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Turf app-eal!

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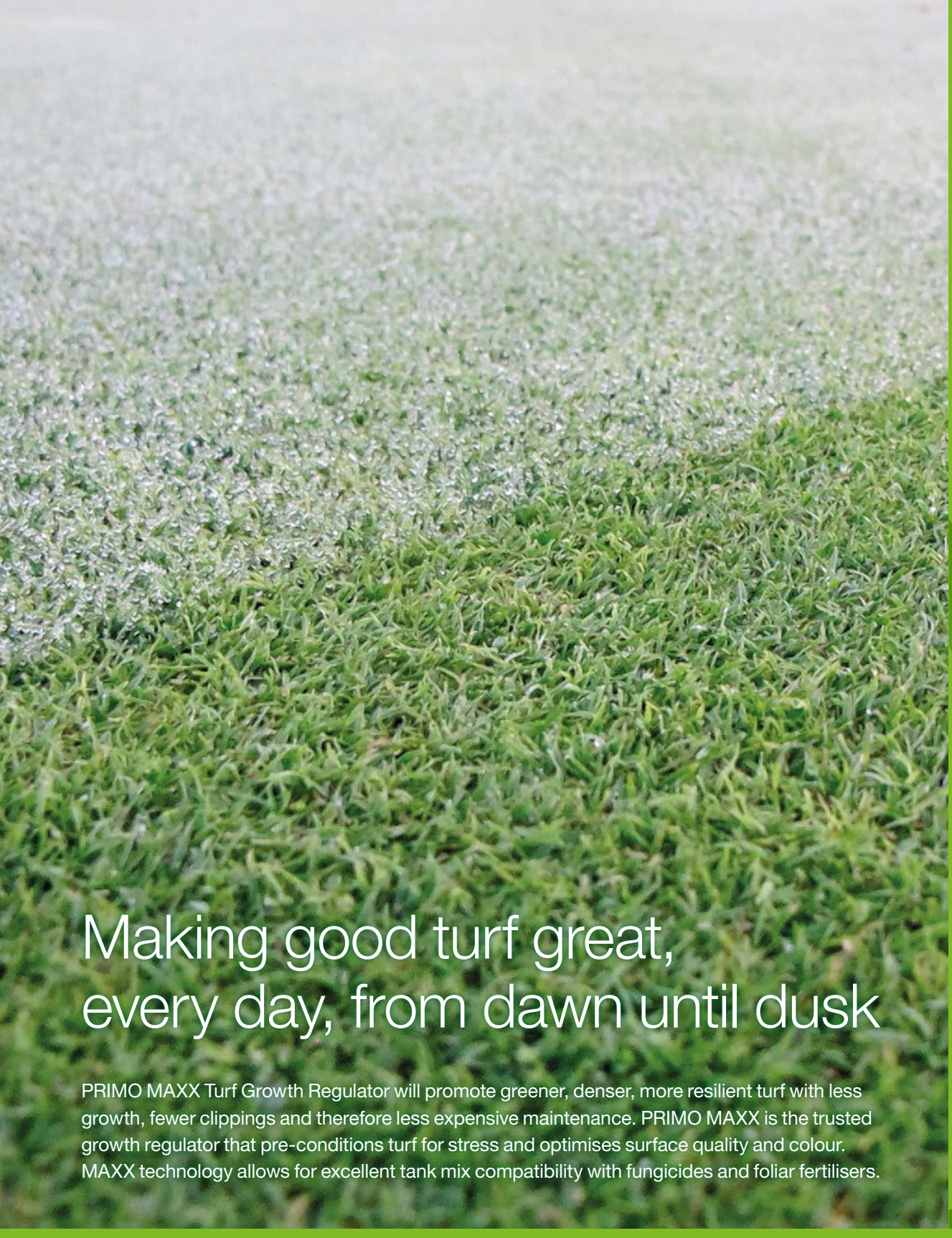
Course construction

Chirnside Park on the Run

Brilliant Brookwater

2013 Isuzu Queensland Open



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COVER

Turf management apps: The range of smart phone apps now available to turf managers can greatly assist their day-to-day turf management operations.

Photo: Brett Robinson

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Social media has changed the way the world communicates both in a social and professional context. Course superintendents and turf managers by nature are hands-on, practical individuals and for some the rise of new communication technology is something that can be difficult to grasp. In this edition's cover story, turf industry practitioners and social media experts Robin Doodson and Nadeem Zreikat take a look at how social media can benefit turf managers and review some of the most useful turf apps currently available and how they can streamline every-day operations on and off the course.

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After many years in the planning, Melbourne's Chirnside Park Country Club will shortly have a brand new home. Called Gardiner's Run, the course is in the final stages of construction with opening scheduled for April 2014. Chirnside Park superintendent Alan Greatorex looks back on the project to date and some of the challenges faced.

Ovals boost for Ormeau 18

Scape Shapes recently completed the construction of the $5.3 million, dual AFL oval Ormeau Sports Park on the Gold Coast. Project leaders Tim Wassell and Scott Johnstone review the project which has delivered a major new recreational facility for the region.

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ATM caught up with Brookwater Golf & Country Club course superintendent Ben Geeson as he and the crew prepared the stunning Greg Norman designed course for the recent return of the new-look Isuzu Queensland Open.

GRASS-ROOTS WITH JOHN NEYLAN

Cutting edge research 28

ATM columnist John Neylan was among a strong contingent of Australian agronomists and turf researchers who converged on Beijing recently for the quadrennial International Turfgrass Research Conference.

RESEARCH

Gaining traction 38

In his follow-up article on anterior cruciate ligament injury in football, the University of Ballarat's Phil Ford looks at boot-surface traction and asks whether ground authorities need to take grass coverage much more seriously by controlling usage, traffic and providing adequate inputs and resources.

Breaking dormancy 42

With the rise in interest of turf colourants, Manuka Oval head curator Brad van Dam conducted a research project that investigated whether the application of pigment sprays on couchgrass helped to break winter dormancy in Canberra's unique climate.

AirField Systems vs USGA green constructions 48

The United States Golf Association has been investigating the performance of a new method of putting green construction which uses a one-inch geocell product called AirDrain to replace the conventional four-inch USGA-spec gravel layer.

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Barry Bryant (SAGCSA); Chris Chapman (STA NSW); Robin Doodson (Sanctuary Cove G&CC); Phil Ford (University of Ballarat); Peter Frewin (AGCSA); Ben Geeson (Brookwater G&CC); Alan Greatorex (Chirnside Park CC); Scott Johnstone (Scape Shapes); Martyn Hedley (STA QLD); Steve Hewitt (VGCSA); Danny Hull (STA ACT); Peter Lonergan (GCSAQ); Kevin McInnes (Texas A&M University); John Neylan (Neyturf); Andrew Peart (AGCSATech); Keisha Rose-Harvey (Texas A&M University); Des Russell (GCSAWA); Phil Ryan (Pacific Coast Design); James Thomas (Texas A&M University); Brad van Dam (Manuka Oval); Jim Vaughan (Turf Queensland); Tim Wassell (Scape Shapes); Brett Woodward (Armidale GC); Nadeem Zreikat (Colin Campbell Chemicals)

In a state of Apple-plexy

I had the rather interesting experience recently of stepping foot inside an Apple Store. Now I'd like to think of myself as somewhat technically savvy, but I departed 45 minutes later with the latest iPad tucked under my arm feeling just a tad meek and insecure.

Having battled the equivalent of rush hour traffic just to get from the store entrance to a table where the object of my desire was located, I was cheerfully accosted by a blue-shirted whippersnapper with far too much hair product. For the next 30 minutes he proceeded to clinically deconstruct all that I thought I knew about the wonderful world of Apple and its devices and opened my eyes up to what apps, besides rugby/AFL/EPL, are on the market and what they can offer both in a personal and professional context.

The iPad has been happily ensconced at home now for a month and aside from a few sessions populating the thing with all manner of apps, it has quickly become the closely guarded property of my seven-year-old son who now not only takes great pleasure in beating me handsomely at most games, but regularly schools me in how to use it. When I think back to the archaic computers I grew up with (I still have fond memories of my Commodore Amiga 500!) you can only but marvel at the way technology has progressed.

While some may lament the intrusive nature of these devices (and I'm certainly in that camp), there is no denying that they have revolutionised the way we not only conduct our lives in a social context but also a professional one. Together with the rise of social media platforms and applications for just about everything nowadays, smartphones and tablets have become essential tools of the trade for many businesses.

Fly now with Virgin Australia and no longer do you need to stuff around with the flickering headrest TV screen and dodgy headphones – simply download the in-flight entertainment app onto your device before you board and voila! In some restaurants now it's not uncommon for the waiter to rock up to your table to take your order via tablet. Hell, even my local patisserie has an app through which to view and order specialty cakes!

As if proof was needed to show how widespread these devices have become, in late July Apple released financial results for its fiscal 2013 third quarter. Posting a quarterly net profit of $6.9 billion, worldwide Apple sold an incredible 31.2 million iPhones (a record for the quarter) and 14.6 million iPads. Serious, serious numbers.

And here's another interesting little stat to digest. Through a handy tool called Google Analytics, the AGCSA can determine what device people use to access the AGCSA website. Comparing August 2012-August 2013 to the corresponding 2011-2012 period, there was an incredible 503 per cent jump in the number of visits to the AGCSA website from Apple devices. The most interesting stat, however, is that 57 per cent of all AGCSA website visits are now from mobile devices.

For turf managers, who are generally of a more practical nature, embracing such technology can be a little bit daunting. Fortunately in Sanctuary Cove G&CC course superintendent Robin Doodson and Colin Campbell Chemicals marketing manager Nadeem Zreikat, the industry has two gents who have fully immersed themselves and use social media and technology to the fullest in their professional capacities.

Following on from their presentation in Melbourne last year, in this edition Nadeem looks at some of the major social media platforms and their benefits, while Robin reviews some of the apps he personally uses. Having had a read, I think I might check a few of them out. Now, where's Kristian so he can download them for me… Enjoy the read.

Brett Robinson, Editor

PETER FREWIN, GENERAL MANAGER, AGCSA

Taking a long, hard look at ourselves

For those based in the southern states winter has been very cold and wet and I am looking forward to the time when daylight hours start to increase and you get an occasional glimpse of the sun. Conversely, those in the northern areas have experienced some lovely weather this winter. I trust the months ahead are kind and we don't see a repeat of those long periods of intense rainfall so that players can experience the wonderful surfaces that turf professionals in Australia are renowned for producing.

All would be aware that golf clubs and many turf based companies have suffered to varying degrees from the weather over the past decade. The impact of extreme weather, drought and, in the case of the past few years, heavy rainfall has significantly reduced revenue coming into many organisations.

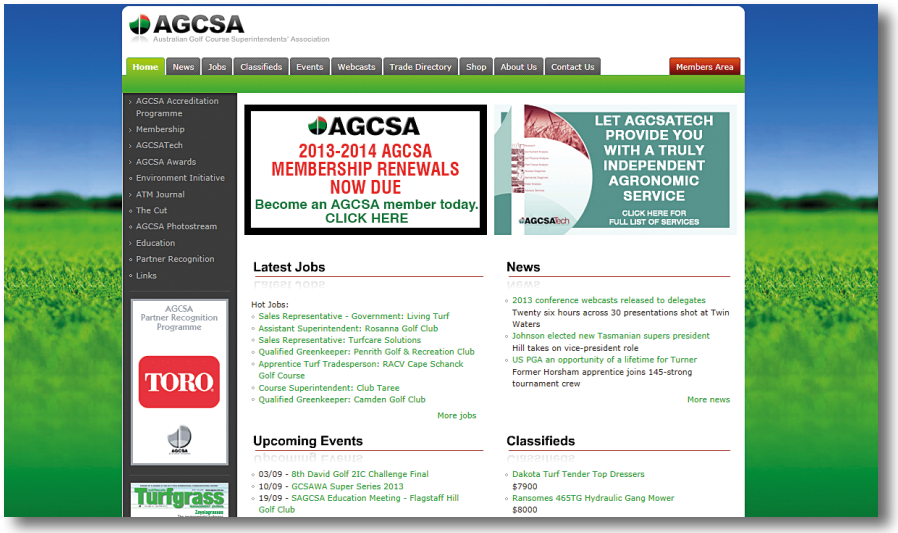
Limited playing opportunities caused by inclement weather has had a significant financial impact on revenue streams such as green fees, cart hire and also food and beverage sales. Reduced income not only affects the individual organisation but has a flow-on effect throughout all areas of the industry.

It is pleasing to see that club golf round numbers are on the rise; let's hope this is a 'real' upward trend and not a reflection on how badly the weather affected some parts of the country last year. Adam Scott's success at the Masters and Barclays should assist the golf sector; let's hope some of our other underperforming sports stars start winning (or at least competing) and bring some confidence back to the sports industry.

The AGCSA is not immune to these financial pressures. During the recent Australian Turfgrass Conference at Twin Waters, AGCSA president Peter Lonergan described the association as being at a crossroads in its history. While some have seen this as a negative statement, I (and the board) look at it optimistically and see opportunities that will come from change.

Without some external pressures things tend to roll on in the same format year after year which can be a problem in itself. The reduction of income entering the AGCSA has allowed all those involved to have the proverbial 'long, hard look' at the association's current activities and make some changes where possible.

The next significant change at the AGCSA will be the website. While this will not be visible to users until mid-2014, work is currently underway to



The AGCSA Board is about to sign off on a new membership and website management system which will allow for all membership data, website, online shop and accounting to be managed through a single platform

ensure the changeover is smooth and as seamless as possible. The current website and the systems used for membership and accounting are not linked which contributes to some very inefficient office practices.

The AGCSA Board is about to sign off on a new system which will allow all membership data, website, online shop and accounting to be managed on the one platform. This will streamline operations within the office significantly, but more importantly improve user access and functionality. The new system will also allow state administrators access to their respective members' information which will improve the way the state associations interact with their members.

The AGCSA is also investigating how best to enter the training field. Discussion has been taking place with current registered training organisations (RTOs) to determine the best way to provide cost effective and targeted training options to all involved in the sports turf industry.

While no decision has been made yet, it is anticipated that in the short-term this training will be targeting the higher levels – Certificate 5 and above. While all involved in the industry would respect what the TAFE institutions have done over the years, it is becoming apparent that the higher levels of training provided by these institutions is being compromised by reduced funding. Like many other sectors, it would appear that if an industry wants quality education and training it is time for them to get on the front foot and provide this service.

I have been fortunate enough to have travelled to most parts of the country in recent times to present at a couple of conferences and seminars. In one of the presentations I spoke about governance and planning and how important it was for an organisation to have good strategic direction.

Previous boards and staff have provided the AGCSA with great direction, but given the changes in the industry it is timely that we also review our operations. These documents need to be fluid and move with the times and importantly be reviewed on a regular basis to ensure they are still relevant.

In closing I would like to thank the committees of the GCSAWA & TGCSA for the invitation to attend and present at their recent two-day events. This is certainly a unique industry and the way that people interact and share information is outstanding. It was also pleasing as one of the older generation to see the new breed of turf professionals engaging and listening to the sage advice offered by some of the more 'seasoned' practitioners.

As always please feel free to contact me on 0418 593 072 or peter@agcsa.com.au should you have any issue or suggestions; feedback is always welcomed. I look forward to catching up when our paths next cross.

AGCSA

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TAS - Tasmania Golf Course Superintendents Association..... $60

WA - Golf Course Superintendents Association of Western Australia $110

VIC - Victorian Golf Course Superintendents Association..... Please call 0408 354 100

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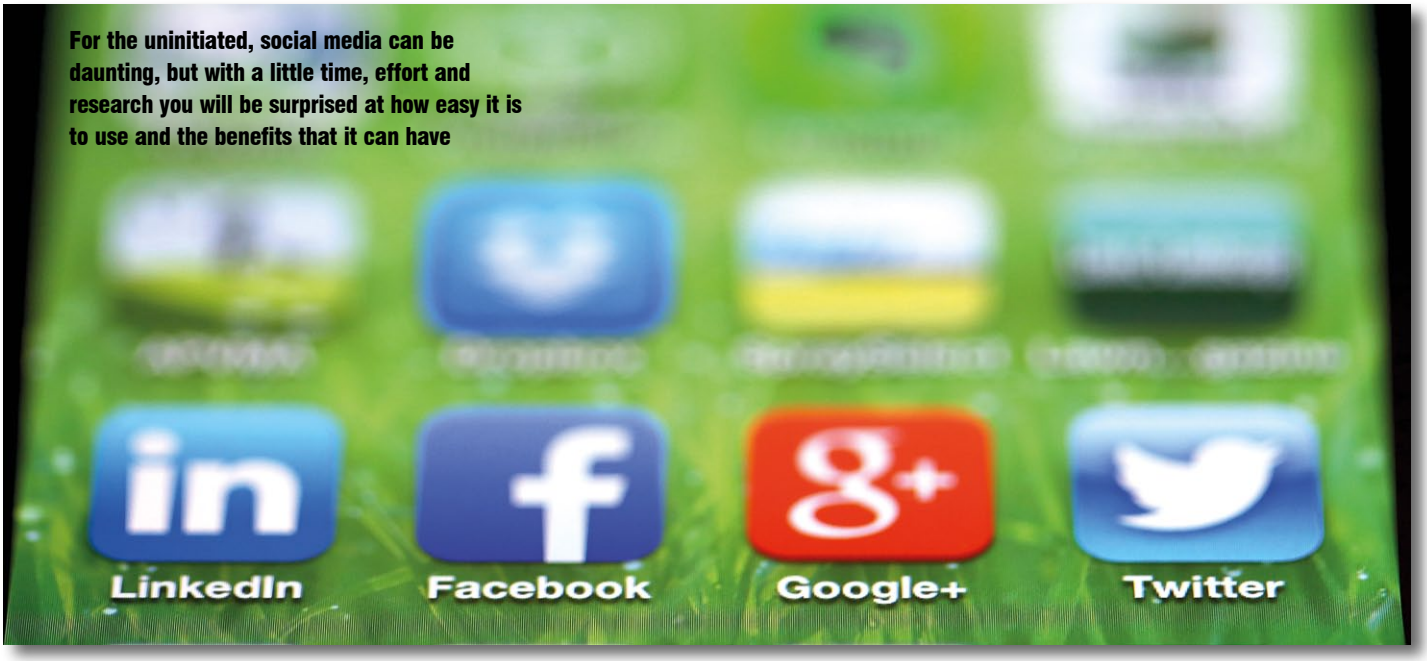


For the uninitiated, social media can be daunting, but with a little time, effort and research you will be surprised at how easy it is to use and the benefits that it can have

Growing media

At the 2012 Australian Turfgrass Conference in Melbourne, Robin Doodson (Sanctuary Cove G&CC) and Nadeem Zreikat (Colin Campbell Chemicals) discussed the boundless potential that social media can have for the modern day turf manager. A year is as good as a century in the world of IT and here they revisit the world of social media and look at some of the new apps and platforms and how they can benefit your operations.

Last year at the 28th Australian Turfgrass Conference in Melbourne we introduced the turf industry to social media and how course superintendents and turf managers can utilise the many benefits of social media in their everyday turf management operations. The past year has again seen some significant developments in the way social media is delivered and consumed and this will only continue in years to come as new technology is released onto the market.

As we stated in that presentation, the potential of social media to make a difference in your turf management operations, both on and off the course, is significant. We all know that superintendents and turf managers must now wear many different hats and one aspect that most would admit to struggling with is the manner in which they communicate with management and members.

Social media, used in the correct manner, can be the perfect remedy for this. Just ask those superintendents or turf managers who have set up a course maintenance blog, Facebook page or Twitter account (AGCSA president Peter Lonergan at Coolangatta Tweed Heads Golf Club is a classic example) and they will tell you it has improved this aspect out of sight.

For the uninitiated, throwing yourself into the social media mire can be daunting. As with anything

The 2012 AGCSA Publications Survey sent to members of the Australian turf industry found that three quarters of respondents owned a smartphone and 42 per cent a tablet device

there are numerous pitfalls to be wary of, but with a little time, effort and research you will be surprised at how easy it is to use and the benefits that it can have, especially from a professional perspective.

And it would appear that Australian superintendents and turf managers are gradually embracing the benefits of social media. Towards the end of last year the AGCSA conducted its annual publications survey and for the first time asked questions pertaining to the use of social media platforms and the various smartphone/tablet applications now available.

The survey threw up some interesting responses and although social media usage was still relatively low in a professional context, it was growing. Some of the key findings were:

- When asked to describe their usage of social networking tools, 51 per cent of the 547 survey respondents indicated they did so for a mix of personal and professional use. 'Personal use only' was 34 per cent and 'Professional use only' 14 per cent;
- More than 60 per cent of respondents had a Facebook page whether for personal or professional use;
- More than 26 per cent or respondents said social networking tools were either 'important' or 'very important' in assisting them in their every-day turf management operations;
- Nearly 15 per cent of respondents said they had a dedicated course maintenance blog/ Facebook page/Twitter feed, with 10 per cent indicating they were considering starting one; and
- Three quarters of all survey respondents owned a smartphone and 42 per cent a tablet device.

WORD OF WARNING

Before we start looking at the various social media platforms and apps currently available on the market, there is one simple tenet that all social media consumers need to abide by – **DO NOT POST ANYTHING UNLESS YOU ARE HAPPY FOR ANYONE TO READ IT.**

Even if a post is deleted it may have been saved by someone before you get the chance to erase it. How many times on the news have we seen well known public figures posting something they shouldn't have, only to delete it straight away but then find out that someone has picked it up and it has made the headlines that night.

Social networks have a number of privacy settings and it is vital that you take the time to look at them and set them up to a level that is appropriate for you. Be wary that default settings when you set up an account are not as private as they should be, so make sure you look into these before you start posting.

To sign up to the following social media platforms, go to their sites via the URL given and follow the sign up procedure. An idea is to have a personal email address and use it for all the platforms; this will make things easier in the long run. With signing up and starting out you do not need to fill out all aspects of your profile straight away as you can update this when you wish.

To make Twitter successful, you need to give followers a reason to come back. This may be regular course updates or photos of course works in progress

FACEBOOK WWW.FACEBOOK.COM

As the AGCSA survey indicated, most turf managers would appear to have a personal account already. In fact, doing various social media talks at state association days and seminars around the country over the past 12 months, we tend to think that figure could even be as high as 80 per cent.

There are quite a few turf related pages on Facebook from companies and universities, but it is also a way to talk to other turf managers and keep in touch on a regular basis. Facebook allows direct private messaging and also group messages where you can share photos, videos etc... all in the one place.

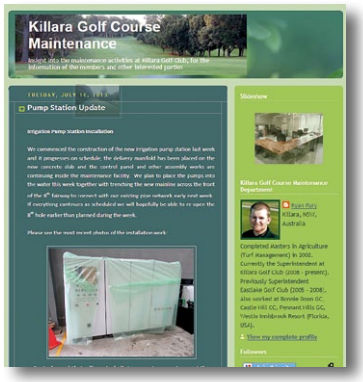
Facebook pages: This is perfect for your members to create a page about the turf facility. Most of your club members will probably have a Facebook account. This is a great platform to showcase your work and keep members up to date. This idea is similar to a blog (but nowhere as in depth or detailed). You can communicate with members here and we encourage you to ask questions and get them involved. You never know what new ideas you may pick up from members.

Of course you don't have to be a member to post a comment and there may be negative comments on the page. Our advice is to respond to the posts but if someone does keep complaining, get in touch with them personally via staff at the club and try to resolve the issue. As an account admin you can also control the comments on the page either through deleting or hiding them.

With this facility make sure your members not only 'like' the page but also allow feeds from the

CONTINUED ON PAGE 10

A course maintenance blog, such as this excellent one by Killara Golf Club superintendent Ryan Fury, is a highly effective way of communicating to members



In recent years a number of applications, or apps, have been developed to assist superintendents with their management operations both on and off course

Turf app-eal

As Robin Doodson writes, smartphone and tablet apps aren't just for keeping up to date with the weekend footy scores, playing games or changing your Facebook status.

As in any modern business, turf managers are becoming increasingly reliant on technology and in particular the use of smartphones and tablets, such as an iPad, are becoming common tools in a superintendent's hand.

In recent years a number of applications, or apps, have been developed which are extremely useful in helping a superintendent manage their facility. The following are a number of apps which I personally use to assist with my operations at Sanctuary Cove Golf & Country Club on the Gold Coast, whether from an agronomic or office management perspective.

With apps it is very much a case of horses for courses and where possible it is recommended to first download a free version of the app, often called a 'lite' version, to see if it suits your needs. Lite versions generally only have partial functionality so if you want all the bells and whistles you will need to upgrade to the full version, which often means paying.

APVMA

First launched in October 2012, then updated and re-launched in April 2013, the Australian Pesticides and Veterinary Medicines Authority (APVMA) app is a must-have for all Australian turf managers. John Neylan highlighted the importance of this free app at the recent Australian Turfgrass Conference during his talk on the use of online tools.

The app enables users to access to the APVMA's Public Chemical Registration Information System Search (PUBCRIS) database or Agricultural and Veterinary Permits Search database to search for turf registered products by product name, ID, active constituent, pest or host. In this highly regulated industry that we work in, this is a great tool to ensure compliance while applying products on your golf course.

In addition to the details available in the online databases, the AVPMA mobile app also includes access to information about stopped, cancelled, suspended and archived products. The app has some enhanced search features and offers suggestions from partially completed search terms. It also has a 'Favourites' option for fast retrieval in the future and allows you to email search results for selected products.

Cost: Free

Devices: Apple only

BAYER TURF ID

Bayer Australia's Turf ID app, updated in May 2013, provides detailed information on turf weeds, diseases and insect pests. High resolution photos showing a magnified perspective of each weed, disease and insect allows for easy identification. Where a problem cannot be identified, you can send a photo to a Bayer turf consulting manager for personalised identification. Advice is also given for treatment options.

Cost: Free

Devices: Apple and Android

DROPBOX

Dropbox is an online cloud storage tool which allows you to access all the files that are on your desktop computer through your smartphone or tablet. I personally store all my site plans of our golf course on Dropbox and access them out on site. It is also handy when you need to reference any documents while in a meeting.

Dropbox is also utilised by a number of third party apps and syncs to all your devices automatically. The beauty of having your data stored in Dropbox is that you cannot lose it, even if you spill your coffee on your PC.

Cost: Free

Devices: Apple and Android

EVERNOTE

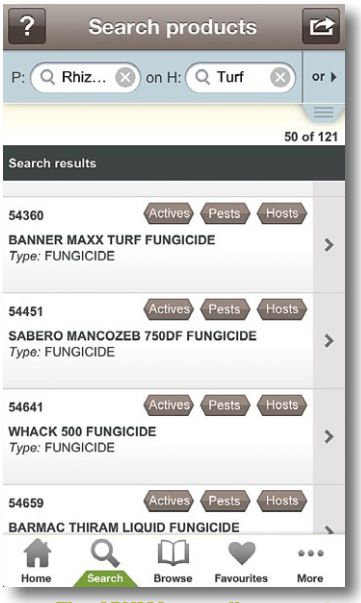
This is a must have application for business and turf managers. This app is great for taking notes while out on the course as pictures can be added. Task lists can also be created and shared with colleagues. Meeting minutes can also be taken and automatically synced between devices and your PC. I cannot rate this app highly enough.

Cost: Free

Devices: Apple and Android

HEYTELL

Heytell turns your mobile phone into a 2-way radio. Instant voice messages are sent between users which makes keeping in touch with your team easy.



The APVMA app allows you to search for turf registered products by product name, ID, active constituent, pest or host

There are no issues with being out of range as it works through the cellular network.

Cost: Free

Devices: Apple and Android

IPLANTFILE PRO

The Australian-developed iPlantFile Pro is an easy-to-use database with over 3800 species and 6000 cultivars and varieties of commonly used ornamental and native plants, together with over 14,000 photographs. iPlantFile Pro covers common pests and diseases and their control methods. iPlantFile Pro is a functional, real-time resource for anyone with an interest in plants – great app for horticulturalists or landscape managers on your crew.

Cost: $9.49

Devices: Apple only

KEYNOTE

Keynote is great for turf managers who want to create stunning presentations right on their iPad. Have a meeting? Take photos and videos from your iPhone and iPad, launch Keynote and create a stunning presentation of what's happening on your golf course. Take your iPad and Keynote right into your meeting and present with Keynote on your iPad, connect to a projector or mirror to Apple TV. Despite the price tag, Keynote is extremely easy to use and lets you go from the course to the boardroom like a pro. You can use PowerPoint files as they are easily transferable.

Cost: $10.49

Devices: Apple only

MEASURE MAP

Many Australian superintendents and turf managers who used to use NearMap will be glad to know that there is now a cheaper alternative on the app market. For those unaware of NearMap, it is an excellent web-based mapping tool which used to be available for free. Unfortunately the owners of NearMap decided to cash in on their excellent tool and are now charging thousands of dollars for access.

Measure Map is the next best thing as it still allows you to measure areas of your golf course very accurately and quickly on your phone or tablet. The one downside is that it uses Google Maps which are fairly dated, so any course changes may not be reflected.

Cost: $1.99

Devices: Apple only

MY-RESULTS DISEASE ALERT

The My-Results Disease Alert App is Australia's only diagnosis and alert app for turf disease. Using local weather data and historic information, this app assists in predicting possible disease outbreaks on your golf course. This can allow you to treat less, more accurately and for greater effect.

Cost: The app is free to download but you must have an annual subscription with My-Results.

Devices: Apple and Android

POCKET WEATHER AUSTRALIA

All modern superintendents should have some form of weather app on their phone to allow them to monitor weather and assist work schedules around upcoming weather forecasts. Pocket Weather Australia utilises the latest weather data from Australia's great Bureau of Meteorology (BOM). The BOM issues precise forecasts that cover every town and suburb in Australia. Many states have access to hourly forecast data and advanced rain tracking so you can plan your weekend and find out exactly what the weather conditions will be like.

Cost: $1.99

Devices: Apple and Android

SPRAY SELECT (TEE JET)

SpraySelect allows you to quickly choose the proper tip for your application. Just enter speed, spacing and target rate, select your droplet size category and a list of tip recommendations is provided.

Cost: Free

Devices: Apple and Android

SUN SEEKER

Designed initially as an app for installers of solar panels, Sun Seeker is extremely helpful for turf managers who have perennial shade issues on their golf courses. Sun Seeker allows you to track the sun's path through summer and winter and show shade lines. This takes the guess work out of tree removal and is a great tool to highlight to committees and managers the shade issues on your course.

The app provides a flat view compass and an augmented reality camera 3D view showing the solar path, its hour intervals, its winter and summer solstice paths, rise and set times and a map view showing solar direction for each daylight hour. To watch a demonstration of this app, go to YouTube and search for 'Bill Brown Sun Seeker App Review'.

Cost and devices: $7.49 (Apple), $6.59 (Android). The free Sun Seeker Lite version is also available but doesn't contain the 3D component of the app.

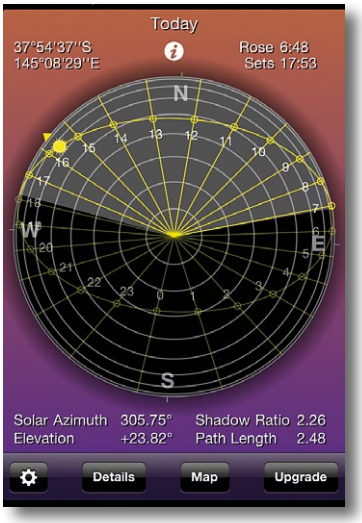
TURFGRASS MANAGEMENT

Turfgrass Management is an excellent online database developed by Dr. Patrick McCullough of the University of Georgia. There is an amazing amount of information and photographs within this app of turfgrasses, pests, diseases etc… which is relevant to turf managers in all climates. This app is probably the best database tool that I have come across.

Cost: Free

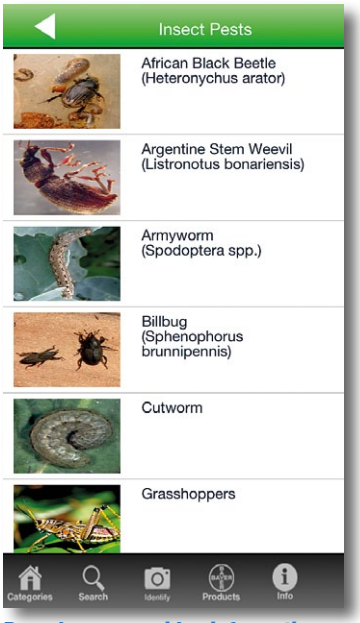
Devices: Apple and Android

CONTINUED ON PAGE 10



Sun Seeker is helpful if you have shade issues on your course

Turfpath is one of the latest apps to hit the market



Bayer's app provides information on pests and diseases

The Google + 'hangout' feature enables an online video discussion with up to 10 people

> "Twitter is often misunderstood... but it is a superb tool for communicating with members and turf managers around the world."
>
> **Nadeem Zreikat**

Disclaimer: The authors wish to advise readers that when sourcing information from turf apps which are overseas-based, such as Turfpath and Turfgrass Management, some of the control recommendations provided may not be registered for turf use in Australia. Please consult the APVMA website for the full list of turf registered products available for use in Australia.

CONTINUED FROM PAGE 7

page to go directly in their news feed. This will enable members to constantly see what is being updated without the need to go to the page each time and try to find it again...

Facebook private group pages: These are great if you want privacy. We haven't utilised this in turf so much but it is growing with some associations, such as STA NSW, having this facility. STA members can post comments between each other and can get advice on issues without being in the public arena.

The great thing about these pages is that you have to be accepted into the group first before you can post. It is a similar idea to a forum where members can post and see posts. The advantage is that pictures and videos can be easily posted and being already on Facebook members do not have to login to another website. We have seen pages like this utilised between friends, families and workplaces.

TWITTER WWW.TWITTER.COM

Twitter is often misunderstood. It is not all about what pampered celebrities are eating, who they're dating or what stupid antics they have gotten up to. Instead, Twitter is a superb tool for communicating with members and other turf managers around the world. We all have similar problems and similar goals in wanting to provide better surfaces.

Twitter is a short message service that allows only 140 characters per 'tweet'. Many problems have been solved with a simple post on Twitter. For instance, a regional course in the US had a machine break down, so rather than calling a mechanic who was a few hours away, the superintendent decided to post on Twitter. Within five minutes of doing so he had a few replies and within 10 minutes the problem had been solved.

 # Hash tags: You see these presented on TV shows all the time. They are a conversation tool to be able to follow a particular topic.

DM (Direct Message): Private messaging from one person to another. If you 'DM' someone they need to be following you for it to work or you follow each other. This is useful when you want to get private information from that person such as an email address. However, this may be hidden to followers but messages can go through a third party.

Links: A great advantage of Twitter is the ability to link a tweet to an article, blog post, video or a general interest story. This has become the norm in the turf game with social media. If your URL is too long you can shorten the URL (this can be done via the actual site or another site; search for 'shortened URL').

To make Twitter successful, though, you cannot just tweet out anything and everything. You need to give your followers a reason to keep coming back. This may be updates on the course, pictures of course works etc... As well, if a follower asks you a question, make sure you reply.

An option that some supers have taken up is to have multiple Twitter accounts – one for the course itself and a second personal account to communicate with other turf managers. For example, US-based superintendent Greg Shaffer has a personal account (@gtshaffer) and one for the course (@ElconaGrounds). He uses the latter for updates on the course to his followers, while the former is to communicate more with other supers.

GOOGLE + WWW.GOOGLE.COM.AU

This platform is fairly new and still trying to find its feet. The best aspect of Google + is the 'hangout' feature which some of you may have seen utilised by the Australian and US versions of Turfchat (see www.turfrepublic.com and www.turfdiseases.org for more information on Turfchat).

The hangout feature allows you to have an online video discussion with up to 10 people. This can be done privately or as a live hangout, as Turfchat is. Videos can be saved and uploaded to YouTube (as Google now own it).

The other benefit of the hangout feature is you can utilise it for online meetings where you can discuss and present to your board from the comfort of your office computer. You can easily share your PowerPoint or Keynote presentations by sharing your screen with people in the hangout.

To get a Google + account you can use an existing email, but having a Gmail account is well

CONTINUED FROM PAGE 9

TURFPATH

Turfpath is another mobile app resource to assist in the visual identification of turfgrass pests throughout the world. There is a large database of turfgrass diseases, insects and weeds which is continually updated. One of the great advantages of this app is that it has the ability to share information with other turf managers around the world who can assist in diagnosing your problem.

At this stage Turfpath is populated predominantly by US superintendents but the more Australians that get involved the more relevant this tool will become for us.

Cost: Free

Devices: Apple and Android

There are many more apps available to utilise in turf management and the list is continuously growing. We will in the future have reviews on new turf related apps out there and you can also keep updated through the excellent www.iturfapps.com/market website and campbellturf.blogspot.com

worth it as this will give you access to all Google products including Blogger, YouTube, Forms, Docs etc. Also, having one dedicated email for social media will make it easier to manage in the long run.

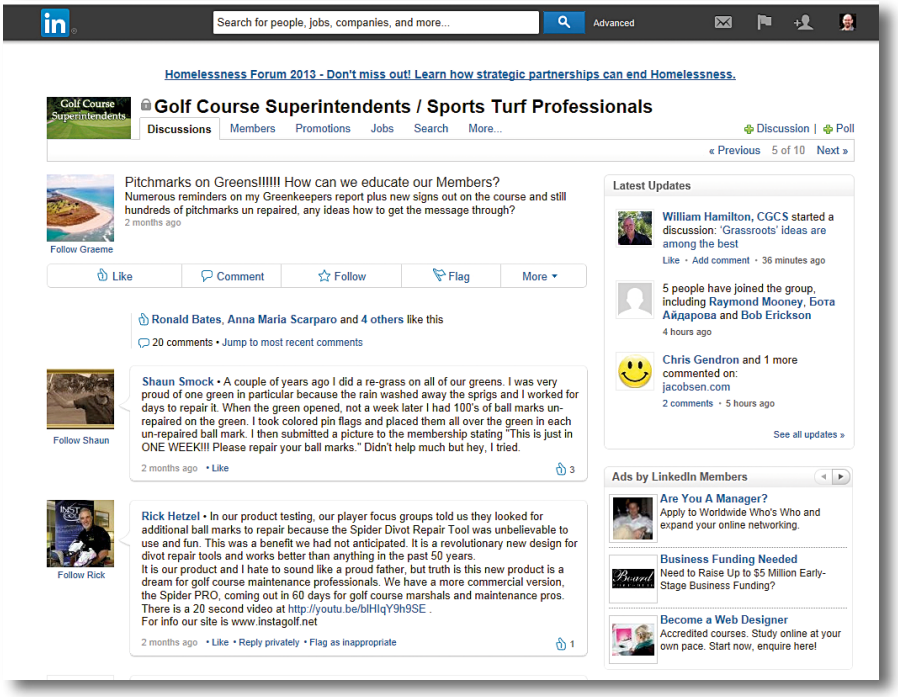
LINKEDIN WWW.LINKEDIN.COM

Known as a professional social network, LinkedIn started off as a job search website that has expanded into something much more. It has the ability for you to build up a database by connecting with other professionals.

The advantage of this network for our industry is that it is another way to market yourself for a job and to contribute to group discussions. You can update your status, share content, blogs and Twitter feeds all on LinkedIn, but it is best to be business focused and not socially focused like Facebook is. Essentially it is an online resume.

Don't be surprised either that if you are applying for a job the employer searches the web for your name and looks to see if you have a LinkedIn account to get an idea of who you are. In this case it pays to keep your LinkedIn profile updated regularly. There are plenty of superintendents, general managers and people within your club who use LinkedIn. Your club may even have a LinkedIn profile.

Another feature of LinkedIn is the ability to join dedicated industry discussion groups. These groups enable you to ask questions and contribute to discussions on an unlimited number of topics. There are plenty of turf discussion groups available (course superintendents, turf technicians, course construction and design, USGA, GCSAA just to name a few) where you can share your knowledge as well as gain new ideas.



A great feature of LinkedIn, the multitude of discussion groups enable you to ask questions and contribute to discussions

An aerial view of the new Gardiners Run course looking from west to east. In the foreground still to be grassed is the back nine, with the front nine holes in the background. The new course measures 6300m in length

On the Run

After a number of years in the planning, Melbourne's Chirnside Park Country Club will shortly have a brand new home. Starting construction early last year, Gardiners Run is now in the final stages of completion with an opening scheduled for April 2014. Course superintendent Alan Greatorex looks back on the project to date.

Chirnside Park Country Club (CPCC) is nearing completion of the construction of its new 18-hole, par 72 golf course that will measure 6300m in length from the back tees. To be called Gardiners Run Golf Course, its scheduled opening in April 2014 will be the culmination of a project which has been more than a decade in the making, but one which is set to put the club on a prosperous future path.

Construction of the new golf course began in early 2012 following some 10 years of negotiations and planning approvals. At that time CPCC along with development partner CSR, started subdividing (into residential lots) the front nine holes of the original golf course at Chirnside Park, while golfers continued to play the back nine twice for their 18-hole fix. At the same time, the club started construction of its new golf course complex on an old CSR mining/quarry site at Victoria Rd, Lilydale, literally a five minute drive away from the existing site in Melbourne's north east.

The central part of the original CPCC site, containing the bowling club, tennis club and bistro/reception area, has been retained with all these facilities being upgraded. The new Gardiners Run course still forms a core part of the country club's operations with the two facilities only a short distance apart. The golf annex, with its own self-contained clubhouse and excellent practice facilities, is set to become the envy of many clubs around Melbourne.

AT A CROSSROADS

The Chirnside Park Country Club golf course was built in the 1960s by the developers of the original Chirnside Park Estate 'Wilmore and Randell'. Once the majority of the land was sold, Wilmore and Randell approached a local residents group with a proposal for them to purchase the property now known as Chirnside Park Country Club and form a club.

The club has been in operation since 1974 and has gone from providing a modest clubhouse, golf course and three tennis courts to now offering lawn bowls (Tifdwarf and bentgrass greens), six tennis courts with lighting, gaming machines, bistro/function rooms and outdoor dining.

As Melbourne's population and boundaries continued to expand, the golf course quickly became surrounded by residential housing. While originally a relatively safe layout, the golf course became increasingly at the mercy of changes to golf equipment and the range of golf balls which inevitably led to many issues with golf balls leaving the property.

Changes were made to numerous holes to try and alleviate the problem but with limited success. As the golf course was compromised by forced changes, membership started to decline which in turn led to reduced revenues and the start of a downward spiral.

As well as these issues, maintenance of the course was becoming increasingly challenging. The course was irrigated with potable water and with rising costs and a number of drought affected years, it often meant that only tees and greens could be watered. Grass coverage on fairways and rough during the summer months almost became non-existent during the height of the drought, making for

tough conditions for players and increased pressure on maintenance budgets.

Add to this relatively small greens (most averaged between 350m^2-400m^2) and with no room or budget to expand, the club had reached a crossroads. Fortunately the forward-thinking board and management of the time bit the bullet and in 2002 took steps to move the club to a more sustainable position and thus the process of relocation began.

MINED OVER MATTER

Melbourne-based golf course architecture company Pacific Coast Design (PCD) was subsequently engaged with a remit to provide CPCC with a "challenging and accommodating" new golf course. Along with a course design and other documentation and information required for the approvals process, there was lengthy communication and consultation between CPCC members and PCD with a number of presentations made at specially convened sessions.

It was a challenging period as the chosen site was still an operational mine and many decisions were taken on the basis of what shape the ground was intended to be left in. This led to changes in contour development right up to a third of the way through construction as the design team reacted to final mining levels.

Any club that has been through such a process would understand it also involved dealing with multiple authorities who had inputs on regional impacts, site landscape, waterways, wildlife protection, construction methodology, environmental processes, OH&S and even carbon emissions.

Permit negotiations and re-zoning applications were a lengthy, drawn-out process with several aspects, such as the maintenance facility complex, needing to be reviewed due to changing regulations. With all that to contend with, it wasn't until 2011 that the green light was given to proceed.

Some nine years after the concept of relocation was first mooted, tenders were finally called for in the second half of 2011 with the Melbourne-based golf course construction company Densal being awarded the contract, with construction starting in early 2012. You have to really admire the loyal membership that stuck with the club during those often frustrating years, all of the time not knowing if they would still have a golf course at the end of it all.

The main face at Densal has been director Chris Young and it was extremely pleasing when he was able to entice ex-inaugural AGCSA Board member Wayne Dale from retirement in South Australia to head the onsite construction team. Wayne has had a great deal of experience in both golf construction and maintenance which made it easier for me as site superintendent (club representative) to maintain standards.

There is regular banter among the Densal crew at the moment as to who takes the most holidays etc... but it really hides the fact that most of them have put in some very long hours over the past 18 months and are really proud of what has been achieved. They have a great core team who are more like family (some of them actually are!) and have worked together for many years, so it makes for a positive work environment.

Bulk earthworks on the 4th hole showing the 'valley' effect that was present over much of the site from more than 30 years of clay mining operations

NEW HOME

The 67.5 hectare site on which the new Gardiners Run course is being built had been mined for the past 30-odd years to extract clay for CSR's roof tile manufacturing business. This left the site with a range of pits, stripped areas and unusual shapes, so needless to say this allowed for an exciting layout and contouring from PCD. A really great feature of the design is the way it takes golfers gradually up to higher ground then gives dramatic golf shots to again move to the lower areas.

The layout is in two standard nine-hole loops, both starting from and leading back to the clubhouse with practice green, bunker, chipping zone and driving range all adjacent to the path leading from car park to the front of the clubhouse.

When the team started visiting the new site, it was clear that the many years of mining had severely compromised the existing site topsoil and this led to the requirement of importing sand for the fairway areas. Over 250,000 cubic metres of bulk earthworks went into shaping and contouring, with PCD directors Phil Ryan and Paul Reeves regularly visiting to oversee the conversion of a mine site into some really interesting golf holes.

The view from the par three 3rd tee showing lake excavations in progress. Gardiners Run will have 1.8ha of waterways

Construction of the onsite 1ML storage tanks showing the hydraulic lifting mechanism used to raise the tank up as further layers are added. The course will be irrigated with Class B recycled water from the adjoining Lilydale treatment plant

A number of the holes have a 'valley' feel to them as you play through the areas that were heavily mined. This will give golfers a feeling of a very exclusive experience as you literally cannot see adjoining fairways on these holes. The placement of the holes along such valleys was also a deliberate strategy of the design to 'direct the ball back into play' as the PCD aim was for golfers to have fun and not lose a dozen golf balls each round.

As well as the changing topography, the site also affords stunning views of Mount Dandenong and the Yarra Ranges, while a couple of strategic water features combine with some spectacular golf features which will make for a great round of golf. The golf journey ends with one of the site's most picturesque views; from the landing zone on the 18th looking down at the green, there is water on two sides with views along one of the best parts of the Yarra Valley.

Due to mining activity most of the site was denuded of trees, so 18,000 trees and 80,000 ornamental grasses are being planted to revegetate the course. These are a mix of Yarra Gum, Blackwood and Casuarina's and along with *Poa labillardieri* (tussock grass) will give a strong native landscape to the golf course once they establish.

PLAYING SURFACES

The Gardiners Run greens have been constructed using a perched water table sand profile, gravel drainage (modified USGA) specification. With the testing parameters and specifications set by PCD, we have ended up with a 300mm sand profile over a 100mm gravel blanket (7mm aggregate) on a compacted clay base with slotted ag drainage cut into the base.

All greens have a perimeter plastic barrier installed to a depth of 300mm to help inhibit fairway grass stolons and rhizomes from encroaching into the green surface. Green sizes range from 650m^2-790m^2 (the average is 710m^2) and they will be planted with Penn G2 creeping bentgrass.

Three separate tees per hole have been constructed with a compacted subgrade that has a 'V' shaped into the middle at a 5 per cent slope and a central drainage line, 100mm layer of 7mm drainage aggregate and 250mm sand profile. The tees have been planted with Santa Ana couchgrass and have a 1 per cent slope into the course away from boundaries to help minimise the degree of wayward shots from the tee.

Fairway drainage is a combination of subgrade and surface contouring, surface pits, solid pipe and slotted ag pipe. Being an old clay mine site there has been no shortage of material to obtain a firm base for drainage lines to be installed.

Sand capping to a depth of 200mm on all fairways along with Santa Ana couch will provide a far superior surface when compared to what the old course was like. Approximately 27,500m^3 of sand has been used to cap fairways, 6500m^3 on tees and greens and around 50,000m^3 of salvaged site topsoil utilised in the rough.

When construction works started in January 2012, the focus was mainly on the front nine due to the fact that mining extraction works were still continuing in the areas proposed for the back nine. Unfortunately these mining works were several months behind schedule which meant that the back

A dozer fitted with GPS receivers on the blade pushes out fairway sand over the shaped subbase on the 2nd fairway. Around 27,500m^3 of imported sand has been used to cap fairways

nine zone was stripped bare going into winter 2012 with not enough time for bulk earthworks, shaping and drainage to be completed prior to the onset of wet weather.

The window of opportunity to have all 18 holes planted for the growing season of spring-summer 2012-2013 was thus lost, however, Densal continued with fairway sprigging on a number of holes up until the end of May 2013. A cover crop of rye corn was sown to assist in erosion control and protection of the sprig from any expected frosts over winter.

IRRIGATION

A+M Irrigation won the tender to install the new Gardiners Run irrigation system. The system features Toro's top-of-the-line Lynx Central Control with satellite communication to valve-in-head sprinklers. The course will be irrigated with recycled Class B water supplied from the adjoining Lilydale Sewage Treatment Plant and stored in two on-site one megalitre tanks. The pump station consists of three variable speed 33kW pumps and a smaller jockey pump to maintain line pressure.

STATE-OF-THE-ART

Having been involved in a previous golf course construction in Western Australia a few years ago, it has been very interesting to see the impact of new technology on construction processes. The use of GPS technology on earthmoving equipment during the shaping and topsoiling phase of construction has dramatically improved efficiencies and accuracy in relation to topsoil depths.

Dozer operators basically have a laptop screen in their cabin with the digital design information loaded into it and as they are manoeuvring around the golf course their front blade is automatically controlled to raise or lower to the required finish level (see photo bottom opposite page).

The operator also has the capacity to manually override the system to allow for fine detail work as required. For example, this may come into action as a dozer approaches where a bunker is intended and the front blade automatically starts dropping to dig

Soil amendments added to the practice fairway prior to sprigging

Above right: The roof goes up on the new Gardiners Run maintenance facility. The new sheds were due to be completed by the end of August

Above: The 5th green complex with solid turf and boards around the bunker with drainage trenching ready for installation. All greens will be seeded with Penn G2 creeping bentgrass in September

the depth of the designed bunker, which would in turn start stalling the machine.

After base shaping of fairways is complete a quick survey reading is carried out. This is then downloaded onto computer and transferred to the onboard dozer control equipment. The information relating to the required depth of topsoil is then added and as the material (sand or soil) is delivered to the required fairway the dozer just pushes the material around with the blade, automatically adjusting to the correct depth. The same methodology is used on green profiles, however, there is still a lot of manual operation utilised to gain more accurate contouring of the finished surface.

ON TRACK

As this edition of Australian Turfgrass Management goes to print, the finishing touches are being made to the back nine holes and with only three holes requiring sprigging this spring an opening date of early autumn 2014 is the aim. Final surface preparation then seeding of greens will start in September. While the bunkers are all shaped and have grass sod retaining all edges, the drainage, sand mat, geotextile and sand installation still need to be completed.

Tree planting, mulching and ornamental garden beds are also being completed along with pathways and services work. The new maintenance facility complex should hopefully be fully completed by the time you read this and with (hopefully) some warm weather on the way the real work for the maintenance team will begin in earnest. The clubhouse is basically finished with only landscape and paving works to be done, so all looks to be on track.

It is not often recently that a new golf course gets built in Australia and we think Gardiners Run will really make an impression. I hope readers get a chance to visit once we are up and running.

Editor's Note: ATM called PCD director Phil Ryan for comments about the new Gardiners Run course and after reading the article his only thoughts were that Alan Greatorex seemed to have omitted his own considerable input and contribution to the construction process, which Ryan thought fairly typical of the man. Says Ryan: "Alan was engaged by the Chirnside Park Country Club specifically to be site superintendent of the new construction and in this role he has done a great job, especially considering that he was also looking after the maintenance of the existing golf course throughout the whole process."

The wonderful view down the recently planted 2nd and 3rd holes with Mount Dandenong in the background. Gardiners Run is due to open autumn 2014

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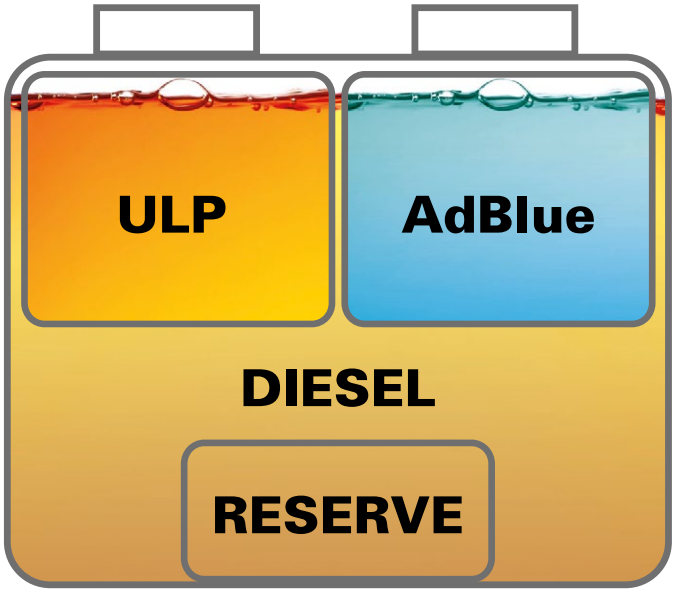

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ADVANCED FUEL TANKS

Ovals boost for Ormeau

Scott Johnstone and Tim Wassell from Scape Shapes look back at the construction of the recently opened $5.3 million Ormeau Sports Park on the Gold Coast which boasts two full-sized AFL ovals.

On 3 August 2013, the $5.3 million Ormeau Sports Park opened on the Gold Coast. Outside of Metricon Stadium which is home to the Gold Coast Suns, the Ormeau Sports Park is the only facility in the region that boasts two full-size AFL ovals, both with best practice surface, soil, drainage and irrigation infrastructure.

As well as the four hectares of ovals themselves, the development also includes nine hectares of landscaped and turfed areas, car parks and fencing. Primarily it has been designed to cater for the growing community needs of the area and the increasing interest in AFL in the region since the arrival of the Suns. For the local Ormeau Bulldogs Junior Football Club, the development has also been a major boost and they now have a brand new state-of-the-art facility to call home.

Among other contractors who undertook the civil, electrical and earthworks, Queensland-based Scape Shapes was principal construction contractor for developers Stockland. The site on which the new facility resides was purchased by the City of Gold Coast in 2010 using funds collected from ratepayers under the Recreation Space Separate Charge. The city then used infrastructure charges to fund an agreement where Stockland would construct the facility as part of the Stockland Ormeau Ridge development.

The project was originally scheduled to start in September 2012, however, delays due to environmental conditions meant civil works didn't begin until November 2012. Shaping and softscapes started January 2013 with practical completion in July. Overseeing the development for Scape Shapes were construction manager Steve Williams, project supervisor Tim Wassell, irrigation manager and designer Scott Johnstone and irrigation supervisor Chris Symons.

Main photo and below: Scape Shapes constructed the $5.3 million, dual AFL oval Ormeau Sports Park which opened in August. To be maintained by the City of Gold Coast, the new facility is a major recreational asset for the growing community and is also the new home of the Ormeau Bulldogs Junior Football Club

SIDE BY SIDE

Although the project included the installation of gardens, turfed areas, a revegetation buffer zone, timber fencing and bollards, the jewel in the crown of the project was the two full-size AFL ovals.

The overall field design is a true domed crown with full 300mm profile made from incorporating and ameliorating stripped and sieved site soil with washed sand. The fields are designed to give the right amount of water runoff to subsurface drains surrounding the oval while allowing enough water/air holding ability to encourage deep healthy root growth for turf and minimise watering requirements.

The key challenge from a construction perspective was getting each step of the construction process involved in creating the ovals correct. These specifications were created from theoretical calculations based on extensive testing of site material and proposed media and ameliorants to be imported. The challenge was to achieve this in practice. This was accomplished with careful adherence to the specifications and best practice methodology combined with testing of the media during construction to ensure ovals performed at their best.

As the overall size of two AFL ovals is approximately 40,000m^2, there was considerable work in each step including;

- Survey mark out of the field heights and boundaries;
- Laser grading, ripping and cultivation and incorporation of gypsum;
- A 150mm layer of sieved site soil moved from stockpiles and evenly distributed over the field base then laser-graded to the correct falls at an exact 150mm depth.
- A 150mm layer of washed sand imported from a local supplier, tipped and laser spread.
- Deep cultivation to bring some of the site soil from the bottom layer up into the sand layer, then shallow cultivation to blend the top layer of sand and soil.
- Laser trimming, rolling to consolidate the surface and then laser trimmed again to produce the surface ready to lay turf.

As well as the challenge of protecting existing vegetation and the nearby creek during the project, throughout the construction process severe weather hampered proceedings. With very dry, dusty conditions in the early stages, where dust suppression was critical due to the site's proximity to the nearby Ormeau Ridge subdivision and M1 motorway, the project then endured prolonged and heavy rain periods which often brought construction to a grinding halt. On many days it was physically impossible to get construction equipment onto the site and on a couple of occasions machinery already on site had to be dragged off with tractors when rain hit.

The turf variety selected for the ovals was Grand Prix couchgrass laid in maxi rolls which was supplied from Tinamba Turf. Grand Prix was chosen for its superior performance with reduced inputs compared to other couch varieties.

The installation of the turf was again a critical and challenging process. As each section of turf was laid, cut in and rolled, it had fertiliser and pre-emergent herbicide applied so there was no need to walk back over the turf area and thus avoid the creation of any unnecessary depressions in the surface. Because the turf was laid in the same direction that the irrigation system was designed to run, each section of turf could be watered immediately after it was laid without wetting the next section of exposed field surface waiting to be laid.

Turfing started in late March 2013 and it took four weeks to lay the ovals and three weeks to lay 3ha of turf on the park surrounds. Due to heavy rainfall and cool growing conditions, establishment

Below: Irrigation trenching. The irrigation system design engaged a unique 'best fit' strategy to ensure the most uniform coverage possible

Bottom: Profiles on both ovals included 150mm of sieved in-situ soil blended with 150mm of imported washed sand

Grand Prix couchgrass was chosen for its superior performance with reduced inputs compared to other couch varieties

Testing of the irrigation system confirmed that it achieved a virtually perfect scheduling co-efficient of 1.1 with distribution uniformity and coefficient of uniformity at 90-plus per cent

took longer than expected but the end result was a strong uniform coverage of couchgrass come handover to the City of Gold Coast in July.

IRRIGATION

One of the key components of the new facility was the irrigation system. Designing an irrigation layout grid for an AFL oval shape is a challenge as the traditional square or triangular pattern does not fit. Scape Shapes' design engaged a unique 'best fit' strategy to ensure the most uniform coverage possible and the end result is a system that has been nominated for a Landscape Queensland Award.

Lateral spacings along the oval length are uniform and parallel in symmetry at 17.4m intervals for ease of construction methodology plus locating for future maintenance. The Rain Bird 8005 SS sprinkler spacings across the oval width are best fit within a range of 17.2m-20.5m to maintain very good head-to-head coverage across the entire range (sprinkler radius is 22m using a No.22 nozzle). At an average spacing of 17.4m x 18.5m, the system achieves a virtually perfect scheduling co-efficient of 1.1 with distribution uniformity and coefficient of uniformity at 90-plus per cent.

The irrigation tender brief included preparing an analysis of alternative water sources. Scape Shapes prepared a comprehensive agronomy calculator to provide all the information required on peak daily water use and average annual water use, plus cost of ownership based on the various options.

The options considered were potable, non-potable and ground water. Recommendations were made for ground water use being the most viable long-term option pending further on-site test drilling to determine capacity and quality. A payback analysis demonstrated that the capital investment in a ground water bore, if available, would have a payback period within one year, with annual savings of $29,460 after the first year.

One of the challenges when constructing a premium quality sports field is ensuring an even surface across the entire field to facilitate minimal future maintenance and player safety issues. Scape Shapes methodology applied a one-team mentality by installing the irrigation laterals, burying the sprinkler risers, then laser levelling and re-locating the sprinkler risers after the surface was fully prepared, just prior to turf being laid. This enabled machinery unimpeded access and best possible surface preparation techniques to be employed.

The City of Gold Coast uses Motorola irrigation central control (ICC) software to manage their irrigation infrastructure via radio from a remote location, therefore one of the challenges was to develop an effective method of controlling the system locally throughout the maintenance period.

One of the complexities in operating a Motorola field controller is that they have no HMI (user interface keypad) and they must be operated via central PC or laptop using ICC software. As it was Scape Shapes' responsibility to maintain the irrigation system for the first six months, a temporary GSM/SIM communications module was installed to the field controller on-site and central PC software set up at Scape Shapes' Nerang office to allow 24/7 management of the irrigation system both on- and off-site, via laptop or office PC.

COMMUNITY ASSET

The new facility was handed over to the City of Gold Coast in early August and sports facilities and turfgrass management officer Peter Apps says his team has received a quality, sustainable, recreational asset which will be of significant benefit to the local community.

"These two fields will provide quality surfaces for AFL in an area of the Gold Coast that is developing at a rapid rate in both population and interest in that code due to the continued improvement of the Gold Coast Suns," says Apps. "It will also alleviate the wear on fields in the area that are already overused.

"Our requirements have always been that the development of the playing surfaces involves current best practice both in design and construction for recreational public open spaces. The City of Gold Coast maintains all its own playing surfaces and as such expects that those surfaces will involve a quality species of turf that thrives in our microclimatic conditions and deals with high levels of use across the year.

"Irrigation systems must maximise the potential of all water usage and ensure the field is both usable and safe when required. Ongoing maintenance costs must be kept to a minimum. Good construction and design for the relevant site and its particular issues and demands ensures this can be the case."

AFL Queensland chief executive Michael Conlan added that AFL was grateful to the council and Stockland for their investment in what was a greatly-needed community AFL precinct. "Ormeau Sports Park is a fantastic asset that will cater for further AFL growth within the fast-growing northern Gold Coast corridor for years to come," says Conlan. "It provides a permanent home for the Ormeau Bulldogs Junior Football Club and we hope to see senior football played at the precinct in the near future."

At the handover of the Ormeau Sports Park were (from left) Chris Symons (Scape Shapes), Danny Allen (Stocklands), Jodi Pocock and Cameron Taylor (City of Gold Coast), Lisa Mercer (Cardno), Tim Wassell (Scape Shapes), Peter Apps (City of Gold Coast) and Scott Johnstone (Scape Shapes)

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Brilliant Brookwater

The stunning Brookwater Golf & Country Club kicked off the PGA Tour of Australasia's tournament season when it hosted the 2013 Isuzu Queensland Open in late August. ATM caught up with Brookwater superintendent Ben Geeson during the opening rounds to look at his preparations.

For those fortunate enough to have visited Brookwater Golf & Country Club south west of Brisbane, it's the sort of golf course where words do little justice. It's not until you walk the wildly undulating fairways and take in the stunning routing with its dramatic changes in elevation and grand greens and bunker complexes that you get a full appreciation of what a unique gem the Greg Norman-designed course is. Indeed, the Brookwater maintenance crew can be pretty certain that they'd be the envy of most course staff the country over.

No-one who appreciates Brookwater's character more is course superintendent Ben Geeson. After cutting his teeth as an apprentice at Cypress Lakes in the Hunter Valley, for the past 12 years Brookwater has been a second home for the now 36-year-old. Geeson joined Brookwater mid-way through the course's construction and gradually worked his way up to irrigation technician and assistant superintendent before taking over the top job from Geoff Bennell four years ago.

Despite its impressive layout, excellent conditioning and reputation as being one of the toughest tests in the game, in the 11 years since its opening Brookwater had only ever been a Pro-Am venue. All that changed however just before Christmas last year when it was announced that after a six year hiatus the Queensland Open would be returning to the PGA Tour of Australasia calendar in August 2013. Along with a major new sponsor in Isuzu and a $110,000 prize purse came the news that Brookwater was to be the tournament's home for the next three years.

For Geeson, his assistant Adam Rose and the rest of the Brookwater crew, the announcement came as a tremendous fillip. With the rare opportunity to showcase their special patch of turf on the Tour stage, preparations began in earnest as far back as February when PGA officials visited the course to assess it for the tournament.

Following that inspection Geeson and his team set about a programme to get the course ready and despite some challenging weather and inherent issues with the course, few could fault the way it presented when the opening round teed off on 22 August. Indeed, come the end of the tournament Brookwater had lived up to its demanding reputation and although eventual winner Nick Cullen broke the course record during the third round with a sublime 7-under 65, he was one of only seven players to finish the tournament even or better.

Brookwater's CT2 couchgrass fairways were the subject of an intensive fertility programme in the six weeks leading up to the tournament. Pictured is the par five 8th

TOURNAMENT FOCUS

As Geeson well knows, Brookwater is a challenging site to manage at the best of times. The course's tree-lined bushland setting and resultant issues with shade, the heavy clay soils and poor quality irrigation water, not to mention the sheer expanse of the site, all conspire to keep him on his toes.

Throw in six months of horrid south east Queensland weather and Geeson admits the lead-up to the Open was not exactly plain sailing. In fact, it wasn't until about four weeks out when the weather started to warm up and the course started to dry out that Geeson felt at ease with his tournament preparations.

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PHOTOS: BRETT ROBINSON

Brookwater course superintendent Ben Geeson

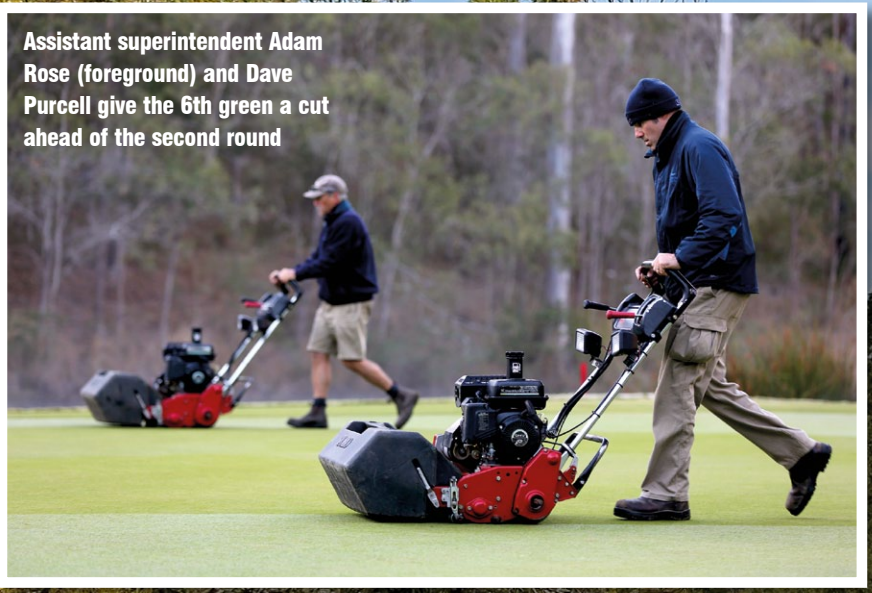
The view from the tee complex on Brookwater's heaving par five 4th. Considered one of the strongest tests in the game, Brookwater lived up to that reputation at the recent 2013 Isuzu Queensland Open with just seven players finishing even or better

Brookwater tees up for Tour

Adam Rose sets the pin on the 5th

For the first time in its 11-year history, Brookwater Golf & Country Club played host to a PGA Tour of Australasia event when it hosted the 2013 Isuzu Queensland Open from 22-25 August. ATM editor Brett Robinson snapped the crew in action.

Brookwater apprentice Liam Ash hand mows the 4th tee following the opening round



Assistant superintendent Adam Rose (foreground) and Dave Purcell give the 6th green a cut ahead of the second round

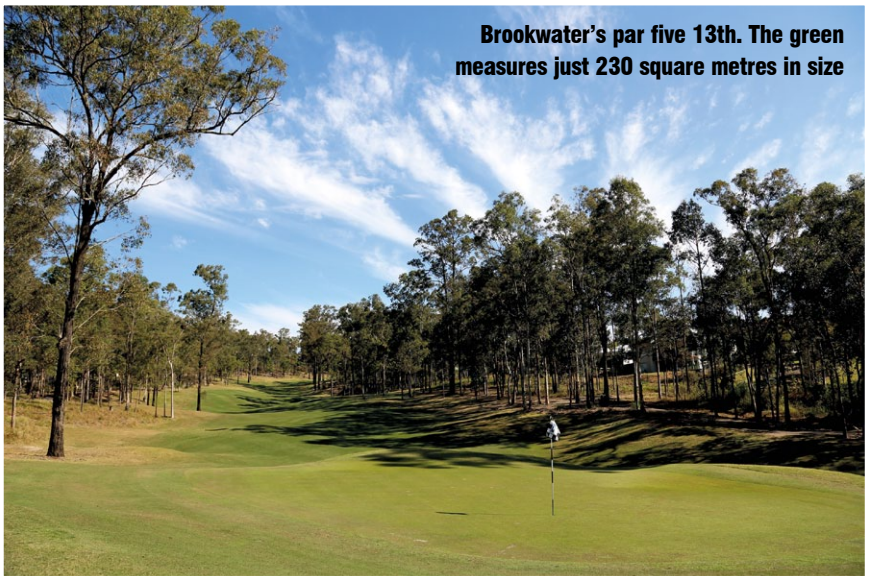
Greenkeeper Garry Kissick gives the 12th fairway an afternoon shave

The view from Brookwater's 17th tee

Main photo: Simply stunning – Brookwater's much admired par three 16th

Anthony Smith (left) and Aaron McQuilty cut the 17th green

Greenkeeper William Neill waters bunker surrounds



Brookwater's par five 13th. The green measures just 230 square metres in size

Brookwater's impressive bunkers received plenty of attention to ensure correct sand depths. Pictured are the fairway bunkers looking back up the 1st

CONTINUED FROM PAGE 23

"That last month in the lead-up to the tournament was really in our favour and couldn't have come at a better time," explains Geeson. "We had a couple of days in the first week of August that nearly tipped 30 degrees, which was pretty abnormal.

"Leading into that, we had already received our annual rainfall prior to July (approx 840mm). Being on clay and heavily treed, the course was an absolute bog in parts, especially the shade-affected areas. We just couldn't dry them out. But once we got those few warm days the place really came to life and everything started to dry out. It was great to see that new growth because for a period there we were getting a little a bit worried."

As well as the usual increase in mowing regimes about a fortnight out, in the months leading up to the tournament there were a few key areas of focus for the crew. First and foremost was getting the CT2 couchgrass fairways and surrounds in as healthy a state as possible. CT2 hasn't the best reputation of all the couches and at Brookwater its shortcomings are exacerbated, especially due to the inherent shade issues.

About six weeks out, Geeson flicked the switch on an intensive fairway nutrition programme, going out weekly with applications of Nitro Iron at 20l/ha. With the weather drying out and warming up, the CT2 responded nicely. By contrast, the Tifdwarf greens and Santa Ana tees were fed on an as-needed basis, primarily because they are oversown in winter (the greens with *Poa trivialis* and the tees with a 70/30 ryegrass/*Poa* mix) and Geeson didn't want them to get away too much.

Bunkers were also targeted. As Geeson is quick to point out Brookwater's traps are always under scrutiny due to their steepness and proximity to the greens, so a fair amount of time was spent ensuring correct sand depths to alleviate ball plugging. The wet start to the year really impacted bunker surrounds and as they became saturated this prevented Geeson from spinning the irrigation heads to help pack the sand down. As a result he had to send guys out to handwater bunkers to try to firm them up. A couple of bunkers on 1 and 10 were also reconstructed and Geeson is hoping to knock off a few more of the worst ones ahead of the tournament returning next year.

Perhaps the most noticeable change to the course in the lead-up to the Open was the substantial clearing of bush just off the fairways. With pace of play a perennial issue at Brookwater, thinning out the native underbrush was already on the cards, but with the tournament being announced it helped to expedite that process.

With a couple of extra casual staff coming on board, Geeson was able to dedicate a small crew

BROOKWATER G&CC – 2013 ISUZU QUEENSLAND OPEN

THE PERSONNEL

- **Superintendent:** Ben Geeson (36). Twelve years at Brookwater, including the past four years as superintendent.
- **Assistant superintendent:** Adam Rose
- **Key personnel:** Steve Kippen (turf technician), Anthony Smith (3IC), Aaron McQuilty (spray technician), Lance Smith (irrigation technician), Joe Crean (landscape).
- **Total course staff for 2013 Isuzu Queensland Open:** 12

THE COURSE

- **Course designer:** Greg Norman
- **Length/Par:** 6505 metres (Championship tees), par 72. The layout essentially comprises a figure 8 design with dramatic changes in elevation.
- **Rounds:** 28,000-30,000.
- **Maintained area of fine turf:** 23 hectares.
- **Bunkers:** 73 (big and steep!).
- **Soil type:** Clay.
- **Water source:** Industrial grade effluent water. Water is treated with a sulphur burner and acid injection system.
- **Greens age/construction type:** Full USGA spec.
- **Greens size:** Just over 1ha of greens in total, ranging in size from the 230m^2 13th, Brookwater's iconic downhill par five, to the 800m^2 par 3 16th.
- **Renovations:** Greens are cored once a year in October (no scarify). A vigorous solid tine programme on the greens is in place throughout the year – fortnightly through winter and once every three weeks during summer. On the back of that, due to the poor quality irrigation water, greens are acid flushed and have with a strong gypsum programme in place as well (5kg per month).
- **Irrigation system:** Toro LTC control system.
- **Machinery:** Toro.

THE TURF

- **Greens:** Tifdwarf couchgrass oversown with *Poa trivialis*
- **Surrounds:** CT2/GN1 couchgrass.
- **Fairways:** CT2/GN1 couchgrass.
- **Tees:** Santa Ana couchgrass oversown with a ryegrass/*Poa* blend (70/30).
- **Roughs:** CT2/GN1 couchgrass.

to the task and over a five month period they went through the entire course. The results have been impressive and playability has greatly improved. A small number of trees and tree limbs were also removed/cut back during this time in order to improve site lines from the black tees.

GAME ON

Cutting heights for the Open remained pretty much as they would have normally been for that time of year. Two weeks before the tournament Geeson sent the rollers out on a more regular basis, while the greens were double cut at 3.5mm. With about a week to go both mowing and rolling was backed off a little and come the actual tournament the greens were given just a single cut each morning and an afternoon roll if necessary.

Due to concerns over pace of play and also because of the slopes on some of the greens (such as the 10th), the PGA was mindful of not having the greens too quick and stipulated speeds between 9"-9.5" across the four rounds. Full course preparations for the tournament included:

- **Greens:** Height of cut (HoC) 3.5mm. Two two-man teams, morning single cut with Toro Greensmaster 1000s;
- **Surrounds:** HoC 14mm; morning cut with Toro Greenmaster 3250D;
- **Fairways:** HoC 14mm. Blown off then afternoon cross cut with Toro Reelmaster 5610s;
- **Tees:** HoC 11mm. Afternoon cut with Toro Greensmaster 1000s;
- **Semi-rough/rough:** HoCs 25mm/67mm;
- **Bunkers:** Hand-raked mornings.

"The PGA were very happy with the playing surfaces," says Geeson. "We were doing a lot of double cutting and rolling in the weeks leading up to the tournament, but we eased off on that about a week out. The PGA just wanted the greens to be pretty straight forward and nothing out of this world.

"The PGA were great to work with and we worked in really well together. It was the first major tournament for most of us and it was a wonderful experience. The guys really embraced it and put in a lot of hours and effort over the past six months to get the course up for the tournament, which is something they can be really proud of."

The Tifdwarf greens, which are oversown with *Poa trivialis* in winter, were kept at 3.5mm for the tournament

ATM columnist John Neylan was among a contingent of Australian agronomists and turfgrass researchers to attend the recent International Turfgrass Society conference in Beijing. Here he looks back at the event and some of the interesting research papers presented.

Cutting edge research

The International Turfgrass Society (ITS) is a not-for-profit scientific organisation established in 1969 to encourage research and education in turfgrass science and to promote personal communication among the international community of turfgrass researchers.

To achieve these aims the ITS organises international conferences to present turfgrass research and information on all aspects of turfgrass production and use. The International Turfgrass Research Conference (ITRC) is held every four years and this year was held in Beijing, China from 14-18 July.

At this year's conference there were over 200 delegates from 20 countries with 123 papers, 46 reports and 65 posters presented. There was no shortage of new and not so new information to absorb, discuss and query.

Australia was again well represented with 11 delegates and 11 papers and posters presented. Dr Don Loch, Australia's ITS officer and current ITS vice-president, had the honour of presenting a keynote address, one of two papers he delivered during the conference. Among those Australians presenting in Beijing were:

- **Dr Don Loch** (University of Queensland): A review of *Digitaria Didactyla* Willd., a low-input warm-season turfgrass in Australia: Biology, adaptation and management; and Effects of foliar nutrient and biostimulant applications and soil moisture and nutrient status on establishment of newly-laid sod of *Zoysia* spp.;
- **Prof. David Aldous** (University of Queensland): A review of the biology, adaptation and management of *Dactyloctenium Australe* Steud. (Durbangrass) as a turfgrass with particular reference to Australia;
- **Dr. Christopher Lambrides** (University of Queensland): Ecoturf – A case study on genetic variation and agronomic potential of bermudagrass (*Cynodon* spp.) germplasm collected from Australian biodiversity;
- **Phil Ford** (University of Ballarat): Peak torque and rotational stiffness of bermudagrass, perennial ryegrass, Kentucky bluegrass and tall fescue; and
- **Yi Zhou** (University of Queensland): Selection for tolerance to both drought and frost among a large number of bermudagrass (*Cynodon* spp.) ecotypes collected from different climatic zones.

A number of poster presentations were also displayed including:

- Evaluation of wear during winter dormancy on the rotational traction of hybrid bermudagrass (by Michael Robinson and Phil Ford);
- Brisbane and Bangkok 2011 – A tale of two floods (by John Neylan, Don Loch, Shane Biddle, Christopher Lambrides and Dennis Baker); and
- Correlation between soil phosphorus tests failed under field conditions in southeast Australia (by James Hull and Peter Martin).

The conference opened with a day of plenary presentations and then for the remaining days there were concurrent streams running covering the key topic areas of;

- Establishment and maintenance;
- Pests;
- Genetics and breeding;
- Physiology and stress physiology; and
- Soil, conservation and environmental quality.

The following is a summary of some of the research work that was of particular interest.

SPORTS TURF IN CHINA

The first of the plenary papers was presented by ITS president Dr. Liebao Han who provided an overview of sports turf in China. According to Dr. Liebao Han there has been a long history of turfgrass utilisation in China with the first golf course constructed in Shanghai in the late 1800's.

The modern turfgrass industry started in the 1980s and is still one of the newly emerging industries. The Beijing Asian Games in 1990 acted as a catalyst to encourage the modern turfgrass industry in China and around this time the first 'real' golf courses were constructed. The first such

Opposite page: Australia and New Zealand were well represented at the recent International Turfgrass Research Conference in Beijing. Pictured (from left) during the conference technical tour are Richard Stephens, John Neylan David Aldous, Bill Walmsley (kneeling), Alan Stewart, Jim Hull, Michael Robinson, Don Loch (kneeling), Nathan Fletcher, Phil Ford, David Nixon and Jyri Kaapro (kneeling)

Left: Dr Don Loch (University of Queensland) presented two papers at the ITRC, including a keynote presentation on *Digitaria didactyla* Willd. Loch is the current International Turfgrass Society vice-president

POA ANNUA ENCROACHMENT IN CREEPING BENTGRASS

It would not be an international turfgrass research conference if at some stage the discussion didn't turn to the control of *Poa annua* in creeping bentgrass. At the recent ITRC conference in Beijing, a paper was presented by Dr James Brosnan (University of Tennessee) that investigated the influence of nitrogen and phosphorus on the encroachment of *Poa annua*.

The influence of nitrogen and phosphorus is a much discussed subject in Australia, where minimal nitrogen applications, particularly during winter, is one part of an effective programme in minimising *Poa annua* intrusion. In the past a zero phosphorus philosophy has also been pursued as a means of controlling this weed species.

Dr Brosnan's research looked at a combination of four nitrogen (N) rates (1.95, 2.93, 3.91, and 4.88kg N/100m^2/yr) and four phosphorus (P) rates (0, 0.43, 0.86, and 1.29kg P/100m^2/yr). The results of the trials established that treatments greater than 0.43kg P/100m^2/yr resulted in an increase in *Poa annua* cover compared to treatments with no P applied, but the *Poa annua* cover was not affected as rates of P increased above 0.43kg P/100m^2/yr.

The *Poa annua* cover in the nil P treatment plots decreased by 2 per cent over the two year experiment whereas it increased from about 3-7 per cent in plots receiving 0.43 to 1.29kg P/100m^2/yr. After two years of treatments, soil Mehlich 3-P concentrations were positively correlated with changes in *Poa annua* cover. Treatments producing concentrations greater than 13mg/kg had a greater *Poa annua* cover than those measuring less than 13mg/kg.

Tissue P concentrations were also significantly correlated with changes in *Poa annua*. Treatments producing tissue P concentrations ranging from 4.0 to 5.5g P/kg had less *Poa annua* cover than treatments producing tissue concentrations greater than 5.5g P/kg. Interestingly, in this study the nitrogen had no effect on *Poa annua* encroachment and there was no N-by-P treatment interaction.

There are several observations; the lowest nitrogen rate could be considered to be at the upper end of nitrogen use on bentgrass greens maintained under Australian conditions. Typically N rates in Australia are around 1.2 to 2kg N/100/m^2/yr.

Phosphorus has often been discussed as a precursor to the occurrence of *Poa annua* and this study would appear to confirm that the soil P levels should be kept relatively low. Johnson et.al. (2003) has suggested that soil P using an Olsen extraction at greater than 3mg/kg is all that is required, while Kreuser et. al. (2012) has indicated that soil P at 6-11mg/kg using the Mehlich method is sufficient.

The exclusive 36-hole Beijing Qinghe Bay Golf Country Club was one of the highlights on the ITRC technical tour

golf course was the Chung Shan Hot Springs in Zhongshan, based on a design by Arnold Palmer, which opened in 1984.

Since this time the Chinese turfgrass industry has experienced rapid development across various fields, including environmental protection, urban construction, landscape greening, sports fields, recreation, entertainment and also conservation of water and soil.

There are now currently 600 golf courses, 5000 sports turf facilities covering soccer fields, racetracks and tennis courts and 2.5 million hectares of urban landscape. It is predicted that over the next 10 years that there will be continued growth, particularly in golf where it is predicted that the number of golfers will increase from about 350,000 to 3 million.

MANAGING EARTHWORMS

Managing earthworm castings has become a growing challenge in Australia, particularly as there has been increasing restrictions on the chemicals used to control them. Dr Daniel Potter (University of Kentucky) presented a paper on his research related to the control of earthworm castings on golf courses and sportsfields.

Dr Potter discussed the different species of worms found in turf and in particular how they relate to an increasing occurrence in sand-based profiles. A few species of European origin, mainly *Aporrectodea* spp. and *L. terrestris* (Lumbricidae), cause most of the casting problems in New Zealand, and (probably) Australia, whereas *Amynthas* spp. (Megascolecidae) are the most important species in Korea, China, Japan, and, sporadically, the US.

He noted that traditionally it was uncommon to find earthworms in sand profiles due to the abrasive effects on the worm gut. However, this has changed in recent times with increasing worm castings occurring in USGA golf greens.

The main culprit is a worm of Asian origin and intriguingly is associated with discarded fish bait! The particular worm is sold as bait and the remnants (in particular the cocoons) are often discarded on the river bank which then finds its way into local river sands that are then used for construction.

This is a most interesting outcome and may go part way to explaining the concerns several years ago about some sources of sand in Australia and the possible association with an increased occurrence of nematodes.

The paper also discussed British greenkeeper Peter Lees, who in the 1890s pioneered a method so effective for reducing earthworm casts on golf courses that it was a mainstay for more than 50 years. It involved applying mowrah meal, made from seeds of the *Bassia latifolia* tree, followed by irrigation. Natural saponins in the mowrah meal irritated earthworms' mucus membranes, expelling them to the surface where they then were removed.

Recent research has followed on from this early work where tea seed meal, a saponin-rich by-product of tea oil manufacture, has shown to be similarly effective. The saponins are effective irritants that cause the worm to dry out and can provide up to five weeks control.

Dr. Potter concluded that targeted use of granular or liquid products with natural plant saponins has potential for reducing casting to tolerable levels. *Note: Much of the research has been done on Early Bird™ organic fertiliser. It is not labelled for earthworm control, although registration as a biological pesticide is being pursued in the USA.*

USE OF TURF COLOURANTS

The use of turf colourants on couch (*Cynodon* sp.) during winter in Australia is increasing and the anecdotal evidence is that there are some agronomic benefits in addition to the green colour they provide.

In research undertaken by Mississippi State University's Dr Christian Baldwin, he investigated the effects of a turf colourant on spring green up in hybrid bermudagrass (*Cynodon dactylon* (L.) Pers. x *C. transvaalensis* Burtt-Davy) that was subjected to full sun and 55 per cent shade as well as with and without overseeding.

The driver for the research was the reluctance to overseed hybrid bermudagrass because of the potential inhibiting effects during the spring transition. The study evaluated the impacts of different cultural practices (overseed, colorant use as an alternative to overseeding and dormant turfgrass) and in sun and shade on TifEagle bermudagrass (*Cynodon dactylon* (L.) Pers. X *C. transvaalensis* Burtt-Davy) spring transition and summer performance. The research demonstrated that using a colourant provided the earliest spring green up and provides an alternative to winter overseeding.

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BEIJING TECHNICAL TOUR

In addition to the formal presentations and posters, the ITRC took delegates on a technical tour of some turf facilities in and around Beijing. The tour was interesting in more ways than just looking at grass and negotiating the incredible traffic snarls was a 'highlight' that soon wore a bit thin.

The first stop was the Beijing Qinghe Bay Golf Country Club, an exclusive 36-hole private membership club in the vicinity of the Olympic park area. The two 18-hole international standard championship courses were opened in 2008 and are designed by Australian LCW Golf Design Company (Les Watts) and American JMP Golf Design Company (Mark Hollinger).

Both courses are a parkland style with the predominant grass type being creeping bentgrass. The greens consist of T1 and the tees and fairways were L93. The summers are hot, wet and humid and the bentgrass is a challenge to manage and requires wall-to-wall fungicide applications every two weeks. Summer lasts for about 8-12 weeks with maximum temperatures averaging 30°C and 70 per cent humidity. During the conference period the temperatures were in the mid- to high 30s and it was clear that the bentgrass required regular irrigation.

The winters provide a distinct contrast, with average maximum temperatures at 2-4°C and the minimum temperatures in the negative for up to five months with ice and snow to top it off; a tough and contrasting environment in which to maintain high quality turf.

The Clover Group and Institute of Turfgrass Research was the next stop (providing you didn't count the two hours stopped on the road). This is a joint facility shared by the state owned seed enterprise (Clover Group) and the institute.

The facility undertakes research into the adaptation of imported turfgrass species/cultivars, turfgrass pest management, native grass selection and breeding and drip irrigation applications for turf. The extensive facility consists of numerous turfgrass plots, mainly focused on cool-season species such as bluegrass, ryegrass and tall fescue.

Beijing's Tang Polo Club was our final turf visit. It was established in 2010 and is China's premier polo and equestrian club. It is an exclusive members club and to become a member requires an invitation by the club's board of advisors or an existing member. The club regularly hosts several tournaments by cooperating with the sport's governing body (Federation of International Polo), the State Physical Culture Administration and many other organisations every year.

The club has an area of 23 hectares with two full size polo fields and a dedicated turf management team to keep them up to tournament standards. The predominant grass species are ryegrass and tall fescue. As with the golf course, disease is a constant burden during the summer and regular fungicide applications are made. The club also has a 5,600m^2 indoor arena which provides all year round usage for members. The facility has 100 stables and 100 horses predominantly from Australia, Argentina and the UK.

The Clover Group and Institute of Turfgrass Research facility in Beijing undertakes research into the adaptation of imported turfgrass species/cultivars, turfgrass pest management and native grass selection and breeding

Beijing's Tang Polo Club

The Beijing Qinghe Bay Golf Country Club greens were T1 bentgrass which are subjected to vast temperature extremes from summer to winter

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Research undertaken by Whitlark and Umeda (2012) demonstrated that most of the colourant products used in their trials tended to warm the surface when compared to untreated areas and that it was estimated that the colourants may have reduced the winter dormancy period by as many as 14 to 20 days. Liu et. al. (2007) have also shown that colourants provide an increase in surface and soil temperatures.

In discussions with Dr Baldwin he said that there were about 30 colourants available in the USA and that they did have a place in turfgrass management. His main caution was that some colourants can dry into an unconventional green colour that makes it obvious that the turf has been painted.

The take home message from this research supports the anecdotal evidence in Australia that the colourants do have a positive effect and are well worth investigating further.

DROUGHT RESISTANCE MECHANISMS

One of the more technical presentations was on the physiological mechanisms that regulate water use and infer drought tolerance in turfgrasses. Dr. Bingru Huang from Rutgers University has undertaken numerous research projects looking at this aspect of turf management and presented a plenary paper on this area of research.

The area that particularly interested me was the influence of temporary water availability on triggering drought avoidance mechanisms. An important avoidance mechanism is the ability of plants to reduce water loss through transpiration. Most transpirational water loss is through the stomata in the leaf epidermal surfaces and stomatal closure is one of the most sensitive responses to drought stress. This process increases resistance for water diffusion out of leaves which results in water conservation.

Stomatal closure can be affected by many factors including the increase in the leaf concentration of abscisic acid (ABA) that is transported from roots exposed to drying soils. Roots are important sites for the synthesis of ABA, which is transported to shoots and initiates a signal in the guard cells which in turn alters the membrane transport of several ions, and as a result, guard cells lose their turgor and the stomata close.

From a practical turf management aspect it reinforces two important aspects from my perspective. The first is that a strong, healthy and deep root system is crucial. Nothing new about that but it does provide a strong reason for a good root system other than the capacity to draw water from a greater volume of soil. The second is that short periods of moisture stress trigger the production of ABA, inferring greater drought avoidance.

Dr. Huang concluded that the ramifications of these processes are that light, frequent irrigations that keep the surface moist all of the time should be avoided. Again, nothing new but it does reinforce the importance of deep, infrequent irrigations and how it influences important physiological functions in the plant.

In recent times it has been a theory of mine that firmer putting surfaces could be better achieved through a periodic 'flooding' that wets the entire profile with the occasional top up rather than daily hand watering for example. The end result should be a hardier, drier and firmer turf.

Dr. Huang also discussed the results of other research she has undertaken which has demonstrated the positive effects of applying ABA (via organic extracts) as a means of reducing heat stress in creeping bentgrass.

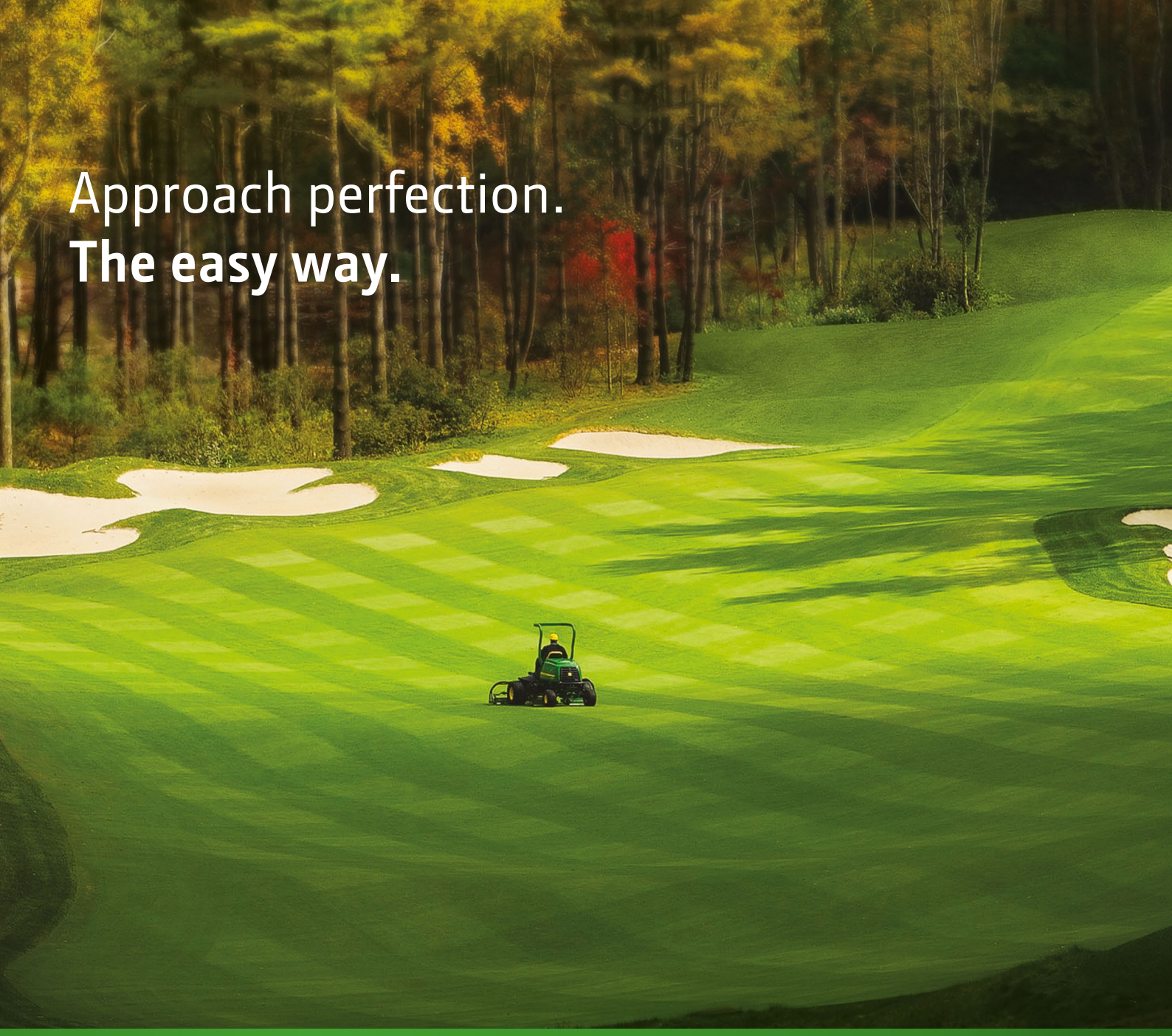
ECOTURF

A fascinating research project that was reported on has been undertaken by Dr. Chris Lambrides from the University of Queensland. His team is looking at the genetic variation and agronomic potential of bermudagrass (*Cynodon* spp.) germplasm collected in an Australian biodiversity project to develop water and nutrient use efficient bermudagrasses. In this study, over 1000 plants have been collected and assessed.

The early part of the research has determined the genetic variation for drought resistance among a large range of potential pasture or turf bermudagrasses (*Cynodon* spp.). Four hundred and sixty genotypes including ecotypes collected from different climatic zones of Australia and commercial cultivars were established in the field and assessed during natural and imposed drought periods.

Physiological analyses of the genotypes within the superior drought resistance groups indicated that the members of this group were probably able to extract more available soil water during the drought period. No commercial cultivars were found in the most drought resistance groups. A more detailed report on this research will be published in a future edition of ATM.

Jim Hull plays a hybrid Chinese game of croquet/golf



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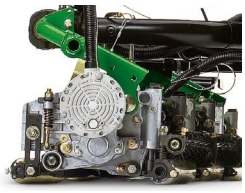

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The difference in quality of a common couchgrass (top) compared to an improved couch variety, in this instance Santa Ana. The common couch is less verdant, more open in habit and susceptible to weed invasion

Quality control

AGCSATech senior agronomist Andrew Peart discusses couchgrass quality issues during winter and looks back on his recent trip to Singapore for the Australian Racecourse Managers Association annual conference.

During winter, issues with the quality of some couchgrass surfaces can manifest because of a number of reasons. As well as being a product of the colder winter temperatures and reduced sunlight, the quality of such surfaces can be significantly affected by other factors such as couchgrass variety, poor vigour, lack of complete coverage, poor nutrition, excessive shade, poor drainage and excessive thatch.

COUCHGRASS VARIETY

Generally, by far the poorest couchgrass surfaces over the winter months are those described as common couchgrass (*Cynodon dactylon*). They tend to have longer dormancy periods, are more open in growth habit, have a less vigourous growth habit, are more susceptible to weed invasion while generally exhibiting less of a green pigmentation.

The photo left illustrates the difference in quality of a common couchgrass compared to an improved couch, in this instance Santa Ana. As seen from the photograph, the common couch has gone into dormancy earlier, is more open in habit and has a much higher degree of weed invasion, in this case *Poa annua*.

While *Poa annua* produces light green plants which stand out dramatically compared to the dormant couchgrass, it also has two other implications on fairways. Firstly, it has a very upright growth habit compared to the couchgrass meaning that unsatisfactory ball lies can occur. Secondly, and of more concern, is that if large patches of *Poa annua* develop they can out-compete the couchgrass leaving very thin or bare areas of ground when the *Poa annua* is either chemically removed or dies off during the summer months.

POOR VIGOUR

Poor vigour is generally either as a result of a common couchgrass variety or insufficient nutrition during the growing season. With plenty of sunlight, warm weather and irrigation, most couchgrass surfaces look impeccable during the summer and even early autumn. However, with the onset of cooler weather and without sufficient carbohydrate reserves, couchgrass can quickly deteriorate. Ideally soil and plant tissue testing should be undertaken during the growing season to ensure the soil and plant has adequate nutrition before the onset of winter.

Poor vigour could also be as a result of couch mite activity and while these symptoms are generally easily observed, if they are not suspected as being a problem they can be overlooked. Anything that retards the growth of couchgrass through the summer months will have implications on its performance during the winter.

LACK OF COMPLETE COVERAGE

If couchgrass swards are not strong leading into winter they will quickly deteriorate. These areas tend to be the same year in year out as a result of thinning from the previous winter. They are areas that have generally been affected by weed invasion, heavy wear, shade or combinations of the three.

The photograph left, for example, illustrates the high percentage of *Poa annua* that has infested a couchgrass area due to it not having a complete coverage of grass due to a large percentage of summergrass (*Digitaria sanguinalis*) that was present within the sward during the summer months.

Areas that are dominated by weeds or those that have previously been thin due to other factors must

simply not be left to naturally regenerate because the strength of their sward will be limited going into another winter.

DRAINAGE

Another major influence on the quality of the couchgrass during the winter months is the drainage ability of the soils, or the ability of the water to penetrate through the thatch into the soil beneath. It is virtually impossible to maintain a high standard of couchgrass on poor draining soils, which is further compromised with the increasing use of carts on golf courses. The photograph right clearly illustrates the impact that poor draining soils in conjunction with cart usage can have upon the quality of a couchgrass surface during winter.

IMPROVEMENT STRATEGIES

The following is a list of recommendations that could improve the condition of couchgrass fairways during the winter months depending on the situation.

TURFGRASS VARIETY

The only real option to improve the quality of common couchgrass within fairways is to line plant a better variety, whether it be Santa Ana, Grand Prix or Legend etc... If that was the course of action, then the following procedure may be adopted;

- Select an appropriate fairway;
- Address any drainage issues that may be of concern;
- Spray out the chosen fairway using the appropriate rate of glyphosate;
- Line plant straight into the fairways;
- Apply the turf registered pre-emergent herbicide Ronstar, if deemed necessary;
- Irrigate and fertilise to promote growth;

If undertaken in late October/early November it would be expected (given average summer temperatures) that a complete coverage would be achieved by late February/early March.

IMPROVE VIGOUR

It is recommended that soil and plant tissue tests are undertaken to ensure optimal nutrition over the couchgrass growing months. It is also recommended that the couch is inspected regularly for the presence of couch mites and if detected the use of a turf registered miticide such as Thumper® (active ingredient abamectin) is applied according to the directions on the label.

WEED CONTROL

Where weeds are a constant issue it would be recommended to apply pre-emergent herbicides. This may well include applications for both the annual winter grass weeds, namely *Poa annua*, and annual summer grass weeds (summer grass and goose grass) before they germinate.

Turf registered selective pre-emergent herbicides with the active ingredients such as pendimethalin, oryzalin and prodiamine can be used for the control of winter grasses, while prodiamine and dithiopyr are selective herbicides that can be used for the control of summer grasses.

While the use of pre-emergent herbicides cannot be guaranteed to inhibit all weeds from germinating, they will stop the vast majority, thus greatly reducing the competition on the couchgrass as well as enhancing playing conditions.

Above: Poor draining soils in conjunction with cart usage can have a significant impact upon the quality of couchgrass surfaces during winter

COMPACTION RELIEF

The impact of compacted growing conditions is often difficult to quantify, however, on clay soil types it is more than likely that the amount of aeration will be greatly restricted if not from compaction but the inherent lack of macropores within the soil structure.

The use of a Vertidrain or similar type of machine that will relieve compaction and create macropores within the profile will provide much more conducive growing conditions. It will also aid water penetration during the summer months, assist with leaching salts from the profile and provide greater root activity.

DRAINAGE RECTIFICATION

Often poor quality soils require the strategic use of a network of subsurface drains to ensure they remain playable during the winter months. Poor drainage, however, may not necessarily be a result of poor soils but in fact excessive thatch or organic matter accumulation. If this is the case, additional hollow coring or other renovation techniques may well be required to reduce the organic matter prior to the upcoming winter months.

ON TRACK IN SINGAPORE

During August I was fortunate enough to attend the Australian Racecourse Managers Association (ARMA) annual conference, which this year was held at Kranji Racecourse in Singapore and hosted by the Singapore Turf Club.

Bottom left, opposite page: A high percentage of *Poa annua* has infested this area of couchgrass due to it not having a complete coverage because of a large percentage of summergrass dominating the sward during the summer months

Top: The 15cm wide x 10cm deep Reflex reinforced plug used at Singapore's Kranji racetrack. Grown in steel rings, its straight sides and 100mm depth means that even with immediate racing the new plug is not displaced

Above: Where large sections of the Kranji track need replacing, turf squares measuring about one square metre by 100mm deep are manually laid

Right: Hand sprigging a section of the Kranji turf nursery with El Toro zoysia

The Singapore Turf Club moved its operations to Kranji in 1999 from its previous home at Bukit Timah Racecourse. Construction of the Kranji facility began in 1996 and saw the installation of one natural turf track with many other synthetic (primarily Polytrack) training tracks. The grass track is a StrathAyr all-weather construction that comprises of a base drainage layer of gravel and pipes, a lower profile of sand and an upper rootzone layer reinforced with unique Reflex mesh elements.

The track design is interesting with two home bends at the northeast end of the course. The long course (outer bend) is 2000m, while the short course (inner bend) is 1800m with the straights to the winning post being about 550 and 450 metres respectively. The overall width of the track is 31m with the maximum rail movement out 14 metres from the true position.

The grass type is El Toro zoysiagrass which is a variety of *Zoysia japonica*. Although not native to Singapore, it has adapted well to Singapore's constantly warm, humid and wet climate and produces strong rhizomatous growth that can withstand the rigours of racing. The one drawback of the variety, however, is its inability to quickly repair from divots and as a result the racecourse management team has devised three somewhat innovative means of re-turfing.

The first is for use in areas which lack turfgrass density and involves conical shaped plugs that are about 15cm deep, 5-8 cm in diameter at the top and 3cm at the bottom. A conical-headed crowbar is simply pushed into the surface to create a similar sized hole with the turf plug dropped in.

The second is somewhat similar to our conventional Turf Doctor device although Kranji has developed a round plugger that extracts a 15cm radius x 10cm deep circular plug from the track in one hit. It is then replaced by a Reflex reinforced plug of the same dimension that has been grown in steel rings ready for immediate replacement (see photograph top left). Because of the straight sides and being 100mm deep means that even with immediate racing the new plug is not displaced from its position.

The final method involves the use of large reinforced squares, which are approximately one square metre in size by what appeared to be around 100mm deep. These again were put in places where the turf coverage had been severely impacted upon and was done so manually (see photograph middle left).

Apart from the different grass species used at Kranji, the most noticeable difference in terms of their maintenance activities appeared to be the sheer number of ground staff they had and how much manual work was undertaken, from hand-weeding to even hand-planting.

Kranji has an on-site turf nursery with at least four hectares of El Toro zoysia under production for large scale turf replacement. During the ARMA conference visit large sections of the track had been completely re-laid in preparation for racing to recommence on the grass track at the beginning of September.

While it is not uncommon to see a golf green being sprigged by hand, it was a very impressive sight to see parts of the turf nursery literally being hand-planted with zoysia sprigs and followed up by hand topdressing.

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For all the complexity involved in modern turf management, it all boils down to a pretty simple statement – turfgrass quality, player perceptions of quality, surface playability and safety all rely on full, uniform turf coverage

Gaining traction

PHOTO COURTESY OF STAR NEWS GROUP

In Volume 15.4, Phil Ford from the University of Ballarat looked at anterior cruciate ligament injury in football and what, if any, role turf species had in their occurrence. In this follow-up article Ford looks at boot-surface traction and asks whether ground authorities need to take grass coverage much more seriously by controlling usage, traffic and providing adequate inputs and resources.

As outlined in the last edition of Australian Turfgrass Management Journal ***(ACL injury in football, Volume 15.4, July-August 2013, p58-62)***, my research, conducted as part of a PhD thesis through the University of Ballarat, investigated turf management strategies to avoid excessive hardness and excessive boot-surface rotational traction. Hopefully these strategies will reduce ground-related injury in football, in particular anterior cruciate ligament (ACL) injury which has been in the headlines this and in past AFL premiership seasons.

As noted in that first article, in the absence of adequate irrigation, maintaining good turfgrass coverage was the most important strategy for avoiding excessive hardness (e.g.: greater than 160 gravities in Clegg hardness). So the turf manager needs to select a grass species that will maintain the best cover over the whole ground and through the whole season, given the limitations of climate, budget etc.

For many community-level football grounds, with inadequate irrigation and susceptible to water restrictions during future drought, that could mean couchgrass. However, Australian research has linked couchgrass to a higher risk of ACL injury, which was attributed to it having more thatch and a tendency to trap players' boots, preventing the free rotation of the foot and placing more stress on the knee ligaments (Chivers, 2008; Orchard et al., 2005).

Many intrinsic factors are implicated in ACL injury (e.g.: genetic factors, body mass index, fatigue, previous injury, landing and pivoting technique etc.), but there is no consensus among the medical profession that boot-surface rotational traction is involved. However, some research implicates either high traction boots (e.g.: Torg & Quedenfeld, 1973) or particular grass types (e.g.: couchgrass compared to perennial ryegrass, Orchard, 2005) in ACL injury risk, which suggests some aspect of traction is involved.

If rotational traction is involved, as suggested by several authors, then the rotational stiffness of a boot-surface combination should be highly relevant. In my thesis, rotational stiffness was measured in the 0-6° phase of the rotation test, corresponding to 0-0.2 seconds after ground engagement. It is known that ACL injury in a pivot manoeuvre occurs almost immediately on footstrike, within 0.25 seconds or so (Grund et al., 2010), so high rotational stiffness should be much more relevant to ACL injury than peak torque, which only occurs late in the rotation test.

As reported in the previous article, couchgrass consistently had a higher peak torque than perennial ryegrass but its average rotational stiffness was never higher than perennial ryegrass, and was actually significantly lower than it on four out of eight assessment dates. This suggests that there is no reason to recommend for perennial ryegrass and against the use of couchgrass based on their rotational traction.

In any case, it turns out that other factors are much more important than grass species in the rotational traction story. Seasonal effects, for example, had a greater effect on traction than species type. A recommendation for a specific turfgrass on the basis of its rotational traction is meaningless if traction varies more from month to month than between grass types.

My investigation was looking for strategies that had a clear and consistent effect on avoiding high boot-surface traction. A series of trials showed that differences in thatch depth, soil type, soil moisture content, cultivar type or nitrogen rate had no consistent effect.

In some cases, thatchy turf had high traction, in other cases low thatch turf had the higher traction. Even couchgrass that was worn back to ground level in winter using a wear machine still had reasonably high traction. In some cases, sand profiles had higher traction, in other cases soil

profiles did. Oversowing couchgrass with perennial ryegrass or *Poa* had no consistent effect on traction – it reduced it early in the winter, but by late winter and into spring it led to an increase in rotational traction.

So, none of these strategies were useful. However, there were three strategies that did have a clear, consistent effect in avoiding high boot-surface traction: dusting, turf coverage and (surprise) boot type.

PUTTING THE BOOT IN

The boot effect was pretty obvious. To give an example, a boot with six 21mm screw-in studs (see photo top right) had a peak torque of 70Nm and a rotational stiffness of 6.5Nm/deg, which was significantly higher than a moulded-sole boot with nine 13mm studs (bottom right) which had a peak torque of 50Nm and a rotational stiffness of 5.3Nm/deg. Boots with multiple rubber dimples had even lower rotational traction.

This means that a perfectly viable strategy to avoid high rotational traction is to just forget about the surface – grow the best grass you can, then manage traction by the simple and immediate strategy of boot selection. That has the advantage for ground authorities (and their insurers) that a traction outcome is clearly the responsibility of the players, who choose which boots to wear.

Orchard had argued against players being forced to wear low-traction boots as they wouldn't want to risk falling, whereas making changes to the playing surface would lead to a universal reduction in boot-surface traction affecting all players (Orchard, 2005).

But another viewpoint is summed up as: there is no such thing as high surface rotational traction, only high boot-surface rotational traction. So if a surface has high traction, it can be easily moderated by boot selection.

There are three problems with this, however. The first problem is that boots aren't sold with a traction rating. Maybe they should be and this has been suggested by several authors in this field. At community-level football, perhaps players should select boots with screw-in stops, so they can change them to suit different conditions.

The second problem is that players are under pressure from their coach never to slip over. Coaches might insist on them wearing long studs and also wearing boots that are uncomfortably tight. Coaches and players should be made more aware of the possibility that excessive traction can increase ACL injury risk.

The third problem is that rotational traction can vary widely on a field from denuded areas to well grassed areas. This is due to traffic and becomes more of a problem as the season continues. In late winter, for example, denuded areas on community-level football fields I tested had peak torques as low as 4Nm and rotational stiffness well below 1Nm/deg, yet well-grassed areas on the same field might have a peak torque of 75Nm and a rotational stiffness of 7Nm/deg.

Football boot with six 21mm screw-in studs (top) and nine 13mm moulded studs (above). Peak torque and rotational stiffness was significantly higher for the screw-in studded boot than the moulded-sole boot

This was especially problematic on sand-based fields (see photo on page 42), due to the low shear strength of sand, which is exposed if turf biomass has been lost through excessive wear. Players will want to wear boots that provide adequate grip even on the worst areas of the ground, which means they'll experience excessively high boot-surface rotational traction on the well-grassed areas.

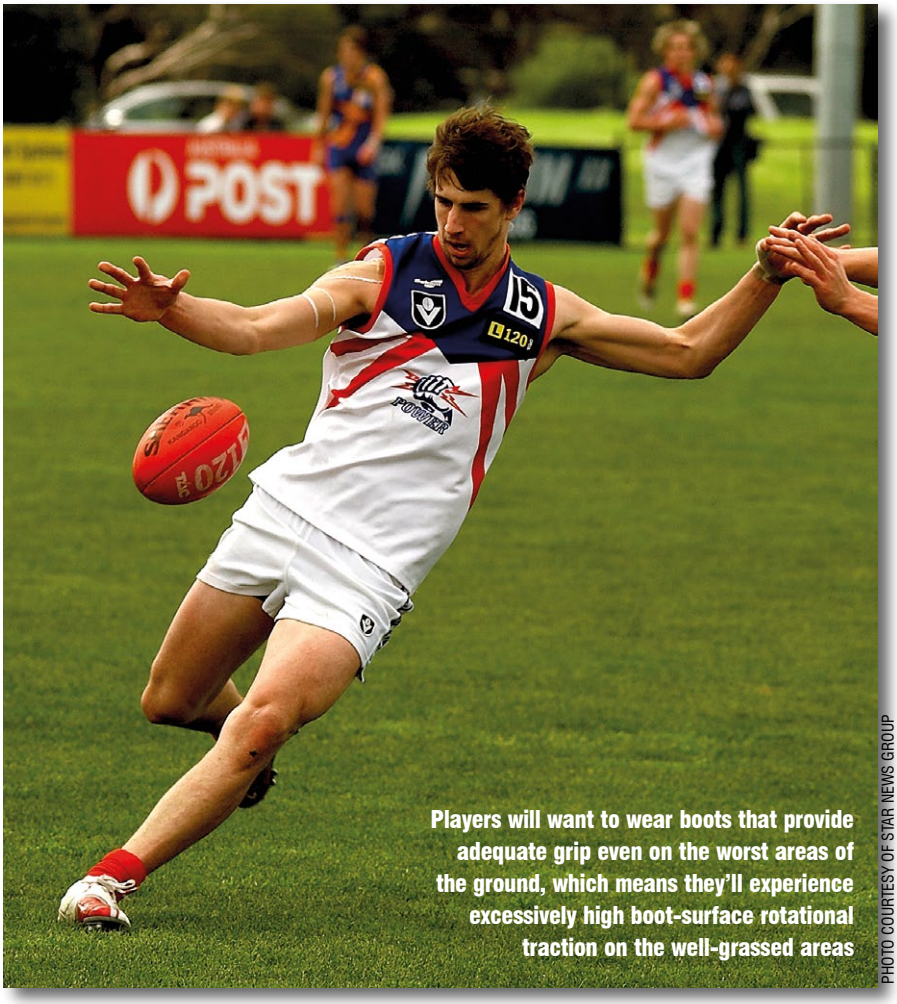
THE BLEEDING OBVIOUS

The solution to this problem is simple – don't let grounds wear out so badly. This is exactly the same as the solution for hardness on community-level fields: if you have good grass cover, injury risk from excessive hardness and excessive rotational traction

Rotational traction can vary widely on a community level football field from denuded areas to well grassed areas

will be minimised. The turf manager and ground authority on such grounds will have exercised their 'duty of care'.

In practice, of course, it's not that easy. Attitudes need to change. Ground authorities need to take grass coverage much more seriously, by controlling usage and traffic and also by providing adequate inputs and resources – the things that their curators have probably been saying for years!



Players will want to wear boots that provide adequate grip even on the worst areas of the ground, which means they'll experience excessively high boot-surface rotational traction on the well-grassed areas

PHOTO COURTESY OF STAR NEWS GROUP

And, again, it comes back to selecting the right grass species. The turf manager needs to select a grass species that will maintain the best cover over the whole ground and through the whole season, given the limitations of climate, budget etc. If that sentence sounds familiar, I just cut and pasted it from the first paragraph of this article, which in that case was referring to hardness, but in this case refers to both hardness and traction.

For all the complexity involved in modern turf management, it all boils down to a pretty simple statement – turfgrass quality, player perceptions of quality, surface playability and now safety all rely on full, uniform turf coverage. You should grow the turf species that best allows you to do that (my thesis should be renamed "Football turf: The bleeding obvious!").

Dusting was also mentioned earlier. A couch surface that had received six 4mm dustings (a total of 24mm sand, equivalent to 240m^3/ha) had a peak torque of 31Nm and a rotational stiffness of 2.9Nm/deg, which was significantly lower than a non-dusted area which had a peak torque of 54Nm and a rotational stiffness of 4.9Nm/deg.

Dusting had also been found to reduce the surface hardness of a droughted, clay profile, so perhaps it has the potential to reduce both hardness and traction. It will be interesting to see if this practice, which has transformed the quality of golf greens, also benefits football grounds. Several elite-level football venues dust. On soil-based grounds, however, the effect of dusting on surface drainage is unknown. There is also the problem of the low shear strength of sand being a problem if turf cover is denuded, as touched on earlier.

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Five couchgrasses (Conquest, Grand Prix, Legend, Santa Ana and Windsor Green) along with four pigments (Duramark, Carbon Trader, Green Lawnger and SP Green) were studied as part of Brad van Dam's research project at Royal Canberra Golf Club's turf nursery

Breaking dormancy

Manuka Oval head curator Brad van Dam conducted a research project that investigated whether the application of pigment sprays on couchgrass helped to break winter dormancy by increasing soil temperatures.

The basis for this research came about from observations made at Manuka Oval in Canberra. The surface is 80 per cent *Cynodon dactylon* (L.) Pers. (couchgrass) by the end of the summer, with areas of cool-season grasses *Lolium multiflorum* (annual ryegrass) var. Caravelle and *Poa annua* 20 per cent combined.

In autumn the surface is oversown with annual ryegrass for improved winter colour and playability. In spring the rye/wintergrass is chemically removed to reduce the competition as the couchgrass comes out of dormancy. Once the rye/wintergrass has died back the turf surface is white which is not only aesthetically unpleasing but presents playability and safety issues.

To reduce the time frame of the dormant couch being an issue, I researched various techniques into breaking spring dormancy. The most practical and viable technique I found for a broad acre scenario was the application of a water soluble coloured pigment to the turf surface. This increases thatch and soil temperature which can break dormancy earlier than naturally.

Couch is a C_4 warm-season grass with optimum growth occurring when soil temperatures range between 27-35°C (Beard 1973). Optimum air temperatures for shoot growth is 29-38°C, with minimum air temperature required for growth 13°C (McCarty and Miller 2002).

Dormancy comes about by a combination of low soil temperatures (10°C or less) which causes chlorophyll production to cease. When soil temperatures increase to 10°C and above, the couch will start to initiate growth and break dormancy (Beard 1973).

MATERIALS AND METHODS

Five couchgrasses were researched – Conquest, Grand Prix, Legend, Santa Ana and Windsor Green. The pigments studied were two black (Supaturf Duramark black line marking paint and Turf Culture's Carbon Trader) and two green (Becker Underwood's Green Lawnger and Simplot's SP Green) plus a control.

The research was conducted on the turf trial plots at Royal Canberra Golf Club (RCGC). These plots were installed for an overall trial 'Warm-season grass evaluations for turf in cold climates' conducted by Dr Peter Martin of the University of Sydney in conjunction with Horticulture Australia Limited and the Sports Turf Association ACT Inc.

The trial site was set out on eight blocks with a split plot design made up of 100 small plots as follows – 5 grass cultivars x 5 treatments (four pigments, plus control) x 4 replicates (blocks). The study evaluated the following hypotheses;

- The increase in temperature will initiate an earlier than natural spring green-up;
- Application of pigment to the grass surface will increase thatch temperature and soil temperature at 50mm; and
- The application of the pigments will increase chlorophyll production.

The project ran for 59 days, from 24 August 2011 (before natural green-up had started) through to 22 October 2011. Spring green-up was assessed by visual scoring for green shoot abundance on six occasions (24 Aug; 2, 16 and 23 Sep; 7 and 22 Oct).

Thatch and soil temperature conditions were monitored hourly by Thermochrons (iButtons). Twenty iButtons were used in the experiment and were placed in the ground on two separate occasions.

The first 10 iButtons were placed in the couch cultivar Grand Prix which was, on assessment,

found to have the most even and densest coverage of turf sward and a well-defined thatch layer. In Block 7 five iButtons were placed in the thatch and in Block 8 five iButtons were placed 50mm below the thatch. Both these plots were irrigated at 45 per cent of net evaporation rate. These iButtons were inserted into the ground on 23 August 2011 and started sampling at one hour intervals for 12 weeks.

The next 10 iButtons were placed in Block 5 thatch and Block 6 at 50mm on 2 September 2011. The grass cultivar and pigment varied for each iButton for this part of the trial to give a comparison. Blocks 5 and 6 were also irrigated at 45 per cent net evaporation.

To test chlorophyll levels, green shoot samples were harvested on 27 October 2011 (64 days after application of pigment, DAAP). Chlorophylls *a* and *b* extracted by the acetone were measured with a spectrophotometer using the method of Bruinsma (1963).

RESULTS
SPRING GREEN-UP

There were varying rates of spring green-up within all plots, pigments and couch cultivars. The overriding factor that affected the spring green-up within all plots over the course of the research was water stress. Other smaller factors included frosts and herbicide treatments.

The final visual estimation of spring green-up combining all the plots and couch cultivars, as shown in Figure 1 (right), revealed Green Lawnger and Duramark Black with the highest average green-up compared to the control.

Figure 2 (bottom right) shows the percentage increase of green-up throughout the study for each pigment on all plots and couch cultivars combined. At the sixth and final percentage score on 22 October 2011, the pigment that had the least amount of green-up was SP Green (59.5 per cent) while Green Lawnger (69 per cent) had the highest. Figure 2 also shows two distinct areas of interest – from initial pigment application to 30 DAAP (23 September 2011) and from 30 DAAP to 59 DAAP (22 October 2011).

THATCH AND SOIL TEMPERATURES

The iButtons placed in thatch of Block 7 (Carbon Trader, cv. Grand Prix) and thatch of Block 5 (Carbon Trader, cv. Conquest) showed significantly higher daily maximum temperature readings than the control in their respective plots than the other pigments. These readings were consistent throughout the research. Combining all the daily maximum temperatures, average increases of 9.9 per cent for Carbon Trader on Grand Prix in Block 7 and 15.3 per cent for Carbon Trader on Conquest in Block 5 were noted.

The average daily minimum temperature readings in the thatch were interesting and showed a contrast compared to the average daily maximum

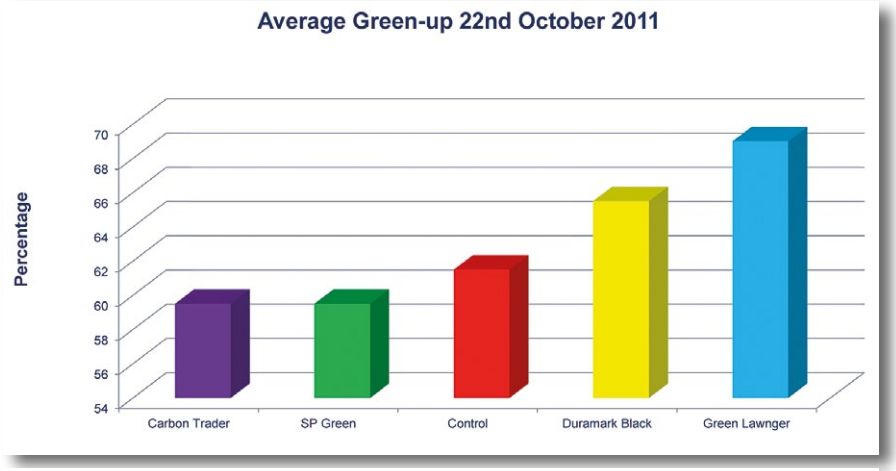
temperatures. The coldest average daily minimum temperature readings were in Carbon Trader on Grand Prix Block 5 as well as Conquest Block 7 which were 2°C and 0.7°C cooler than the control respectively. The iButtons placed at 50mm soil depth showed minimal differences in temperature readings compared to the control.

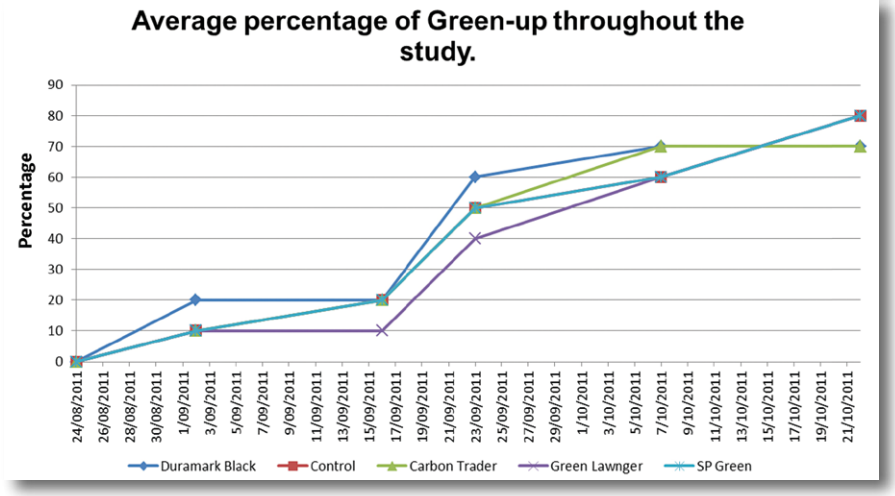
There was a contrast in average temperature readings for two specific times during each day of the study – 9.30am and 3:30pm in Block 7 cv. Grand Prix. There was a definite spread of average temperature readings at 9:30am – 14.6°C for Duramark Black being the coldest to 17.5°C for Carbon Trader the warmest compared to the Control which was 15.6°C.

Twenty iButtons were used in the experiment which monitored thatch and soil temperature conditions

Below: Figure 1. Average spring green-up, 22 October 2011 (59 DAAP) for all plots and couch cultivars combined

Bottom: Figure 2. Average percentage of green-up throughout the study for each pigment for all plots and couch cultivars combined





Block 8 couch plots at the completion of the trial in October 2011

Block 7 Grand Prix which had the iButtons inserted into the thatch

Looking at the temperature readings for Block 7 cv. Grand Prix at 3:30pm, the warmest pigment was Carbon Trader 19.8°C and the coolest Green Lawnger 18.7°C. This equals a temperature spread of 5.7 per cent, with the Control temperature being 19.2°C.

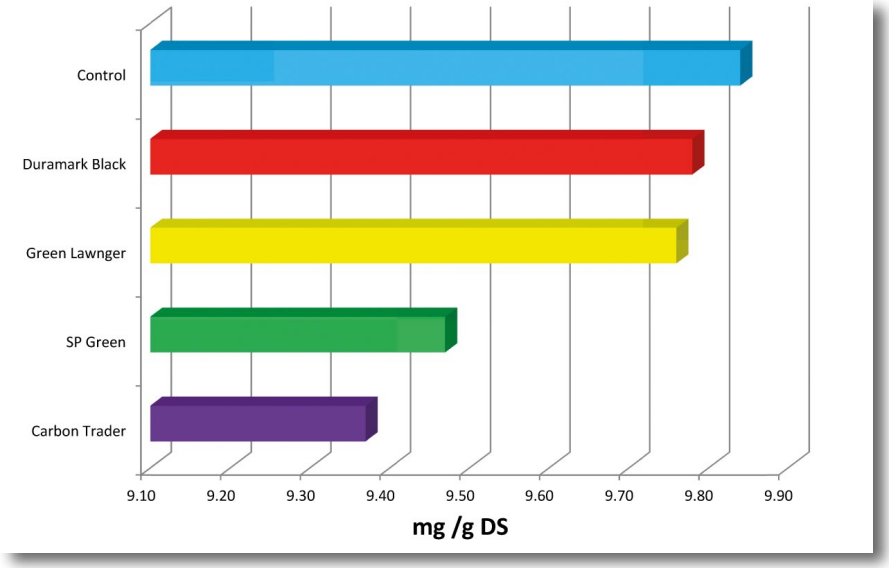
CHLOROPHYLL CONTENTS

The results calculated showed no correlation between average chlorophyll content of green shoots and pigment applied to all couch varieties (see Figure 3).

SNAPSHOTS

There were various factors during the research that may have contributed to some confusing results. To follow the progression of the spring green-up throughout the project, several 'snapshot' periods were studied. These snapshots were 10 days in length and culminated in a spring green-up score. Various factors were studied to see if any or a combination of these factors may have influenced the data one way or the other.

Figure 3. Chlorophyll content, average mg/gDS



The snapshots were conducted on Block 7 cv. Grand Prix which had the five iButtons placed in the thatch, one in each pigment. The data and weather observations as listed below were collected for each snapshot period:

- Rainfall (mm);
- Average minimum and maximum temperatures;
- Herbicide and fertiliser applications;
- Cultural practices (i.e.: mowing);
- Evapotranspiration and evaporation (mm);
- Irrigation amount (45% net evap.); and
- Total irrigation and rainfall combined (mm)

Air temperatures were sampled hourly within the snapshot period.The last fertiliser application was in the autumn and the plots were only mown before the application of the pigments.

Due to the snapshot periods overlapping, as well as some having a small window of time between, weather observations for the entire period of the study were:

- **Average minimum temp:** 2.4°C
- **Average maximum temp:** 19°C
- **Total rainfall:** 38.2mm
- **Evapotranspiration:** 191.4mm
- **Total evaporation:** 235.4mm
- **Total irrigation (45% net evap):** 105.9mm
- **Total (combined):** 144.1mm

Table 1 (opposite page, bottom) shows the respective data for each snapshot.

SNAPSHOT 1 (24 AUG – 2 SEP 2011)

The data in this snapshot ending nine DAAP, Duramark black was the only pigment that showed any sign of green-up compared to the Control. In this period the plots experienced two heavy frosts and one light frost.

SNAPSHOT 2 (7-16 SEP 2011)

The weather during this snapshot was more extreme than Snapshot 1, with both minimum and maximum average temperatures for the period considerably

less. This snapshot experienced one severe frost, three heavy frosts, two medium and one light frost. Due to these frosts there was noticeable dieback of new shoots on the plants.

SNAPSHOT 3 (14-23 SEP 2011)

During this snapshot Grand Prix showed the most significant rise in green-up percentages than any other period for all pigments. Duramark had an increase of 40 per cent and the rest of the pigments had a 30 per cent increase in green-up. These increases came about from warmer minimum (3.9°C increase) and maximum (5.7°C increase) temperatures on average than the previous snapshot. This period only experienced one medium and one light frost.

SNAPSHOT 4 (28 SEP – 7 OCT 2011)

The increase in green-up percentages slowed down in this snapshot period. Pigments Green Lawnger and Carbon Trader had increases of 20 per cent and the other pigments had increases of 10 per cent. The colour of the newly emerged couch leaf lost some of its brightness and looked stressed. A few factors may have contributed this:

- The average maximum temperatures for the period were down by 6.5°C compared to the previous snapshot;
- All the plots were sprayed with the herbicide propyzamide (Kerb 500SC) on 26 September 2011. Kerb 500SC is a selective herbicide, its target weed in this situation was rye/wintergrass;
- In the 10 days of the snapshot period, not one of the days was cloud free. Six of the 10 days had less than four hours of sunshine; and
- Fertility levels were low and the turf was under water stress.

SNAPSHOT 5 (13-22 OCT 2011)

This period showed average temperatures becoming much milder, with no frosts recorded. During this snapshot, Green Lawnger, SP Green and the Control showed a 20 per cent increase in green-up. Carbon Trader and Duramark showed no increase.

DISCUSSION

When compared with the results reported in overseas studies, the patterns of pigment-induced earlier than natural spring green-up rates observed in this study were more complicated. Studies by Shearman et al (2005), Long (2006), Liu et al. (2007) and Briscoe (2010) found spring green-up was consistently enhanced by an increase in surface and soil temperatures due to the pigments.

Throughout this research the rate of spring green-up for all pigments across all couch cultivars was varied and inconsistent in stages. There were many factors that contributed to the interesting results shown in the snapshot periods.

Perhaps the most interesting finding was that the only pigment to show an increase in maximum

The Block 8 Santa Ana plot at the completion of the project. Santa Ana and Grand Prix were the best performing couch cultivars within the Control plots which received no pigment applications

thatch temperatures (Carbon Trader, Block 7) did not bring about an earlier than natural spring green-up. However, Duramark Black, that showed no increase in thatch temperature compared to the Control, had the same amount of spring green-up as Carbon Trader.

All pigments showed a significant slowdown of green-up after the 23 September 2011 snapshot period where the average maximum daytime temperatures were 22.2°C compared to 15.7°C for the next snapshot period ending 7 October 2011.

This slowdown concurs with past studies that show unseasonal temperature fluctuations such as late season frosts can damage new growth during the spring green-up. McCarty and Miller (2002) found if spring green-up has been initiated and a late cool snap occurs with night temperatures dropping down to 10°C or below, it will require three to seven days of above 15.6°C temperatures for the couchgrass to resume active growth.

Others factors that could have contributed to the slowing down of green-up after the 23 September snapshot may have been the water and nutrient levels (stored carbohydrates) within the plants. The couch may have used up a large amount of both stored water and nutrients during the initial green-up phase.

As part of the overall study by Dr Martin, the whole trial was being run on a low input of water

TABLE 1. SNAPSHOT DATA

	Snapshot 1 24 Aug-2 Sep	Snapshot 2 7-16 Sep	Snapshot 3 14-23 Sep	Snapshot 4 28 Sep-7 Oct	Snapshot 5 13-22 Oct
Rainfall (mm)	0	8.4	0.8	17.4	0
Ave. min °C	1	-1.4	2.5	4.3	5.8
Ave. max °C	18.4	16.5	22.2	15.7	23.5
ET (mm)	27.8	19.1	39.4	22	44.7
Evap (mm)	33.2	35.8	56.2	27.4	48
Irrigation (45% net evap, mm)	14.9	16.1	25.3	12.3	21.6
Total (mm)	14.9	24.5	26.1	29.4	21.6

and nutrient scenario. In addition, for experimental reasons in his trial, no irrigation water was applied during the study. It is probable that the couch could not sustain the same level of green-up after 23 September 2011 with limited availability of water.

Another factor that may have contributed to the overall slowing down of the green-up was the spraying of the area with the selective herbicide Kerb at a time when the grasses were probably suffering some degree of stress.

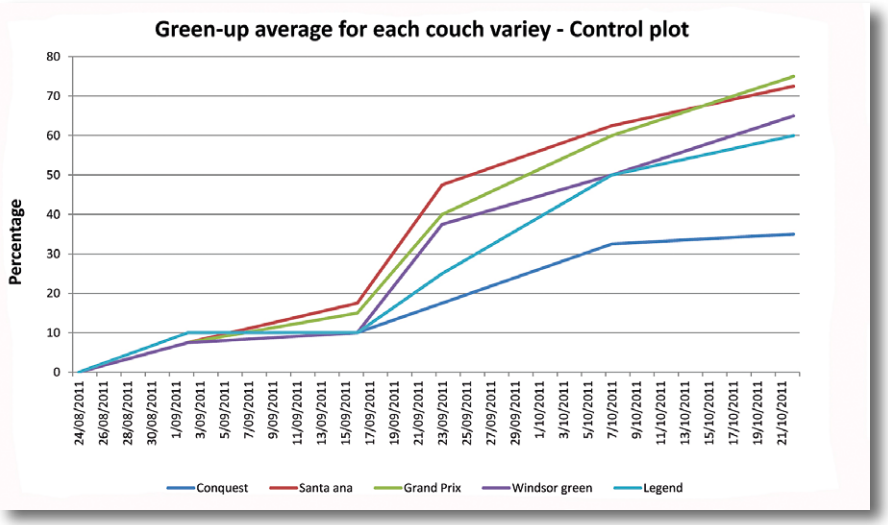
A lack of available water in the case of Carbon Trader slowing down green-up could be associated with the water regime implemented on the plots. Block 7 was irrigated at 45 per cent net evaporation. The evaporation rates were sampled in a separate location and not directly within or near each individual plot and/or pigment. The amount of evaporation could vary quite a lot when you combine increased temperature within the sward due to the pigment applied. The actual evaporation within the couch compared to the readings taken off site could be much higher.

Another important point that needs to be acknowledged is the amount of irrigation was 45 per cent of net evaporation, meaning that this did not take into consideration the evapotranspiration (ET) rates of the couch. Thus higher evaporation and potential ET rates may well have caused the plants to go into water stress earlier than naturally.

The accuracy of placement of the iButtons may need to be improved when working at shallow depths as in the thatch layer. Although hard to be certain whether it was a factor or not, it seems possible that some of the temperature differences recorded in the thatch in Block 7 may have been influenced by placements slightly deeper or shallower than others. These differences, if present, would reduce the strength of the correlation between the green-up scores and thatch temperature.

Placement of iButtons in the thatch of Block 5 was difficult to get precise due to the different couch varieties. Temperature variance could be due to the differing amounts of thatch between couch varieties and how much the thatch insulated the iButtons.

Figure 4. Increase in green-up for couch varieties in the Control plots



According to the colour scale used, both green pigments were of an acceptable colour in appearance at the start of the study. This finding concurs with the results found by Long (2006), Liu et al. (2007) and Briscoe (2010). SP Green lost its colour and turned blue in the early stages of the study which made it unacceptable.

The snapshots have shed some light on the issues concerning the performance of the treatments and cultivars through the duration of the study. By combining data from various sources both on and off-site during the study, a clearer picture can be drawn to see whether any outcomes have resulted from or been influenced by factors other than cultivars and pigment treatments.

The application of some pigments reduced the dormancy window, which should help the couch get to its optimum growth period quicker so it can utilise high growth period temperatures more efficiently.

Further study could look at a second application of pigment combined with a liquid Nitro-iron to stimulate colour and growth. Another avenue of further study would be the application of pigments when going into winter dormancy to prolong satisfactory colour and extend the growth period.

A supplementary result that was encouraging emerged when looking at the average green-up scores for each couch in the Control plots. The research found the best performing couches were Grand Prix and Santa Ana (Figure 4, below left).

CONCLUSIONS

There was some very encouraging data collected during this project showing that some of the pigments did work sufficiently well to warrant testing on a larger scale. The products of greatest promise were found to be Duramark Black and Green Lawnger. The consistently higher maximum temperatures of Carbon Trader did not translate into higher green-up scores or higher chlorophyll contents. The reasons for this apparent anomaly require further examination.

The best performance in terms of mid-spring green-up scores may warrant further study. The evidence that has been found in this research shows there is a definite relationship between application of some pigments and reducing the dormancy length and initiating an earlier than natural spring green-up.

The best couch cultivars in terms of natural spring green-up in Canberra out of the five studied, without taking into account the application of pigment were Grand Prix and Santa Ana.

If any future study needs to be made on this topic in cold climate areas it should be based on a high nutrient and water input scenario, to provide a better simulation of conditions on a highly maintained sports turf area.

REFERENCES

A full list of references for this research article can be obtained from the AGCSA.

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The Best Brands in the Market

The United States Golf Association has been investigating the performance of a new method of putting green construction which uses a geocell product called AirDrain to replace the conventional USGA-spec gravel layer.

AirField Systems vs USGA greens construction

AirField Systems offers an alternative to the standard USGA putting green design. Their design utilises a highly porous, 1-inch deep plastic grid geocell product called AirDrain (see photo bottom opposite page) in place of a 4-inch deep gravel layer. As with gravel, AirDrain allows rapid lateral movement of excess water to drains and thus provides for uniform horizontal moisture content within the rootzone.

While voids in AirDrain are very effective in transmitting water, they are much too large for the sand in the rootzone to bridge for self-support, so a geotextile is used atop the grid to prevent infilling of the void space.

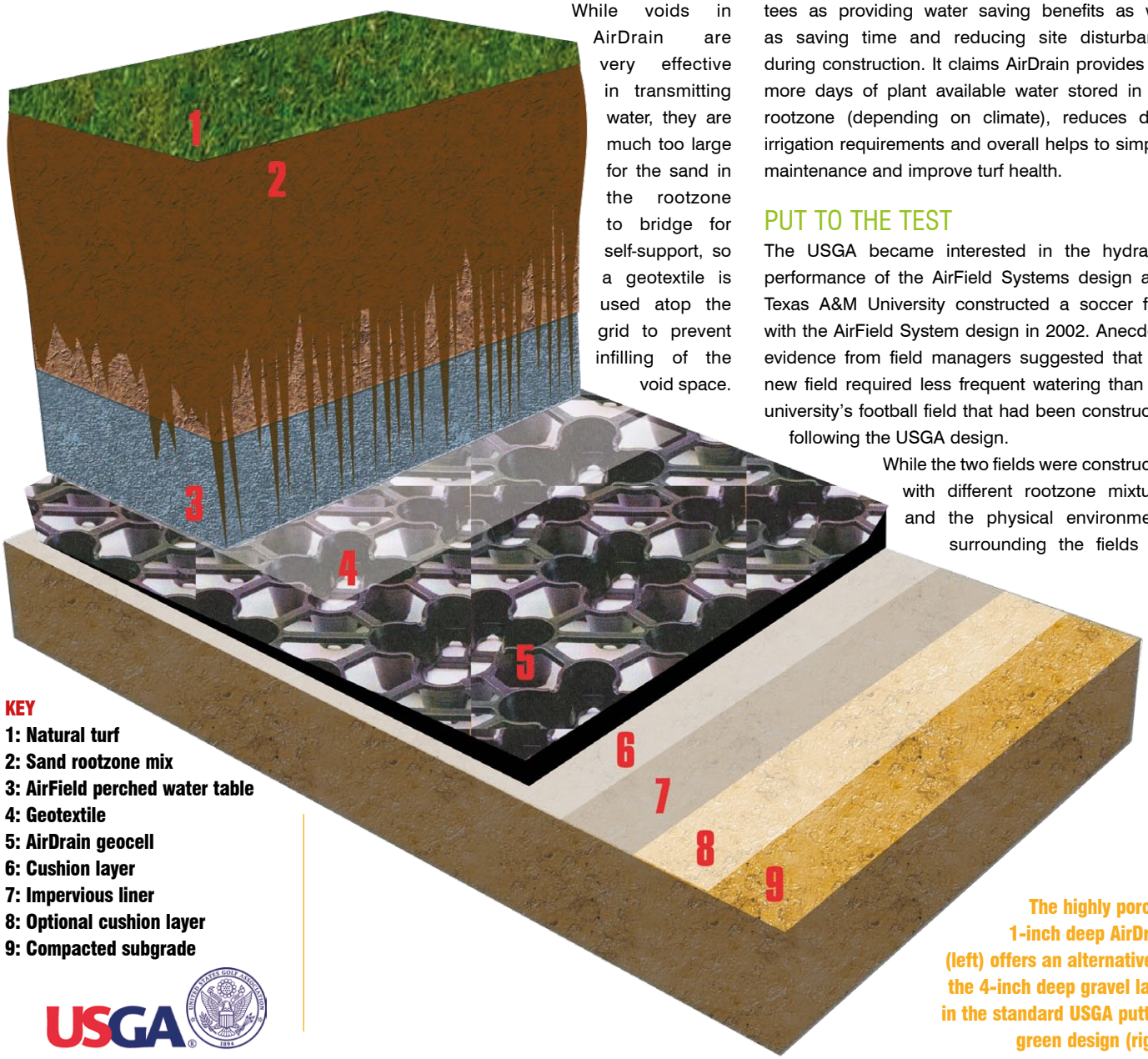
Use of geotextiles in putting green construction has been controversial due to the perceived potential for clogging of the fabric by migrating fine particles and eventual loss of permeability.

The AirDrain product has been used across a number of applications in the US for the past 10 years, from sportsfields, green roofing, playgrounds and grass paving. AirField Systems markets its AirDrain product for golf greens, bunkers and tees as providing water saving benefits as well as saving time and reducing site disturbance during construction. It claims AirDrain provides 1-3 more days of plant available water stored in the rootzone (depending on climate), reduces daily irrigation requirements and overall helps to simplify maintenance and improve turf health.

PUT TO THE TEST

The USGA became interested in the hydraulic performance of the AirField Systems design after Texas A&M University constructed a soccer field with the AirField System design in 2002. Anecdotal evidence from field managers suggested that the new field required less frequent watering than the university's football field that had been constructed following the USGA design.

While the two fields were constructed with different rootzone mixtures and the physical environments surrounding the fields are



KEY
1: Natural turf
2: Sand rootzone mix
3: AirField perched water table
4: Geotextile
5: AirDrain geocell
6: Cushion layer
7: Impervious liner
8: Optional cushion layer
9: Compacted subgrade

The highly porous, 1-inch deep AirDrain (left) offers an alternative to the 4-inch deep gravel layer in the standard USGA putting green design (right)

quite different, we suspected that there may have been a difference in the amount of water stored in rootzones on fields constructed with the two designs (i.e.: a difference in the vertical distributions of water content in the rootzones).

We knew from the physics of water in sand that the amount of water stored in a rootzone decreases with increasing tension at the bottom of the rootzone, and we expected because of the geometrical and physical differences in the designs that there would be differences in water tension at the bottom of the rootzones.

While the rootzone may be saturated above the drainage layer, the water is under tension so the term 'perched water table' often used to describe the state of water in the rootzone immediately above the drainage layer is a bit of a misnomer. A better term might be 'perched capillary fringe'.

Capillary fringe is the saturated zone above a water table where water is under tension. The further upward from the bottom of the rootzone the greater the water tension. As distance increases upward and water tension increases, the rootzone eventually begins to desaturate as the largest pores drain.

As distance increases beyond this height, water content continues to decrease. As a consequence, the tension that develops at the bottom sets the starting tension and determines the thickness of the saturated zone and the amount of water stored in the rootzone profile (Figure 1). The depth and hydraulic properties of the drainage layer determine the magnitude of tension that develops at the bottom of the rootzone.

AirDrain is 1-inch deep so the maximum tension that can develop at the bottom of the rootzone during drainage in the Airfield Systems design would be 1 inch of water. Gravel is typically 4 inches deep so the tension that could develop would be up to 4 inches of water, depending on the hydraulic properties of the gravel and the depth to which sand ingresses pores of the gravel.

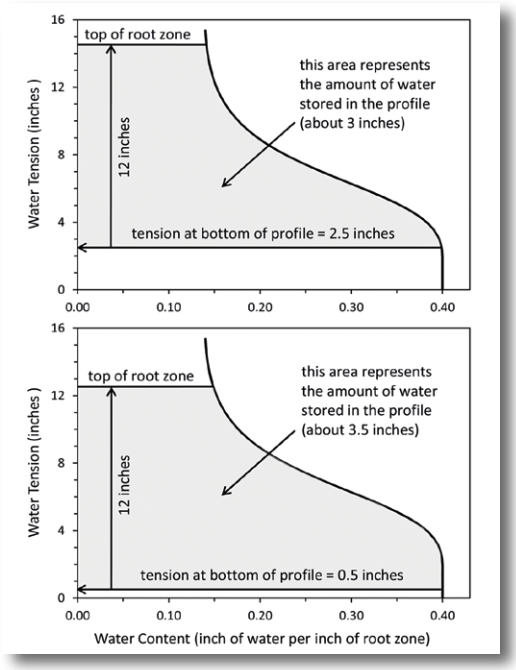


Figure 1: Graphic representation of the dependence of water-holding capacity on tension at the bottom of the profile for a typical rootzone mixture meeting USGA recommendation for total, air-filled and capillary porosities. The curved lines to the right represent the relationship between water tension and water content for the rootzone mixture

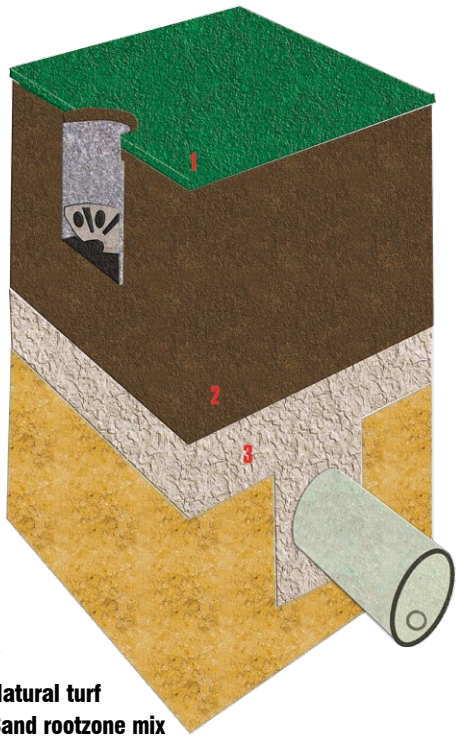
Water is slow to drain from small pores into large pores, but if both systems were sealed from evaporation the tensions would eventually reach 1 and 4 inches at the bottom of the rootzone in the Airfield Systems and USGA design greens respectively. An occasional finger of sand penetrating the gravel in the USGA design green can lead to an appreciably quicker increase in tension at the rootzone/gravel interface.

WATER TENSION

To test for differences in tension developed at the bottom of the rootzones of the two designs, we constructed laboratory-based test cells from 4-inch diameter PVC pipe containing profiles of the AirField Systems and USGA greens. Using tensiometers, we were able to demonstrate that the tension that developed at the bottom of the rootzone in the AirField Systems design was appreciably less than that in the USGA design.

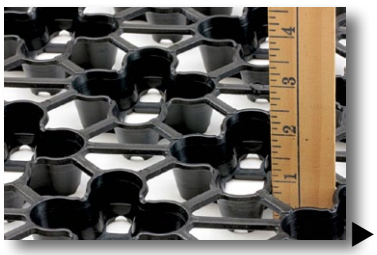
At that point we thought it worthwhile to investigate this finding on a slightly larger scale and a more realistic setting. To this end, we constructed test greens in 14-inch diameter PVC pipe. Three sands and three gravels were chosen such that they covered the ranges from coarser to finer sides of the USGA recommendations for particle size distribution.

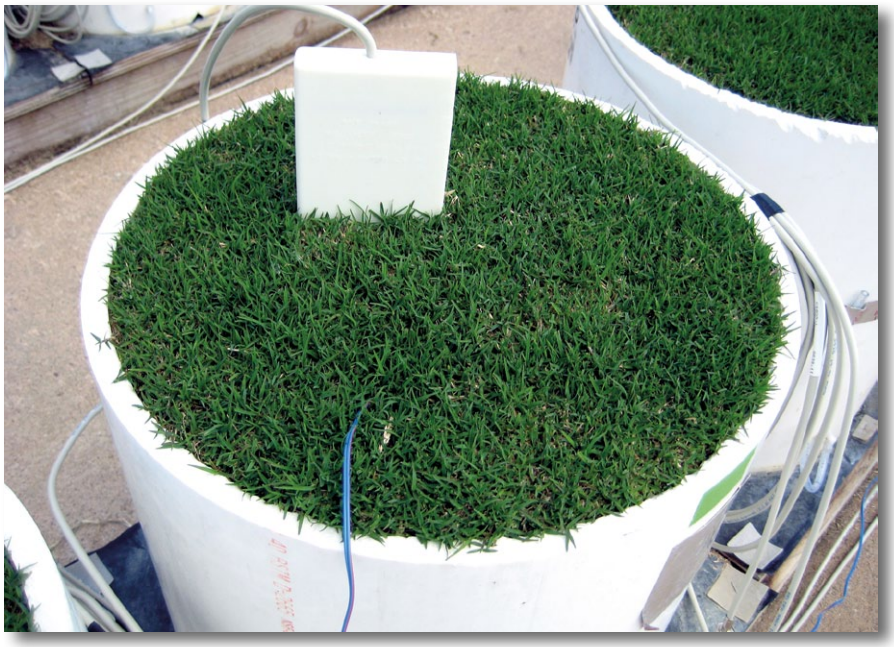
To create rootzone mixtures, the coarser two sands had peat moss added to increase water retention. The finer sand was not amended. These three rootzone mixtures were used in combination with the three gravels to construct test greens of the USGA design. The gravel layer in all of the test greens was 4 inches deep. An intermediate choke layer of coarse sand was not used.



KEY
1: Natural turf
2: Sand rootzone mix
3: 4-inch gravel layer

The AirDrain geocell, developed by AirField Systems, has been used across a number of turf applications in the US





Test greens constructed in 14-inch PVC pipe with either gravel or geotextile atop AirDrain as the drainage layers

The same three rootzone mixtures were used in combination with four geotextiles atop AirDrain to construct test greens of the AirField Systems design. We used the Lutradur polyester geotextile prescribed by Airfield Systems at the time and chose three additional geotextiles that had the same apparent opening size (0.2mm), but differed in material and/or manner of construction.

Manometer-tensiometers were used to measure pressure or tension that developed at the rootzone-drainage layer interface of both designs (see photo left). After the test green columns were packed with 12 inches of the rootzone mixtures, they were sprigged with MiniVerde bermudagrass.

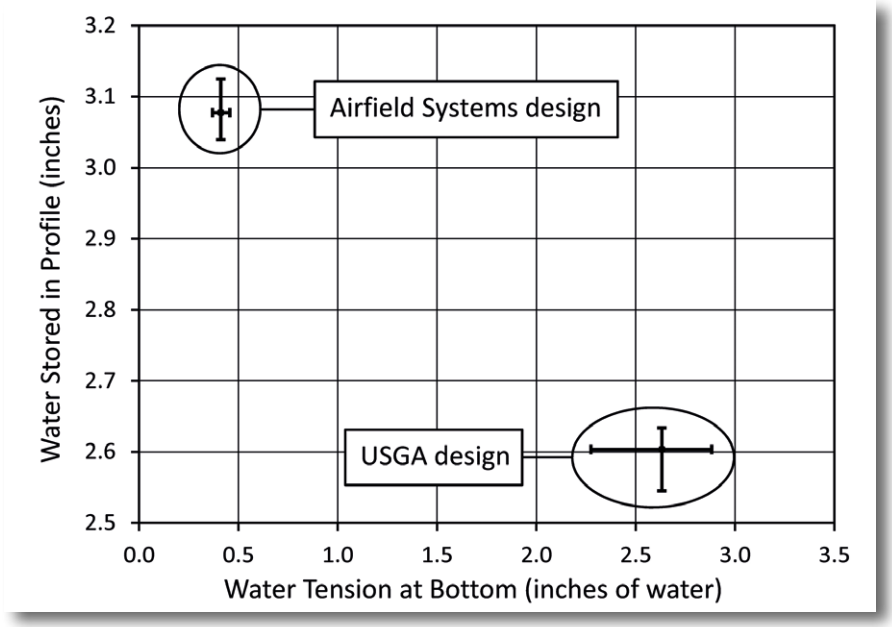


Figure 2: Range in the mean amount of water stored in 12-inch rootzone profiles in AirField Systems (geotextiles atop AirDrain) and USGA (gravels) design test greens 12 hours after irrigation

Following a period to grow-in the grass, a series of experiments were conducted that measured the amount of water stored in the rootzone profiles and the water tension that developed at the bottom of the rootzones of the different treatments after irrigation and drainage. Vertically oriented time domain reflectometry (TDR) probes were used to measure the amount of water stored in the rootzone profiles (see photo left).

Periodically during the course of the study, the test greens were watered until drainage was observed and then the amount of water stored in the profiles and the water tension at the bottom of the rootzones were recorded for 48 hours.

As with our preliminary lab study, we found that the water at the bottom of the rootzones of test greens constructed with the AirField design was under less tension than the water in test greens constructed with the USGA design, by about 2.2 inches of water tension (Figure 2). This lower tension was associated with an increase in water storage of about 0.5 inches in the AirField System design greens above that in the USGA design greens (Figure 2). This increase in water retention could lead to less frequent necessity to irrigate.

Because of reduced tension at the bottom of the rootzone, these results also implied that the tension at which rootzone mixtures should be tested for capillary porosity when intended to be used in an AirField System design green should be reduced to achieve similar moisture retention to greens built according to the USGA recommendations.

In doing so, slightly coarser sand would meet specifications for capillary water retention in the AirField design. Conversely, sands that push the very fine side of the current recommendations might not meet specifications for air-filled porosity.

GEOTEXTILES

The question of whether or not geotextiles used in a green will clog with fines migrating out of the rootzone was also studied. To address this issue, we conducted a year-long laboratory experiment to investigate a range of geotextiles that were suited to supporting sand in the AirField System design and determine whether or not they limit drainage out of the rootzone.

In this experiment, 6-inch diameter PVC columns were used to contain combinations of 12 inches of three sand mixes with 10 geotextiles held atop AirDrain (see photos opposite page and page 52). Manometer-tensiometers again were used to measure pressure or tension at the sand-geotextile interfaces.

Mix 1 had a particle size distribution that ran down the centre of the USGA specs. Mix 2 was made by blending Mix 1 with a sandy clay loam (9:1 by mass) and Mix 3 was made by blending Mix

1 with a sand having excess fines (1:1 by mass). Mix 1 and Mix 2 met USGA recommendations. Mix 3 contained twice the recommended amount of very fine sand. The apparent opening sizes of the geotextiles used ranged from 0.15mm to 0.43mm.

After the sands were added to the columns they were regularly irrigated. Periodically, the rate that 1-inch of irrigation water drained from a column was measured and the pressure/tension at the sand-geotextile interface was recorded. For the first six months, any particles that washed out of the sand through the geotextiles were accumulated and analysed for total dry weight and particle size distribution. At the end of the study, the saturated hydraulic conductivity of the sand-geotextile combinations were measured.

Statistical analyses showed that drainage rate, saturated hydraulic conductivity and mass of eluviated particles were not dependent on the properties of the geotextiles, but rather on the properties of the sands (Figure 3, page 52). Most of the particles that washed out of the columns were of clay and silt sizes.

This could be construed as evidence that the geotextiles were sieving out larger particles, but we found that the size of particles in the drainage water was not related to the apparent opening size (AOS) of the geotextiles, which it should have been if the geotextiles were acting as sieves (i.e., the geotextiles with the larger AOS would have let larger particles pass, and vice versa, but this did not happen). The geotextiles obviously prevented the passage of particles as their purpose is to prevent migration of the rootzone sand into the drainage layer, but it appeared in our study that the sands were responsible for determining the particle sizes leaving the columns.

Columns used to measure potential clogging of geotextiles by fines migrating out of the rootzone

Drainage rates from the columns containing the sand without added fines increased over the year, presumably because pore channels in the sand

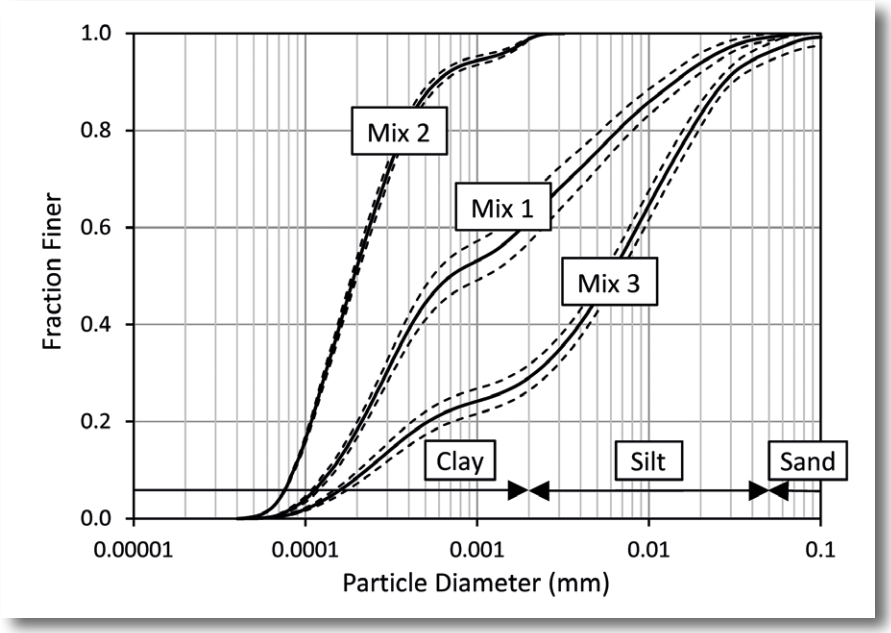


Figure 3: Size distribution of particles washed out of the three sand mixes through the geotextiles. The solid line for each sand mixture represents the mean fraction of particles finer than a given diameter over 30 columns containing the mixture (10 geotextiles with three replicates) and the dashed lines represent one standard deviation each side of the mean

were widened when silt and clay washed out of the profile. Drainage rates of the columns containing the two sands with additional fines decreased over the year, but the decrease was not statistically related to the properties of the geotextiles.

To test if the sands themselves were clogging, saturated hydraulic conductivities were measured as layers of sand were removed from columns. Since saturated hydraulic conductivity would not depend on the depth of sand in a hydraulically uniform column, any observed changes would be due to difference in the conductivity of the layers removed compared to those remaining.

We found that when surface layers were removed the saturated hydraulic conductivity increased, indicating that the surface layers had lower conductivities. This was not too surprising as the majority of inter-particle pores of sand meeting USGA recommendation are smaller than the apparent opening sizes of the geotextiles we tested.

Statistical analyses showed that drainage rate, saturated hydraulic conductivity and mass of eluviated particles were not dependent on the properties of the geotextiles, but rather on the properties of the sands

In support of our conclusion that the sands were clogging and not the geotextiles, we did not notice a build-up of positive pressure atop any of the geotextiles during drainage, as would have occurred if the geotextile had been restricting drainage.

CONCLUSION

In conclusion, the results of our studies gave no reason to prevent more widespread use of AirField Systems' design as an alternative to the USGA method for putting green construction. The AirField Systems design produces additional water holding capacity above the USGA design, which leads to more plant available water, given the same rootzone mixture, and, possibly, less frequent requirement for irrigation.

Our data also support the general use of properly sized geotextiles to support sand-based rootzones in putting greens. Geotextiles with apparent opening size of 0.2 mm worked well in our test greens and a woven geotextile with an apparent opening size twice as large (0.43 mm) retained the rootzone sand just as well.

AUTHORS' NOTE

The information in this article has been adapted from the original work published in Crop Science titled 'Water Storage in Putting Greens Constructed with United States Golf Association and Airfield Systems Designs' (Dr Kevin McInnes and James C. Thomas, 2011, 51:1261-1267) and in HortScience titled 'Water Flow Though Sand-based Root Zones atop Geotextiles' (Keisha M. Rose-Harvey et al., 2012, 47:1543-1547).

This research was collaboratively funded by Texas A&M University, AirField Systems (Oklahoma City, OK) and the United States Golf Association.

SUMMARY POINTS

- Water at the bottom of the test green rootzones constructed with the AirField System design was under less tension than the water in test greens constructed with the USGA design (about 2.2 inches of water tension).
- This lower tension was associated with an increase in water storage of about 0.5 inches in the AirField design greens above that in the USGA design greens.
- Geotextiles with apparent opening size of 0.2mm worked well in test greens and a woven geotextile with an apparent opening size twice as large (0.43mm) retained the rootzone sand just as well.
- The geotextiles that were tested prevented the migration and passage of the sand rootzone mixture into the drainage layer, but it appeared that the tested sands were responsible for determining the particle sizes leaving the columns.
- The results gave no reason to prevent more widespread use of AirField Systems' design as an alternative to the USGA method for putting green construction.

We have the solutions to set you up for a perfect season this summer

Ensuring your greens get the best start for the peak golf season is a key priority at this time of year. A good fungicide program will help protect your club's investment and set the course up for the challenges of mid-summer.

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Armidale Golf Club is one of the city's premier sporting and social hubs and has been home to course superintendent Brett Woodward since 2011. Pictured is the par three 7th and the course's 12 megalitre storage dam which is fed by an off-site 100ML dam

Armidale Golf Club, NSW

After cutting his teeth at one of Sydney's leading golf clubs, the regional lifestyle beckoned for Brett Woodward who took up his first course superintendent posting at the picturesque Armidale Golf Club in northern NSW.

Superintendent: Brett Woodward (35).
Nickname: Woody.
Family: Wife Nadine, children Logan (8), Ashton (6) and Bailey (4).
Period as a superintendent: Two years.
Association involvement: AGCSA (7 years), NSWGCSA.
Career: Armidale Golf Club (superintendent, 2011-present); Shelly Beach Golf Club (assistant superintendent, 2006-2011); Everglades Golf Club (assistant superintendent, 2005-2006); Bonnie Doon Golf Club (irrigation foreman 2002-2005, greenkeeper 2001-2002, trainee greenkeeper 1998-2001)
Qualifications: Certificate III in Horticulture and Turf (Ryde TAFE, NSW).

Tell us a bit about your background in turf management and how you came to be at Armidale Golf Club. My first taste of greenkeeping was at Dunheved Golf Club in Sydney. I had two weeks work experience there when I was in Year 10 in 1993 and loved it (I don't know whether it was all the girly mags in the locker room or the bunch of guys that I got to meet and work with!). I have always been an outdoors guy who can't stand being inside for too long.

At the age of 16 I was already a plus handicap golfer and went to the US to play college golf for a few years, winning a state title along the way. When I returned from America, I was offered the opportunity to play pennant for Bonnie Doon Golf Club. The club also offered me a casual job on the course and as time went by golf started taking a back seat as I took on a greenkeeping traineeship. I ended up spending seven years at the Doon before assistant superintendent stints at Everglades and Shelly Beach which set me up for my first superintendent appointment at Armidale in 2011.

Give us an overview of Armidale Golf Club and some of its unique characteristics? The Armidale Golf Club clubhouse overlooks the course and parts of the city from the function room, outdoor areas and bar. The club has been in existence since 1899 and is being promoted heavily as a social and hospitality hub for local members, guests and visitors to the area.

During its many years of existence the club has had three sites. The original course was laid out along Dumaresq Creek before being relocated to the local racecourse in 1922. Play continued there until 1928 when the course was established on its present site in the city's western suburbs.

What are some of the unique features about Armidale GC from a turf management perspective? Is it an easy/hard facility to manage? Armidale Golf Club has been a challenge for me personally. I've always been at clubs that have had mechanics, horticulturalists, irrigation foremen, so coming to a club with no one in these roles was an adjustment.

When I first arrived here I thought that the course wouldn't have much rough mowing, considering that there was no rough watering at all. I soon discover that it was the complete opposite and for six months of the year the rough grows out of control. Even in areas that don't see any water for months, the rough still powers on like it gets watered every night and consumes a lot of time to keep in check during summer. The course itself throws up a few challenges here and there, but overall it manages quite well, especially with the limited staff and budgets we have.

Take us through your turf management operations there and how you have fine-tuned them during your time as superintendent. Since starting as a superintendent I have had to fine-tune every aspect of my turf management skills. When starting out as a new superintendent you soon learn about dealing with committees, club captains, general managers and presidents. As a 2IC you get glimpses of this, but not everything – that's probably why supers go grey quicker than 2ICs! I didn't realise how political a super has to be and also the challenges that come with dealing with employees and their family and social issues.

The biggest change for me has been adapting to Armidale's climate. Coming from courses which may have experienced two or three heavy frosts a year to a course which has one almost every morning for six months of the year, has certainly been different. The course, however, copes well with the low temperatures through the cold months, with the greens thriving in the minus temperatures.

As with any new superintendent coming on board, I have brought different techniques to this course that I have learned from working at past courses and the staff have jumped on board which is pleasing. Some of the changes include the introduction of many garden areas around the course and also concentrating on the finer details – all the little things that members pick up on such as trimmed sprinklers, markers on tees, areas cut every week, course set-up every comp day, tees edged, bunkers raked during the week, tree bases Roundup-ed, distance markers edged and so on. I was lucky to have a blank canvas to start with.

The Armidale Golf Club course maintenance team is (from left) superintendent Brett Woodward, Colin Dart, Chris Pennell and Josh Martin

What are some of the major challenges facing Armidale Golf Club both from a turf and club management perspective? The main challenges are membership numbers and the increasing cost of playing golf. Armidale has a high number of veteran members who are on a fixed income and combining that with increasing prices for fuel, electricity etc… the club has struggled for a few years.

We believe we now have the right people in the major roles of the club to turn the club's fortunes around. The club has started to advertise on all social media, radio and TV and we are trying to appeal to the younger generation, especially having one of the biggest universities in Australia on our doorstep.

The big challenge for me is to run the course on a very low budget with ageing machinery and

CONTINUED ON PAGE 57

Armidale's greens are a 70/30 bentgrass/*Poa* annua mix which handle the extreme climate variations of the NSW Northern Tablelands well. Pictured is the 9th green

AT A GLANCE – ARMIDALE GOLF CLUB

Woodward renovates the Armidale greens twice a year. The greens mostly consist of a loam profile with a few that have been reconstructed over the years with river sand. Pictured is the 13th

Where in Australia is Armidale? Armidale is on top of the Great Dividing Range in the Northern Tablelands of NSW. Armidale is famous for being very cold and has a big university (University of New England).

Course specs: Armidale Golf Club is an 18-hole course – 6035m for the men and 5480m for the ladies. We have a mixture of turf varieties on the course. Tees are kikuyu/*Poa annua* with ryegrass oversown. Greens are bentgrass/*Poa annua*. Fairways in summer are mostly kikuyu with a bit of Queensland blue, but in winter they are *Poa*/fescue/kikuyu (the same goes for the roughs). We maintain 32 hectares, including 0.6ha of greens, 0.4ha of tees and 10ha of fairways and surrounds

Staff: Brett Woodward (superintendent), Colin Dart (assistant superintendent), Josh Martin and Chris Pennell (4th year apprentices). Martin was due to finish in late August.

Members: 500 (339 playing members).

Annual rounds: Anywhere from 25,000-35,000.

Major tournaments/events: We have four major events:

- **Armidale Open** – two-day strokeplay event held in September, with the winner being the lowest scratch score.
- **Ladies Jug** – two-day 4BBB event held in the first week of November. Ladies come from all around Australia to play in this with significant prizes up for grabs.
- **Men's Jug** – similar format to the Ladies held in the second weekend of November.
- **Men's and ladies club championships** in March (four rounds stroke).

Annual course budget: Around $270,000 including wages.

Climate: We have two totally different climates throughout the year. From April to October we can get temperatures ranging from -12°C in the mornings to 19°C during the day. From November to March we can get temperatures ranging from 5°C to 38°C. We have had snow here in December and since starting in 2011 we have had frost and snow in late October.

Soil types: The greens mostly consist of a loam profile with a few that have been reconstructed over the years with river sand. The tees are all push-up, being loamy clay, with the same make-up for the fairways. We have a layer of iron stone about 10-15 inches under the fairways.

Water sources: Armidale Golf Club is very lucky to have an external water source. The club owns a five acre property off site that holds around 100 megalitres which catches the runoff from the surrounding roads, hills and properties. I have had members come up to me who have lived here their whole life and told me that they have never seen the dam empty! The water quality is perfect (pH of 7, which we test for twice a year) and from this I pump straight into the club's on-site dam that holds around 12ML.

Irrigation system: The course is only two fairways away from being fully irrigated. Our irrigation software is very old and outdated and a number of areas have to be turned on manually because there is no room in the programming to add any more stations. There are also a number of areas that are joined together which means I can't water areas separately.

Cutting heights: Greens (3mm year round); fairways and surrounds (11mm in growing months, 14mm during winter; tees (8mm in growing months, 10mm in winter); rough (50mm year round).

Renovations: During the year I will groom greens regularly and try to give them a solid tine twice as well. We renovate twice a year. I will groom the greens twice the day before then hollow core with 5/8" tines to a depth of 4". I will then normally add gypsum at 5kg/100m^2 and a reno blend at 5kg/100m^2 as well. I then use a 90/10 sand mix to topdress and rub in. Water it in and watch it grow!

Major disease pressures: The major disease I have to deal with here is anthracnose which I seem to have for a good part of the year. With the greens being a bentgrass/*Poa* mix I let the disease exist in the greens as a natural form of *Poa* control and will only spray when the plant gets overly stressed. The greens used to be 30 per cent bent/70 per cent *Poa*, but now they are 70/30 bent/*Poa*.

And off the 1st… Armidale's premier event each September is the two-day Armidale Open

CONTINUED FROM PAGE 55

very little growing season. I have a window from November to end of March to get as much growth across the course as possible to last through the colder months.

Outline any major course improvement works completed recently or currently ongoing/planned? Due to limited finances we haven't completed a lot of major projects on the course since I started. I have installed irrigation in the 8th fairway, upgraded all the QCVs on course and upgraded the suction line to our pump shed from steel to 160mm poly. Little jobs like improving drainage in bunkers, lopping dead trees around course, introducing new gardens around the course, especially tee complexes, has been a focus. Although many of these tasks might seem minor, the results have had a big impact on the quality of the course and the perception of the members.

The club is always looking for ways to save money and at the moment is investigating ways to save on electricity by getting quotes on solar panels. With electricity prices only going up, this should pay for itself within a few years. The club is also looking to install the irrigation infrastructure needed to finish off the remaining two fairways which will allow me to water these holes and provide a better surface for the members.

The one product I couldn't manage my course without is… wetting agent. Because of the limited staff and trying to keep a good surface on greens, applying wetting agent gives me more time through summer to concentrate on other things without worrying about dry greens.

What are some pros and cons of being a regional superintendent? Since I started as a superintendent in a regional area my hours of work through the whole year has dropped, especially through the winter months. I have made sure that I am able to spend more time with my wife and kids in the afternoons after school. I also like the fact that a lot of regional golf clubs have good course designs – they are enjoyable to play without being over-designed.

Due to the limited budgets most regional courses have, not being able to build and improve areas due to financial constraints is a con and also not being able to drop in on other supers around the area to talk and vent to.

Have you found that expectations of course presentation and conditioning are any less than those placed on your metropolitan counterparts? I have learnt that the expectations of members are just as high here as other courses. Members get out and play at courses all over Australia and always come back asking why we can't be like this course or this course does this and that, without understanding the different conditions and financial constraints which we have to operate under. On the flip side, however, some members go away to other courses and come back far more appreciative of the course they are a member of.

Armidale's closing hole. Fairways in summer are mostly kikuyu with a bit of Queensland blue, but in winter they are primarily a mix of *Poa*/fescue/kikuyu

Do you have to be more resourceful as a regional-based superintendent? I think all smaller regional clubs have to be more resourceful. The money for clubs is just not there anymore so we have to do our part to save and use different means to produce the surfaces. The biggest money saver that has helped me at Armidale is the amount of volunteer work by the members. They have been a fantastic resource in the two years I have been here to help the course move forward. With the right volunteer base behind you, you can achieve a lot of positive outcomes for the club.

If you could change one thing about your job as a regional superintendent what would it be and why? I would like to change people's perceptions about the courses in these areas of the country. I was the same until you get out and walk around these courses and realise what great surfaces can be produced on the smell of an oily rag.

How important are the relationships you have with other nearby country course supers/trade reps? Relationships you gather in this trade are important to everyone. No matter who you are or what course you are at, there will always be problems on your course that you need help with

Armidale's tees are a kikuyu/*Poa annua* mix and are oversown with ryegrass

Since arriving as superintendent in 2011, Woodward has introduced many garden areas around the course, particularly around tees, and has also concentrated on the finer details of course presentation

and someone to bounce ideas off. Coming to Armidale as a first time super, my closest mates helped me through areas that I have never dealt with before. From matters on course, the best chemicals and machinery to use through to course furniture, these were all the things that I had to start to deal with by myself. My relationships helped me through these times and still help me and thanks go to Andy Banning, Guy Thomas, Chris Blagg, Mark Johnson and many others.

What are some of the more unusual aspects of your role as a regional superintendent? The main water source for the course is about 1km away and is situated on a five acre block that is dangerous to work on, with big pieces of concrete on the hills and steep banks. In order to maintain this area we have goats roaming around and eating all the weeds and grass on site which has worked better than I thought it would. The only problem comes when someone cuts holes in the fence and the goats escape – guess who have to catch them… the greens staff!

All but two of Armidale's fairways have irrigation, with the 8th fairway (pictured below looking back from behind the 8th green) the most recently upgraded

What have you got in the shed? Mainly red. 2004 328 rough mower, 2001 Workman, 1996 Reelmaster, 2001 Greensmaster 3200-D, 1992 Greensmaster 3000-D, 2005 Sand Pro 3020, 2011 5510 fairway mower, 2012 4000-D rough mower, 2011 Tru-Turf roller, 1995 Verti-drain, Tycrop Propass, 1970 Ford tractor, Daedong tractor and 2006 Yamaha quad bike.

Our two rough mowers get a good workout and with the amount of trees around the course and tree roots, they get hammered. I would love to be able to replace my 1992 Greensmaster with the latest greens mower. It's just too old and slow and most of its parts have reached the end of their life expectancy.

I'm fortunate to have a volunteer that I call the bush mechanic who has brought back to life many of my machines. From parts off old fairway mowers to old engines sitting in the shed, give him time and he will fix it.

Do you think regional superintendents have a better work-life balance than their metro counterparts? For me the balance of work to home life has made me relax a lot more being in a regional area. I think everyone is different in what they want to achieve at work and at home. The move to Armidale was more for my family life and so far it has worked out for me.

Favourite spot on the course? Looking out towards the course from the putting green. From there you can see four fairways all running in different directions and also the dam in the background.

Most rewarding moment at Armidale? When members come up to me and say that they are happy with the course and what I'm trying to achieve.

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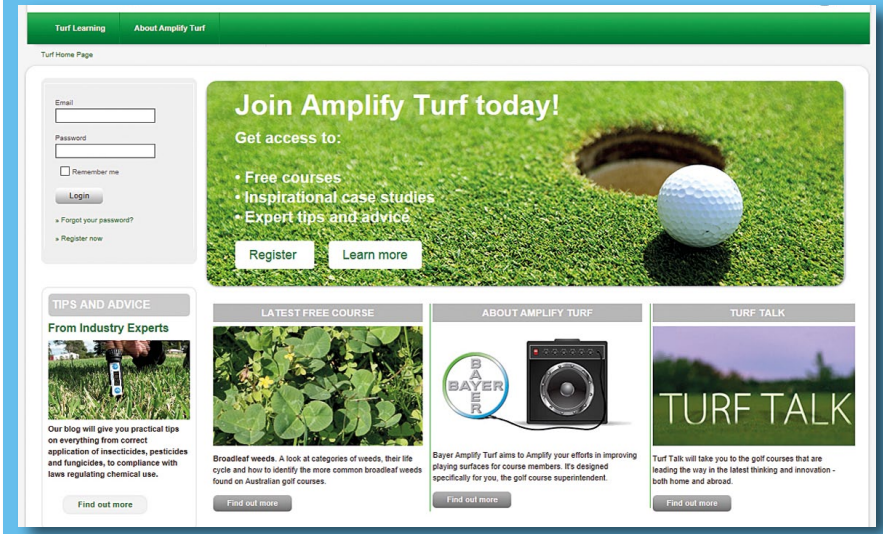
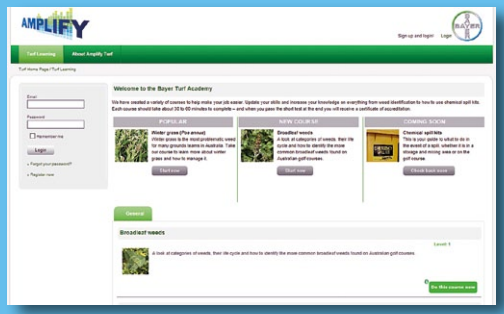
BAYER PUMPS UP SUPERS WITH NEW AMPLIFY TURF WEBSITE





The Bayer Amplify Turf website offers online training to keep superintendents up to date with the latest in skills and knowledge on everything from managing chemical spills to broadleaf weed control and chemical application

AGCSA Silver partner Bayer has unveiled a new free online information portal for Australian golf course superintendents called Bayer Amplify Turf – www.bayeramplifyturf.com.au.

Amplify Turf aims to assist and strengthen the efforts of golf superintendents in improving their playing surfaces for course members. It is designed specifically for the golf course superintendent and aims to help them solve their everyday challenges and concerns, whether budgeting, water or weed management.

The website offers online training to keep superintendents up to date with the latest in skills and knowledge on everything from managing chemical spills to broadleaf weed control and chemical application. And because it's online, the training can be undertaken at a time that suits the practitioner.

The website contains regular weekly insights, advice and practical tips on everything from the correct application of insecticides, pesticides and fungicides, to compliance with laws regulating chemical use.

The website will also feature a monthly Turf Talk segment where Bayer will visit golf courses that are leading the way in the latest thinking and innovation, whether in waste and water management, or course design, best practice in OH&S, and demonstrate how these practitioners are managing the issues that are important to superintendents.

Bayer Environmental Science general manager Dave Ross said the company has created the innovative programme specifically for golf course superintendents and their staff as a way of adding value for their customer base.

"We gave a preview of the Amplify Turf website at this year's Australian Turfgrass Conference and Trade Exhibition on the Sunshine Coast and our intention is to continually improve and add to the website's content," says Ross.

"One of the most interesting aspects of the website is the video blogs. We hope that being able to watch an interview with a golf superintendent, take a virtual tour through the golf course and hear about the challenges and issues faced by others will be really beneficial, particularly the solutions they discuss."

Bayer turf consulting manager Jyri Kaapro, who has been a key member of Bayer's R&D team for the past 14 years, has a blog on the Amplify Turf website. This blog provides a wealth of technical information for the golf superintendent with current articles on topics such as C_3 and C_4 grasses, the importance of soil temperature and spotting mites in couchgrass.

In order to take advantage of Bayer's new online resource, superintendents can register at www.bayeramplifyturf.com.au or talk to your local Bayer sales representative about how to get involved.

The Toro TurfMaster has a 76.2cm (30-inch) wide cutting deck

TORO UNVEILS TURFMASTER 30-INCH WALK-BEHIND

Toro has released its new TurfMaster commercial walk-behind mower. The TurfMaster has a 76.2cm (30-inch) wide cutting deck which makes it ideal for landscape contractors who need a mower that can access most areas and perform the job quickly and efficiently.

The twin-blade cutting system is powered by a tough commercial grade 179cc Kawasaki engine and comes with a heavy-duty 2-point height of cut. By way of a blade stop system, users can stop the cutting blades without turning off the engine. This makes it quick and easy to remove obstacles from the mowing path without having to restart the engine. A mulching system recuts the grass into finely shredded clippings and the 3'n'1 cutting options (bagging, side-discharge & recycling) covers all conditions.

Heavy duty components like deck skid plates, tough sealed transmissions and a strong one-piece handle are all designed for the demands of commercial mowing. The Toro TurfMaster comes with a one-year limited commercial use warranty and a three-year limited commercial use engine warranty. For more details visit www.toro.com.au.

TURF TYRES NOW A CLICK AWAY

Superintendents and turf managers can now source their turf tyre requirements online through the new GEO Tyres Online website - www.geotyres.com.au.

GEO Tyres Online is a division of Australia's largest importer of turf, ATV, UTV industrial and specialty tyres, specialising in all tyres for golf courses, sports grounds, parks and off-highway industrial and agricultural uses.

"The main focus of the online business is to supply quality tyre solutions to the golf course and turf industries in the most convenient way, a one-stop shop if you like for all turf and golf cart tyres," says director Andrew Bloxham.

"Traditionally our tyres have been supplied via tyre dealers, however, we recognised the need to be connected directly to the commercial end users (such as golf courses). This speeds up response time and takes the guess work out of both supplying tyres and also in recommendations to ensure the best performing tyres are supplied."

GEO Tyres Online distributes world-leading brands Kenda and Deestone. Kenda is a leading OEM brand and produces the world's largest range of high quality speciality turf and industrial tyres. Deestone offer quality heavy duty, reliable tyres. All tyres purchased through GEO Tyres Online are covered by the manufacturer's warranty and product liability insurance and the company's online network, with stocking points around Australia, ensures fastest delivery times.

To see the GEO Tyres Online range visit www.geotyres.com.au

TORO'S SINGLE STATION SOLUTION

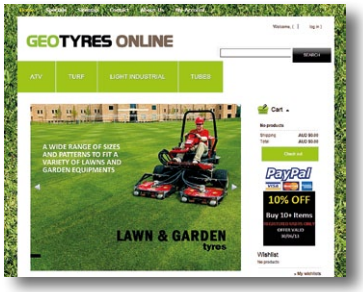
Toro's irrigation division has released a new waterproof single station battery controller on to the market, ideal for use in remote locations and areas where it is difficult to get power to a controller. The new product is specifically designed to help landscaping professionals better manage their irrigation systems at sites with no power or where cable trenching is difficult or expensive.

"The new Toro Single Station Controller is all about flexibility," says Alyce Rigby, Toro Australia's product manager – garden and irrigation. "Because it is battery-powered, portable and operates entirely from one controller connected to a single valve, there is no need to lay multiple wires on site."

One 9-volt alkaline battery is all that is required to sufficiently power an entire irrigation season. It features built-in protection to avoid programming or valve operation if the battery is low on power, as well as a short circuit error detection. The controller can be retrofitted to most DC-latching solenoids on the market and it's also fully waterproof and submersible to two metres.

The unique 'runtime extension' feature means that manual operation will simply pause any automatic irrigation programmes. Once the manual run is complete, automatic irrigation will resume as normal, allowing simple and efficient doubling of runtime when additional watering is needed.

The Toro waterproof Single Station Battery Controller can be purchased through authorised Toro Irrigation dealers. Please visit www.toro.com.au to locate your closest dealer.



The GEO Tyres Online website

Toro's new waterproof single station battery controller

INDUSTRY APPOINTMENTS AND ANNOUNCEMENTS

SIMPLOT PARTNERS SPECTRUM

AGCSA Bronze partner Simplot Partners has signed an exclusive arrangement with Spectrum Technologies to distribute the company's range of measurement and monitoring equipment into the Australian turf market. For over 25 years, Spectrum has developed a range of products that include weather and environmental monitoring, nutrient management, IPM and soil moisture measurement (such as the TDR Field Scout probe).

For more information on the range of products that Spectrum Technologies offers, visit the Simplot Partners website http://www.simplotpartners.com.au/ or contact your local Simplot Partners representative.

LEGGETT JOINS SYNGENTA LAWN AND GARDEN TEAM

AGCSA Gold Partner Syngenta has appointed **Albie Leggett** (pictured) to its Lawn and Garden team as Turf Sales Manager – NSW, ACT and NZ. Leggett has over 20 years of experience working in the sports turf industry and his most recent role with Amgrow saw him working in a number of technical, diagnostic and R&D positions.

Leggett, who has a Master's degree in Agriculture (Turf Management) from the University of Sydney can be contacted on 0418 395 632 or email Albie.Leggett@.syngenta.com

MORRIS MOVES INTO AMGROW PRODUCT DEVELOPMENT ROLE

Dr Brett Morris (pictured) has been appointed as product development and regulatory affairs specialist for Amgrow. Morris finished in his role as golf course superintendent at Brisbane Golf Club in early-August and started his new Brisbane-based role with Amgrow on 19 August.

Morris, who returned to Brisbane Golf Club as superintendent in August 2011 after initially being superintendent there between 2001 and 2004, will work alongside Amgrow business development manager **Peter Kirby** to identify new products, conducting trials and research with the goal of registering them with the APVMA for eventual release.

"There are many exciting new products in development at present which hopefully will assist superintendents and professional turf managers in their roles which is something I'm very much interested in," says Morris. "I enjoy trial work and research so it was a good opportunity to join an innovative and progressive company full of very talented people." Morris can be contacted on brettm@amgrow.com.au or on mobile 0419 977 963.

HOLOHAN RETURNS TO GLOBE

Mick Holohan has re-joined AGCSA Bronze partner Globe's Victorian Turf & Specialty sales team as of late July. The former STA VIC committee member left Globe two years ago to experience life as a practitioner, with stints at Mooney Valley City Council as a sportsfield supervisor and most recently at Hume Turf. Holohan can be contacted on 0419 247 103 or email mholohan@globeaustralia.com.au

Green focus

Water and energy use efficiency continue to remain at the forefront of the turf industry's targets in maintaining a professional and cost-effective method of growing and harvesting quality natural turfgrass

As turf producers look forward to what will hopefully be a bumper spring, Jim Vaughan reports on the latest news from Turf Queensland.

Turf Queensland
Grow Green
www.turfaustralia.com.au

As with most industries in the current economic climate, the turf production industry is no different and after surviving drought for many years and an unusually high level of rainfall over the past few years, it is once again finding its feet and looking forward to spring which is always the high point of the year as things dry out.

The Queensland turf industry has seen a number of casualties, however, it is also seen some growth within professional and innovative companies as they undertake the transition between dry and wet and now back to dry conditions.

The environmental area is one that continues to draw attention and the use of natural turfgrass remains a major benefit as it has numerous species to cover the diversity of varying requirements, whether from the wet tropics, dry tropics, subtropical, salt-tolerant to sunny and shady areas.

Erosion control has been a focal point in recent times with quality natural turfgrass being utilised as an erosion barrier between the run-off from construction sites and natural waterways. Nutrient and sediment run off at times of heavy or unseasonal rainfall can significantly reduce water quality within our catchments.

As has been reported in past editions of Australian Turfgrass Management, the soil erosion control research demonstration facility that has been set up at Redlands has shown how natural turfgrass can be successfully employed as a barrier against such contamination and that it can be far more effective than traditional methods employed.

In another research project, earlier this year Turf Queensland entered into an agreement with the Queensland Department of Agriculture Fisheries and Forestry to establish a demonstration pilot farm programme to validate fertigation practices.

Evergreen Turf Queensland farm in Pumicestone Passage was the venue for this trial which provided two comparison sites (one with and one without) to measure chemical leaching and run-off into this important waterway catchment while managing different nutrient management practices. Turf Queensland managed the programme through contractors Pat Daley and Shane Holborn.

The project has covered the monitoring of water run-off and leaching through a series of different probes, weather stations and the use of fertigation and correct water distribution through turf farm irrigators. Irrigator assessments identify any issues with machinery and modifications undertaken to ensure uniformity of distribution. Readings, water and soil tests are taken regularly, analysed and qualified by a NATA-approved laboratory.

This project is assessing the ability of fertigation units, along with the correct amount of water and a correctly set up irrigation unit, to provide fertiliser and water evenly across turf production paddocks. The objective is to identify that if the correct amount of water is placed on to the ground and fertigation is adjusted correctly and dispersing the correct amount of fertiliser, there should be no wastage, run off or leaching.

Projects such as these demonstrate that water and energy use efficiency continue to remain at the forefront of the turf industry's targets in maintaining a professional and cost-effective method of growing and harvesting quality natural turfgrass.

The Turf Queensland Accreditation Program supports water and energy use efficiency along with the correct applications of fertiliser and reduction in nutrient/sediment run-off. The programme has been taken up by a number of councils (Brisbane City being one) as it reduces their risk associated with purchasing natural turfgrass.

The turf production industry in Queensland is looking forward to a bumper spring to assist its recovery from extremely low sales levels, however, the lack of current construction projects is not assisting.

A Turf Queensland project is looking at fertigation practices on a turf farm

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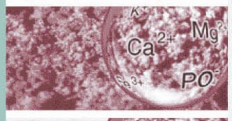

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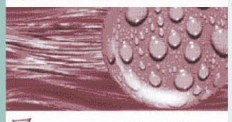

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GCSAWA

Plant pathologist Jorg Imberger (above) and Barnbougle course superintendent Phil Hill (below) were among the guest speakers at the recent GCSAWA Margaret River conference

In an industry that is controlled by weather conditions and committees that love control, we find ourselves gearing up for renovations and spring. It has been a challenging year to say the least and after enduring one of the hottest, driest summers on record, we have just experienced one of the driest Junes on record and some of the coldest minimums through July. With some superintendents forced to hand water during June and July, who in their right mind would get into greenkeeping?!

On top of these environmental issues, we then have to battle with committees and directors from all walks of life with a far superior knowledge of growing turf better than the professionals they employ. I applaud and commend all superintendents with their broad shoulders and thick skins to power on as long as possible – not too many superintendents retire these days!

It has been a big few months in the WA meat market and we lost another stalwart in **Peter Fleming** who saw the gates close on Burswood Park Golf Course for the last time. Other movements saw **Mark Claise** replaced by **Shane Baker** at Araluen, while ever popular GCSAWA secretary (now vice-president) **Paul Needham** rushed in to fill the vacancy left by **Eric Dennis** moving to Lakelands.

With that move, ex-AGCSA president **Allan Devlin** realised he had lost his drinking buddy and after a few discussions with the hierarchy at 'Secrets', decided to venture out into the unknown after 26 years in the WA industry. Allan's enthusiasm and colourful words of wisdom will be missed around the traps and we wish him all the best for the future.

As one door closes another opens and for **Adam Strachan** that has seen him take over at Secrets. Another change was the departure of **Rohan Farrow** from Hartfield Country Club to be replaced by Mount Lawley 2IC **Nick Kinley**. Nick is one of the young charges coming through and definitely deserves a superintendent's role.

And then to top off the musical chairs, **Mike Healy** resigned from Gosnells Golf Club which left the door ajar for **Phil Moylan** to return to the industry. Mike has taken on the position of WA turf representative for McIntosh & Son which was vacated by **Mike Foskett** who is now at Jacobsen.

As a result of all the movements, the GCSAWA committee has changed a little since last year. With the retirement of Allan, change of career for Mike, no golf course for Peter and the standing down of our golf secretary **Callum Hitching**, the new-look committee for 2013/2014 is:

- **President:** Des Russell (Bunbury GC)
- **Vice-president:** Paul Needham (Kwinana GC)
- **Treasurer:** Simon Bourne (Cottesloe GC)
- **Secretary:** Neil Graham (Melville Glades GC)
- **Committee:** Darren Wilson (Wembley GC), Geoff Kirk (trade rep) and Adam Strachan (Secret Harbour)

The GCSAWA's biennial Margaret River State Conference was a great success and thanks to the efforts of event organiser **Simon Bourne** I have no hesitation in saying it was one of the best I have been to. With legendary Barnbougle superintendent **Phil Hill** as one of the main drawcards along with **Peter Frewin** and **Andrew Peart** from the AGCSA, the presentations and the entertainment was not only controversial but very entertaining. The event was almost at capacity and it was great to see the younger brigade of WA superintendents making up the majority of attendees.

While in Margaret River we tried to play the Toro Cup at Margaret River Golf Club. Host superintendent **Mark Lewis** and his boys tried their best but the continual rain reduced the event to nine holes (seven for some weaker individuals). The eventual winner was **Nick Price** (The Cut) with one over. In the highly sought after Niel Adams Shield, **Darren Wilson** prevailed in a countback from Callum Hitching, while **David Miles** (Bailey's Fertilisers) took home the Alan Barlow Trophy.

Speaking of the trade guys, how could I possibly forget to thank them? Without their support we would have to increase the fees for attending this fantastic event.

As the year winds up (or down depending how you look at it), we have two GCSAWA Super Series events left with the next being at **Jon Carter's** Wanneroo Golf Club. Thanks to all our members for a great 2012/2013 and the committee and I look forward to a bigger and better 2013/2014. Good luck with renovations and I will see you around the traps.

DES RUSSELL
PRESIDENT, GCSAWA

SAGCSA

Winter in South Australia has been on the wet side with July very damp and August starting off in very much the same way. The SAGCSA Annual General Meeting was held at Kooyonga Golf Club. The SAGCSA thanks host superintendent **Steven Newell** for allowing us to have our AGM at this sensational facility.

Adelaide Shores course superintendent **Tim Warren** collected the Superintendent's Trophy with **Sam Fraser** (Globe Australia) winning the trade section. Former SABFL legends **Chris** and **James Gowans** were the guest speakers and kept everyone who attended amused with stories from their footballing days.

The existing SAGCSA committee was re-elected at the AGM and the full executive is made up of:

- **President:** Barry Bryant (Mount Osmond GC)
- **Vice-president:** Chad Dawe (Willunga GC)
- **Secretary/Treasurer:** Richard James (The Grange GC)
- **Committee:** Stephen Chapman (Barossa GC)

Thank you to all our members and sponsors for their support over the past year and also to the committee for all their hard work and dedication to the industry.

During the AGM, long-serving Flagstaff Hill Golf Club superintendent **Gary Day** announced he was leaving the club after 23 years of service. On behalf of the SAGCSA I would like to wish Gary all the best for the future.

The AGM was followed by an education meeting at Adelaide Shores on 22 August. Guest speaker was recently appointed Bonnie Doon Golf Club course superintendent **Justin Bradbury** as well as a variety of presentations from trade and machinery companies.

With spring fast approaching I wish everyone all the best for their renovations.

BARRY BRYANT
PRESIDENT, SAGCSA

Adelaide Shores' Tim Warren collected the SAGCSA Superintendent's Trophy at this year's AGM at Kooyonga Golf Club

VGCSA

After our AGM and combined country and assistant superintendents meetings earlier in the year, the VGCSA has had a quiet period during the winter. The AGCSA conference in the northern part of Australia during this time always takes a few Victorian superintendents away to seek some warmer weather and by all reports the conference on the Sunshine Coast was a success with many compliments voiced from both trade and superintendent delegates. Congratulations to all those involved.

By the time this edition is out, the VGCSA would have held its education meeting at Eastern Golf Club. The club is approaching the start date of its relocation which will see it construct a new golf course in Melbourne's far eastern suburbs.

This process has taken many years and as a result course superintendent **Clayton Howell** has been able to turn parts of the current golf course into a trial zone for researching options relating to the new golf course. The education meeting focussed on Clayton's trials along with input from Phil Ford regarding the process and outcomes of each trial.

Eastern Golf Club manager **Ben Telley** also elaborated on what was involved with obtaining the approval to relocate the club to its future site. Sponsors of the meeting were Syngenta and PGG Wrightson Turf.

Huntingdale Golf Club (host superintendent **Michael Freeman**) is the venue for VGCSA Open Golf Day which will again be sponsored by Bayer. This event continues to grow and to have the opportunity of playing on one of Melbourne's finest sandbelt courses is sure to attract a good field again this year. The date of this event is Tuesday 22 October and its aim is to again provide funds for turf research.

Huntingdale Golf Club will host the VGCSA Open Golf Day which benefits turf research on 22 October

I would like to take this opportunity to thank the many sponsors of the VGCSA for their continued support of the association. A key to providing members with interesting meeting content and up to date information is all based around the committee's ability to source the right venue, appropriate information and to be able to facilitate this in a way that makes members want to be a part of the association. This cannot be possible without the help of our sponsors and for this all our members are extremely grateful.

STEVEN HEWITT
PRESIDENT, VGCSA

STA ACT REGION

Top: Manuka Oval is currently undergoing a major reconstruction which will see the outfield converted to Grand Prix couchgrass and installation of a new seven-wicket Legend couchgrass square

Above: Scott Harris was elected the new STA ACT president at the recent AGM

We hope all delegates who attended the recent STA ACT Turf Seminar enjoyed the day. Numbers were down on previous years, which was surprising considering the calibre of speakers assembled for the day.

Although only in the early planning stage we will be looking to revamp next year's seminar and will advise details in future reports. A huge thank-you to all sponsors and speakers who contributed to the day; your continued support of these events is very much appreciated and continues to allow us to run these days for our members.

Our Annual General Meeting was held at the conclusion of the seminar and a number of changes were made to committee positions. **Scott Harris** was elected president, replacing **Garry Dawson, Karen Higgs** was elected treasurer, with **Scott Fogg** moving up from the general committee to take over the secretary role. Five new faces grace the general committee, each bringing a wealth of knowledge and experience. The full STA ACT committee for the coming year is:

- **President:** Scott Harris (Gold Creek CC)
- **Secretary:** Scott Fogg (Queanbeyan GC)
- **Treasurer:** Karen Higgs (Royal Canberra GC)
- **Committee:** Bruce Davies (CIT), Michael Waring (CT&T), Danny Hull (Queanbeyan BC), Lennon Ryan (Parliament House), Bill Franklin (Nuturf), Mark Thomson (Federal GC), John Tait (Marist College), Brad van Dam (Manuka Oval), Luke Jorgensen (Royal Canberra) and Tony Fogarty (Living Turf).

At the AGM we farewelled outgoing president Garry Dawson and vice-president **Keith McIntyre.** The contribution of these two men over many years cannot be overstated. They have worked tirelessly in an effort to improve the association and provide maximum benefit to its members. Thank you Gary and Keith on behalf of everyone involved in our association.

It was with a great deal of pleasure that we also congratulated **Luke Jorgensen** on his success in winning the AGCSA Graduate of the Year Award, sponsored by Toro. Luke is an outstanding young man and a credit to his family and the staff at Federal Golf Club. Luke has now moved on to Royal Canberra Golf Club to learn the challenges of working on a cool-season course and has also stepped up onto the STA ACT committee. We look forward to his input on the committee and wish him all the best as he heads to the US in early 2014 as part of his award prize.

We must also congratulate **Garry Dawson, Bruce Davies** and all the team at Canberra Institute of Technology. It is their hard work and determination to improve the standard of students coming through the system that sees the ACT continually do well in the national graduate award.

In other developments, Canberra has been chosen as the venue for next year's Bowling Greenkeepers Federation Week. ACT will host the event on behalf of NSW from 4-9 May. This event has been held since 1966 and comes around every three years. There will be championship games, Test matches, educational seminars and tours of some local sporting facilities and tourist sites. A full list of venues and dates will be passed on in future reports. Regular monthly greenkeeper bowls days will be held as fundraisers leading up to the event and anyone interested in a fun day on the greens should contact any of the local bowling greenkeepers for dates of upcoming events.

Finally, Manuka Oval is currently undergoing a complete reconstruction. Lights were installed at the ground earlier this year to allow international matches to be played at the venue. This latest work has been undertaken to complement the lights and involves lowering the existing surface and adding two more rows of seating around the ground.

Approximately 20,000m^3 of soil will be removed from the site including the existing five pitch wicket square. The new profile will be USGA spec with new drainage and irrigation systems installed as well. The outfield will be Grand Prix couchgrass with the new seven wicket square Legend couch. Work is hoping to be completed by end of December.

DANNY HULL
COMMITTEE, STA ACT

ON THE MOVE

Brett Barsby: From Brisbane North Institute of TAFE to course superintendent Mystic Sands Golf Resort, Townsville, QLD.

Andrew Boyle: From East Course assistant superintendent at Royal Melbourne Golf Club, VIC to superintendent Royal Canberra Golf Club, ACT.

STA QLD

This winter has almost been a case of 'blink and you missed it,' at least in south east Queensland. What started off as an unusually wet season which played havoc with many sports fields and caused plenty of fixture cancellations, soon turned into a very warm and, up until now, dry second half with barely a frost in sight. Of course with these higher than average temperatures it's important to adjust your spray programmes to suit.

Talking of spray programmes, STA QLD recently held a field day at Ballymore Stadium where stadium and grounds manager **Scott Wallace** described the success he has had in controlling a range of weeds, including the old arch enemy wiregrass, in trials he has carried out with the herbicide Tribute. The results are very impressive. If you want to read Scott's article about this trial you can find it on the STA QLD website www.staqld.com.au or better still join the association and read it in our magazine.

There was a great turn out for the field day which was our annual sponsor's day. The place was well prepared and looking great thanks to Scott and his staff and the sponsor's presentations were spot on. As always the committee would like to thank our sponsors for their support and our members for their attendance.

STA QLD members at the recent field day held at Ballymore

Coming up in October is our annual bus trip which is always a great day. Plans are well under way with details to be released soon so stay tuned.

MARTYN HEDLEY
VICE-PRESIDENT, STA QLD

TGCSA

Ulverstone Golf Club course superintendent **Mark Johnson** has been elected the new president of the TGCSA following the AGM and two-day seminar held in August in Scamander on the state's north-east coast. Mark takes over the reins from Launceston Golf Club's **Tony Smith** who after three years as president has stepped down to a general committee position.

Other changes to the TGCSA committee included **Phil Hill** (Barnbougle) taking over as vice-president from **Danny Gilligan** (Tasmania Golf Club), with **Stuart Matthewson** (The Pump Shed) taking on the secretary role following Mark's elevation to president. The full TGCSA committee for the coming year is:

- **President:** Mark Johnson (Ulverstone GC)
- **Vice-president:** Phil Hill (Barnbougle)
- **Secretary:** Stuart Matthewson (The Pump Shed)
- **Treasurer:** Ricky Barr (Longford GC)
- **Committee:** Wayne Hefford (Devonport GC), Bryan Dunn (Aurora Stadium), Greg Duff (Burnie GC) and Tony Smith (Launceston GC)

The TGCSA conference, trade show and AGM attracted more than 50 members in what again proved to be a very popular format. The speaking line-up included **Adrian Black** from Melbourne and Olympic Parks Trust who spoke on the works that have been completed at the complex in recent years. This included the new Collingwood training facility, Gosch's Paddock upgrade and works within the Rod Laver Arena precinct.

Other speakers during the event included plant pathologist **Dr Dean Metcalf** who spoke on the benefits of trichoderma in the soil and AGCSA general manager **Peter Frewin** who gave talks on dealing with difficult committees and CV writing and presentation skills. There were also numerous presentations by trade sponsors. One of particular interest was **Phillip Knight** who provided details of his new company Long Paddock Organic Solutions which now supplies Charlie Carp products specifically formulated for the sports turf industry.

Scamander River Golf Club hosted the annual golf event and despite the inclement weather **Ricky Barr** (Longford GC) prevailed to win the Reg Roberts Memorial Trophy with 19 points, while David Golf's **Steve Williams** won the trade trophy with a superb 21 points.

COMMITTEE, TGCSA

STA NSW

At the time of writing this report we are a week away from our seminar in Wollongong. We have had a really positive response to the event which will be held at WIN Stadium. It is a good opportunity for the many of the sports turf managers on the south coast of NSW to meet up and get information on current industry practices.

We are also planning for our Annual General Meeting on 10 September and encourage anyone in NSW who is interested in getting involved with the association to come along. The STA NSW committee is made up of both greenkeepers and trade reps but we are particularly looking for greenkeepers to come on to the committee.

More information on the AGM and a review on the Wollongong seminar can be found on at www.sportsturf.asn.au

CHRIS CHAPMAN
PRESIDENT, STA NSW

GCSAQ

Lakelands Golf Club on the Gold Coast recently changed ownership

Bottom right: This little critter made a dramatic entrance at Headland Golf Club recently after it fell through the lunchroom roof

I am sitting writing this report in the third week of August and am contemplating whether or not to turn on the air conditioner in my office! After another exceptionally wet start to the year, I now find myself in near full irrigation mode which seems ridiculous given that two metres of rain fell in the six months since Australia Day. I don't know if it is global warming or climate change causing our weird weather, but in true Queenslander laidback style I saw a bumper sticker last week that effectively said 'Global warming = rising sea levels = more fishing spots. Bring it on!'

We have had a couple of movements of late with **Ben Baumann** departing The Glades to move into a landscaping position in north Queensland and **Brett Morris** departing Brisbane Golf Club and joining Nuturf /Amgrow.

Another imminent move is the retirement of **Chris Haselden** at Lismore Golf Club. Chris has been at the club for 36 years over two stints and has certainly ridden the merry-go-round that can be a country golf club. The club has had its highs and lows over the years but Chris has always held firm and produced a great result with very little in the way of financial and machinery resources. After 40 years in the turf industry Chris is going to have some well-deserved time off before continuing his golfing career at, you guessed it, Lismore Golf Club!

Some good news following the closure of Ipswich GC is that the local council stepped in and is operating the golf course again, but unfortunately there is news of another couple of clubs close to the brink. On perhaps a more positive note, Lakelands and Hope Island have recently changed ownership with another couple of clubs close to being sold if you believe everything you hear.

At least the change of ownership at Lakelands has got the thumbs up from incumbent superintendent **Phil Soegaard** with some new machinery already in the shed, a bunker rebuild underway and the reconstruction of the signature 14th green that has been giving Phil headaches for some time now underway. Lakelands becomes the new owner's 16th golf course!

Nominations for the GCSAQ's two awards are just about to close so if you haven't seen the details then please contact me as soon as possible. We have a new award this year – the GCSAQ Technician Recognition Award in addition to the GCSAQ Assistants Recognition Award.

The two winners will travel to Melbourne in November to assist with preparations for the 2013 Australian Masters and World Cup tournaments at Royal Melbourne Golf Club, thus providing them with exposure to golf course and tournament preparation at the highest level.

Awards of this type can't happen without sponsors and we are indebted to Nuturf for their sponsorship of the assistants award and KC Turf Equipment/Jacobsen for the technicians award. I would also like to thank Royal Melbourne superintendent **Richard Forsyth** for holding the two positions open for us.

Over many years the GCSAQ have held a Turf Research Golf Day but with the demise of DEEDI at Redlands we will be conducting an industry golf day at Nudgee Golf Club on Tuesday 22 October. The idea of the day is to bring together all areas of the industry, particularly superintendents and their management group from their own club.

Nudgee GC provides a very central and easy-to-get-to location so please support this day by bringing some of the officialdom from your club along. Host super **Dave Brushfield** has a reputation for having some of the most consistent greens in Brisbane so who knows you may even learn something as well.

And finally, we all know Headland Golf Club superintendent **Ben Tilley** is very environmentally conscious and is even known as 'the vegetarian superintendent' given his penchant for using natural compounds on his greens. But he has gone to extreme lengths to control ants and termites in his lunchroom by using an echidna to clean them up! I digress, as the photo below shows the poor echidna actually fell through the roof of the lunchroom and onto a table full of startled staff!

PETER LONERGAN
PRESIDENT, GCSAQ

ON THE MOVE

Trent Butterfield: From assistant superintendent to superintendent The Glades Golf Club, QLD replacing **Ben Baumann** who has moved to Airlie Beach.

Gary Day: Departed as superintendent of Flagstaff Hill Golf Club, SA after 23 years.

Nick Kinley: From assistant superintendent Mt Lawley Golf Club, WA to superintendent Hartfield Country Club, WA replacing **Rohan Farrow**.

Phil Moylan: Appointed superintendent Gosnells Golf Club, WA replacing **Mike Healy** who has joined Jacobsen's WA distributor MacIntosh & Son.

Trevor Ridge: Departed as superintendent Sawtell Golf Club, NSW in mid-August after 15 years.

Adam Strachan: From superintendent Collier Park Golf Club, WA to superintendent Secret Harbour Golf Club, WA.

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Mark Jennings & Jim Waring with the Box Hill Golf Clubs Lowara Hydrovar pump set

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- Mark Jennings Superintendent Box Hill Golf Club

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