left an indelible mark. Yes, the next 32 are looking good indeed.

by Daisy Moore

Ornamental Grasses

Ornamental grasses are loved for their beauty, stature and grace. They can be used as specimen plants in show gardens and they make good companions to flowering plants in perennial gardens, rockeries and even containers. Ornamental grasses are surprisingly low maintenance and pest free. The diversity of size, colour and growth habit makes them an impressive component of any garden, large or small.

Ornamental grasses are in the family, Gramineae, along with their cousins the turf grasses. In general, ornamental grasses respond in a similar fashion as turf grasses to cultural practices and site conditions. For example, they don't grow well in shade, they will spread if cut down, they will grow thicker and taller in moist conditions and they will grow poorly in dry conditions. Nitrogen fertilization will accelerate growth of the foliage at the expense of flowers. Flowers are borne on stalks that usually rise well above the foliage and the seeds are spread by the wind. Ideal conditions for most ornamental grasses are not unlike what you want for a green, except that you don't mow or fertilize.

I use ornamental grasses all the time when I design gardens. The larger types are used as accents, as hedges or wind breaks, or simply as part of the perennial garden. *Calamagrostis sp.*(feather reed grass), or *Molinia sp.* are medium-sized clump-forming grasses that are suitable as a centrepiece in a garden or as a contrast to flowering plants. Birds love the seeds of *Molinia*. *Panicum* (Switch grass) is a good medium sized grass that is chosen for its fall colour. For the best effect it is best planted in masses.

Slightly taller and more robust ornamental grasses include *Cortaderia sp.* (pampas grass) and the many varieties of Miscanthus. These are outstanding individuals and can be planted alone as well as grouped with other plants. One of my favourite grasses is Zebra grass *Miscanthus sinensis 'Variegatus'*. The leaves are lined with white horizontal bands along their length. This unique leaf variegation makes it stand out. Another favourite from the Miscanthus group is Maiden grass. This is the classic pillar of grass forming 2-3 foot diameter clumps standing 4-5 feet tall. They take up substantial space in the garden and are well worth it.

Ornamental grasses work well in smaller gardens as well. *Festuca ovina* var *glauca* (blue fescue) forms blue-grey clumps with delicate seed heads and is quite drought tolerant. A larger version of this is *Helictotrichon sp.*(blue oat grass). *Imperata* (Japanese Blood Grass) grows to 12 inches high with red growing tips. When grown in masses it forms a scarlet band and makes an excellent border plant.

Native grasses are yet another group of ornamental grasses with which we are just becoming familiar. I recently came upon a sward of Sweet grass (*Hierochloe odorata*) that made me realize that I must find more places to accommodate this plant. Sweet grass spreads easily, has lime green foliage with yellow seed heads and most importantly can be harvested in the fall, dried, and made into braids. When burned, these will scent the home with a lovely sweet aroma. The important thing with sweet grass is giving it room to grow in order to form these impressive swards. If you don't have the space for sweet grass then here are a few native grasses to try. Little blue stem (*Andropogon scoparium)* is a clump forming grass with blue-green foliage that grows 2-3 feet in height. It has fabulous fluffy white flowers that line the stem in the early fall, followed by an impressive fall colour. Indian grass *(Sorghastrum nutans)* is a handsome tall prairie grass that produces glossy, copper, plume like seed heads in August. It grows well with broadleaf plants and the flowers are particularly unique and striking. Canada wild rye *(Elymus canadensis)*, Prairie dropseed *(Sporobolus heterolepus)* and Bottlebrush grass (*Hystrix patula)* are all native grasses that are worth growing for their flowers.

Ornamental grasses are bound to become even more popular as we use them more and learn more about them. More and more types and variations are becoming available and we are just beginning to appreciate their subtle beauty. This leads to another group of plants that will soon take our gardens by storm and those are the sedges and rushes. I will need to dedicate another article to these beauties.

Daisy Moore is a horticulturist and garden designer. She works with commercial (including golf) and residential properties throughout the GTA. Daisy hosts "The Gardening Show" on 570news, Saturday mornings 7-8am.

If you have any questions you can visit my website www.daisymoore.com
Listen to The Gardening Show on 570news (www.570news.com) Saturday mornings 7-8
Visit my website www.daisymoore.com for more tips on gardening.

Turf or consequences

by Doug Breen, Superintendent
Golf North Properties

Taraxacum Officinale

Taraxacum Officinale. Never heard of it, right? Sure you have. It's an ancient plant that's had many, many names through history. Names like Bitterwort, Priest's Crown, Doonheadclock, Blowball, Swine Snout, Cankerwort, and my personal favorite Piss-a-bed. The common English name comes from the French phrase for "teeth of the lion" – "dents de lion" – Dandelion. Every year we all spend a lot of time and money in the endless attempt to eradicate these weeds from our courses, and every following year they return with a vengeance. Why do we do it?

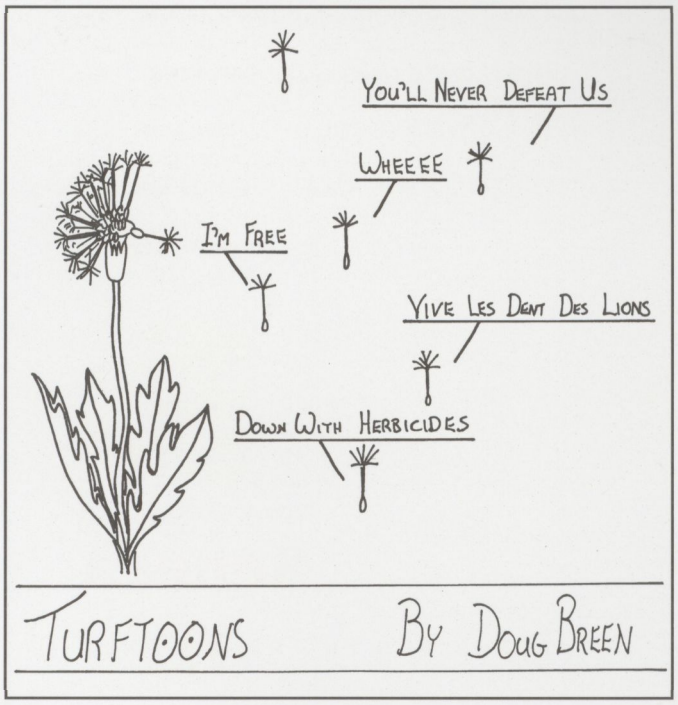
What is it about those wee yellow flowers that make us despise them so intently. Is it the colour? What if they were bright purple, or Toronto Maple Leaf blue? If every spring, during the Stanley Cup run, everyone's lawn automatically shot up little blue tributes to the Leafs, would we still kill them, or would the nurseries be sold out of them? I think they'd sell faster than those stupid window flags do whenever Toronto gets to the second round.

If the flowers and leaves were less ragged looking would it help? What if they smelled like apple blossoms? What if they didn't have those messy seed heads? Even the lowly Thistle, which last time I looked was still on the noxious weeds list, gets *some* respect. Heck, it's the symbol of an entire nation! Admittedly, it's the symbol of the nation that brought us bagpipes and men in kilts, but it's also the motherland of curling and, (reverent pause) golf. According to my atlas, there are 190 sovereign states in the world today, yet not one of them has adopted the Dandelion as it's symbol. Why?

It is a truly remarkable plant. A quick Google search gleaned millions of matches for the history of Dandelions, but the most interesting one was a website where in January 2002, it was the "herb of the month". This put it in the esteemed ranks of such herbs as Cocklebur and Bladderwort. Heady company, to be sure. Dandelions have been used since the dawn of time for medicinal purposes. They have more vitamin A than carrots, and more iron than spinach. Both Bugs Bunny and Popeye could have done better with a few yellowheads. They are not native to North America, but were introduced by early settlers and have done pretty darned well for themselves, in my humble opinion. Those seeds can blow for miles, germinate, and survive on bare concrete. The taproot can go down many feet, and if you pull up 99.9% of the plant but leave three cells of the root, a bigger plant will replace it. You can eat it, make wine from it, and Dandelion beer is quite tasty I'm told.

I think it all comes down to jealousy. That's right, I'm proposing that we're all just jealous of a plant. We hate it because it's so stinking successful. No one likes an over achiever. It's like that guy down the street who's always going on and on about his investments, and stupid retirement plan, and his cottage at the lake where he keeps his stupid boat, and his 20 year old trophy wife who worships the ground he walks on. I hope he chokes on a hundred dollar steak and dies! OK, so I've got some neighbour issues, but you all know what I mean by jealousy. I think it just drives us nuts that we all know that no matter what we do, that plant will be sitting there next year laughing at me because I don't have a cottage, or a boat, or a retirement plan, or a bimbo second wife. Want more proof that we hate success? Most prolific insect in the world – cockroach. Most successful animal in the world – rat. We hate them. And apart from the Black Plague, what did they ever do to us? Everybody loves that local band until they actually have some success, get enough money to sleep in a Motel 6 instead of the backseat of their car, and stop living on day old doughnuts. Then we talk about how they've gone "all Hollywood" and "forgotten their roots".

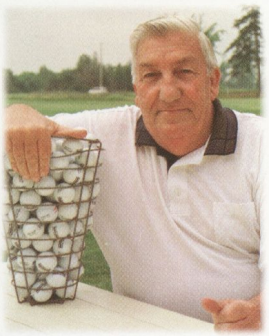
People are petty, envious creatures, and while there are lots of legitimate reasons why we control broadleaf weeds on golf courses, you never hear anyone cursing Plantain do you? We have a very evil part of our brain that's glad that Donald Trump's "hair" looks like crap, elated that Britney Spears is getting fat, and believes that the only good Dandelion is a dead Dandelion.



IN MEMORIUM

Rene Muylaert

by Brent Long



For more than four decades Rene Muylaert criss-crossed the province filling in the Ontario landscape one golf course at a time. For a youngster who grew up on the sandy soil of a tobacco farm near Strathroy, Muylaert found his passion in life by making the world a greener place.

His big break in the golf design business came in 1960. The 24-year-old was asked to be the greens keeper for a new course to be built, Chinguacousy Country Club, now Caledon Country Club. As it turned out, the first architect hired for the project declined and developer S. B. McLaughlin asked Muylaert to step in and design the course. He obliged. A year later, Muylaert was asked to design nearby Glen Eagle Golf Club north of Bolton and by 1965 designing became a fulltime endeavour.

"I was a greens keeper who started designing on the side. The business kept coming and coming and eventually I quit greens keeping," Muylaert said. At age 69, he had been in semi retirement for the last few years choosing to operate a driving range in London and taking on the odd design job when it came along. "Every job you learned a little more, let's put it that way. I didn't work under anybody. I did it my way. I tried to follow the land."

Muylaert designed new courses and developed renovation plans at existing clubs, while twin brother, Charles looked after the construction end of the projects through his company, Green-Par-Golf Construction. He became a master at designing courses on small sites of 100 to 125 acres because owners didn't want the expense of having to purchase more land than was absolutely necessary. The brothers also operated a sod farm back home in Strathroy, where Muylaert lived until his death on May 7th of a heart attack.

"In those days they didn't throw the millions of dollars around like they're doing today," said Muylaert, who designed most of his courses over the existing land and moved very little earth. "That's the one aspect of the business that has really changed."

Never wanting to stray too far from home, the bulk of Muylaert's work can be found in the GTA, just north of it and throughout southwestern Ontario. It includes the likes of DiamondBack GC in Richmond Hill, Emerald Hills GC in Markham, Hawk Ridge GC in Orillia, Indian Wells GC in Burlington, Greenhills GC and West Haven G and CC in London, Victoria Park East in Guelph, The Oaks GC in Komoka, and Peninsula Lakes GC in Fonthill to name a few.

"It was a simpler process to build a golf course in the early days, no question. It's a big deal to build a golf course today. It's much more complicated," he said. "Most of my years there weren't a lot of environmental problems, people weren't aware of the issues and government agencies weren't involved."

Brent Long operates Longshot Communications – a golf-based writing, photography & communications business in Burlington, ON. He can be reached at brentlong@cogeco.ca

Looking back

25 YEARS AGO TO-DAY

by Barry Endicott, Superintendent
Banty's Roost Golf Club

The Board of Directors of the **OGSA** in 1980 was as follows: **Paul White** (president), **Ken Nelson** (vice), **Doug Hoskins** (sec.), **John Smith** (treasurer), **Stu Mills** (past pres.), **Dan Ardley, Bob Brewster, Al Draper, Shorty Jenkins, Blake McMaster, David Moote** and **Rusty Warkman. Bob Brewster** was editor and **Blake McMaster** was co-editor of *Green is Beautiful.*

There was a March meeting held at Scarboro Golf and Curling Club for the annual curling day. **Bob Moote's** rink beat **Bill Bowen's** rink and won the R.F.M. Trophy. The business section of the meeting, lead by host **Dave Moote**, involved a salary and benefit discussion with **Stuart Mills, Dan Ardley** and **Gordon Witteveen**. A breakdown of the wages and benefits paid to their employees was also given.

The first golf meeting was held on May 5 at Roseland Golf and Country Club, Windsor, hosted by **Bud Hooper. Dr. Vargas** paid a post dinner visit, speaking on the theories about "Maintaining Turf, Not Grass". The Galt Field Day was held on June 12 at Galt with a visit to the University of Guelph Turf Plots. **Dr. Tom Fisher** was the guest speaker. Low gross superintendent was **Bruce Vollett** 74, low net super was **Whitey Jones** 64. Low assistant gross was **Bruce Burger** 72 and low guest gross was **Rod Hermitage**.

The President, Green Chairman and Superintendent Tournament was held Friday, July 25 at the Summit Golf Club, hosted by **Doug Hoskins.** The team from Richmond Hill Golf Club of **Peter Barnett** scored 109 points for first place. **Hugh Kirkpatrick** of Westmount had the low gross round for the day shooting 72. **Andy Bertoni** was guest speaker.

On August 12th a meeting was held at Westview, hosted by **Keith Nesbit**. Low gross scores were **Bill Bowen** and **Hugh Kirkpatrick** with 79 and low net winners were **Bill Hynd** and **Neil Acton** with 70. A discussion was started on the rules of golf, as **Keith** was the head of the rules of golf for **OGA.**

Ken Wright and **Ben Kern** won the Pro-Superintendent Tournament, played at Lake St. George Golf Club, in Orillia, with a score of 153. Low super gross was **Dan Ardley** 78, low super net was **Brent McCaffery** 69, and low pro **Ben Kern** 67.

The McClumpha Tournament was held at Dalewood Golf Club on September 29, hosted by **Dan Ardley**. Low gross superintendent was **Ken Wright** with 74 and low net was **Hugh Kirkpatrick** with 70. A scramble golf day was held at Bayview Golf Club hosted by **Jim Wyllie**. The winning team was **Bob Heron, Shorty Jenkins** and **Dave Dick** with a score of 67. The Christmas Party was held at Lambton Golf and Country Club on November 15.

A **GCSAA** fall seminar was scheduled in Toronto on Landscape I Design Theory for October 29 and 30. Instructors were **William R. Nelson**, University of Illinois and **Mr. C.E. McNinch**, director of independent study, University of Guelph. The 1981 **GCSAA** International Turfgrass Conference and Show was held-on January 25-30 in Anaheim, California.

The first annual Turfgrass Research Foundation Invitational Golf Tournament was held on Friday, August 1st, at the National, hosted by **Ken Wright** with the barbecue being held at the Board of Trade, hosted by **Gord Witteveen.** The tournament raised $2,800 for Turfgrass Research in Ontario. Low gross was **Bob Cherry** with an 84 and low net was **Kimmo Salonen.**

Tom Lewis ended a 55 year career when he went into semi-retirement after serving as head greenskeeper at Kawartha Golf and Country Club for the past 22 years. **Fred Curra** was hired to replace him. **Hugh Moulton,** of Windsor Park Golf Club was killed in a car accident in September. A committee consisting of **Dan Ardley, Bob Brewster, Blake McMaster** and **Thom Charters** was established to study regionalization issues.

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