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VOLUME 12.3 MAY-JUNE 2010

MANAGEMENT JOURNAL

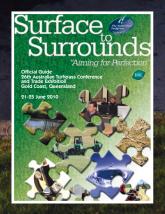
Cape Kidnappers A Kiwi classic

The Purr-fect Surface
Skilled Stadium
redevelopment

The Pulse Golf course rankings

Research

Warm-season greens trials PGRs and biostimulants



26th Australian Turfgrass Conference Your guide to Gold Coast 2010



New Rain Bird® IC™ System improves aesthetics and water management capabilities at Pebble Beach Golf Links while providing unparalleled flexibility



Pebble Beach Golf Links Pebble Beach, CA

Project Details

Superintendent: Chris Dalhamer **Contractor**: Hydro-Engineering **Installation Date**: August 2008

Project Goals

- Upgrade irrigation system to provide increased level of irrigation control and management
- Choose a system that will allow for easy future expansion with minimal impact on the course and on play
- Eliminate field satellites to maximize aesthetic value of links-style course layout

Results

- The new Rain Bird Integrated Control (IC) System[™] was installed on the 12th hole. This system offers single head control on every rotor, increasing control and improving water management capabilities
- The IC System was easy to install with minimal impact on play area
- Field controllers were eliminated on the hole, improving course aesthetics. Integrated control is now built right into the rotor

Project Overview

Since 1919, the exquisite beauty and unique challenge of Pebble Beach Golf Links has thrilled golfers and spectators alike. Pebble Beach Golf Links has been the site of golf's most prestigious tournaments, including the upcoming 2010 U.S. Open Championship. Designed by Jack Neville and Douglas Grant, the links-style course hugs the rugged coastline, providing wide-open vistas, cliffside fairways, and sloping greens.

Project Challenges

The irrigation system at Pebble Beach Golf Links has an outdated $\,$

pipe network and operates multiple rotors on each station. Efficiently managing the irrigation system is a challenge for Superintendent Chris Dalhamer and his staff.

Dalhamer acknowledges that Pebble Beach Golf Links, as a world-famous golf attraction, has an environmental leadership responsibility. "Right now it is difficult to efficiently manage our irrigation because the system is running between three and five rotors per zone. Water conservation is critical to our long-term success. We need to be seen as a leader in irrigation management."

In addition, the course is constantly going through minor design adjustments and updates to the landscape. "We need an irrigation system that is very flexible and can easily be modified without disruption to the players or the course."

Dalhamer added that the wideopen links-style course means that that there are a lot of rotors and consequently a high number of field satellites. The satellites are aesthetically unappealing and create minimal impact on the course and playability, and provides the flexibility that suits their ever-changing needs

The system was easy to install with

Because the IC System works with all Rain Bird central control software, Dalhamer and his staff have the ability to link the new rotors on the 12th hole to their existing central control software.

> They enjoy increased water management and conservation capabilities offered by the IC System and single head control.

> Dalhamer said, "We are very pleased with what we have seen from the IC System thus far. If you are buying a new irrigation system, I recommend that you learn

about Rain Bird's IC System."

Summary

Rain Bird's IC System has given Pebble Beach Golf Links a new level of irrigation control, achieving their water management objectives. The system was easy to install with minimal impact on the course and playability, and provides the flexibility that suits their everchanging needs.

Chris Dalhamer and his staff are enjoying the fact that there are fewer field satellites to maintain on the golf course, freeing them to focus valuable maintenance time on other critical areas. They are looking forward to upgrading the entire irrigation system in the future as they continue to enhance the world renowned landscape of Pebble Beach Golf Links. For more information on this and other Rain Bird golf irrigation products and services, please contact:

Rain Bird Australia 10 Mareno Rd, Tullamarine, Vic 3043 Phone: (03) 8336 6700 Freecall: 1800 424 044 or call: Greg Smith (Senior area manager-golf & services 0438 503 070) Troy Barbour (Senior area manager 0409 123 191) Dale Stafford (Technical Support 0409 115 000) Email: info@rainbird.com.au www.rainbird.com.au



additional maintenance issues. "If we can eliminate the satellites we

can eliminate another area of maintenance and increase the

Solutions

Pebble Beach Golf Links installed Rain Bird's new IC System on the 12th hole to demonstrate the improved irrigation management and aesthetics. They contracted with Hydro Engineering to install new IC Rotors and a new two-wire path, linking the rotors directly with the interface located in the maintenance building. Rain Bird IC Rotors have an Integrated Control Module (ICM) mounted directly on the sprinkler. This provides direct intelligent control (using constant two-way communication with the central control software). With the intelligent control located at the sprinkler, the maintenance team can eliminate the now-unnecessary field satellites on the hole, instantly improving aesthetics.

Dalhamer was impressed by the ease of installation and minimal fuss. "This system went in really quickly because it is so simple to install. One wire path connecting directly to each sprinkler is about as easy as it can get."

The IC System's large station capacity provides Pebble Beach Golf Links with the flexibility to add future rotors when needed. "We are always adding rotors, so the ability to simply tie into the nearest sprinkler allows us to have maximum flexibility with minimal course and player disruption." Dalhamer explained, "With decoders or satellites, we needed to plan ahead to ensure that we had sufficient addresses available for exp ansion. The new IC System essentially eliminates this issue and creates a very user-friendly option for my course."

News Flash

Congratulations to Newcastle Golf Club in NSW and St. Lucia Golf Club in Brisbane for being the first Australian golf courses to install Rain Bird's new IC irrigation system.

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COVER: THE GLADES GOLF CLUB, QLD

One of Queensland's premier resort courses, The Glades plays host to the 2010 AGCSA Golf Championship during the 26th Australian Turfgrass Conference and Trade Exhibition. Pictured is the challenging par 4 10th **Photo:** Brett Robinson



Hell bent on bent

8

Managing bentgrass greens in the hot and humid climate of south east Queensland climate wouldn't be many superintendent's idea of a stress-free job, but for The Glades Golf Club superintendent Ben Baumann it's not as bad as everyone would make it out to be. ATM takes a look inside The Glades maintenance operations and previews the 2010 Toro AGCSA Golf Championships which will be held there during this year's Gold Coast conference.

A Kiwi classic – Cape Kidnappers

- 1

Since opening in 2004, New Zealand's Cape Kidnappers Golf Course has risen to be ranked among the world's top layouts. Situated on a dramatic parcel of coastal land which plummets into the Pacific Ocean, the course is now home to ex-pat Aussie Steve Marsden who provides an insight into managing this Tom Doak masterpiece.

The purr-fect surface

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Last summer Skilled Stadium, home to the Geelong Football Club, underwent a dramatic multi-million dollar facelift to bring it up to the same level as its Melbourne counterparts the MCG and Etihad Stadium. Project manager David Goldie looks at some of the challenges faced in providing a premiership quality surface for a premiership winning club.

PICTORIAL

Classic Commonwealth

In early February world number six Yani Tseng won the 2010 Australian Women's Open on a superbly presented Commonwealth Golf Club. ATM caught the maintenance crew in action as they prepared the sandbelt gem for its first Open tournament since 1967

OPINION

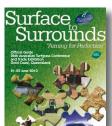
Golf course rankings 28

Golf course rankings lists always create plenty of debate among the golf industry and no more was this demonstrated than in March when Australian Golf Digest anointed Kingston Heath as Australia's number one ahead of Royal Melbourne. ATM asks superintendents their thoughts on course ranking lists and what additional pressures they can create.

AGCSATECH UPDATE

Mother Nature puts bents to the test

The AGCSATech team provides the latest results from the bentgrass variety trials and look at the some of the discussion to come out of the recent World Forum for Golf Architects held at St Andrews.



CONFERENCE GUIDE Gold Coast 2010 37-5

Australia's tourist mecca hosts the 26th Australian Turfgrass Conference and Trade Exhibition from 21-25 June. ATM will be your official guide on the Gold Coast and here we

review the week ahead for delegates. Included is a rundown of education sessions, keynote speakers and presenters, AGCSA Graduate of the Year Award finalists as well as a comprehensive listing of companies attending the trade exhibition.

RESEARCH

Management guidelines for new warm-season greens grasses

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Matt Roche, Jon Penberthy and John Neylan provide a technical summary of the major findings to emerge from the extensive warm-season greens grass trials conducted at various sites around Australian between 2006 and 2009.



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Summer bentgrass decline and use of biostimulants and PGRs

Rutgers University researchers have investigated whether foliar application of trinexapac-ethyl and two biostimulants containing seaweed extracts would alleviate summer decline in creeping

WATER MANAGEMENT

bentgrass.



Preventing a blooming mess

Yes it's coming into winter and algal blooms are probably the last thing on a superintendent's mind, but as Scott Tucker writes with a little forward planning the annual battle of algae control can become a thing of the past.

Irrigation planning for effluent reuse

Scott Johnstone looks at the key considerations when designing, building, maintaining and operating irrigation systems using recycled water.

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Contributors to Australian Turfgrass Management Volume 12.3 (May-June 2010)

Andy Blacker (SAGCSA); Brett Chivers (VGCSA); Lincoln Coombes (RACV Cape Schanck); Wade Cranston (Glenden Town Club); Glenn Cross (Mt Lawley GC); Garry Dawson (CIT); Allan Devlin (Secret Harbour); Robin Doodson (Sanctuary Cove CC); Mark Gahan (The Dunes); David Goldie (City of Greater Geelong); John Geary (AGCSA); Dennis Grounds (Young GC): Scott Harris (Gold Creek CC): Bingru Huang (Rutgers University); Scott Johnstone (Scape Shapes Landscaping); Steve Lewis (TGCSA); Graeme Logan (STA NSW); Peter Lonergan (GCSAQ); Steve Marsden (Cape Kidnappers, NZ); John Neylan (AGCSA); Andrew Peart (AGCSATech); Jon Penberthy (DEEDI); Doug Robinson (Pacific Golf Operations); Matt Roche (DEEDI); Peter Svenne (Eastlake GC); Cameron Thompson (The Tiger Woods Dubai, UAE); Nathan Tovey (TGAA VIC); Brad Tucker (Whittlesea GC); Scott Tucker (Clearwater Lakes and Ponds); Brock Weston (TGAA ACT); Darren Wilson (Wembley Golf Complex/GCSAWA); Craig Wright (NSWGCSA); Yan Xu (Rutgers University).

uperintendents and turf managers aren't averse to meeting challenges head on. Having to deal with Mother Nature on a daily basis is enough to test anyone and you only have to look at last year's Victorian bushfires and Queensland floods to see the resilient nature of our hardened practitioners.

We have all faced adversity at some point in our lives, but for one superintendent the recent curve ball thrown him and his young family has been quite difficult to comprehend. As many of you will be aware, Cottesloe Golf Club superintendent Simon Bourne crushed his spinal cord in a holiday accident in Bali, leaving him paralysed from the chest down.

Since the accident, many of you, like me, would have been following Simon's rehabilitation through the blog set up by wife Marina. The progress Simon has made since the accident has been nothing short of inspiring and despite the unimaginable prospect of never walking again - doctors have given him a 2 per cent chance of regaining motor function in his legs - Simon has remained upbeat, determined and focused on the challenges that now face him and his family.

As Marina commented on their blog (http://marinaandsimon.blogspot.com/) in early April... "Now we prepare ourselves for the next part of our journey, making sure our home life will be ready for Simon's release into the real world. The days, weeks, months and years ahead will be challenging to say the least, but the evident fortitude he, and we, display will continue to help overcome anything and everything."

It's this sort of determination which has seen Simon progressively rise up the ranks within the WA industry over the years. Simon has spent his entire turf management career - some 14 years now - at Cottesloe, starting there as an apprentice before taking over the reins as superintendent in 2006. Under his management Cottesloe has gone from strength to strength and just to prove that the course jumped 35 places - the highest of any other - in the Australian Golf Digest's Top 100 rankings released this March.

While the resilience of Simon, Marina and their two young daughters Alexandra and Georgia has to be admired, the manner in which the WA turf management community has rallied around to assist the Bournes has also been inspirational. The outpouring of support from colleagues again reinforces the strong bonds those within the turf management industry forge and it's those ties which will be even more important as Simon continues his rehabilitation and focuses on his ultimate goals of returning home and to work.

Reading Darren Wilson's GCSAWA report in this edition (page 86), it is heartening to hear that Cottesloe Golf Club is looking to make necessary alterations to the maintenance facility to accommodate Simon's eventual return to work. In an industry where all too often clubs and management show scant disregard for the service their superintendents have given them, it is great to see one standing by its superintendent during a time of need.

With the 26th Australian Turfgrass Conference and Trade Exhibition now on our doorstep, this edition of Australian Turfgrass Management will again act as the official publication for Gold Coast 2010. Our cover story looks at The Glades Golf Club, host venue of this year's Toro AGCSA Golf Championships, while the comprehensive guide provides all the information delegates need to make the most of their conference experience. Elsewhere in this edition ex-pat Australian superintendent Steve Marsden looks at his management operations at the stunning Cape Kidnappers while David Goldie recounts the redevelopment of Geelong's Skilled Stadium. See you on the Gold Coast.



Brett Robinson,



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JOHN NEYLAN, AGCSA GENERAL MANAGER

Ten years on and still going strong





n March this year I chalked up 10 years with the AGCSA and it is the longest time that I have been employed with any one organisation. When you reach such milestones you tend to reflect on what you have done, what you should have done, what you could have done better and even think whether you have been around too long. I am sure that I am not unusual in this respect.

In 2000, Euan Laird, the then chief executive of the AGCSA, offered me a job to come and set up the technical arm of the AGCSA. At that time I was looking for a change and jumped on board. It wasn't without controversy and there was a lot of angst from various sectors of the turf industry. I have to thank the board at the time (president Peter Frewin and directors Peter Schumacher, Jeff Gambin and Mark Couchman) for withstanding the pressure and providing the support required to develop this next phase of the AGCSA.

AGCSATech was established at the time to undertake independent research and provide technical services and consultancy advice. It also created another member service at a time when the AGCSA was re-evaluating what it was doing as a member organisation.

It has been a 'quick' 10 years and it has been great to be a part of the growth of the AGCSA. Over this time the thing that I have enjoyed the most is the great people in the industry. The strong fraternal nature of greenkeeping, where there is so much in common and a deep understanding of the dramas and challenges of dealing with nature, is the strong link that makes this industry a great one. Unfortunately, it is also the down-side of working in this industry, as the greatest disappointments that I have had is when I see great people moved on for all manner of unfair reasons.

There have been many people that have had an influence on my time at the AGCSA, both within the organisation and in the wider turf community. I have already mentioned the AGCSA board of 2000 that took the punt with me and there are many others as well. The first person that made a public stand for my employment was one of the golf industry's icons (and AGCSA life-member) Doug Robinson, who provided a voice of reason when there was a lot of industry disquiet. From that point on the hype died down and we were able to get on with the job.

In reviewing the work that AGCSATech has undertaken over the years it was interesting to look back and to see who the first clients were. Michael Bradbery (Manly Golf Club) provided the first disease samples, David Warwick (Avondale Golf Club) provided the first soil samples and John Odell (Royal Sydney Golf Club) invited me to be part of the advisory team when the club looked to re-develop its putting greens.

It doesn't matter what occupation you are involved in we all need a mentor(s). They are usually experienced people in the industry that we turn to for advice or able to just have a chat to about work and life in general. A person that I consider to be a long-term mentor is Peter McMaugh. From the first time I saw him in action at the 1984 conference in Melbourne, where he was in full swing laying down the law, he was undoubtedly a man to be listened to. Peter has always been generous with his time and advice, even if it stung a bit from time to time, and for this I am very grateful.

Another great part of working at the AGCSA has been the staff. The AGCSA has had a wonderful group of talented people over the years and the current group is no exception. The staff certainly makes the job of being GM an enjoyable experience.





The cover of Australian Turfgrass Management Volume 2.2 (April-May 2000) heralding the arrival of AGCSATech and John Neylan

Working at the AGCSA was my first experience of working with a board of directors and over the journey I have worked with four presidents and 12 directors. The support of all the board members during this time has been part of the great experience and again emphasises the attraction of working in this industry and working for a member organisation. In particular I must thank the present board of Allan Devlin, Pat Pauli, John Odell and Bryce Strachan who saw fit to offer me the position of general manager.

The AGCSA is a great association and over the past 10 years it has enhanced its reputation as a key player in the golf industry as the wider industry has come to realise the great skill base that golf course superintendents have. It has been a thoroughly enjoyable 10 years and I look forward to the years ahead and thank the editor for allowing me this indulgence.

MEMBERSHIP UPDATE

2010-11 AGCSA MEMBERSHIP RENEWALS

With AGCSA membership renewals on the horizon – yes, expect a renewal notice not long after you flick through this edition of Australian Turfgrass Management – AGCSA membership co-ordinator Lyndel Conway wishes to remind all members that if their contact details, or those of their staff, have changed recently then please let the AGCSA know. This will ensure all renewal notices get to the correct people and avoid confusion. To make sure your membership details are up to date, email Lyndel info@agcsa.com.au or call the office on (03) 9548 8600.



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The Gold Coast isn't the most forgiving place to be nurturing and presenting bentgrass greens, but for Ben Baumann, superintendent at The Glades Golf Club, it has become second nature.

ATM editor Brett Robinson visits this year's venue for the Toro AGCSA Golf Championships to see how he and his crew pull it off.



Born and bred on the Gold Coast, Ben Baumann has spent his entire turf management career at The Glades and in 2008 was elevated to superintendent s the saying goes, you can always bank on one certainty in life – change. Just ask Ben Baumann. Not even 30, he has seen plenty of it in a relatively short turf management career, whether it has been the machinations of working in the competitive resort course market, witnessing four 'one in one hundred year' storms, or walking into work one day to find out he had been promoted to superintendent.

While Baumann has witnessed change aplenty and can relay plenty of interesting tales from his 12 years to date, the one thing that has been a constant has been his place of employment – The Glades Golf Club. Wedged between Robina town centre and the M1 freeway, The Glades is one of the more unique establishments on the Gold Coast and is one of a brave minority that persists with managing cool-

Born and bred in Upper Coomera, Baumann has certainly trod a different path to many other of his turf management colleagues on the Gold Coast. While getting his first introduction to golf course management on the 328 greens at the now defunct Pacific Springs Golf Course near Pimpama, in January 1998 a nervous Baumann walked into the maintenance compound at The Glades – then just a collection of shipping containers – hoping to secure an apprenticeship.

The highly anticipated course was still being grown in under the guidance of superintendent Paul Bevan who was quickly impressed with the downto-earth teen. Baumann's hort background – he had spent many hours during his formative years growing tomatoes, bananas and passionfruit on the family farm – meant he could easily adapt to the turf management game and Bevan had little hesitation in signing Baumann on.

It was just the break Baumann had been looking for. At the time, The Glades was the most talked about course development in the region, especially with its A4 bentgrass greens, zoysia/couch rough, expansive wetland network and Greg Norman design tag. Under the eye of Bevan, Baumann was able to get a broad introduction to the art of greenkeeping and most importantly the intricacies of managing bent greens in south east Queensland's fickle climate.

While the course itself was progressing nicely, off course the same couldn't be said of its South





Rated as one of Australia's premier resort courses, The Glades Golf Club on the Gold Coast will play host to the 2010 Toro AGCSA Golf Championships during the 26th Australian Turfgrass Conference. Pictured is the par 4 10th

Korean developer Dong Ah. Falling on hard times thanks to the Asian financial crisis, in October 2000 it sold the course to a Queensland consortium led by lan Baker-Finch. As the course had been pretty much ready for a year leading up to the buyout, it finally opened in December that same year with Baumann and the rest of the crew employed by Troon Golf which Baker-Finch had brought in to oversee course maintenance operations.

As many had predicted, the Glades quickly established itself as one of Australia's elite resort courses and prepared to tournament standard seven days a week it easily debuted in the top 20 of Australian Golf Digest's 2002 Top 100 Australian courses. (Some eight years on and The Glades still holds its place among Australia's best, coming in at 48 in the 2010 Australian Golf Digest rankings).

After stints working under Bevan, Colin Thorsborne and Geoff Bennell, it was during Brad Burgess's time as superintendent that Baumann was elevated to assistant superintendent. Burgess would eventually head up to south east Asia where he would literally swap roles with Paul Lierse who returned Down Under to take over at The Glades.

One of the curiosities of The Glades is that a number of its former superintendents have been moved into the general manager role at the request of the course's owners. Bevan and Burgess all had time in the big office and in late winter 2008 Baumann arrived at work to literally find Lierse packing boxes. Lierse informed Baumann that he was off to the clubhouse as the new general manager and that maintenance ops were now in

his hands. Some 20 months on and Baumann still finds himself in the rather unique position of having a former superintendent as a general manager, a situation many of his colleagues could only dream of

"It seems to be the way things are around here," laughs Baumann, who is quick to avoid any talk of a similar super-to-GM move in the years to come. "It was a privilege at my age to be handed the superintendent role and I feel very lucky to have been given the opportunities that I have had over the years working here.

"I have been very fortunate to have work under some very passionate and well respected people within in the industry who made my transition into the role a lot easier. Paul (Lierse) and Brad made sure that I understood this side of the job as well, so I was able to adapt relatively easily to it when Paul moved up.

As well as the challenge of managing A4 bentgrass greens in a warm-season climate, Baumann also has nine hectares of wetlands and waterways to contend with





The par 4 18th ranks as the hardest hole at The Glades

"I guess I'm very lucky to have someone like Paul as a general manager who can see things from both a business and agronomic point of view. If I have any problems he was only a phone call away and even now he will often come down to the shed. We have a really good relationship both personal and professional."

PASSION AND PREVENTATIVES

Now holding the mantle as the longest serving member of The Glades maintenance team, Baumann knows pretty much every square metre of the 65-hectare property, but more importantly knows what works and what doesn't. Over the years he has played a key part in streamlining maintenance practices, which has been somewhat forced by a reduction in budgets and staffing levels, while in terms of the greens he has their management down to a fine art.

So how do you maintain optimum bentgrass greens in the heat, humidity and sometimes monsoonal conditions of the Gold Coast? An intensive preventive fungicide programme? Goes without saying doesn't it. Round the clock hand watering seven days a week? Essential, especially in summer. But ask Baumann what the key ingredient is and the answer is simple – passion.

Back-to-back par fives on both nines is just one of many unique features of the Greg Norman designed course. Pictured is the 480m 11th



"It's not as bad as everyone makes it out to be," explains Baumann. "Having been here all of my career and working under the likes of Brad and Paul, you develop a passion for the place because it is different to the other courses up here. Bent provides the best putting surface and the extra work that does go into it is worth it when you look at the finished product.

"As much as couch has its difficulties, with bentgrass up here you have to be extra vigilant. You can't push it and say it'll be alright to water tomorrow night. The worst period is without doubt December through to February. That's when we use a lot of what Paul called the 'trump cards' like 3sixty5 and Banol. At other times we try and juggle around mancozeb and daconil.

"We do our renovations in September which is pushing it a little bit late, but generally early September is our quieter month. We have streamlined renovations a fair bit in recent years and we now use much smaller tines at closer spacings. Once the sand is rubbed in properly and the amendments are in it looks as though we've just mini-tined them. We've done the stats and we're pulling out more now than when we were using larger tines at wider spacings. Now we get recovery as early as two days rather than two weeks.

"For the past five years we have been using Floratine products on the greens. At first it was a bit of a leap of faith. A lot of people questioned it, myself included, more because of the cost than anything else, but over the years they have proven to work. One product – Perk Up – we put out nearly every week through summer which helps strengthen the greens so they can handle the heat and wear and tear. We also put out potassium silica every week all year round just to keep them tough and firm.

"Aside from that and a preventative fungicide programme, the biggest thing is having someone always on standby with the hose. During the real hot times we'll have two blokes out on course all day after they've finished mowing greens or setting up in the morning. By the time they've done nine holes they go back to the start.

"Correct water practices are the key and instead of watering every night and little and often, through summer especially we try and base ourselves so we are deep watering with split cycles to help get the roots down. As a general rule of thumb we put wetters out every three to four weeks and if it's a real hot period we'll go out with kelp tablets or pro-apps to wet up areas that we know will go off quick. We have also undertaken a major audit on the irrigation system in the last three years, especially on the greens and surrounds where sprinklers have been changed to half circles to provide greater accuracy and uniformity.

"Obviously the big downside having bent greens this far north is the constant attention it requires. Our rosters are pretty elaborate and from November through to March we'll do afternoon and weekend split shifts. The couch guys can come in, set up and go home and not have to worry about the greens, whereas with the bent you're always sitting at home worrying that sprinklers haven't gone off. You certainly can't relax or let your guard down."

WATER WATER EVERYWHERE

If the bentgrass greens aren't challenging enough, Baumann also has nine hectares of wetlands to contend with. At nearly 1.5 kilometres long and 50m wide, the club's main irrigation dam is quite a sight, snaking its way alongside 16, 17 and all the way up 18, while the 10th hole has water from tee to green along its left flank. In fact only three holes – 9, 13 and 14 – don't have water in play.

While an integral part of Norman's design and a key selling point for the surrounding residential development, the practicalities of having to look after such an expanse of waterway is enough to give any manager a headache and after couch encroachment of the A4 is one of the biggest issues the club needs to address according to Baumann.

While battling the ever present treats of salvinia (salvinia molesta) and water lettuce (pistia stratiotes), the big struggle in recent times has been against cabomba (cabomba caroliniana). Designated a weed of national significance, its mass of underwater stems and leaves are extremely invasive and when they decompose cause dramatic oxygen reductions and foul-smelling water.



Eradication has proved a huge challenge and as well as hooking up a few more aerators Baumann has conducted trials using Hydrogel but with only limited success. The club is currently investigating a product called Sonar and is looking at getting a limited permit use through the Queensland Department of Natural Resources.

Compounding aquatic weed management issues is the large amount of silt that has been deposited in the wetland system over the years through regular flood events. Baumann, who has seen about four one-in-one-hundred-year floods decimate the course, estimates that the main irrigation dam, once 50-foot deep, would now be lucky to be 10 foot at its deepest point.

"When the wetlands were fully planted and landscaped they looked fantastic," says Baumann who has a full-time member of staff helping oversee

At 526m from the blacks, the par 5 7th is the longest hole at The Glades



Couch encroachment into the A4 bent greens is a serious headache for Baumann with chemical control proving ineffective



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While battling the ever-present threats of salvinia and water lettuce, the big struggle in recent times has been against cabomba

management of the wetlands. "But with all the floods we have had over the years they are in desperate need of dredging. The problem we have is access.

"As long as we keep on top of the bad weeds, the residents are happy. We don't tend to worry too much about the red azolla because the fish feed off the roots and it tends to thin out in winter anyway. In our efforts to get rid of the cabomba, we actually ran a trial last year in one of the lakes where we let the azolla get real dense and thick, almost to the point where it was growing on top of itself. The theory was to try and blacken the top out and kill off the cabomba. Although it was effective, the cabomba still came back."

TEEING OFF

Baumann is predicting a challenging test for his colleagues come 21 June and is looking forward to hosting the 2010 Toro AGCSA Golf Championships for the first time. Baumann and assistant Trent Butterfield will line up as part of a 110-strong field and while local knowledge will no doubt have them in the reckoning for the stableford title, the main trophy looks set to be fought out among the usual suspects.

While defending champion and three-times winner Anthony Toogood is a noticeable absentee from this year's line-up, the likes of perennial challengers and past winners Trevor Ridge (Sawtell

Golf Club), Scott Harris (Gold Creek Country Club) and Steve Jacobsen (Carnarvon Golf Club) will start as favourites to add another of Red Jacket to the closet. Of most interest, however, will be the performance of Howlong Golf Club superintendent Sara Hagy who off a three handicap becomes the first female player to enter the Toro AGCSA Golf Championships.

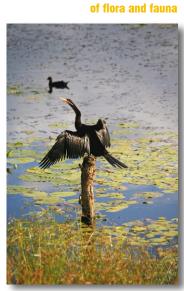
After a relatively benign start – only the 2nd provides a real test early on – the fun begins following The Glades' stunning par 3 5th. Back-to-back par fives on 6 and 7 – the latter a monster at 526m with a green guarded by three massive bunkers – pave the way for two tough par fours in the form of 8 and 9. The 9th, one of only a few holes not to have any water near or in play, is a sweeping hole heavily bunkered down the left and boasts one of the largest greens on course.

Spray left off the 10th tee and you'll be reloading, the water hazard running the full length of this 355m par four, while 11 and 12 are, again, back-to-back par fives. If set up from the back tees, the par 3 13th measures 206m, while the views from the 14th tee complex will provide some temporary distraction before a testing closing quartet. Fifteen is rated number three on the index, the par 3 17th requires a full carry over water, while just to make sure the Glades experience is complete, 18 weighs in at number one on the index.

"It should be a great day both here and at Lakelands (which hosts the Toro Scramble)," says Baumann. "Phil (Soegaard, Lakelands superintendent) has probably got the best couch greens I have ever played on which is a testament to him and how well he keeps the place. They're firm, hard and fast and you can still check your ball up.

"As for here, sharpen up your bunker skills and steer clear of the water. The course is open and forgiving, but it will depend on how we set it up. If you're a good hitter you can pick your lines and go for the pin seekers, while for Joe Average you can spray it and get away with it – sometimes. The bunkers – 98 of them – are pretty tough and are typical Greg Norman designs with steep faces. The greens are quite undulating and we generally keep them anywhere between 10 and 12. I'm sure the southerners will be looking forward to playing them."

Despite their management challenges, the wetlands provide a wonderful habitat for a wide array



AT A GLANCE - THE GLADES GOLF CLUB

Superintendent: Ben Baumann

Assistant: Trent Butterfield

Staff: 13 (includes full-time mechanic, clubhouse/

landscape and wetlands)

Length: 6420m, par 72 Greens: A4 creeping bentgrass

Tees: Santa ana couch Fairways: CT2 couch Roughs: CT2/zoysia

Bunkers: 98

Water: Treated effluent (Merrimac treatment plant)
Cutting heights: Greens 3.0mm-3.5mm; tees
7mm; fairways 10mm

Recent/upcoming projects: Recently constructed a new A4 turf nursery adjacent to the 9th after floods damaged the existing nursery behind the 15th green. Plans to convert the couch practice putter next to the 1st tee to bentgrass. The clubhouse restaurant is currently being extended to improve function facilities.





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In 2001 American businessman and golf enthusiast Julian Robertson bought a unique track of land located on the east coast of New Zealand's North Island. Sprawling over five thousand acres. was rebranded Cape Kidnappers and Robertson secured architect Tom Doak to design something special. Opened in 2004, Cape Kidnappers has since come to reside as one of the world's top ranked courses and is now home to ex-pat Australian course manager Steve Marsden.

Cape Kidnappers' most memorable stretch – 14, 15, 16 and 17 hen Cape Kidnappers owner Julian Robertson went to Bandon Dunes Resort in Oregon four days after Pacific Dunes opened in 2001, he had planned to play 36 holes on David McLay Kidd's Bandon Dunes layout. After playing just 18 holes, he was shunted across to Pacific Dunes for his second 18. "I was furious," Robertson would later recall. "I played Pacific Dunes against my will. But I loved it! Tom uses nature so well and that's when I decided that I wanted him."

As a direct result of the impression that Tom Doak's work at Pacific Dunes had made on Robertson, Doak was invited to come and see Robertson's newly acquired property, located just south of Napier on the east coast of New Zealand's North Island.

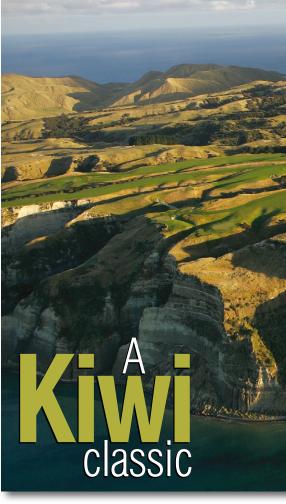
Doak made his first visit in late 2001 and made four visits before the start of construction and another three during the shaping stages. The visits during this period were anywhere between 7-14 days. Once the routing of the golf course was agreed upon, work began in September 2002 under the guidance of lead design associate Bruce Hepner, who moved to New Zealand for nine months.

According to Bruce one important aspect of the project was "we tried to integrate the golf course with the sheep station. We wanted to respect what the property was really used for. I spent a lot of time with the station shepherd making sure we disturbed the operation as little as possible".

In all around 150,000m³ of earth was shifted, reflecting Doak's sensitivity to the landscape and also just how good a piece of land Cape Kidnappers is. The Cape Kidnappers site is anchored around seven long fingers of land that stretch down toward the plunging east coast cliffs and contain the most memorable holes, including 14, 15, 16 and 17.

Cape Kidnappers opened in 2004 to great reviews and along with its sister course Kauri Cliffs (also owned by Robertson) have made a significant impact on the New Zealand golfing landscape. It debuted at 27 in Golf Magazine's Top 100 courses and currently sits at 36th.

In 2008 Cape Kidnappers, along with Kauri



Cliffs, was venue for newly created Kiwi Challenge golf tournament. This four-man stroke play event brought together some of the best players on the US PGA Tour under the age of 30 to play for a US\$1.5 million prize purse. Day one consisted of 18 holes at Kauri Cliffs followed by 18 holes at Cape Kidnappers on day two.

The tournament was played again in 2009, but this time all 36 holes were played at Cape Kidnappers. The event was beamed back to the US and around the world by US broadcaster NBC, providing huge exposure for the course as well as New Zealand. Anthony Kim ended up collecting the trophy over Camilo Villegas, Hunter Mahan and Sean O'Hair, whom he beat in a playoff.

COMING TO LIFE

The timeline for construction of Cape Kidnappers was tight and original superintendent Paul Delaney orchestrated the grow-in over a 10 month period. The last two holes were seeded just six weeks prior to the opening and are a testimony to the efforts of Paul and his team.

There were many challenges during construction of the course with site access being a key one. With an eight kilometre narrow farm track through bush and riverbeds the only way up to the golf course, all sand deliveries had to be stockpiled at the bottom of the property and then reloaded into six-wheeler trucks. Each day all staff were taken up to the golf course site in mini-vans to minimise traffic as the road itself was being rebuilt.





Cape Kidnappers is located south of Napier on the east coast of New Zealand's North Island. The site is anchored around seven spectacular long fingers of land that stretch down towards the plunging cliffs overlooking the Pacific Ocean

The soils on the property are heavy in their make-up. The soil structure is poor with the primary subsoil de-flocculated and extremely tight. During periods of modest rainfall progress with the site work soon came to a halt. Due to the location of the property the coastal winds played havoc with dust on site when conditions became dry.

Greens were built to a USGA specification and with a sand supply some 4-5 hours away material costs were high. A number of sands were tested before finding a suitable medium in which to build

the greens. Fortunately compatibility was achieved between the sand/peat mix and the gravel layer to avoid having to use an intermediate layer.

The golf course was seeded with the following turf varieties:

- Greens: SR1019/SR1119 creeping bentgrass;
- Tees, fairways and roughs: Egmont colonial bentgrass, creeping red and Chewings fescue;
- Tall rough: Sheeps fescue, Chewings fescue, blue fescue and creeping red fescue;
 Doak was very specific in regards to the way in

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◆ The Cape Kidnappers maintenance crew with 2009 Kiwi Challenge victor Anthony Kim

which he wanted to see the golf course presented. Everything was to be cut 50/50 and look as natural as possible – no striped fairways or rough. This has allowed the golf course to blend in with the adjoining farm and natural surroundings and this is no more evident in May when over 100 head of Angus cattle are brought in to graze the taller grass areas.

Temporary electric fencing is set up to keep them contained and despite the odd escapee this arrangement has worked extremely well. It allows us to reduce the density of the tall grass areas and with a simple chain harrow once the cattle have done their thing they are back in play. This harrowing is very rewarding for the individual given this mucky task with an abundance of golf balls found!

All in all the grassing selections have worked well, with the exception of the Egmont colonial bentgrass being part of the seed blend in the cut rough. It provides a terrific surface under close mowing for use on greens, tees and fairways. As part of the cut rough, however, which is kept at 50mm, it becomes puffy which in turn offers poor playability. It is very susceptible to Melting Out (leaf spot) and has poor tolerance to selective herbicides used for other grass weed eradication.

Over the next few years the Egmont will be removed selectively using Haloxyfop and the rough then drill seeded using the existing varieties of fine fescue. A pure stand of fine fescue will offer all of the things that the Egmont does not, coupled with a reduction in irrigation inputs.

THE OLD ENEMY

Like most golf courses *Poa annua* offers significant challenges and here at Cape Kidnappers we are no different. A holistic approach is being taken to manage *Poa annua* from all playing surfaces which ultimately will help keep it from becoming a dominant species in the greens.

The turf industry here in New Zealand is a small one, therefore newly developed products specific for the turf market are unlikely to make their way this side of the Tasman. We do, however, have access to the wider agricultural market where in some cases label use includes turf.

In the case of *Poa annua* management for greens, products such as Exposan (bensulide) are not available to provide a pre-emergent partnership with post-emergent herbicides and growth regulators. Currently under trial here is the new herbicide product Nominee for use on creeping bentgrass greens.

Over the last 18 months we have implemented an extensive Amitrole herbicide programme to control *Poa annua*. To date, applications have been made on tee tops, green surrounds and par 3 fairways and followed a number of trial applications and its historical use on the property.

Amitrole is translocated within the weed causing chlorosis and weed death. The chlorosis is also very evident in desirable grasses, and although not causing death will discolor the turf and doesn't look very appealing (similar to applications of MSMA), so support for this work was needed by our owner. With the great results achieved to date the programme will be extended to include all fairways this spring.

The five thousand acre sheep station that became Cape Kidnappers is one of the most glorious places on earth, and it was a privilege just to come to work every day. Tom Doak, golf course architect.

Along with using suitable chemicals, cultural practices such as collecting clippings, close monitoring of irrigation use, monitoring fertility levels, using suitable N sources, targeting desirable pH levels to avoid disease such as Take All resulting in a weakened turf favoring *Poa annua* infestation, are carried out.

To support the post-emergent applications, a pre-emergent programme using pendimethalin has been implemented to tees, surrounds and fairways with applications made in March, May and July.

Currently the greens programme consists of applications of paclobutrazol and endothal. This summer has seen trial work carried out with Nominee herbicide and we have been very encouraged by the results and hope that its introduction to the market here is not far away.



Right: Over the last 18 months course manager Steve Marsden has implemented an extensive Amitrole herbicide programme to control *Poa annua*

Fertility regimes are quite simple and largely dictated by the irrigation bore water having a pH of 8.2. All applications to greens and tees are foliar, except at renovations, with sulphate of ammonia, sulphate of potash, magnesium sulphate and chelated iron as the main ingredients. The addition of manganese has assisted with Take All prevention over late spring and summer. Fairways are also foliar fertilised and we make applications of a similar makeup to those applied to greens and tees. Just over 50kg N/ha/yr is light enough not to flush and keep the fairways fresh.

Sand dusting programmes are carried out fortnightly on both greens and tees basis. We have found the Egmont colonial bentgrass on the tees takes the sand into the canopy easier, possibly due to its more upright growth and slightly higher height of cut at 5mm, compared to the greens which are at 3.5mm.

Greens are brushed daily (except for two days after sanding as we try to let the sand settle into the canopy) with a small brush out in front of the catcher (walk behind mowers are used). We carry out a more aggressive brush with a strip brush behind a bunker rake once a month.

Groomers are used at a depth of -1.5mm over the growing season and then dialed back to anywhere from 0.5 to -1mm as growth and the turf canopy condition dictate. It is normally a few days



after dusting until we can get the groomers engaged again without picking up sand.

The greens are hollow cored once a year with 5/8 tines at 25mm spacings. Also prior to our monthly wetting agent applications we try to vertidrain over the growing season using a 12mm solid tine.

Thatch levels in fairways and green surrounds have got away over the years and the hot dry summers in the Hawkes Bay region are challenging to say the least. This spring we will hollow core and scarify all of the green approaches and surrounds followed by a heavy sanding. This work will start after turf recovery from Amitrole applications for *Poa*

With the support of adjoining landowners, Cape Kidnappers is part of the Cape Preserve which was established for the conservation of endangered wildlife, including the North Island Brown Kiwi which was released onto the course in spring 2009





Cape Kidnappers is home to the world's largest and most accessible Gannet nesting site and more than 20,000 gannets can be seen from September to early May

annua. The following summer all fairways will be done and a regular fairway topdressing programme will be implemented to follow on from this work to assist with thatch management, improving drainage and provide a firmer playing surface. We will also step up the current wetting agent programme to fairways to assist over the summer period.

Managing traffic over the winter months on a heavy soil site is interesting, not just with golfer traffic, but maintenance traffic being just as taxing on the turf. There are no full length paths to move traffic onto when the course gets wet. Fairways are vertidrained 2-3 times over the winter period to assist water movement through the profile. Ideally this work should be done early autumn when the soils are not too moist and where some fracture of the soil can occur. The soils are often moist by the time we get the vertidrain onto them and we create a glazed hole instead and they can still hold water.

GOING GREEN

With the support of adjoining landowners, Cape Kidnappers is part of the Cape Preserve which was established for the conservation of endangered wildlife. A 9.6km predator proof fence was erected in 2005, with trapping commencing in 2006. The fence aims to keep out the likes of feral cats, ferrets, stoats, possums, hedgehogs, feral goats and weasels.

Cape Kidnappers is home to the world's largest and most accessible Gannet nesting site and more than 20,000 gannets can be seen from September to early May. In September they return to build their nests ready for the arrival of their chicks come December and January.

Birds such as the Robin, Tomtit, Rifleman, Brown teal duck (one of the world's rarest ducks), Banded rail, Red crowned parakeet and the North Island Brown Kiwi, to name a few, have also been re-introduced. The North Island Brown Kiwi and Brown teal are radio tracked to monitor bird development and breeding.

Inside the preserve a secondary fence covering an area of one hectare has also been built, with the fence mesh fine enough to keep mice out. Within this area a seabird restoration programme is underway with the second release of 50 Grey faced petrel taking place in December 2009 and 55 Cooks petrel released in March 2010. It is hoped over the next decade it could well become New Zealand's finest mainland sanctuary, with an assemblage of terrestrial, coastal and oceanic species of animals found nowhere else.

In regards to our maintenance operations, we are currently undertaking certification with Audubon International to further enhance the environment we are in. The programme offers a good framework for environmental stewardship and also further promotes the commitment being undertaken here at Cape Kidnappers.

The work environment here at Cape Kidnappers is second to no other, with a terrific team of green staff capably lead by assistant superintendent Mike Wilson; it's a great place to do what we do. We have great support from the Robertson family with our maintenance operation which coupled with the work carried out by Tom Doak and his team provides a unique and memorable golfing experience.



Tees, fairways and roughs at Cape Kidnappers are a mix of Egmont colonial bentgass, creeping red and Chewings fescue while the greens are SR1019/SR1119 creeping bentgrass





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purr-fect surface

As well as a few premierships to its credit in recent years, the Geelong Football Club can now boast one of the AFL's premier surfaces thanks to a multi-million dollar redevelopment of Skilled Stadium last summer. City of Greater Geelong capital projects officer David Goldie looks back at the project which will hopefully deliver more success for Geelong in seasons to

own at Kardinia Park', as the Geelong Football Club theme song goes, the first major ground renovation since the venue was built early last century was completed over the summer of 2009/2010. With increasing expectations of having perfect surfaces 12 months a year, the days of players sliding through mud have gone and Skilled Stadium now has a surface to rival the likes of the MCG and Etihad Stadium.

The previous surface was a classic old field with an infiltration rate below 15mm/hr, a thick black layer, indifferent soils and *Poa* infestation. The City of Greater Geelong, owner of the ground, had spent large amounts of money over the years valiantly replacing turf, oversowing, aerating and topdressing in an attempt to avoid the inevitable.

As it transpired, five different drainage systems would be removed during excavation dating back to hexagonal terracotta. These systems were all installed with good intent but with poor soil infiltration and a dense root mat layer above, the moisture couldn't reach the pipes. As a result, the soil would reach field capacity following 10mm or so of rain and further precipitation would just pool on the surface.

As well as being the Cats' home ground, Skilled Stadium also serves as a major events venue for other sports including cricket, soccer and even motor cross. The previous oval conditions restricted council's ability to confidently hold events without the fear of rain cancelling them.

In 2008 the council contracted AGCSATech to undertake a thorough audit of the ground and to provide advice on our options. We also sought

advice from proven curators like Tony Ware and Les Burdett and also visited Etihad Stadium as part of our investigations. Council and the Geelong Football Club (GFC) supported the advice from the AGCSA to rebuild the field to modern construction methods.

I started employment with the City of Greater Geelong in 2008 and it was very exciting to be handed this project, from my manager Mark Gallon, to oversee from its inception. As with all our projects we started with a detailed risk assessment which highlighted everything from contaminated soils to the loss of an AFL game. However, we couldn't plan for everything...

FIRST BOUNCE

Stakeholder surveying resulted in a long wish list of items to be included. The most elaborate came in at \$5.8 million which included a synthetic turf boundary, stabilised turf system and Sub Air cooling system. With an available budget of \$1.45 million we simplified our needs to a perched water table construction, 'valve under head' sprinkler system and an extensive drainage system.

With more than 80 years of organic matter build up and topdressing, the ground had risen 400mm above the concrete perimeter spoon drain. The redesigned surface would maintain its 1.2 per cent one-way fall but be lowered 400mm to be flush with the perimeter drain. (Interestingly, the oval has a 1.7m fall from goal to goal – no wonder Gary Ablett Sr could kick barrels from the centre through the southern goals!)

Eighteen geotechnical test bores across the oval identified the clays would provide a consistent workable sub-base. We investigated preserving the most recent of the installed drainage systems but it was decided it would cost more to protect and work around them than replace with new.

Cardno Young, based in Canberra, was appointed the civil design and had a brief to come up with an oval ready for year round AFL, FIFA soccer, international cricket and rugby in any weather. They presented a comprehensive 140-

come.



The new Kardinia Park surface, redeveloped over the 2009/2010 summer, was christened in style when Geelong thumped Port Adelaide by 95 points in round 4 of the 2010 AFL season

page specification and a set of 20 plans that went back and forth several times before the final draft was ready for tendering.

Rain Bird Australia was awarded the irrigation design which was separately tendered because we identified this was a specialist area and wanted the flexibility to decide. Rain Bird's brief included a sprinkler set out to have minimal or no overthrow into the seating and be capable of taking alternative water sources. (Skilled Stadium will shortly be irrigated with captured stormwater).

Again, we had a long wish list including soil sensors, weather station, dosing injection and auto filters all of which we reluctantly cut out due to budget. The minimum design distribution uniformity target was 85 per cent which we specified to be verified once installed on site as a minimum of 75 using catch cans in four zones.

Council recognised we had only one chance to get the right infrastructure under the oval so valve in head, or actually 'valve under head', capabilities were left in even though this was pushing the budget. New technology is decreasing the surface

area of the top of a valve in head sprinkler but it was still deemed a risk to have such a large sprinkler top under the surface of an AFL ground. Therefore, 250mm beneath each sprinkler in a valve box is a single pack decoder, PESB valve and a PVC ball valve. Council now has the ability to meet the demand of the different micro climates across the ground and conserve water.

In 2008 we appointed HG Sports Turf to grow two hectares of 'sand in sod' Wintergreen turf on its farm in Alexandra. Budget did not allow stabilised, ready-to-play-on sod and we didn't have time to seed or line plant, so we decided standard 15mm thick 'sand in sod' (not washed) would be grown. We specified the type of sand to be supplied, spread and leveled and certified Wintergreen sprigs from Sydney, then muck spread and topdressed on the farm in Alexandra. We chose Wintergreen because of its proven performance and coarser nature enabling oversowing.

McMahon's Construction was picked to do the civil works and their excavators rolled onto the hallowed turf the day after the 2009 Grand Final.

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A total of 20,000 tonnes (1000 truckloads) of material was transported away from Skilled Stadium during initial works

AGCSATech advised we would need the entire AFL off season to complete the project in order to have the ground ready for the Cats' first home game of 2010 in Round 4.

We topmaked the turf first because we required the top 300mm of soil below as clean as possible as we were transporting it to another council oval under construction. The profile was everything the audit had identified and more, varying in depth and soil type all over the oval.

We took about 800mm below the previous surface, with a total of 20,000 tonnes (1000 truckloads) being transported away from Skilled Stadium, including a magpie that was supposedly buried under the centre circle following a Collingwood thrashing many years ago.

We didn't have much of a contingency for poor weather etc so when I was informed we would be holding a Super X motorbike event on the oval during construction I was a little nervous. We held many meetings to ensure it could work and in the end it went perfectly. We left 5000m³ of clay stockpiled for the Super X organisers to shape into a track and tidied the site up as best we could. Funnily enough this same clay formed a speedway track on the site 90 years ago!

The previous Kardinia Park surface provided council with plenty of management issues. Infiltration rates were poor, a significant black layer was present and *Poa* infestation was rife



TESTING TIMES

At the same time as this work was going on, construction had started on the new \$33 million stadium. This presented a number of challenges, in particular the single vehicle access point onto the oval which ran underneath and through the new stand under construction.

It was a daily juggling act but somehow the stand was built while we made in excess of 4000 vehicle movements through their site. The numerous cranes required for lifting building materials or pouring concrete frequently blocked access through the tunnel or operating from the oval itself. We met

weekly with the stadium's construction managers to compare Gantt charts but the success of the two contracts came down to the good working relationship forged by the two site foremen.

This relationship was first tested when an 80mm copper fire service primed by an unstoppable V8 Chevy motor was damaged. By the time the 60-foot geyser was under control the oval was a lake. This only slowed us down a day or two but when the temporary repair join blew in the middle of the night two weeks later, considerable damage was caused. One hundred metres of newly laid 600mm trunk drainage and conduit was floating in the open trench, while the laser graded sub-base had to be excavated in many areas to remove soft patches that wouldn't dry out and consolidate.

Once we had the sub-base consolidated to within a tolerance of 20mm and 98 per cent density, McMahons contracted Aussie Drain to trench the four kilometres of 160mm slotted Vinidex Stormpro drainage pipe. These pipes were laid 5m apart, parallel with each other across the full width of the ground. They connected to a perimeter trunk drain which joined a 600mm Vinidex Stormpro pipe that we originally bored but later had to open trench beneath the old Doug Wade Stand at the southern end

The two wire decoder irrigation system was trenched in above the drainage system but it was designed so there were minimal crosses over drainage lines. A 125,000-litre Rhino tank, twin Lowara vertical multistage Hydrovar pump set and Rain Bird Site Control computer package was part of the project. The Site Control will likely manage Kardinia Park's other sporting ovals and soon-to-be-installed stormwater harvesting system. The pump station and irrigation control room were installed in a newly built maintenance facility which the Cats temporarily used as a gymnasium while their new facilities were being built.

A 100mm thick, locally sourced 7mm gravel blanket layer was then spread across the base. I found this as a turning point in the project because we were finally building the profile back up. We had been investigating suitable sand for this project for two years with indifferent results and following 46 separate lab tests we were able to confidently select a local sand, mined at a particular depth, 20km west of Geelong supplied by Newcomb Sand and Soils.

We strictly followed Cardno's specification for a perched water table, paying particular attention to the performance factors for bridging, permeability and uniformity. I am aware of many 'so-called' perched water table constructions which don't perform as designed, so I was determined to get this right.

The sand's medium to coarse fraction was within tolerance but higher than preferred. This resulted in an infiltration in excess of 700mm/hr and volumetric water content barely 15 per cent. The sand was mined, screened and stockpiled in 500m³

lots then tested for approval at Ground Science in Melbourne. We also used Sydney Environmental and Soil Laboratory for a second opinion. The piles were labeled and once approved covered in hessian. Victorian Turfgrass Consultancy Services, based in Geelong, were appointed to independently manage this process for council.

The moisture release curve and gravel suction indicated a 260mm deep profile of sand would be required to maintain a 100mm air gap below the turf. The specification also called for the top 100mm to be mixed with peat moss or cocoa peat to improve moisture retention. McMahon's had sourced the peat and many lab tests using samples of each indicated 10 per cent by volume mixing ratio was required.

It wasn't until we started mixing at the quarry that tests started showing inconsistent results. The peat was very difficult to work and mix evenly. Many mixing methodologies and ratios were tried but it was agreed that the risk was high and the benefits were minimal considering the sand, in its raw state, actually met the specification. I am sure we could have eventually got it right but it was four days before Christmas at this point. We had the 8000m³ of sand on the oval prior to Christmas and the team was able to enjoy a short break.

McMahon's spreading methodology was to stockpile the sand or gravel inside the oval edge which was partly due to the fact that there was no



place to do so outside of the ground due to the stand construction. From there a 20 tonne excavator would fill small 'moxy' trucks to take the material around the oval. Considering the moxys only hold 2m³ at a time, it was a Herculean effort.

Using a Lely Roterra power harrow we mixed trace elements, dynamic lifter, lime and a new product on the market supplied by Globe and Barmac called Sure Start. In addition to a turf starter, humic acid and beneficial *Bascillus* spp. bacteria, Sure Start also has water gel crystals that release moisture up to 14 days after the profile has reached wilting point.

ROLLING OUT

By this stage we had made many trips up the highway to Alexandra to inspect the Wintergreen – and the local vanilla slices! The turf looked dense, clean, consistent and come 11 January 2010 was

Due to construction of the stand running concurrently to the ground works, sand had to be stockpiled within the oval







A key component of the ground re-design was the drainage system

Four kilometres of 160mm slotted drainage pipe was laid 5m apart and parallel with each other across the full width of the ground



Just to make things more challenging, after the old surface was ripped up and before work started on the new profile, Kardinia Park was transformed into a motor cross venue



Far right: Following two years and 46 separate lab tests, a suitable profile sand was eventaully found

ready for harvesting. HG harvested and transported from 2am for a 7am laying to limit the risk of the turf overheating. An experienced team of 15 worked methodically to ensure each sod was laid perfectly.

We used the smaller sod so we could keep a close eye on quality. Each sod was checked for weeds and any unwanted native clay from the farm. The last sod was laid and rolled on 19 January, two weeks earlier than forecast. This gave us 12 weeks for HG to establish the Wintergreen then hand over to Pitchcraft (Richard Winter) to establish a fine perennial ryegrass cover for the Round 4 opening.

Just when I thought we had jumped our last hurdle another unexpected issue cropped up. The water we were applying to stabilise the sand and establish the turf was largely infiltrating straight through our new drainage system, through council's drainage network and out to the nearby Barwon River. This was expected as initially there is little rootmass to use this water but the water was picking up a very fine sediment or nutrient and changing to a yellow colour.

The Environment Protection Act states stormwater discharge must match or better the turbidity or clarity of the river itself. The river's turbidity, or NTU reading, is around 30 and our stormwater was considerably higher. A high NTU means water traps sunlight and changes the oxygen levels which can affect bottom feeding fish. Our sand tests indicated we had very few fine particles, well within the specification's requirements. The sediment was so fine it stayed in solution and would pass through a two micron filter paper.

We had no choice but to either stop irrigating or divert the stormwater. We obviously decided to divert which involved blocking the outlet and sucking the water into water tankers. We then spread this water across councils grassed parklands in the area.

This process carried on 24 hours a day until it was suggested trying gypsum. Bottle tests were promising so we applied GypFlo at full rates to the oval which started working within a few days. Since the EPA was only concerned with the colour of the

HG Sports Turf was appointed in 2008 to grow two hectares of 'sand in sod' Wintergreen couch for the new Kardinia Park surface on its farm in Alexandra

water, this problem was solved. Council are about to install permanent diversion infrastructure anyway and reuse the water back through the irrigation system.

A warmer than normal start to 2010 resulted in better than expected establishment of the new turf. New shoots emerged on the sod within three days and were pushing below 100mm within four weeks.

We had expressed to the AFL and GFC from the beginning the oval would have a couch base oversown with ryegrass, the same as the MCG and Etihad. We are slightly too far south for any other option, although many discussions have been had around whether to bring the couch back the following summer or continue to push the rye through. This is a high use arena and such a decision will be dependent on event scheduling and not what's agronomically best for the Wintergreen.

The Kardinia Park oval was opened to light use on 8 April 2010 and 27,000 spectators arrived on 18 April to watch Geelong v Port Adelaide. Feedback on the new surface has thus far been very positive and hopefully it will last another 80 years before the next rebuild.

ACKNOWLEDGEMENTS

The success of this project is attributed to a long list of passionate stakeholders, my supportive manager Mark Gallon and the following industry consultants: AGCSATech, Victorian Turfgrass Consultancy Services, Endeavour Turf Products, Rain Bird Australia, Rural and Turf, Cardno Young, Yellowbox Computing Services and Pitchcraft. Also, the past experience and professionalism of McMahon's Construction and HG Sports Turf resulted in their works delivered with quality on time and budget. $\underline{\square}$





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2010 WOMEN'S OPEN













of personal health issues to combat in the lead

up to the event



t's considered one of the original Melbourne sandbelt courses and in mid-March Commonwealth Golf Club lived up to its reputation as one of Australia's most loved layouts when it hosted the 2010 Australian Women's Open. Players, spectators and commentators alike had nothing but praise for superintendent Mark Prosser and his team on the way Commonwealth scrubbed up for its first national Open tournament since 1967.

Aside from a violent storm which ripped through Melbourne the weekend before the tournament, preparations on course over summer went pretty much to plan for Prosser and his team. Off course, however, it was a different story with a number of staffing setbacks in the weeks and months leading up to the tournament. It started at the top when Prosser was forced out of action at the start of the year after undergoing a second hip replacement. No sooner had he returned to work than assistant Travis Scott was forced to undergo surgery to remove a lump from his neck, which saw him miss most of the tournament, while a week out apprentice Kade Murphy contracted glandular fever!



Top: Commonwealth's par 4 14th and par 3 15th

Above: A hazardous job for staff member Tom Bickerdike

In March Australian Golf Digest unveiled its biennial Top 100 Australian Golf Courses rankings list which saw Kingston Heath anointed as the country's number one course. Golf course rankings lists by their very nature are highly subjective yet within the golfing world a huge emphasis is placed on them, especially by golfers and club management. This edition of The Pulse asks superintendents their thoughts on golf course rankings lists and whether they create undue pressure to achieve something unattainable?



"I believe golf course ratings can affect the positions of a superintendent. I have been at Cape Schanck for six years now and have watched my course slide from the top 100. I have found that when vying for the public dollar we offer an exceptional price for green fees, but as it is not in the top 100 the course may not be deemed 'any good'. Some guests have commented on how they are trying to play a lot of the courses that are rated in the top 100.

I do tend to think that some members who believe their course should be in the top 100 and when ratings appear see that their course has slid down or even out of the ratings, they feel that maybe the superintendent is not doing their job properly which can in turn put unrealistic pressure on some 'to do a better job'.

We are currently looking at redevelopment over the next few years. Will this get us into the top 100? Will spending more on our operational expenses improve our rating? And would we see a huge return in revenue if we were to make it into the 100? I'm not entirely sure, but one thing I do know is that according to feedback from our members and guests they are very happy with what we present to them for the price they pay. This is good as it keeps me employed for another week!" Lincoln Coombes, RACV Cape Schanck, VIC

"There is a vast discrepancy between rating organisations. At any one time of publication there could be as many as 200 golf courses that make the top 100 lists across the varying judging bodies. Many that appear on one list may not necessarily be on another. Each rating organisation values different attributes – beauty, playability, architecture, designer and so on. Due to the subjective nature of the ranking systems I choose to view them in a more homogenous manner, one of recognition and admiration as opposed to actual rank when viewed from an agronomic standpoint.

I place particular importance on them with industry acknowledgment and benchmarking a necessity. It creates a good type of pressure, something to aspire to, and showcases the world's best golf courses. It's up to the superintendent

at each golfing facility to understand and manage not only the golf course to the highest standards possible but also manage and educate unrealistic expectations from both golfers and club management. Top recognition is only relevant or attainable to a small percentage of clubs and very much facility specific, based on ownership goals. Ownership support, sacrifice and financial backing are imperative to realising top ranking recognition.

Even in the hiring process of key staff members I definitely look for Top 100 experience. Sharing photos of internationally recognised golf courses with team members is a great way of expressing what agronomic standards can be obtained, helping to educate and inspire staff and formalise what you as the superintendent is visualising. They can be a powerful tool in showcasing or selling renovation and construction ideas to committees and board members.

At The Tiger Woods Dubai there is great expectation of being recognised as one of the leading golfing facilities in the world. Understandably there is tremendous pressure on me to produce a world class golfing experience. I relish the pressures and feel this is a huge component of what drives me to generate ever improving golfing conditions. Utilised in the correct fashion the rating systems can be used to your advantage and at times have profoundly positive results on a golfing facility and your personal career satisfaction." Cameron Thompson, The Tiger Woods Dubai, UAE

"Funny thing those ratings. I would be amazed if very many of the judges on the panel have actually seen Mt Lawley at any stage, let alone since the course has been re-built. As a course rated at 50-something out of all the courses in the country I would assume most judges would have needed to.

I left Mandurah Country Club in 1998 and at that time the club had engaged an influential designer to update the course. That year Mandurah came in at 80-something and since then has never made it again. How can a course on the up go down 20 places in one year? As far as the ratings go, no one seems to care except everyone is quick to



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comment if you have gone up or down. It's a little like the horoscopes – nobody believes in them but everyone reads them." Glenn Cross, Mt Lawley Golf Club, WA

"I certainly don't place too much importance on the top 100 rankings. When we opened Secret Harbour in 1994, even as a 9-hole course we made the top 100. When we opened the 18-hole layout in 1999, the year after we were ranked 23rd. I'm not sure if it is a coincidence or not but we were spending more money on advertising then! Now we are busier than ever at Secret Harbour and very popular with most golfers, but our top 100 ranking has slipped into nonexistence.

Another thing I don't understand is how those 'exclusive' courses like Ellerston get rated when no one is allowed to play them apart from a few honoured guests. This will always be a controversial subject and one I am sure a few certain golf clubs will care about." Allan Devlin, Secret Harbour, WA

"I feel rankings do serve a purpose so that other clubs have something to aspire to and for apprentices to have ambition to work at some of the better clubs. In saying that however, it does put a lot of pressure on supers that can sometimes be unrealistic. In general the rankings don't have a huge impact at our club but is quite often brought up when talking about course improvements and general course conditions. As a superintendent it can be frustrating at times when members compare our course to other higher ranked courses that have staff and budgets way above ours." Brad Tucker, Whittlesea GC, VIC

"There seems to be more and more emphasis placed on the top 100 courses in Australia. My course owners have stated that they would like our course to be ranked in the top 100. From a personal perspective the rating system does not work due to a couple of major reasons.

 Course preparation or condition is different for each golf club due to climate, renovation practices and tournament preparation;

- All courses are not rated at the same time;
- Established courses cannot compete with new courses:
- If your club advertises, this seems to give you a better chance to be ranked in top 100;
- The ranking system does not have any supers or CEO rating courses;
- If the player has bad round at a course this reflects in the rating.

All courses should have time and/or the option to state why the course was not at best condition when ranking was done. At the end of the day the members of your club are the only players you have to please, and we all know that is not easy." Scott Harris, Gold Creek CC, ACT

(Trevor Strachan, superintendent at Lake Karrinyup, is on the judging panel of the Australian Golf Digest Top 100 courses rankings list – Ed)

"Eastlake Golf Club certainly does not figure in Australia's top 100, but we have been included in Australia's top 100 for public courses costing less than \$50 to play. The club did try and promote itself along this avenue, capitalising on the exposure, and I believe with some limited success in improved player numbers.

I think the rankings are important to superintendents as this is what will bring people to our courses and ultimately this is what helps pay our wages and also gives supers at a less recognised course something to strive for. I believe pressure is always there to present the course in its finest, irrespective of golf rankings, and most supers aim to achieve their best as an ongoing ethic. However, with US PGA Tour events beamed in live every weekend, where maintenance budgets far exceed ours and staff can indulge in presenting finely manicured courses, golfers and club administrators see this as a standard to be achieved and accordingly expecting the same. As we all know that is not achievable." Peter Svenne, Eastlake GC, NSW.

"The evaluation of golf courses is very subjective. It is interesting to note that the criteria now used by Australian Golf Digest was changed to follow its

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American affiliate. To quote their architecture editor Darius Oliver, 'Interestingly, this year we altered our definition for conditioning to emphasise firm, fast turf conditions over courses that are lush and green. This was done in concert with our American affiliate'. I am sure the rating is done with the best intentions in mind but the concern is that this type of adjudication could be taken too seriously by some.

There is little doubt in my mind that this sort of editorial helps sell the magazine and provides the 'golf tragic' with great debating material for end of game drinks or the next BBQ. It concerns me to read this further comment again from Darius Oliver - 'We believe that the role of a magazine like Australian Golf Digest is to inform readers and, where appropriate, to influence change within the industry. While we don't pretend our system is perfect, it clearly remains the most credible ranking in Australia and also best reflects the actual state of play at our finest courses'. It would be more credible if the judges were identified along with their qualifications, when and how they evaluated all Australian courses to finally reach agreement on the top 100 courses." Doug Robinson, Pacific Golf Operations, QLD

"I believe golf course rankings would or could create extra pressure for superintendents and their staff, particularly if the club members and club committee took great interest in the ranking system. I find it very hard to see how rankings can be taken too seriously when every person's opinion of a top class golf course is different. However, I personally do like to know how golf courses rate, even if it is an opinion of a rating system." Wade Cranston, Glenden Town Club, QLD

"The recent publication of Australia's top 100 by both Golf Australia and Golf Digest have caused much controversy and discussion. The lists themselves have prompted much debate but also the supporting commentary which has gone with them. One club in south east Queensland was described as 'disgraceful' with no substantiation whatsoever by the author. Our own club managed to

have some comments attested to it due to its drop in the rankings even though not one member of the judging panel had visited the course in the past two years. Members and committees react in two ways to course rankings:

- The course has risen in the rankings so obviously we don't need to invest any more money on the course; or
- The course has dropped in the rankings therefore the superintendent is to blame and we better replace him.

Nothing good has ever come of course ratings as it is such a subjective thing. A perfect example was the AGCSA trip to Barnbougle Dunes last year. Opinions were extremely divided with a number of supers appreciating the complexity of the design and the rustic nature of the golf course. On the other side, a number of the 'resort' supers failed to appreciate the golf course and couldn't enjoy the tough conditions. Different strokes for different folks." Robin Doodson, Sanctuary Cove CC, QLD

"Course ratings are important to both members and management at our club. My issue is how and who rates the course. Golf magazines claim a team of assessors visit each course but to my knowledge only the odd judge appears to play and rate the course. Our course presents well for most of the year but we struggle in winter with heavy frosts, dormant couch fairways and heavy golf cart traffic. On one occasion a judge played on a Sunday afternoon in the middle of winter after a full field of social players. Our rating subsequently slipped due to course conditioning. On another occasion during summer we were rated highly.

I believe design constraints should be reconsidered by judges, issues such as terrain where carts are required by all but the fittest and courses without returning nines. While golf purists will disagree, returning nines are a necessity on high traffic golf courses." Mark Gahan, The Dunes, VIC

HAVE YOUR SAY

Send a letter to the editor brett@agcsa.com.au

Australian Golf Digest elevated Kingston Heath to number one on its 2010 Top 100 course rankings



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In this instalment of
AGCSATech Update John
Neylan looks at the latest
results from the AGCSA
bentgrass trials and
recounts his involvement
with the SAGCA delegation
to St Andrews for the World
Forum for Golf Architects in
March





ince October 2009, the AGCSA bentgrass variety trials at Keysborough, Cromer and Royal Adelaide golf clubs have been rated bi-monthly for turfgrass colour, sward density and overall quality as a putting surface. Other characteristics that are being measured 3-4 times a year include thatch accumulation, green speed and surface hardness.

The trial plots have been suffering somewhat from the elements, with flooding and *pythium* at Cromer and heat stress at Royal Adelaide. However, while Mother Nature has had an influence it does provide a more realistic view of the performance of the respective cultivars. The following summarises some of the results to date, with results from all sites to be presented at the 26th Australian Turfgrass Conference on the Gold Coast.

TURFGRASS QUALITY

At Cromer, the vegetative variety AGCSA1 showed the best overall turfgrass quality for the December assessment and was significantly greater than all seeded varieties with the exception of the variety Shark. Shark had significantly greater turfgrass quality than all other seeded varieties with the exception of Tyee, SRP1RH93, SR1150 and SRP1GMC (see Table 1).

At the Keysborough site there is less variation in overall turfgrass quality between the varieties, however, the vegetative variety AGCSA1 has produced one of the poorest overall turfgrass qualities, primarily due to the low cutting height and scalped surface it has produced. AGCSA1 has the

TABLE 1: TURFGRASS QUALITY CROMER GOLF CLUB

Variety	27/10/09	15/12/09	15/3/10
AGCSA 1	7.7	8.0	7.2
Shark	8.0	7.5	6.8
SRP1RH93	7.0	7.3	7.2
SRP1GMC	7.5	7.2	6.8
Tyee	7.3	7.0	6.7
SR1150	6.7	7.0	6.3
Penn A1	7.2	6.8	6.5
Mackenzie	6.7	6.8	6.3
Authority	7.3	6.8	6.3
Penn G2	7.0	6.7	6.2
Cobra 2	6.7	6.7	6.3
007	6.8	6.7	6.5
T-1	6.8	6.5	6.7
Declaration	7.2	6.5	6.3
CY 2	6.8	6.2	6.5
Dominant X-treme	6.0	5.7	6.3
LSD (P<0.05)	0.5	0.5	0.5

Disease pressures and heavy rain have really tested the AGCSA bentgrass trial plots, in particular the Cromer Golf Club site which was partly under water following a heavy deluge in Sydney

potential to produce a high quality turf, however, compared to the seeded types it has been difficult to keep up with its growth rate in the early stages of establishment.

TURFGRASS COLOUR

At Keysborough and Cromer the seeded variety T-1, along with the vegetative variety AGCSA1, have proven to have the darkest green colour and on some occasions have been significantly darker green than all other varieties (Table 2). At the January assessment at Keysborough there was no

TABLE 2: TURFGRASS COLOUR - KEYSBOROUGH GOLF CLUB

Variety	19/8/09	26/10/09	29/1/10	15/3/10
T-1	6.7	8.0	5.2	7.3
AGCSA 1	8.0	7.8	5.7	7.0
SRP1RH93	6.2	7.2	5.5	6.8
Dominant	6.8	6.5	5.5	6.8
X-treme				
Cobra 2	7.2	7.7	6.2	6.8
Authority	6.7	7.0	6.0	6.7
Penn A1	6.7	7.2	5.7	6.7
007	6.5	7.2	5.8	6.7
Penn G2	6.7	6.7	6.5	6.5
Declaration	n 6.0	7.0	5.8	6.5
CY 2	5.7	7.0	5.7	6.5
SR1150	6.2	6.8	5.5	6.3
Shark	6.3	7.5	6.2	6.3
Mackenzie	6.5	6.8	5.5	6.3
Tyee	6.2	6.3	5.7	6.2
SRP1GMC	6.3	7.5	6.2	6.2
LSD (P<0.0	5) 0.5	0.6	ns	0.5

TABLE 3: TURFGRASS DENSITY - CROMER GOLF CLUB

Variety	27/10/09	15/12/09	15/3/10
AGCSA 1	8.0	8.3	7.2
Shark	8.0	7.5	6.8
Tyee	7.3	7.3	6.7
SRP1RH93	7.2	7.3	7.3
SR1150	6.8	7.3	6.3
SRP1GMC	7.7	7.2	6.8
Declaration	7.5	7.2	6.3
Penn G2	6.8	7.0	6.2
Mackenzie	7.0	7.0	6.3
CY 2	6.7	7.0	6.7
Cobra 2	6.8	7.0	6.3
Authority	7.3	7.0	6.3
007	7.2	7.0	6.5
T-1	6.8	6.8	6.7
Penn A1	7.3	6.8	6.8
Dominant X-trem	ne 6.2	6.5	6.3
LSD (P<0.05)	0.6	0.4	0.6

TABLE 4: TURFGRASS DENSITY - KEYSBOROUGH GOLF CLUB

Variety	19/8/09	26/10/09	29/1/10	19/3/10
Shark	7.0	7.5	7.3	7.3
AGCSA 1	5.0	6.8	6.8	7.2
SRP1GMC	7.2	7.5	7.3	7.0
Declaration	n 7.2	7.8	7.0	7.0
Authority	7.0	7.5	6.5	7.0
SRP1RH93	6.8	7.3	6.2	6.8
CY 2	7.2	6.8	6.3	6.8
Cobra 2	6.7	7.3	6.7	6.8
Mackenzie	7.0	7.2	7.0	6.7
Penn G2	7.0	7.0	6.7	6.7
007	6.8	7.3	6.2	6.7
Tyee	6.8	6.8	6.3	6.5
SR1150	6.8	7.0	6.5	6.5
Dominant	6.8	6.8	6.2	6.5
X-treme				
Penn A1	6.8	7.0	6.0	6.5
T-1	6.3	7.0	5.8	6.3
LSD(P<0.05	6) 0.5	0.6	0.7	0.4

TABLE 5: THATCH ACCUMULATION - CROMER GOLF CLUB

Variety	Thatch de	Thatch depth (mm)		
	27/10/09	15/3/10		
AGCSA 1	14	15		
Shark	12	13		
SRP1GMC	12	13		
007	12	12		
Tyee	10	13		
CY 2	10	13		
Authority	10	13		
SRP1RH93	10	14		
T-1	9	13		
Penn G2	9	13		
Penn A1	9	14		
Cobra 2	9	11		
SR1150	9	12		
Declaration	9	12		
Mackenzie	7	13		
Dominant X-treme	e 7	11		
LSD (P<0.05)	3	ns		

significant difference in turfgrass colour between any varieties due to some drought stress that was affecting all varieties. At Royal Adelaide there has been no significant difference or trend seen between any varieties based on turfgrass colour.

TURFGRASS DENSITY

At Cromer, the varieties Shark, Tyee, SRP1RH93 and SR1150 have shown very good turfgrass density although at the time of the December assessment they had significantly less density than the vegetative variety AGCSA1 (Table 3). The table is sorted after the December assessment as the trial area was badly affected by *pythium* spp. disease and water inundation during February meaning the March assessment (15/3/10) may not have been



As well as being rated for turfgrass colour, sward density and overall quality as a putting surface, other characteristics being measured during the three-year trial include thatch accumulation, green speed and surface hardness



Above: In April the AGCSA conducted the first of three workshops where superintendents had the opportunity to assess the trial plots. Pictured is the Royal Adelaide site

Right: Thatch depth has been measured on at least one occasion at all sites and so far there has been little significant difference observed between cultivars



a true reflection of overall density. The main photo on page 32 shows the plots at Cromer Golf Club and the severe effect that the excessive rainfall and humidity had on the bentgrasses.

At Keysborough, the same four varieties as Cromer have all shown very good overall turfgrass density with the addition of Declaration and Authority (see Table 4), while at Royal Adelaide there has been no significant difference between any varieties based on turfgrass density.

THATCH ACCUMULATION

Thatch depth has been measured on at least one occasion at all sites and so far there has been little significant difference observed between cultivars. At the Cromer and Royal Adelaide sites the vegetative variety AGCSA1 produced the most thatch of all varieties (see Table 5).

SURFACE HARDNESS AND GREEN SPEED

There has been no significant difference observed in surface hardness of the varieties for any of the assessment dates at any of the sites. The vegetative variety AGCSA1 has shown to have the slowest green speed at both Keysborough and Royal Adelaide. During the last assessment at Royal

Adelaide (11 March 2010) the vegetative variety AGCSA1 had significantly less green speed than all other varieties with the exception of Mariner and Shark (see Table 6.).

The first of three field days was held at Royal Adelaide Golf Club on 22 April with a number of superintendents in attendance. AGCSA senior agronomist Andrew Peart provided an overview of the trials and then each of the attendees independently assessed the plots for quality as a putting surface. At the time of printing, the AGCSA had also planned for field days at the Keysborough and Cromer sites in mid-May.

WORLD FORUM OF GOLF ARCHITECTS

In March I was very fortunate to be invited by the Society of Australian Golf Course Architects (SAGCA) to the inaugural World Forum of Golf Architects held at St. Andrews University, St. Andrews, Scotland. The World Forum was jointly organised by the European Institute of Golf Course Architects (EIGCA) who initiated the event, the American Society of Golf Course Architects (ASGCA) and the SAGCA.

The World Forum of Golf Architects attracted over 170 golf industry delegates from around the world. As well as a sizeable turnout from European, American and Australian designers there were representatives from the Japanese Society of Golf Course Architects and other delegates from Mexico, China, Portugal and South Africa.

The forum provided opportunities to play golf at St Andrews with a two-day conference based at the historic St Andrews University, the oldest in the UK. The conference was split into three different sessions covering the economics of golf, the environment and design trends chaired by the SAGCA, EIGCA and ASGCA respectively. In addition delegates were

TABLE 6: GREEN SPEED - ROYAL ADELAIDE GC

Variety	Green speed (cm)		
	16/12/09	11/3/10	
SRP1GMC	164	186	
Declaration	160	180	
007	161	171	
T-1	163	170	
Mackenzie	167	169	
RAGC blend	163	169	
SR1150	170	166	
Authority	162	165	
Dominant X-treme	150	165	
Cobra 2	157	165	
CY 2	162	164	
Penn G2	161	164	
Penn A1	157	159	
SRP1RH93	156	159	
Tyee	160	158	
Shark	167	149	
Mariner	154	146	
AGCSA 1	167	140	
LSD (P<0.05)	ns	16	



given the chance to play golf with hickory clubs at Kingarrock, Hill of Tarvit, near Cupar and to enjoy various other official functions, including the Gala Dinner and a private reception hosted by The R&A.

The conference programme was very interesting and generated a lot of debate around water, the environment, planning restrictions and course design. The Australian contingent presented a well organised programme on the economics of golf. Some of the key points to come out of the conference were;

FNVIRONMENT

- Increasingly stricter planning requirements are an impediment to golf course development;
- As an industry we must promote non-golf values as part of the design concept including green space, biodiversity, carbon; health and wellbeing; and rehabilitation of degraded sites
- The Golf Environment Organisation (GEO) is currently producing a document for golf course development that is focused on environmental planning.
- At the conference, the GEO outlined their draft "Guidelines for Sustainable Golf Development". This project commenced in 2009 and GEO has been co-ordinating a team of experts in the creation of globally applicable guidelines that will enable the diverse stakeholders in golf development to achieve higher standards of social, economic and environmental return on investment.



WATER

- The lack of a sustainable water supply is probably the greatest universal threat to the golf economy;
- Water management planning, introducing new technology and water conservation considerations need to be designed into every project.

DESIGN AND COURSE MAINTENANCE

Design aspects were debated very passionately and I must admit as not being too much wiser at the end of the discussion. One of the big issues was the excessive length of golf courses as a counter to

The Society of Australian Golf Course Architects delegation to the World Forum of Golf Architects

WHAT'S YOUR DIAGNOSIS?

AGCSATech recently received this photograph of a hybrid couchgrass putting green. What is going on? Is it a disease, dry patch, nutrient deficiency or poor fertiliser application? One of the primary clues was a water report which contained the following analysis:

Element	Concentration	Comment
Total soluble salts (ppm)	2016	High
Bicarbonates (ppm)	246	Moderate - high
Sodium (ppm)	406	Very high
Sodium Absorption Ratio adj	21.5	Very high

The water source is of high salinity, has elevated bicarbonates and very high concentrations of sodium. Water of this type requires careful management, particularly in terms of calcium nutrition. The elevated bicarbonates will lock up calcium and magnesium and the high sodium will also displace much of the calcium and magnesium from the soil. The normal response is to maintain high levels of calcium applications, often in the form of gypsum. In this case there had been limited magnesium applied.

As you read, the answer to the problem is developing in your mind I am sure. However, an excellent article by James Camberato and Bruce Martin from Clemson University ("Magnesium is at the Heart of Your Green" www.clemson.edu/turfornamental/) provided the answer.

In this article they discuss where Ca-induced Mg deficiency can occur on coastal golf courses using poor quality irrigation water that is high in sodium. Application of calcium in conjunction with leaching



irrigation or rainfall is the antidote to sodium. After calcium displaces sodium from the cation exchange site it can be leached from the soil with excess water. Although this practice is necessary to manage the sodium problem, it may lead to high soil calcium levels and a calcium:magnesium imbalance because magnesium will be leached along with the sodium.

The answer to the problem, which is applicable to many soil and turf management situations, is to make sure that there are regular applications of magnesium applied with each application of calcium. Regular soil testing is also a key part of managing the situation so that imbalances can be rectified and remedial actions assessed.



TURF 10 FIELD DAY – HAWKESBURY RACE CLUB

n March Turf Australia and the Sports Turf Association (NSW) conducted the Turf 10 field day and conference at the Hawkesbury Race Club, Clarendon (near Richmond - Sydney NSW). The two day event was a mix of education, big machines, trade show and culminated in an afternoon at the races.

The education sessions covered turf and sports injury, minimising spray drift, erosion and sediment control and how the Sydney Harbour Bridge was turfed. The field day provided for the demonstration of a range of large pieces

of harvesting equipment, tractors, line marking equipment and mowers as well as a range of product suppliers.

The most interesting demonstration was Toro's PrecisionSense Technology (pictured) which is a piece of futuristic equipment that is towed behind a Workman type vehicle and measures soil moisture, turf health and soil compaction at multiple sites over a turf area. The data generated provides a detailed map which can be used to diagnose soil and moisture problems and to monitor the effects of remedial activities.

the changes in club and ball technology. The other consideration was the safety aspect as it also related to the modern drivers and balls (i.e.: a miss hit shot diverts further off the true line of play than it used to).

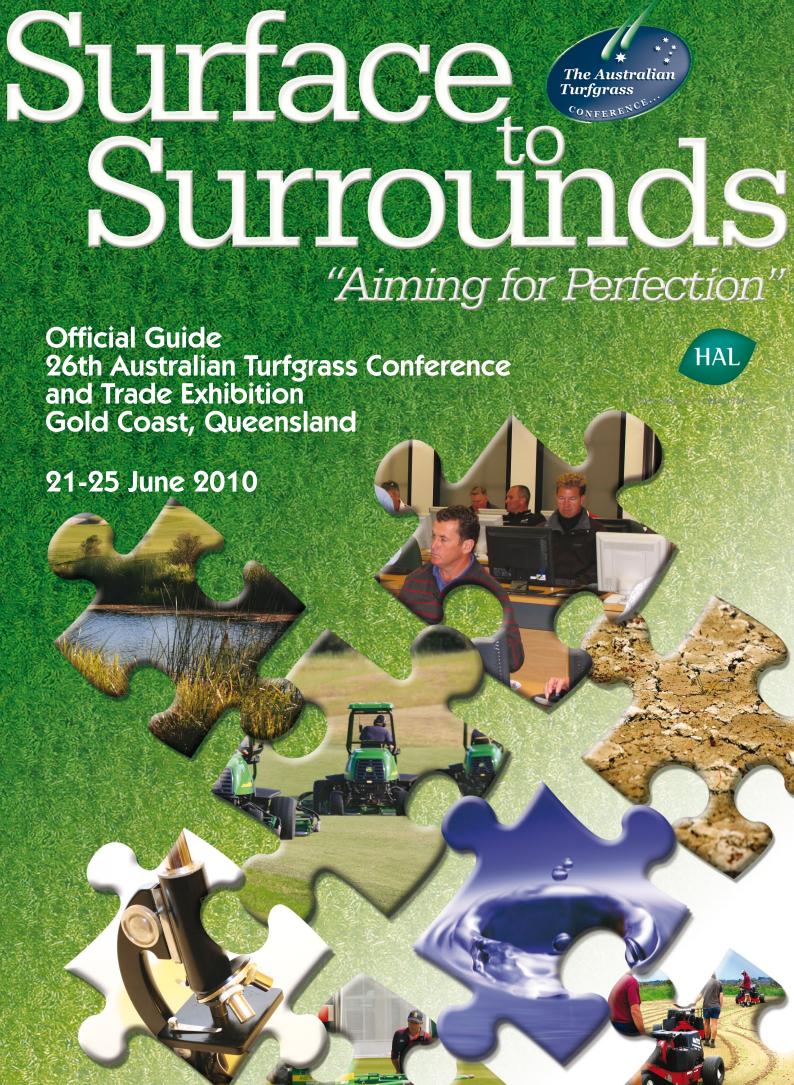
The only person to actually provide any scientific data was Dr. Steve Otto from The R&A, who shot down a lot of the anecdotal evidence of the architects by producing data that indicated that the ball is actually not going that much further for the 'average' golfer. What transpired out of the discussion was that it is likely that there are more high handicappers confident in using drivers today than ever before and the miss hit shot is straying further off line. The R&A will be producing a detailed report on their findings since 1996 towards the end of this year.

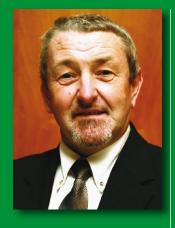
There were a few other practical points to consider that came out of the discussions;

- It is important to develop a sustainable golf model that considers the following values; economic the golf club must be able to develop a viable business based around the design concepts; environmental the design must build in environmental values (e.g. water conservation, biodiversity, restoration of degraded sites); and social how does the golf course interact with the wider community.
- The maintenance requirements must be taken into consideration during the design and planning stages. Do not design a golf course that becomes too expensive to maintain.

It was a great event to be part of and I wish to thank the Society of Australian Golf Course Architects in particular president Graham Papworth and Phil Ryan (SAGCA organiser) for inviting me and sponsoring my attendance.







WELCOME TO THE GOLD COAST

t is with great anticipation that I extend a warm welcome to all delegates, trade and partners who have made the trip to Queensland's magnificent Gold Coast for the 26th Australian Turfgrass Conference and Trade Exhibition. I would like to also make a special mention to all those delegates who are attending for the first time; I am sure you will have an interesting experience.

The Gold Coast Convention and Exhibition Centre will be playing host from 21-25 June and it promises to be a special week. The AGCSA has brought together an excellent range of speakers and presentations for this year's conference across all streams.

After a hard day absorbing the fantastic content from these experts I am sure you will all find time for a quiet drink or two with your colleagues. There will, of course, be our famous social functions where delegates can catch up with old friends and meet many new ones. We have some great social events for you again this year as well as some stunning venues. Simone and her team have also planned an impressive Partners Programme for all

those delegates who choose to make the week a 'family affair'.

As always I must thank our wonderful trade members, who despite the tough economic times have again thrown huge support behind the conference. Without these dedicated companies the event would struggle to survive. I encourage all delegates to have a good look around the trade exhibition to see what latest products and technology they have to offer. One opportunity to do this will be at the special Trade Exhibition Opening Cocktail event being held on the evening of Tuesday 22 June.

I look forward to meeting with as many of you as possible on the Gold Coast and trust you all have a week of high quality education, great networking opportunities and most importantly an enjoyable experience.

ALLAN DEVLIN PRESIDENT, AGCSA SUPERINTENDENT, SECRET HARBOUR

The Australian tourist mecca that is the Gold Coast plays host to the 26th Australian Turfgrass Conference and Trade Exhibition. The recently refurbished Gold Coast Convention and Exhibition Centre will entertain delegates for the week and as always ATM will act as your official conference guide. Read on to find out what awaits you at the turf industry's premier gathering of

26TH AUSTRALIAN TURFGRASS CONFERENCE AND TRADE EXHIBITION — 21-25 JUNE 2010 GOLD COAST CONVENTION AND EXHIBITION CENTRE

n conjunction with principal partners Toro Australia, John Deere, Syngenta, Rain Bird and Bayer Environmental Science, the AGCSA welcomes you to the Gold Coast Convention and Exhibition Centre for the most anticipated industry gathering of 2010.

This is the first time that the annual conference has been held on the Gold Coast and the AGCSA has put together a fantastic week of networking and education. As in previous years there will be dedicated golf, sportsfield and turf technician streams, while the trade exhibition on Wednesday and Thursday will see more than 60 companies exhibiting their wares.

This year's conference theme is Surface to Surrounds and the education sessions have been designed to provide delegates with a wide range of topics and speakers both local and international. To that end you will hear from the likes of Turnberry head greenkeeper Euan Grant, green speed expert Thom Nikolai, Kyle Waters from the Home Depot Center (home of MLS side LA Galaxy) as well as Eden Park's (NZ) Mark Perham and PGG Wrightson's Stephan Charrier. Complementing them will be an excellent line-up of local experts including AGCSA life member Doug Robinson, Royal Melbourne superintendent Richard Forsyth and Dr Percy Wong.

Given the popularity of previous forum sessions and workshops, this year's education sessions will include several forums, including green speed, disaster recovery, water management and the new couchgrass disease afflicting Sydney courses. Syngenta's Henk Smith also returns to host two very informative disease ID workshops.

For the big hitters and hackers, conference week will tee off with the 2010 Toro AGCSA Golf Championships and Toro Scramble which will be held at The Glades Golf Club (superintendent Ben Baumann) and Lakelands Golf Club (superintendent Phil Soegaard) respectively. The battle for the AGCSA Red Jacket will again be hotly contested, while those in the Scramble field will be looking to emulate the feats of Henry Young who last year holed out on the last hole to win the trophy.

As well as viewing all the latest products and services to hit the Australian market, delegates and visitors to this year's 26th Australian Turfgrass Conference Trade Exhibition will be in with a fantastic chance to win one of three iPod Shuffles.

Upon entry you will be given a card which you can take around to the various stands to get stamped. Each company stand will have a stamp relating to their sector of the industry (i.e.: machinery, irrigation, chemicals etc). Collect all

2010.

the sector stamps, place your completed card into the barrel located at the AGCSA stand by no later than 3.30pm on Thursday 24 June and cross your fingers. The winner will be announced at 4pm and notified by telephone if not in attendance during the draw.

The AGCSA hopes all delegates, partners and trade representatives have an enjoyable time on the Gold Coast. If you have any queries please don't hesitate to ask any of the friendly AGCSA staff in attendance or head to the registration desk. Enjoy the week





EVENT INFORMATION AND CONFERENCE REGISTRATION

he conference registration desk will be located in the main entrance foyer of the Gold Coast Convention and Exhibition Centre. Delegates are requested to visit the registration desk upon arrival to receive their conference accreditation and delegate satchel. The registration desk will operate at the following times:

Sunday 2pm-4.30pm Monday 9am-4pm Tuesday 7am-4pm Wednesday 7am-1.30pm Thursday 7.30am-3pm

The following event information was correct at the time of going to print. If there are any changes these will be displayed on TV screens around the GCCEC and announced during conference sessions. If you are unsure please visit the registration desk or AGCSA stand in the trade exhibition.

2010 TORO AGCSA GOLF CHAMPIONSHIPS

Where: The Glades Golf Club When: Monday 21 June

Details: Buses will depart for The Glades from the Gold Coast Convention and Exhibition Centre (GCCEC) main entrance at 6.45am for an 8am shotgun start. Light breakfast will be served upon arrival. This year's luncheon and presentation ceremony will be held at The Glades with buses returning to GCCEC at 3pm.

2010 TORO AGCSA SCRAMBLE

Where: Lakelands Golf Club When: Monday 21 June

Details: Buses will depart for Lakelands from the GCCEC main entrance at 7am for an 8.30am shotgun start. Light breakfast

will be served upon arrival. This year's luncheon and presentation ceremony will be held at Lakelands (please note there is no combined golf luncheon this year). Buses will return to GCCEC at 3pm.

BAYER ENVIRONMENTAL SCIENCE WELCOME RECEPTION

Where: Adrenalin Alley, Dreamworld When: Monday 21 June (7pm-9.30pm)

Details: This year's Bayer Environmental Science Welcome Reception is set to blow your mind. Dreamworld's Adrenalin Alley is the venue and delegates and partners will have the chance to ride the Cyclone rollercoaster, drive a V8 Supercar, play laser tag and surf the Wave Rider. Come dressed neat casual, but if you fancy going on the Wave Rider bring boardies and a towel. Please gather at GCCEC main entrance by 6.15pm for 6.30pm sharp departure to Dreamworld. Buses return to GCCEC.

26TH AUSTRALIAN TURFGRASS CONFERENCE TRADE EXHIBITION

Where: GCCEC

When: Wednesday 23 June (9am-5pm) and Thursday 24 June (9am-4pm)

Details: Over 60 companies will be exhibiting their products and services on the Gold Coast. Entry to the trade exhibition is free. If you are attending the trade exhibition only you will be required to fill in a registration form before entering. See later in this guide for a full listing of companies exhibiting.

2010 AGCSA AGM

Where: GCCEC (Room 7)
When: Wednesday 23 June (5pm)
Details: Open for all current financial AGCSA

members. Two board director positions will be up for election.

JOHN DEERE TURF TECHNICIANS DINNER

Where: Hog's Breath Cafe, Broadbeach When: Wednesday 23 June (7pm)

Details: For those registered for the Turf Technicians stream, a conference dinner will be held at the Hog's Breath Café. This is included in the price of registration.

SYNGENTA PRESIDENTS DINNER AND 2010 AGCSA AWARDS PRESENTATION CEREMONY

Where: Marquee Pavilion, Jupiters

When: Thursday 24 June (6.30pm predinner drinks for a 7pm start)

Details: To cap off a week of camaraderie and education we have planned a fantastic night at the Marquee Pavilion. The dinner will include the 2010 AGCSA Awards presentation ceremony which will feature the inaugural AGCSA/PGG Wrightson Seeds Award for Academic Achievement. The dinner is an optional extra for all delegates. Tickets can be purchased from the registration desk up until Tuesday. Dress code: Semi-formal, dress pants and collard shirt (jacket and tie optional).

POST CONFERENCE TURF TOUR

When: Friday 25 June (8am-3pm)

Details: This year's post conference turf tour will visit Skilled Park and Sanctuary Cove Golf and Country Club. Buses depart GCCEC at 8am. At the conclusion of the tour the bus will make a drop-off at Coolangatta Airport (approx 3pm) before returning to GCCEC.

As the theme for this year's conference alludes, delegates will have the opportunity to experience a wide range of industry experts both local and international.

ATM looks at the quality line-up for Gold Coast 2010.

26TH AUSTRALIAN TURFGRASS CONFERENCE KEYNOTE SPEAKERS AND EDUCATION SESSIONS



EUAN GRANT

Superintendent, Turnberry

Travelling to us from Turnberry in Scotland, Euan Grant will kick off the 26th Australian Turfgrass Conference by looking back at a career which has taken him

to some of the game's most hallowed courses. Euan, who last year took over as superintendent at Turnberry, is former head greenkeeper of the Old Course at St Andrews and prepared the course for the 2005 Open Championship. As well as his plenary address, Euan will give a separate talk on the extensive environmental considerations that went into the construction of the unique Machrihanish Dunes course in Scotland. Euan will also be part of Thursday's Green Speed forum.



DR THOM NIKOLAI

Turfgrass Academic Specialist, Michigan State University

For more than 20 years Thom Nikolai has devoted his life to one of the most contentious

topics in golf course management – green speed. Now the industry's foremost authority on green speed with numerous papers and books to his credit (see this edition's book review on page 81), Thom will give delegates an insight into green speed management issues, research and how superintendents can empower themselves to become their club's expert when it comes to green speed. As well as his two papers, Thom will also be a key member of the Green Speed forum panel.



KYLE WATERS

V.P. Operations, Home Depot Center, California

The Home Depot Center is a 125-acre, \$150 million state-ofthe-art sports facility which is home of Major League Soccer

giant Los Angeles Galaxy. The site also houses facilities for soccer, tennis, track and field, cycling, lacrosse, rugby, volleyball, baseball, softball and basketball and if that's not enough is also the official US Olympic training site. Kyle will provide an overview of his operations and sportsfield preparations, as well as an insight into chemical application trends in the US.



RICHARD FORSYTH

Superintendent, Royal Melbourne Golf Club

Since taking over as superintendent at Royal Melbourne in 2009, Richard Forsyth has not only been

responsible for the day-to-day management of the famed 36-hole complex but also overseeing extensive restoration works to playing surfaces on the Composite Course. Richard will look at these works and some of the challenges faced in getting one of Australia's most iconic facilities ready to host the 2011 President's Cup.

DR PERCY WONG

Honorary Associate, Faculty of Agriculture, University of Sydney

Percy has been at the leading edge of research in Australia for many years, and is heavily involved with investigations into a new couch disease – dubbed Black Fungus 1 – which is slowly causing widespread damage at a number of golf courses in Sydney's eastern suburbs. Percy will be a key member of a forum which will look into this most curious of turf diseases.

Also presenting on the Gold Coast...

STEPHAN CHARRIER (PGG Wrightson)

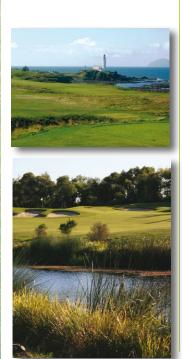
Originally hailing from France, Stephan has been working for PGG Wrightson Seeds at Ceres Research Centre in Christchurch for the past eight years as a turf plant breeder. In that time Stephan has bred six commercially available cultivars in three different species. His presentation will give an insight into ryegrass breeding and what we can expect in the future. (Wednesday – Sportsfield Stream)

JOHN GEARY (AGCSA)

As well as chairing Tuesday's Water Management forum, AGCSA environmental agronomist and self-confessed golf architect nut John Geary will discuss the concept of minimalist golf and its role in turf management. (Thursday – Golf Stream)

ANDY HUGILL (Mona Vale Golf Club)

The 2009 AGCSA Excellence in Golf Course Management Award winner will look at the major works undertaken at Mona Vale Golf Club over a six year period which have seen the club become



one of the leading facilities in Sydney's northern beaches region. (Wednesday - Golf Stream)

SCOTT JOHNSTONE (Scape Shapes)

Irrigation expert Scott Johnstone will discuss how to develop an irrigation and water use budget and management plan for your turf facility. (Wednesday – Sportsfield Stream)

MARK PARKER (Concord Golf Club)

Following on from the successful session in Hobart on proactive management, highly respected and experienced Sydney superintendent Mark Parker will team with Andy Hugill to host a session on managing your staff so that as a team you are more productive, enthusiastic and ready to take on challenges as they arise. (Thursday – Golf Stream)

ANDREW PEART (AGCSA)

The AGCSA's senior agronomist will update delegates on the new AGCSA/HAL-funded bentgrass trials which aim to assess the new range of bentgrass cultivars which have hit the Australian market in recent times. Andrew will present findings from the first year of the three-year project. (Thursday – Golf Stream)

MARK PERHAM (Eden Park, NZ)

Mark will look at the extensive changes to New Zealand's iconic Eden Park ahead of the 2011 Rugby World Cup. (Thursday – Sportsfield Stream)

IAN REID (Golf Australia)

With the new USGA handicapping and course rating system now being rolled out across the country, lan will give a presentation on what needs to be done, how things will change and the benefits of the new system. (Thursday – Golf Stream)

MATT ROCHE (DEEDI)

The acting senior research scientist at Redlands Research Station, Matt will provide a summary of the final results to emerge from the warm-season greens grass trials which were held at various locations around Australian between 2006 and 2009. (Thursday – Golf Stream)

DOUG ROBINSON (Pacific Golf Operations)

At the 2008 conference in Melbourne Doug recounted the challenges he and his team faced constructing the new Hamilton Island Golf Club on Dent Island. Two years on the AGCSA life member and former AGCSA Distinguished Service Award winner returns to present the fascinating final chapter on this unique golf course development. (Wednesday – Environment Stream)

ANDREW SMITH (Yamba Golf Club)

It is easy being green and Yamba superintendent Andrew Smith will reveal how his dedication to

environmental management principles saw him collect the 2009 AGCSA Claude Crockford Environmental Award. (Wednesday – Environment Stream)

STUART STAPLES (Scotts)

Scotts UK representative Stuart Staples will discuss how pesticides, fertilisers and oversowing impact the outcome of turfgrass quality. (Wednesday - Sportsfield Stream)

STEVE WAIT (Safetee Pro)

OH&S expert Steve Wait will look at how to manage and adapt OH&S systems for a high-use environment. (Wednesday - Sportsfield Stream)





CONFERENCE FORUM SESSIONS

DISASTER RECOVERY

Tuesday (Plenary) 10.30am-12.30pm

Chaired by AGCSA general manager John Neylan, this forum looks at some of the extreme challenges that Australian turf managers have had to face in recent times. The panel will include RACV Royal Pines superintendent Paul McLean, Anco Turf's Bruce Stephens, John Geary and a representative from Sport and Recreation Victoria who will look at the work to reinstate community sports facilities in the wake of the 2009 Black Saturday bushfires.

WATER MANAGEMENT

Tuesday (Plenary) 2pm-4pm

Without doubt the biggest issue facing Australian turf managers is the need to secure a constant, good quality water source in the quest to maintain high quality sports turf surfaces. This year's water forum, chaired by John Geary, will include panellists Richard Kirkby (Pennant Hills Golf Club), Daryl Sellar (Turfwise), Rob Savedra (Wesley College) and Michael Smith (Scotch College) who will look at some of the measures they have taken to secure future water supplies for their facilities.

BLACK FUNGUS 1

Wednesday 11.40am-1pm

Chaired by AGCSA general manager John Neylan, this forum will look at an insidious new couchgrass disease which is having a dramatic impact on turf surfaces at a select number of Sydney golf courses. The disease has yet to be identified and despite numerous trials an

effective cure is still to be found. Expert panellists will include **David Scaife** (Bonnie Doon Golf Club), **John Odell** (Royal Sydney Golf Club), **Jyri Kaapro** (Bayer) and **Dr Percy Wong**.

GREEN SPEED

Thursday 2.30pm-4pm

Chaired by Avondale Golf Club superintendent David Warwick, there is no forum topic more fitting to end this year's conference than green speed. Bound to get all superintendents up out of their seat and involved, this session will bring together an expert panel including Euan Grant, Dr Thom Nikolai, Richard Forsyth, Tim Hicks (Thurgoona Country Club) and Andrew Langford-Jones (PGA of Australia).



The 2010 AGCSA Awards will be a little different this year with the announcement of a fifth award to be handed out on the Gold Coast, Read on to find out more about this exciting development and the finalists who will battle it out for the eagerly contested AGCSA

Graduate of the Year

Award.

2010 AGCSA AWARDS – HONOURING **EXCELLENCE IN TURF MANAGEMENT**

he annual AGCSA Awards have for many premier recognition programme and that reputation is set to be enhanced further on the Gold Coast in 2010. The AGCSA is delighted to announce that a fifth award will be presented during the 26th Australian Turfgrass Conference and Trade Exhibition which will honour the Diploma of Sports Turf Management.

To be named the PGG Wrightson Seeds AGCSA Award for Academic Achievement, the new award aims to recognise individuals for their commitment to pursue further studies and will be bestowed annually to an individual who has completed and excelled in their Diploma studies. The award joins the existing AGCSA Distinguished **Excellence in Golf Course Management Award** (sponsored by John Deere), AGCSA Claude Crockford Environmental Award (sponsored by Syngenta) and AGCSA Graduate of the Year Award (sponsored by Toro).

While ongoing education is reward in itself, the winner of the newly instated award will receive a superb education prize package courtesy of PGG Wrightson Seeds. As well as an all expenses Australian Turfgrass Conference, the winner will also embark on a five-day study tour to New Zealand. The tour will include visits to key golf and sporting venues in both the North and South Islands as well as a tour to PGG Wrightson Seeds' impressive Kimihia Research Centre, the centre of PGG Wrightson Turf's plant breeding and turf

Nominees for the award need to be employed in the Australian turf industry and have completed the Diploma of Sports Turf Management in the year immediately preceding the year in which the award will be presented. Judges will be looking

- Why the nominee considers on-going education to be important;
- How their organisation benefits from them undertaking additional education;
- What their future ambitions in the turf industry are and why; and

AGCSA general manager John Neylan and PGG Wrightson Turf business manager Cameron component of the awards programme in the years to come. For further information on nominating for this award and criteria, please contact the AGCSA or visit the AGCSA Awards section on the AGCSA



2010 AGCSA GRADUATE OF THE YEAR AWARD

Federal Golf Club's Wade Williams continued the ACT's impressive showing at the AGCSA Graduate of the Year Award last year when he collected the honour ahead of a strong field in Hobart. Another six impressive graduates from Queensland, NSW, Victoria, ACT, South Australia and Western Australia will line up in 2010 with a substantial education package awaiting the winner from award sponsor Toro. The finalists of this most anticipated award are...

ACT **Brad Revill** Bermagui Country Club Brad has just completed his apprenticeship at Bermagui Country Club and now holds a senior position within the

maintenance team under course superintendent Dave Thomson. Working at a small regional course

has allowed Brad to experience all aspects of turf management including all machinery operation and maintenance. All construction is completed in house and Brad has gained valuable experience in a broad variety of projects including bridge building, landscaping, irrigation design and installation, as well as establishing two Greenlees Park bowling greens and tee and bunker construction. Brad also helped to maintain trial plots for the national warmseason greens grass trial conducted by the AGCSA and DEEDI.

Brad attended Canberra Institute of Technology one day per week for the last three years which involved a six-hour round trip from Bermagui. It is this sought of dedication that all regional students have that make there qualifications that more special. Brad excelled in all areas of his studies, picking up the CIT Award for Excellence, Rotary Club's 'Best Male Trade Student' and most recently the TGAA ACT Living Turf Apprentice of the Year. Brad has chosen to continue his studies and has started Certificate IV.





SOUTH AUSTRALIA

Kym TattersallThe Grange Golf Club

Kym beat home strong challenges from Matthew Sugg (Glenelg GC) and Ashley Pellatt (Kooyonga GC) to win the

SAGCSA Graduate of the Year Award in March. Tattersall started out in landscaping and contract lawn mowing and spent some time travelling abroad before starting at The Grange Golf Club as an apprentice in 2006, completing his studies last year.

During his time under course superintendent Richard James, Kym has had a wide range of roles and was involved with the 2008 Eisenhower Trophy preparations, several construction projects along with the full range of greenkeeping duties. Kym impressed the SAGCSA panel with his passion for the industry and willingness to better himself.



VICTORIA

Ben Hartley

Thirteenth Beach Golf Links

Ben originated from Bundaberg
in Queensland and made
contact with Thirteenth Beach
Golf Links superintendent Steve

Hewitt with the intent to start an apprenticeship in turf management. His goal was to experience the seasonal changes of Victoria and the management of different turf species.

While it took him a little longer to acclimatise to the Victorian winter than his greenkeeping duties, Ben progressed rapidly in all areas of his apprenticeship, both on the job and with his schooling. He was awarded Best 2nd Year and Best 3rd Year Apprentice at Gordon TAFE and went on to win the VGCSA Graduate of the Year award. Ben is extremely passionate about his career in golf and turf management and in March 2010 started an Ohio State Program internship at Robert Trent Jones Golf Club in Virginia.



NEW SOUTH WALES

Adam Shields

Casino Golf Club

Adam was always destined for a career in turf management. Growing up in Shannonbrook just outside of Casino in

northern NSW, during his teenage years Adam developed a cricket pitch and a nine-hole (one green) par 3 course on the family farm. After eight years working on the farm, in September 2006 an opportunity came up as apprentice greenkeeper at Casino Golf Club. Beating a strong field of applicants Adam was given the job and has since become an integral part of a small yet dedicated turf management team which has over 50 years combined experience.

Adam recently completed his Certificate III with distinction and is hoping to undertake his Certificate IV studies in the future. Such has Adam's progression been, that in April he was awarded the NSWGCSA Vince Church Graduate of the Year Award, named for the first time after the legendary Pennant Hills superintendent.

A passionate cricketer, Adam has played representative grade for NSW Country and Australia Country, and as well as his greenkeeping duties at the golf club is also curator of Casino's number one cricket pitch and square. This includes watering 3-4 days a week, rolling four times a week, mowing up to twice a week, marking out, fertilising, replanting runners and spraying weeds.



QUEENSLAND

Jesse Zervos

Coolangatta & Tweed Heads Golf Club

Jesse is 23-years-old and finished his apprenticeship in 2009 with an early completion,

such is his value to Coolangatta & Tweed Heads Golf Club where he works under course superintendent and GCSAQ president Peter Lonergan. A skilled and dedicated worker who has become a valuable asset to the course management team, upon completion of his apprenticeship Jesse was appointed to the important senior role of spray technician and is proving to be most capable in this critical role.

With a promising career ahead of him in golf course management, Jesse cemented that by beating home a strong field of graduates to win the GCSAQ Apprentice of the Year Award which was announced at the Queensland Golf Industry Awards in March



WESTERN AUSTRALIA

Shaun Quinsee

Hill View Public Golf Course
Shaun started his greenkeeping
career in 2005 and at the time
was the only apprentice at
Hill View, a 27-hole public golf

facility in Perth. Under current superintendent Brett Fiorini, Shaun has become an integral team member who has a keen eye for detail and a willingness to learn, quickly mastering all maintenance jobs. With a small staff and budget on an old course, the apprentices at Hill View get to deal with and perform all tasks involved with golf course maintenance and by his third year Shaun was looking after the reticulation system by himself. In 2009 Shaun was promoted to irrigation technician, a position which he has taken to with great enthusiasm.

The 2010 AGCSA Award winners will be announced at the start of Tuesday's Plenary session.









26TH AUSTRALIAN TURFGRASS CONFERENCE SCHEDULE

MONDAY 21 JUNE

6.45am-3pm Toro AGCSA Golf Championships The Glades Golf Club **♣AGCSA**

7.00am-3.00pm AGCSA Toro Scramble Lakelands Golf Club TORO

7.00-9.30pm Bayer Welcome Reception



TUESDAY 22 JUNE PLENARY

8.10-8.40am Conference welcome and 2010 AGCSA Awards announcement

8.40-9.20am *Euan Grant* Superintendent, Turnberry, UK

9.20-10.00am *Kyle Waters* V.P. Operations Home Depot Centre, - LA

10.00-10.30am Morning tea

10.30am-12.30pm *Disaster Recovery Forum*Speakers from all areas of turf recount how they coped during times of natural disasters.

12.30-2.00pm Lunch

2.00-4.00pm Water Forum

Various speakers from all areas of turf speak on alternative water supplies they have adopted.

4.00-7.00pm Trade Show opening reception

TECHNICIANS

To be held at The Glades GC (Buses depart GCCEC at 7am)

8.00-9.30am New Holland

Hands on workshop on new engine type

9.30-10.00am Morning tea

10.00-11.00am *Craig Day*Spray unit maintenance and troubleshooting

11.00am-12.00pm

Irrigation pump maintenance and trouble shooting

12.00-12.45pm Lunch

12.45-2.00pm Tour of various golf course maintenance facilities

2.00-4.00pm Tour V8 Supercar team workshop

4.00-4.15pm Return to GCCEC

4.00-7.00pm Trade Show opening reception

WEDNESDAY 23 JUNE

GOLF AND ENVIRONMENT

8.00-8.45am Euan Grant

Environmental considerations when constructing Machrihanish Dunes

9.00-9.45am Richard Forsyth

Restoration of playing surfaces at Royal Melbourne

9.45-10.30am *Dr.Thom Nikolai* Green speed research

10.30-11.00am Morning tea

PLEASE NOTE: Stream separates between 11am and 1pm - see sessions below.

GOLF

11.00-11.40am Andy Hugill

2009 John Deere AGCSA Excellence in Golf Course Management Award recipient

11.40am-1.00pm Dr Percy Wong, Jyri Kaapro, David Scaife, John Neylan and John Odell Black Fungus 1 - The newest couch disease

1.00-5.00pm Lunch, Trade Show and afternoon tea

5.00-6.30pm AGCSA Annual General Meeting

** ♣**AGCSA

ENVIRONMENT

11.00-11.40am *Doug Robinson* Hamilton Island Golf Club follow up

11.40am-12.20pm *Kyle Waters* Chemical application trends in the USA

12.20-1.00pm Andrew Smith

Keeping it green in Yamba - 2009 Claude Crockford Environment Award recipient

1.00-5.00pm Lunch, Trade Show and afternoon tea

5.00-6.30pm AGCSA Annual General Meeting

AGCSA

SPORTSFIELD

8.00-8.40am *Stephan Charrier* Ryegrass and ryegrass breeding

8.40-9.20am *Dr. Percy Wong*Info session on new couch disease BF1

9.20-10.30am Synthetic Surfaces Panel Session

10.30-11.00am Morning tea

11.00-11.40am Stuart Staples

How the interaction of pesticides, fertilisers and oversowing impacts turfgrass quality











11.40am-12.20pm Scott Johnstone

Practical guide to developing an irrigation water use budget and management plan

12.20-1.00pm Steve Wait

How to manage and adapt your OH&S system for a high-use environment

OR

11.00-1.00pm *Henk Smith and friends* Disease ID Workshop

1.00-5.00pm Lunch, Trade Show and afternoon tea

TECHNICIANS

8.00-900am *Briggs and Stratton* Presentation

9.00-9.30am Club Car Golf cart troubleshooting

9.30-10.30am Sylvan Presentation

10.30-11.00am Morning tea

11.00am-1.00pm *John Deere* Workshop by John Deere

1.00-3.00pm Lunch and Trade Show

3.00-5.00pm *Textron* Workshop by Textron

7.00pm - late John Deere Turf Technicians Dinner

THURSDAY 24 JUNE WORKSHOP OPTION

8.00-10.00am Henk Smith and friends Disease ID Workshop

10.00-11.00am Morning tea and Trade Show

GOLF

8.00-8.45am *John Geary* Minimalist golf

8.45-9.30am *Matt Roach*Final results of Warm Season Grass Trials

9.30-10.00am *Andrew Peart* AGCSA bentgrass trial update

10.00-11.00am Morning tea and Trade Show

11.00am-12.15pm *Mark Parker and Andy Hugill* Creating enthusiasm within your team

12.15-1.00pm *lan Reid*USGA handicapping and course rating system

1.00-2.30pm Lunch and Trade Show

2.30-4.00pm Euan Grant, Thom Nikolai, Richard Forsyth, Tim Hicks and Andrew Langford-Jones Green Speed forum

7.00pm-12.00am Syngenta President's Dinner **Syngenta AGCSA**

SPORTSFIELD

8.00-8.40am Dr. Thom NikolaiResearch and reality8.40-9.10am Mark PerhamSportsfield preparation at Eden Park, NZ

9.10-9.50am *Kyle Waters*Sportsfield preparation at Home Depot Centre

10.00-11.00am Morning tea

11.00am-1.00pm Les Burdett, Keith Mitchell Jnr, Graeme Logan and Mal Caddies Short presentations on the variety of events through which sporting curators have to manage their arenas

1.00-2.30pm Lunch and Trade Show

2.30-4.00pm Sportsfield Forum

Panel of various end users looking at sports surfaces from the playing/coaching perspective

7.00pm-12.00am Syngenta President's Dinner Syngenta

AGCSA

TECHNICIANS

8.00-9.00am Alco - Batteries

9.00-9.30am Wurth - Spare parts

9.30-10.00am *Lubrimax* Grease is the word

10.00-11.00am Morning tea and Trade Show

11.00am-1.00pm *Toro*My Turf and alternate power sources

1.00-2.30pm Lunch and Trade Show

2.30-3.30pm Enware Safety systems

3.30-4.00pm *STS* Blades and tines

7.00pm-12.00am Syngenta President's Dinner syngenta ◆AGCSA

DISCLAIMER

All times and sessions presented in this guide were correct at the time of going to print. Please check the conference registration desk or TV screens within the GCCEC for any changes to the education session timetable.

THURSDAY 24 JUNE GENERAL MANAGERS

9.00-9.45am *Euan Grant* Keeper of the Green - Turnberry, UK

9.45-10.30am Madgwicks
National Employment
Standard (Fair Work Act 2009)
Where do you stand?

10.30-11.15am Morning tea

11.15am-12.00pm

John Neylan

GMs and supers doing it better

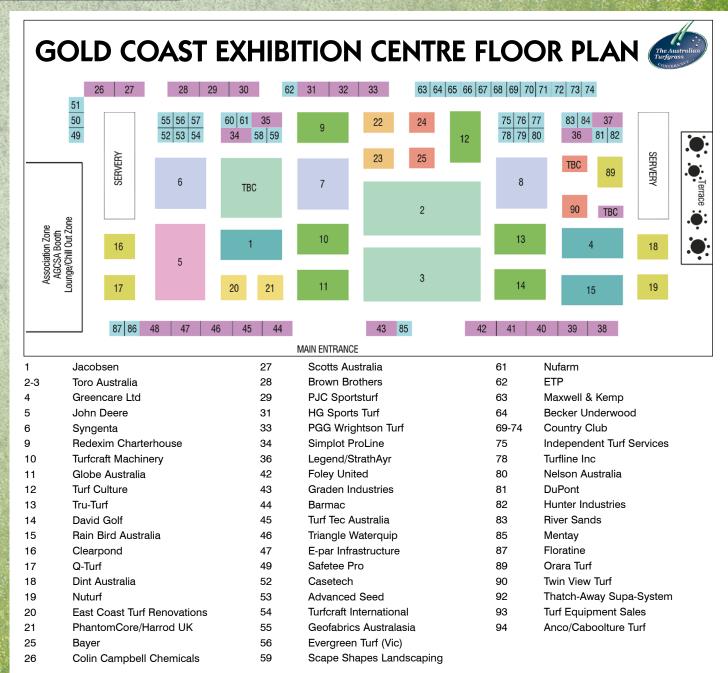
12.00pm MOVE ROOMS 12.15-1.00pm Ian Reid USGA handicapping and course rating system

1.00-2.30pm Lunch and Trade Show

2.30-4.00pm Green Speed forum

7.00pm-12.00am Syngenta President's Dinner

syngenta **DAGCSA**



ADVANCED SEED Advanced

Stand 53

Advanced Seed is a leading importer and provider of turfgrass seed and related products for both the commercial and retail markets throughout Australia. Our products are used by leading racecourses, golf courses, turf farms, local governments and sporting facilities throughout Australia. Our extensive range of both cool- and warm-season grasses allows us to provide the very best selection of products to turf managers. Access to major seed producers and breeders from USA, Europe and New Zealand allows us to provide a product range at the cutting edge of turfgrass research.

These suppliers include Seed Research of Orego, responsible for high performance varieties such as SR4600, SR4420 ryegrass, SR8600 tall fescue, Tyee, 007 and Dominant X-Treme bentgrasses. They are also responsible for some of our warm-season grasses such as LaPrima, LaPrima XD, Veracruz and Yukon. Our other major supplier is DLF who have developed some leading turf type ryegrasses including All*Star 3, Regal 5, Essence and fine fescue varieties such as Longfellow 2 and Cindy Lou. Apart from highlighting our turfgrasses, we will be displaying information on our Evergreen Turf Covers and Earthway Spreaders. Visit Stand 53 where we will be happy to assist you with all your turf enquiries. www.adseed.com.au

ANCO TURF/CABOOLTURE TURF anco

Stand 94

Anco and Caboolture Turf invite all attendees to visit Stand 94 to view the latest in turf products called Transforma. Transforma is providing Australian turf managers with a new stabilised replacement turf system. Following surveys with major stadium managers it was apparent that a natural turf product capable of providing an even profile and rapid root development into the existing profile would be accepted and sought after. With this in mind Transforma was developed.

Developed to provide a stable surface, agronomic quality, compatibility with existing surface types and rapid installation, Transforma has been used at several AFL grounds and golf courses. Available in various grass types, Transforma comes in a 40mm thick profile. Rolls can be custom cut to length and are 1.1 metres wide. Transforma does not split in transport and remains even in profile depth during the laying process. Golf and high wear sports such as football can be played on Transforma immediately after laying. Developed in Australia by turf practitioners, Transforma is currently being grown in Melbourne and Brisbane. Anco and Caboolture Turf look forward to seeing you at the trade exhibition to discuss Transforma and your turf.

BARMAC Stand 44

Barmac will bring a world of technology to the Australian turf manager this year. Barmac is back with every intention of delivering new technologies to the Australian turf industry that are not only world class, but also provide the turf manager with economical solutions. Barmac will be showcasing the new and very successful 2SPEC fertiliser range, along with our unique 2SPEC website and portal. Come and see how easy it is to get your fertiliser made to your specifications. If you want to know the scientifically proven best way to get calcium into turf, then you will be interested in our Manniturf range. Come view our latest DVD illustrating this world class technology.

Technology is the focus in 2010 and if you are looking for some technology to take back to your workplace that will help you manage your busy schedule come and ask us how you can receive your own iPhone 3G courtesy of Barmac, the technology leaders. At Barmac we are putting the right technology in your hands. For more information about how to obtain your iPhone 3G, contact Paul Jackson at pjackson@barmac.com.au. (iPhones only available while stocks last.)

BECKER UNDERWOOD

Stand 64

As a leading supplier to the turf industry, Becker Underwood produces an innovative array of spray indicators, turf paints, lake colourants and an evergrowing line of turf products. Becker Underwood's bio-agronomic line includes Wettasoil Ultra, a 100% non-ionic wetting agent. It is ideal for use on newly seeded or hydroseeded turfgrasses. Wettasoil Ultra alleviates problems associated with localised dry spot. Other products include:

Green Lawnger – a fast and economical way

BAYER ENVIRONMENTAL SCIENCE

Stand 25

Bayer Environmental Science has been a long-term supporter of the AGCSA and we are proud to be a sponsor of the 26th Australian Turfgrass Conference and Trade Exhibition. We look forward to catching up with members of the turf industry at this year's conference. Spring 2010 will be an exciting time with the launch of a new product and a series of seminars for turf managers around the country that will include guest speakers from the USA. With an historically strong position on product stewardship and environmental responsibility, our commitment as one of the principal partners of the Australian Golf Environment Foundation is also part of our ongoing 'Protecting Tomorrow Today' sustainable development initiative; a long-term commitment which we believe is critical for the on-going viability of our industry.

We invite you all to visit our stand to find out about our Spring Turf Seminars and associated product launch.

to keep turf looking healthy and green all year round. Not a dye but an environmentally friendly permanent green pigment that blends in beautifully.

- Turf Mark Blue apply liquid pesticides and fertilisers safely and accurately with this spray pattern indicator, leaving a distinctive colour that shows exactly where you've sprayed and dissipates quickly in all weather conditions.
- Lake Colourant WSP ideal for lakes, ponds, water hazards and large fountains.
- Black Onyx Lake and Pond Colourant create the unique natural look of black water lakes and ponds favoured in golf courses.

For more information visit Stand 64 or call toll free on 1800 558 399.

BROWN BROTHERS ENGINEERS AUSTRALIA LTD

Stand 28

Lowara Pumps combined with Hydrovar variable speed pump controls are fast becoming the best way to minimise and manage irrigation energy cost. Energy savings of up to 70 per cent can be achieved over conventional pumping systems. The Hydrovar is simple to operate, cost effective and can even be retrofitted to other pumps. Lowara has a full range of irrigation pumping products including vertical multistage pumps, end suction pumps, borehole pumps and complete single or multiple pump custom built systems. Brown Brothers Engineers Australia Ltd has over 50 Lowara pump and Hydrovar controller installations in golf courses all over Australia. The number of installations continues to grow as energy consumption and savings become a key decision making criteria for the industry.

CLEARPOND

Stand 16

BECKER

Since 1992, Clearpond continues to be a leading

and exclusive distributor of a wide range of high quality lake management, fountain technology, water entertainment and water garden products throughout Australia and New Zealand. These



include famous brands like world leading Oase products from Germany. Additionally Clearpond also manufactures and distributes its own range of

Clearpond is a true specialist and can provide you the right solutions and products to almost all your water chemistry and water quality issues. We are constantly improving and expanding our product ranges, to provide you the latest in product innovation and quality. Products being exhibited at the conference include lake aerators, water treatments, pumps, ultra violet lights, skimmers and commercial water entertainment equipment.

Clearpond provides both in-house and external training to ensure we keep ahead of our competition. Our standard is defined by the customer's expectations being met or exceeded, not by our perceptions as a supplier. Our goal is to work in partnership with our customers through the use of the latest technologies, careful design and supply of the most appropriate lake management system for that particular application.

COLIN CAMPBELL (CHEMICALS)



Celebrating 70 years in 2010, Colin Campbell Chemicals is proudly an Australian company. We are honoured to be associated with the 26th Australian

quality products to service the aquatic markets.

Turfgrass Conference and Trade Exhibition. This year we have a number of new products on display

- Blazon Blue and Green (non-staining spray indicators);
- Vorlon (the only Group 1 fungicide alternative to the carbendazim ban);
- Dacogreen WeatherShield (the most advanced chlorothalonil with built in sticker); and
- Biff yes we are "bringing back the Biff" for broad spectrum insect control.

As well we have the most comprehensive range of management tools to help you solve disease and pest problems. We welcome all delegates to join us at Stand 26. For more information please call us on (02) 9725 2544 or email info@campbellchemicals. com.au. Website: www.campbellchemicals.com.au. Follow us at twitter.com/campbellturf

DAVID GOLF



Stand 14

David Golf is Australia's largest manufacturer and distributor of golf course hardware, accessories and driving range equipment, with offices in Melbourne, Sydney and Brisbane. This year our trade show booth will feature our various turf divisions along with some major distribution lines. We will showcase products and show specials from David Golf Hardware, David Golf Range, Sports Safety Netting and DG Safety & Environmental. Other brands represented at our booth will include Better Methods hand tools, Enware spill containment and emergency showers, Water Stax treatment systems, Standard Golf hardware and accessories and Underhill irrigation products. Representatives from each of the above companies will be present to answer any of your technical questions.

The 2010 AGCSA trade show is our opportunity to fully launch DG Safety & Environmental - finally a supplier that can answer all your greenkeeping safety needs, with an extensive product range designed specifically for the turf industry. Products include respiratory protection, eye protection, footwear, hand protection, spray suits and much more. Please drop by Stand 14 for all the latest information. David Golf & Engineering Pty Ltd: ph 61 3 9540 0011; fax 61 3 9540 0909; www.davidgolf.

ASSOCIATIONS ZONE

AGCSA **#AGCSA**

Turfgrass Conference, the Australian Golf Course Superintendents' Association is committed to the ongoing professional involved in the golf course maintenance 1000, the AGCSA is growing in size and offers a range of specialist services to help superintendents and their staff who are seeking access to resources, training and networking opportunities.

Visit the AGCSA stand to experience first hand the extensive range of services meet the needs of people working in the golf course maintenance industry. Copies of the AGCSA's award-winning Management Journal, will be available, while merchandise and turf text books will be for sale at discounted prices. New membership applications are always the stand. Current members can renew their membership, update contact details

STA/TGAA STA

the Turf Grass Association (TGAA) are Turf Association was formerly known as we are still proud to be a part of Turf introduction of STA QLD Inc.) conducts greens, schools and councils, with up to date pertinent industry information.

committee members who are dedicated representative bodies for all sports turf-Australia. If you would like to belong to contact your local association or visit our

DINT AUSTRALIA

Stand 18

DINT Australia is proud and honoured to have been commissioned once again to manufacture the magnificent trophies that will be presented during this year's Australian Turfgrass Conference on the Gold Coast. The winners of the Distinguished Service Award, Claude Crockford Environmental Award, Excellence in Golf Course Management Award and Graduate of the Year Award, will all receive a magnificent 22ct gold-plated trophy, hand

made by DINT, depicting the AGCSA logo. These trophies are expertly crafted by our foundry, J.A. Dinte P/L, which has been in business for 80 years.

It is this same experience, expertise and craftsmanship that goes into making the cast bronze tee plaques that so many of Australia's golf courses have displayed on their tees. In recent times there has been a resurgence in the demand for highest quality cast tee plaques. DINT is the leader in this area, providing unrivalled quality, design and finish in this 100 per cent Australian made product. On behalf of DINT, we wish all the nominees and candidates for awards, the best of luck. We trust also, that all conference attendees enjoy the week and we look forward to seeing you on Stand 18.

DUPONT Stand 81

Long before 'green' became the new buzzword, DuPont was focusing research on developing high-performing products with improved safety and environmental attributes. This R&D effort has started to deliver new products. DuPont Acelepryn insecticide provides turf managers with long lasting control of the major turf-damaging insect species. As an unscheduled poison it had few application restrictions and it has extremely low toxicity to nontarget animals such as birds, fish and bees.

Many Australian golf course superintendents now include DuPont Acelepryn as standard within their integrated pest management programmes and are extremely happy with the performance and benefits. In step with our customers, we are 'walking the walk' in making meaningful differences that our generation and future generations will experience firsthand.

In recognition of this innovation and excellence, DuPont Acelepryn received the prestigious 'Best Innovation in Non-Crop' at the 2009 AGROW Awards (Agrochemical industry awards). DuPont is honoured by the recognition of our work to develop better products for the turf industry and invite you to the DuPont Booth (81) to learn more about how to get optimal performance from DuPont Acelepryn as part of your insect control programmes.

EAST COAST TURF RENOVATIONS

East Coast Turf Renovations has been supporting superintendents of golf courses, bowls clubs and sporting grounds since 1999 and we pride ourselves on being an industry leader. Evidence of this can be seen in the quality workmanship presented to customers along the eastern seaboard of Australia from Cairns in Queensland to the Central Coast of New South Wales and west to South Australia.

East Coast Turf Renovations has a wide variety of turf renovation equipment. This enables us to supply all professional turf managers with a selection of different turf renovation methods. East

Coast Turf Renovations constantly searches for new technologies (products and services) to selectively invest in from sources all over the world and locally right here in Australia. This allows us to deliver superior turf management services to the professional turfarass industry, while making the job easier for all turf managers. East Coast Turf renovations can handle any job from scarifying, aeration, topdressing to consulting, green reconstruction or turf maintenance. Of equal importance, East Coast Turf Renovations has a fundamental commitment to continuous improvement of the turf industry - now and in the future. East Coast Turf Renovations renovations made easy.

E-PAR INFRASTRUCTURE 6.00



Stand 47

e-Par Infrastructure (EPI) is a new business dedicated to assisting turf facility owners and managers avoid harm to people, property or the environment. EPI achieves these objectives by offering its clientele a range of professional services and innovative products customised for the turf industry that focus on reducing the risks that hazardous and dangerous goods pose in a turf maintenance facility. Through the long standing involvement of e-par in the turf industry, combined with our engineering design and construction capability, both standard and nonstandard facilities can be designed and built into the maintenance facility Master Plan, whether this is a retrofit scenario or a new facility altogether.

Our services include site audits, risk and compliance assessments; infrastructure Master Planning, built around risks identified; detailed design of maintenance facilities, including DA's and permits; and project management. Our standard products include Multi Function Centre, BinSmart, StoreSmart, FuelSmart and CartSmart Our team at EPI is dedicated to meeting or exceeding the rigorous standards set by our regulators. Come along to Stand 47 to see our technical team who have displays and demonstrations of our innovative products and services available for review.

ETP TURF

Stand 62



Drop by Stand 62 for the opportunity to win one of several 'Turf Manger Super Computers'. These laptops are loaded with a wealth of turf management tools and knowledge to raise your expertise to the next level. ETP Turf is an innovative company that offers an agronomic and technical solution for its customers in conjunction with the first Australian turf products brokerage service where you can access great prices for chemicals, seed and fertilisers no matter where you are or the size of your budget. An example of ETP Turf's technical expertise is its development of TurfScan an analytical measuring technology used to generate efficiencies in your application volumes and superior turf quality.

Jerry Spencer, Jim Porter and Grant Greenway are our senior turf consultants and exclusive contact to this wealth of knowledge is all part of the technical support and service that you will enjoy when dealing with ETP Turf. We look forward to catching up on the Gold Coast and helping you in the future. ETP's goal is to assist turf managers produce superior turf surfaces at a reduced cost. For more information visit www.etpturf.com.au or call (03) 8555 0641.

EVERGREEN TURF Spergreen Stand 56

Evergreen Turf commenced operations Pakenham, Victoria in 1982 and is now a leading turf and services provider to the sports grounds industry. Evergreen Turf has spread its wings to now include ACT and NSW. Recent projects include turfing the Sydney Harbour Bridge in October 2009 for the Crave Festival as well as the supply and laying of the playing surface at the new Rectangular Stadium in Melbourne.

Evergreen Turf can offer a full range of services to all sporting clubs, golf courses, schools and councils. Services range from cultivation of new or existing surfaces, warm-season turf conversion to turf consultancy and management. Evergreen's committed team ensures that every job, big or small, is done to the highest standard with back up support. Evergreen Turf now also offers a range of synthetic turfs to help maintain high traffic areas. Evergreen Turf has a range of turf products available including a new breed of couch called Grand Prix. Grand Prix offers a rapid growth rate with low seed head numbers. It is hard wearing with low water requirements making it idea for the golfing industry. The Evergreen Turf exhibit is at Stand 56 so come and discuss your needs with us.

FLORATINE * FLORATINE Stand 87

Floratine Products Group has been designing and manufacturing high-grade turf nutrient products for nearly 20 years. With its highly trained and dedicated distribution team, Floratine works with turf managers to develop proactive plans that meet your turf management goals and agronomic challenges. Floratine's product line is divided among four general categories - foliar, soil, biological and additional (specialty) products such as wetting agents. Our products assist with plant strength, root development, stress tolerance and recovery, soil structure and chemistry, nutrient content and balance, and moisture and oxygen management. By pursuing this agronomic harmony and working alongside nature, Floratine's product range and philosophy is geared toward achieving optimal results for every individual customer.

Floratine is working with turf managers worldwide to provide scientifically sound and environmentally responsible materials and methods that meet challenges and achieve goals. The strongest turf comes from the correct balance of physical, chemical and biological elements all working together in, on and around the plant. Floratine products are designed to enhance core plant processes, such as photosynthesis and respiration, to provide the strongest turf. The quality and consistency of Floratine's nutrient products, used at the proper application rates, are designed to meet the plant's and turf manager's needs.

FOLEY UNITED



If you are looking for superior grinding equipment, Foley United Grinders are available exclusively in Australia through Toro Australia. The world leader in reel grinding equipment since 1934, Foley offers innovation, ease of use and technical proficiency with spin and relief grinding reels, providing the highest quality grind. Featuring an extensive range of rotary, reel, spin/relief and bedknife grinders, the Foley United range offers technical superiority and performance combined with easy maintenance and use. Elevate your performance, increase cut quality and production with the leading name in grinding equipment. To discover more about the Foley ranges talk to your local golf specialist at the Toro Australia stand and see the difference these machines can make to your golf course. For more information please contact Toro Australia on 1800 356 672 or visit www.toro.com.au

GEOFABRICS Cofabric Stand 55

Geofabrics - Golf has made a name for manufacturing and distributing high quality golf specific products. Our BunkerMat product has become the benchmark when it comes to bunker liners. BunkerMat is recognised around the world for its high UV-stabilised fibres, tensile strength and superior sand-holding capabilities. Geofabrics Megaflo flat panel drainage system is manufactured from recycled plastic out of our Albury plant. Megaflo is now becoming an integral part of golf course design specifications around the world. Architects and designers are seeing the ease and the speed or a trenchless drainage system that is approved by authority bodies like the USGA.

Other products Geofabrics offers to the golfing community include a range of erosion control products such as our Jute matting which is a biodegradable erosion control product. Grassroots is a high density polyethylene mesh that will allow grass to grow between its profile thus reducing wear. Geosynthetic Clay Liner provides exceptional liquid containment. Gabions are not only robust and durable, but when filled with a locally available rock, a natural rock wall can be achieved. We are proud to be an Australian manufacturer providing Australian jobs.

GLOBE AUSTRALIA





Globe Australia has continued its commitment to bring innovative and practical turf products to the Australian turf manager. This year our stand will present our recent release of turf maintenance machinery from international and local manufacturers. We will also be featuring our leading range of Aquatrol soil surfactants and The Andersons DG technology.

Our products, as usual, will be supported by the Globe team of turf professionals including two of our newer members Jeff Lane (Western Australia) and Peter Frewin (Victoria). Both are well known and respected in the Australia turf industry and anxious to discuss and offer turf management assistance. You won't miss the Globe stand just inside the entrance, as you would expect with Globe up front and personal.

GRADEN INDUSTRIES GRADEN

Stand 43

On show this year will be Graden's GSR1200 Greens Roller which has some great new features. Along with the innovative twin split steering heads and the rubber covered drive rollers, the GSR1200 now comes with the option of headlights and electric lift of the in-built tow bar. The lights allow for early morning use of the roller, while the electric lift option makes it a more user-friendly machine, taking all the effort out of lifting and lowering the tow bar into position.

Also new this year is the Seeder Kit option for the Contour Sand Injection Verticutter. This kit enables you to use the CSI Verticutter for verticutting, sand injecting and seeding as well. Early trials in the UK show an excellent germination rate from this process, thereby saving big dollars with less seed required to finish the job. This new option makes the CSI Verticutter an essential tool for the Greenkeeper. Graden machinery, now distributed by Toro Australia in Australia, is renowned for its toughness, reliability and ingenuity. For more details about the Graden range please visit our website or contact your local Toro sales agent. www.graden.com.au

HG SPORTS TURF





HG Sports Turf Pty Ltd is involved in the design and construction of sports fields and supplies both natural turf and synthetic turf to the sports field market. HG Sports Turf markets proprietary products supplied by The Motz Group (USA) and Desso Sports Systems (Belgium). These international partnerships ensure HG Sports Turf is at the forefront of product research and development.

HG Sports Turf has supplied its turf to high profile events including the 2000 Olympic Games (Olympic Stadium), the 2003 Rugby World Cup, the 2006 Commonwealth Games (MCG) and the 2006

Asian Games (Qatar). The company has rebuilt a number of sports fields including the Gabba, Eden Park (NZ), the MCG and AMI Stadium (NZ). One of its proprietary products, TSIII Motz Stabilized Turf, has been used to resurface, in part or in full, many stadiums in Australia and New Zealand, including ANZ Stadium, AMI Stadium, Canberra Stadium, Eden Park, Etihad Stadium, Gabba, MCG and most recently Waikato Stadium. HG Sports Turf has also resurfaced a number sports fields for the AIS, City of Greater Geelong and most recently Skilled Stadium in Geelong. HG Sports Turf recently constructed two Desso Ambition synthetic football fields for the Australian National University.

HUNTER INDUSTRIES Hunter*

Stand 82

As one of the world's leading manufacturers of irrigation equipment for the landscape and golf course industries, Hunter Industries has enjoyed a well-established reputation as the innovation leader in irrigation. We continue to focus on the needs of the irrigation professional, just as we have since being founded 28 years ago. Hunter is the only manufacturer to offer a true total top service valvein-head rotor that is in both adjustable and full circle models. This year we are excited to be displaying the G900 which completes the Hunter Golf range of rotors, our award winning ACC (Advanced Commercial Controller) and Surveyor, our simple powerful central control for golf. Come and visit us at Stand 82 to see more or contact Hunter Industries on (08) 8363 3599.

INDEPENDENT TURF SERVICES

Stand 75

Independent Turf Services (ITS) is an Australian owned and operated company. The business was conceived with one main objective – to service the commercial turf industry with a range of quality products and services designed to meet the needs of turf care professionals. The company manufactures, imports and distributes a large range of goods. The product range encompasses turf seed, specialist fertilisers, chemicals, analytical services, general irrigation equipment and golf course accessories. ITS also leads the turf industry in warm-season grass conversions, which enables the converted surface to remain in play during the establishment period.

As an organisation we are committed to a practical research and development programme which in the past has seen the introduction of many successful chemicals, fertiliser and turf management techniques. This program is industry driven and is the result of ongoing consultation with key turf professionals around Australia. Our customers are serviced directly by ITS trained technical sales consultants, who are all industry orientated and are committed to a high level of customer satisfaction.

JOHN DEERE

Stand 5

When John Deere, a blacksmith from Rutland, Vermont, invented the first commercially successful, self-cleaning plough in 1837, he also forged the beginning of Deere & Company, which has grown to become the world's leading manufacturer and distributor of agricultural and turf care equipment. Today John Deere's success is driven by the same core values - integrity, quality, commitment and innovation, once held by its founding father. That's

how the company has continued to set benchmarks in the ag and turf care industry that only others can follow.

John Deere's long standing experience manufacturing and designing products plus its commitment to leading edge technology has ensured customer needs are always at the forefront. John Deere's golf and turf products are built with performance, comfort, reliability and environmental concerns in mind. To find out how John Deere can tailor a solution to suit your needs visit the team at the





JACOBSEN JACOBSEN



It is fitting that Jacobsen, a Textron company, will release the new Eclipse 322 hybrid ride-on greens mower at the 26th Australian Turfgrass Conference and Trade Exhibition. The Eclipse 322 is set to revolutionise greens management as it is the world's first hybrid mower with no hydraulics. The Eclipse 322 has three power sources - battery, hybrid petrol and hybrid diesel. Features include:

- Better design: no hydraulic leaks, turf damage or hoses to worry about;
- Greater control: set your frequency of clip to suit your conditions. Individual reel control 1, 2, or 3 in any sequence. Once set the operator cannot change XP classic reels (new in 2010) and steering by wire;
- Better operating costs: lower cost of ownership, up to 86 per cent reduction in operating costs, fewer parts to stock, no hoses, seal kits, pumps, linkages; and
- Greener operations: up to 50 per cent reduction in fuel consumption, no waste oil to dispose of, reduced air and noise pollution, no hydraulic oil contamination.

Come and see the new Jacobsen team at Stand 1.

LEGEND COUCH GRASS/STRATHAYR TURF SYSTEMS

Stand 36



Legend Couch Grass is Australasia's premiere couch grass. For over 15 years Legend has continually proven itself as a top performer from elite golf courses and stadiums to parklands and home lawns. Legend has been DNA tested by the University of Queensland and all production paddocks are certified by the AGCSA. Proven performance qualities include excellent recuperative ability after wear, rapid establishment, good winter colour, excellent spring green up rate, low thatch accumulation and excellent recovery after drought stress. Please come by Stand 36 for details of your licensed local producer. www.legendcouch.com

StrathAyr Turf Systems provides turfgrass varieties and turf systems for all applications. The many turf varieties grown in Victoria include Legend Couch, Santa ana, Wintergreen, Sir Walter, Kikuyu, RTF self repairing tall fescue and Bluegrass/Rye. Bentgrass is sent from StrathAvr's Tasmanian farm to golf courses in Victoria, NSW and SA. StrathAyr Turf Systems products include reinforced all-weather turf system for stadia, in use in seven NRL stadiums; StrathAyr Track recently installed at Darley's Osborne Park Training Complex in NSW; portable drop-in cricket wickets; removable turf system for stadia; removable racetrack crossings and natural turf car parking systems. www.strathayr.

MAXWELL & KEMP



Stand 63

Well, here we are again, the annual AGCSA conference has come around. We are really excited about this one being at a new venue and it has been a long time since the Gold Coast has hosted it. This year we will have six M&K staff attending, four from NSW and two from QLD, so we encourage you all to come and visit our stand. For those of you not familiar with M&K, we are a totally independent supplier of fertiliser, chemical and other turf and soil products. We hold direct accounts with all the major suppliers, which makes us competitive in the market.

M&K was established in 1984 and in 2006 we expanded to QLD. All our sales staff have field experience and are all qualified greenkeepers. We are very proud of our team and the reputation they uphold within the industry. On our stand this year we will be running a range of promotions and giveaways from our different suppliers, so we look forward to seeing you all at the Gold Coast.

MENTAY COMENCAN

Stand 85

Queensland has been our best state for sales with all the money from grants available through the casinos and gambling. Although it has been cut back in the last couple of years, the grant money gives sporting organisations the opportunity to get gear for not only cricket but tennis and all field sports. Victoria could do with something like this to assist sporting clubs. All of us need to join in and support the funds for getting things going for clubs to make it easy for all people who play sport. Mentay is keen to support and make Australia even better.

NELSON AUSTRALIA Stand 80



Nelson Australia, Australia's leading distributor of technically advanced irrigation equipment, is proud to be showcasing Hunter's range of golf irrigation equipment. All the popular Hunter golf products will be available on display, including the Hunter G800

Rotor Series which is one of Australia's most widely used golf irrigation products. The G800 features complete access from the surface for maintenance without the need for unsightly excavation. Also on display at the Nelson stand is the Hunter AGC Controller which is gaining a reputation for providing a fresh approach to the traditional golf field controller with an information-packed, video-like display. The AGC Controller is completely programmable from a convenient and removable face pack. For the golfing maintenance professionals, there will be the Surveyor software and the new release IMMS 3.0 software available for demonstration.

Of course, Hunter's wide range of turf irrigation products will be also be on display, including the popular rotary sprinklers and the Smart-Water approved MP Rotator, plus many more water-efficient products such as valves, controllers, central controllers and weather sensors. Nelson Australia invites you to make the most of this opportunity and visit Stand #80 for a free catalogue and pricing information, obligation free.

NUFARM Stand 61 Nufarm

Nufarm, the largest pesticide chemical company in Australia, has had a strong focus in the turf and amenity horticulture industries for the past three decades. Nufarm currently has more than 30 registered turf and amenity products. Our products go through extensive research and development programmes prior to commercial release and are specifically designed to perform in the tough Australian conditions.

Nufarm is the only manufacturer of non-crop products in Australia with an extensive network of regional service centres. These centres are based in key geographical areas which allows Nufarm to store products closer to you, enabling them to be available in the shortest possible time. Armed with a team of technical specialists offering support and local know-how, Nufarm has all your plant protection requirements covered. Come and see the Nufarm stand to discuss how we can maximise your plant protection budget.

NUTURF AUSTRALIA PROVIDENCI SOLUTIONS

Stand 19

Nuturf Australia Pty Ltd is the leading distributor of products and technical services to the professional turf industry throughout Australia. Our national network of sales specialists provide a comprehensive range of products and services to our valued customer base. Our mission is to deliver to the Australian turf and amenity horticulture industry products, services and technical solutions above and beyond the expectations of our valued clients. Our commitment is to our customers, our staff, the environment and the community in which we operate.

Nuturf, Australia's link to the future in turf management and amenity horticultural solutions, is proud to have a stand at this year's 26th Australian Turfgrass Conference and Trade Exhibition so come and see us at Stand 19. We are proud to be releasing several new products at this year's conference, including Nominee, a new wintergrass herbicide for use on bentgrass greens. To find out more, please feel welcome to visit us and talk to one of our many sales and technical specialists who will be present. www.nuturf.com.au

PGG WRIGHTSON TURF

PGG Wrightson

Stand 33

PGG Wrightson Turf is a division of PGG Wrightson Seeds, Australia's and New Zealand's largest seed breeder and producer and will be on Stand 33. This year we are very pleased to announce our partnership with the AGCSA on an education award called the AGCSA PGG Wrightson Seeds Award for Academic Achievement. This is awarded to the nation's most outstanding Turf Diploma student and will be an annual prize from 2010 onwards. Part of the prize is an all expenses paid trip to New Zealand visiting world class golf resorts, international stadiums both for cricket and football as well as a thorough examination of the PGG Wrightson Seeds turf breeding centre at Kimihia on the South Island.

PGG Wrightson Seeds is a research based seed technology company and values higher education in turf as betterment to the industry as well as providing the individual greater career prospects. Please come and say hello to our staff and see how through choosing the right seed from the beginning can make for a better result in the end.

PHANTOMCORE AND HARROD UK

Stand 21 PHANTOMO PRE

Since launching in Hobart, PhantomCore is now in use at several leading stadiums within Australia and New Zealand. PhantomCore is unique in its offering, tailor made to aerate, remove organic matter and improve player/surface interaction characteristics with one machine, all in a single pass. This innovative product utilises a drum core chassis with over three hundred 12mm hollow tines to core and harvest in a single pass. The tine spacing is designed to allow implementation of the overriding turf maintenance principle of 'light and frequent'. This also allows you to aerate year round, no need to wait for a break in play or favourable weather patterns; aerate when your turf needs it, not when your schedule dictates it. The tumble action of the drums ensures only organic matter is removed with root zone material filtering back through the drum as an invisible dusting. Take your facility to the next level - PhantomCore.

Harrod UK is the UK's leading manufacturer of sports ground equipment. From the Manchester Commonwealth Games, the Millennium Stadium,

RAIN BIRD AUSTRALIA

Stand 15

Now more than ever performance counts with your irrigation system. Come and see the exciting new Integrated Control System and the new Eagle Series rotors. Complete confidence in your irrigation system gives you peace of mind. Rain Bird understands your need to get the most from your irrigation Our industry leadership and sole passion is irrigation and we continue our commitment to innovative irrigation solutions every day. Rain Bird Corporation – Golf Division manufactures a wide range of irrigation products for golf courses - pump stations, Rain Bird EAGLE Gear Drive Rotors, field controllers, map-based central irrigation systems, decoders, swing joints, flow meters, filtration systems and valve and irrigation accessories.

Rain Bird Central Control and Pump Station components are serviced and supported by a comprehensive Global Service Plan (GSP). We invented irrigation technology and continue innovating every day. We are the world leader in irrigation expertise with a proven reputation for high quality products and services.

For further information regarding Rain Bird golf course irrigation system expertise, visit us at Stand 15 or contact Rain Bird Australia Pty Ltd on 1800 424 044 or at www.rainbird.com



Twickenham, Wembley to the Emirates Stadium, within the Harrod UK range you will find a product to meet your needs and all are built for quality, strength, safety and performance.

QTURF **Wiedenmann**

Stand 17

QTurf is a Brisbane-based company offering national service as Australia's sole importer and distributor of the Wiedenmann range of products. Wiedenmann, German engineered and proven effective in Australian conditions, comprises a range of equipment vital to the structure and maintenance of quality greens and first class fairways. Australian conditions present challenges to the sporting industry, where quality turf is demanded without compromising environmental consciousness. Wiedenmann has revolutionised the methods and set new benchmarks in speed, productivity and quality, when it comes to aeration. Aeration strikes to the root of the issue, being imperative to successful growth and maintenance of a lush cover of turf in the harsh Australian climate. Decompacting the soil and allowing the roots to penetrate deeper results in more effective use of water and fertiliser. Improved air flow within the soil helps to eliminate thatch and enhances the strength of the grass.

Every function of turf maintenance is covered by the range of aerators, scarifiers, drag brushes, leaf and debris blowers, spike rollers and overseeders. When you have sorted your turf, we can offer you solutions that could help reduce the time taken to beautify your course with fast path edging. The quality and efficiency of the C-Dax Weed Wiper will get rid of those spindly weeds on fairways.

REDEXIM CHARTERHOUSE Redexim

Stand 9

Redexim Charterhouse continues to address the global requirements for more efficient turf renovation

and cleaning equipment for both natural and synthetic turf. Strong relationships and understanding of our clients' needs around the world, in all aspects and at all levels of turf maintenance, allows Redexim Charterhouse to address and meet these needs, while developing new and smarter models to achieve the ultimate results in deep tine aeration, slitting with ability for sand inlaying, coring, scarification, sweeping, seeding, topdressing and synthetic turf maintenance.

With these criteria in mind the Redexim Charterhouse range of products continues to grow with the recent introduction of new machines such as the Sandmaster Vibra, SpeedSeed 2.4 metre, big brother to the popular 1.6m version, the Verti Quake range, five models of pedestrian corers and new synthetic turf cleaning machines which will all contribute to meeting the increasing demands of our industry. Redexim Charterhouse's reputation for quality, reliability, multifunctional applications, ease of use and high safety standards continues and remains paramount in our quest to continue serving our Industry. For more information and to view a range of new-to-Australia machines, visit Stand 9 and chat with our representatives.

RIVER SANDS

Stand 83



An affiliate member of the AGCSA, River Sands is a leading manufacturer and supplier of turf and top dressing sand. River Sands can also blend amendments to the sand if required and can supply specialised organically enhanced sands. With evenly distributed sand particle sizes, our turf sand allows water to penetrate and gradually seep down from the surface to the roots below, at a controlled rate

The water is therefore optimised at the root level. Most importantly, our turf and top dressing sand meets the demanding United States Golf Association Grading Standard for use on putting greens and you can be sure our sand is free of weeds and seeds so you don't have to worry about 'uninvited' guests. Also available in our range of sands is a proven, specialist bunker sand. For further information please visit us at Stand 83.

SAFETEE PRO

Stand 49

Since the early part of this century many state jurisdictions have imposed upon small to medium sized businesses a rigorous set of legal requirements that need to be in place to demonstrate effective and transparent Occupational Health and Safety practices. Safetee Pro gives first hand the benefits that a properly compiled system can have on a business. The system methodology is based on a behavioural approach to safety and has passed the very demanding construction industry head contractor audit process. The system also complies

with Australian Standards, provides on the job training, management review and a consultation mechanisms in an easy to deliver diary based OHS system.

We have from our own experience and from a passionate interest in the prevention of workplace accidents, customised this system to golf course facilities and clubhouse environments. This was initially achieved by conducting a pilot of the Safetee Pro system at Newcastle Golf Club in 2005. In 2006 in cooperation with the superintendent and general manager at Avondale Golf Club this Safetee Pro trial was successfully expanded in the clubhouse and course areas. Safetee Pro is now the standard OHS system in use by many clubs throughout Australia.

SCAPE SHAPES LANDSCAPING SOME SHAPES

Stand 59

Since 1986, Scape Shapes Landscaping has provided the east coast of Queensland with specialist landscaping solutions. Aside from commercial landscape construction, Scape Shapes is also leading the way in terms of water use planning and management, with the biggest challenge of the decade being the cost and availability of water which we have recognised as major priorities for our clients.

Scape Shapes manager of irrigation services, Scott Johnstone, is a certified designer with Irrigation Australia (IAL) and has also had experience in the US auditing golf irrigation systems. Since joining Scape Shapes, Scott has successfully designed and constructed a number of irrigation projects including Rob Akers Oval and is currently designing the irrigation system for the Jack Evans Boat Harbour, a multi-million dollar facelift for Tweed Heads on behalf of the Tweed Shire Council. For more information visit Scape Shapes at Stand 59 at the 2010 conference or contact Scott Johnstone on 0406 317 560 or (07) 5596 0166. With branches on the Gold Coast, Brisbane, Sunshine Coast and Townsville we can assist with all of your irrigation needs.

SCOTTS AUSTRALIA Scotts.



Stand 27

Scotts Australia is part of the Scotts Company, servicing the industry since 1868 and active in Australia since 1993. Scotts is a recognised leader in the industry, producing and supplying specialty fertilisers Sierrablen and Sierraform GT, pest control products MaxGuard, combination products Dicot II, Premax, and wetting agents in the Hydraflo range, plus a new range of turf seeds through the acquisition of The Turf Seeds Company - USA. Scotts' R&D division is located in Europe and we look forward to introducing many new technologies to the industry in the years ahead.

The latest addition to our turf product range is Sierrablen Plus and Fairwaymaster Mini, available

SYNGENTA

Stand 6

Syngenta provides a range of innovative turf protection products in Australia and around the world, and supports them with the highest levels of technical service and support. Syngenta invests US\$2 billion into research and development every year to provide solutions that are specific to the needs of our customers, especially those involved in golf and sports turf. Please visit our website www.greencast.com.au or contact out technical advice line on 1800 067 108.

in 2-3 and 4-5 month longevities. New generation Poly S relies on a dual coated urea granule. This regulates the release of nutrients and significantly reduces the risk of scorch with no spotting. All of the Sierrablen and Fairwaymaster products are produced as a mini prill. This provides 7500 granules per sq/m, six times more than the Sierrablen and SportsMaster standard range. The new Sierrablen and Fairway Master range provides a homogenous prill which guarantees extended longevity, better distribution when spreading and disperses fast into the turf sward, particularly at low mowing heights.

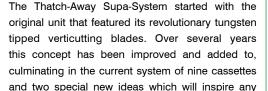


Simplot Proline is once again proud to be a part of the 26th Australian Turfgrass Conference on the Gold Coast. The Simplot Company's mission statement - Bringing Earth's resources to life embodies our reason for being in business and it is our dedication to customer satisfaction through our products and services that recognises Simplot Proline as an industry leader in innovation and efficiency.

As a leader in turf nutrition and plant protection we will be showcasing our BEST granular fertiliser along with our Simplot Liquid range, the most complete nutrition range available. Syngenta and Nufarm are widely regarded for their chemical range and knowledge and we are proud to be associated with these leaders in plant protection.

We will be introducing Profile, a soil amendment that boosts CEC and retains moisture while increasing infiltration rates, along with other new developments to our extensive product list. Don't miss the opportunity to join our exclusive Greenmaxx Club. Membership not only entitles you to a free shirt but also puts your club into the running for free 1000 litres of our hugely popular Greenmaxx. Also, visit Stand 34 to see how to enter to win a trip to the 2011 GCSAA Show in Florida.

THATCH-AWAY SUPA-SYSTEM



superintendent who wants the best for their greens.



TORO AUSTRALIA

Stand 2 and 3

If you've ever wondered how Australia's leading golf courses have the most flawless surfaces, then look no further than Toro. Toro Australia continues to provide unparalleled service and new technical advances across all of its everexpanding fleet. Each Toro model is designed to make the job safer, easier, more economical and kinder to the environment, while making your course one of the finest.

Working hand in hand with the latest machinery, Toro Irrigation supplies ongoing solutions, water saving technology and competitive financial solutions. As part of this, Toro Australia is also committed to the AGCSA Water

Initiative and the AGCSA's Australia Golf Environmental Initiative.

Providing support from the ground up, Toro specialists and service teams work closely with leading golf courses and turf managers to ensure the delivery of the right machinery and a dedicated tech team for on-going service and support across both irrigation and equipment. In fact, Toro's after sales and technical support is unsurpassed in the industry. Whether it's a championship golf course or your own golf club, the name Toro is synonymous with golfing paradise. Discover the Toro difference and be a part of the finest turf equipment story in Australia. For more information please contact Toro Australia on 1800 356 672 or visit www.toro.com.au

TORO

This system can be fitted to all leading brands of triplex mowers and being a cassette system the units have the versatility of doing many different jobs well, making grounds maintenance work on all types of greens that much better. Much thought and practical experience has gone into the design of the system making it one of the leading turf machinery developments of recent years. This unit is compact which gives it stability when following the green contours.

TRIANGLE WATERQUIP



Stand 46

Triangle Waterquip is an Australian owned company that has been established for nearly 25 years as a major distributor and supplier of irrigation equipment to the golf course, commercial turf and agricultural markets. Triangle Waterquip has been and continues to be a major supplier of filtration and fertigation equipment to the golf course industry Australia wide.

Over the years the range of fully automatic selfcleaning screen filters and ITC fertigation injection pumps have developed a reputation for reliability and dependability and now even more so as many golf courses need to rely on treated effluent water for irrigation. In addition to the range ITC electric fertigation injection pumps and fully automatic selfcleaning screen filters on display you will also be able to view and discuss water meters, hydraulic control valves, impact sprinklers, manual and semiautomatic filtration equipment.

Triangle Waterquip has established a sound reputation for problem solving and supplying tailored solutions, so please take advantage of this opportunity to discuss any application you may have. Head Office: Melbourne with branch offices in Perth, Sydney and Brisbane. Key Contacts: Wally Menke (managing director) and Gary Horton (national marketing manager).

TURFCRAFT INTERNATIONAL TRECRAFT



Stand 54

The TurfCraft team of Alastair Dowie and Ed Kryskow invite all readers and interested people to call in at our stand at the trade exhibition. We will be demonstrating our new searchable CD which includes stories from the past five years of TurfCraft. We will also have special subscription offers to new subscribers and to existing subscribers who extend their subscription. We would also welcome feedback and any ideas for the magazine. TurfCraft is proud to be involved with the Australian Turfgrass Conference and Trade Exhibition.

TURF CULTURE TURF



Stand 12

Turf Culture's aim is to develop innovative and professional products for the turf market. We develop products for a wide range of uses that will help turf managers establish, maintain and manicure their turf surface to the highest quality. Turf Culture is the leading independent developer of plant protection products and technical support to the professional turf industry throughout Australia and New Zealand. Our national network of distributors and agents provide comprehensive coverage for all products

The only focus of Turf Culture is turf. We are an Australian-owned independent company and where possible we manufacture our products in Australia, a rare practice in the chemical industry. By doing this our products generate jobs, security and strength to the Australia workforce and economy. Most of our competitors do not share the same links to Australia in terms of ownership and manufacturing. All of our products come with a formulation guarantee, which ensures that the turf manager can be extremely confident he is applying a quality product. The core segments of the turf industry business on which we focus are golf courses, bowling greens, racetracks, councils and sports-fields, spray contractors, turf farms and schools.

TURF EQUIPMENT SALES

and services to our valued clients.

Stand 93

Turf Equipment Sales is a proudly owned and operated Australian company and have been servicing customers throughout Australasia for over 25 years. We have a highly skilled and knowledgeable team who are experts in their field and we pride ourselves in the highest quality service and products. We not only offer our customers the best in expert advice, we are a company that understands that each job and each client needs customised solutions and support.

Turf Equipment Sales is unique in its offerings. We are small enough to be flexible but big enough to enable our clients to get the best deals in Australia. That's why we are trusted suppliers to golf courses, commercial trade, agricultural companies

as well as independent sports clubs and clients. If you have a job that needs specialist equipment to lease or own talk to Turf Equipment Sales first, we are leaders in reconditioned and fully serviced second hand equipment. Our products are good as new, without the price tag.

TURFLINE TRUE-SURFACE®



Stand 78

True-Surface by Turfline offers quality products along with quality service. The True-Surface Vibe VTM Vibratory Greens Rollers will leave your greens healthy, smooth and consistent. The Vibe VTM is also the least disruptive method to shake in topdressing, remove dew and smooth your greens after core aerification. The True-Surface Greens Care Collection (GCC) has 11 different interchangeable inserts, making it one of the most versatile products on the market. The GCC is easy on you and your budget. Switch from multiple cultural practices without having to switch machines. Inserts include Vacu-Cutter (32 blades and 45 blades), Vacu-Scarifier, Vacu-Groomer, Vacu-Brush (soft, super soft and firm), Deep Slicer, Star Slitter, Greens Spiker and NV Greens Roller (non-vibratory). The True-Surface Trekker takes both the GCC and the Vibe VTM and attaches them to your walk-behind greens mower. It will fit the Toro Flex 21, Jacobsen Eclipse and John Deere 220E-Cut units.

TURF TEC AUSTRALIA

Stand 45

Turf Tec Australia has been manufacturing specialised Australian made turf machinery since 1980 and is proud to be a part of the 26th Australian Turforass Conference and Trade Exhibition on the Gold Coast. Turf Tec Australia's products are now available factory direct in Australia or exclusively in New Zealand through John Deere Farm Services or D&E Pro-Turf. We also export factory direct to Singapore, Hong Kong and South Africa. A number of our products will be on display on both our stand and the Turfcraft Machinery Australia stand as they are an agent.

Apart from manufacturing our standard machines we can custom make machinery to your requirements from modifying a standard machine slightly to one-off machines bringing your concept to life. So if you have any questions about our machines, modifications or custom built machines call in and see us for a can do attitude at Stand 45, freecall 1800 887 383, visit www.turftec.com.au or email info@turftec.com.au

Disclaimer: All stand numbers were correct at the time of this edition going to print.

PRINCIPAL SPONSORS









SUPPORTING ORGANISATIONS

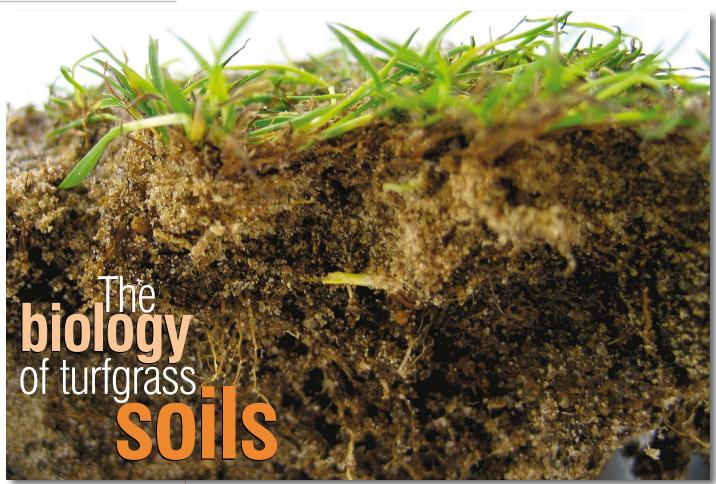












The concentration of microorganisms is at its greatest in the top 5cm of soils. This area, known as the rhizosphere, is home to a thriving ecosystem of beneficial fungi, bacteria and actinomycetes

AGCSA agronomist John
Geary gets his hands
dirty and takes a detailed
look at the soil microbial
community and the
roles micro and macro
organisms play.

n some respects when it comes to sports turf management, a strong argument could be made that soil biology is the forgotten side of soil science. This is particularly true when looking at the topic of greens construction, specifically sandbased constructions with soil physics and soil chemistry tending to dominate discussions.

In recent years, however, considerable progress has been made in furthering our understanding of microorganisms and their function in soils supporting turfgrass growth. Over the past 10 years or so we have also seen a sharp increase in products aimed at promoting soil microorganisms introduced to the turf market.

To take full advantage of such products it is important turf practitioners understand that the vast majority of micro and macro organisms play a vital

TABLE 1: NUMBER AND LIVE WEIGHT OF MICRO ORGANISMS IN SOIL

Microbial	Soil	Biomass
Group	Population	(kg/100m²)
	(cells/gram)	
Bacteria	Up to 200 million	6
Actinomycetes	Up to 100 million	8
Fungi	Up to 1 million	17
Protozoa	Up to 100,000	4
Yeasts	Up to 100,000	2
Algae	Up to 50,000	1.5

Source: Nelson, Cornell University, Grounds Maintenance, March 1997

and beneficial role in soils. Many who have studied soils will be familiar with the chart presented in Figure 1 outlining the major components that make up soil. Interestingly, only 4-6 percent of the total volume of soil is made up of organic matter.

Organic matter can be described as 'plant and animal residues in varying stages of decomposition.' Over time and after considerable decomposition, it is eventually broken down and converted to brown/black complexes which appear to be relatively structure-less which is known as humus (Cooper, 1995-96). Humus is particularly important in soil biology as it contains organic carbon and nitrogen needed for microbial development and is thus the major food reservoir for micro-organisms.

Figure 1 also illustrates that living organisms make up only around 1 percent of soils. Even so, soils contain millions of organisms per gram (see Table 1) with the micro organism component consisting primarily of bacteria, actinomycetes, fungi and algae. Larger organisms, known as macro organisms also play an important role such as protozoa, nematodes and earthworms.

Beneficial soil microbes play a number of important roles such as the decomposition of organic matter, including thatch. Organic matter such as clippings, fragments of cell walls, leaking cell contents, dead roots and stems are a major food source which when broken down produce microscopic particles and molecules such as humates and humic acids. In doing so, the microbes

cause nutrients tried up in organic matter to be released back into the soil, as well as creating sticky organic molecules that allow soil to form good crumb structure, preventing the leaching of nutrients (Ford, 2002).

Microbes can also play a vital role in decomposing pollutants such as waste oils, toxins and pesticides while some soil microbes have the ability to produce chemicals that repel or kill disease-causing fungi. The fungi *trichoderma*, which is marketed commercially as Trichopel and Trichloflow Turf, has been well studied and researched and has proven effective at repelling root pathogens such as *pythium*, *rhizoctonia*, *phytophthora*, *sclerotinia* and *verticillium* (Handreck & Black, 2007).

Soil microbes also feed on each other which help balance out any one organism building up a dominant population capable of damaging turf. An example of this are predatory nematodes which feed on other nematodes and have the potential to control plant parasitic nematodes which can be so damaging to sports turf.

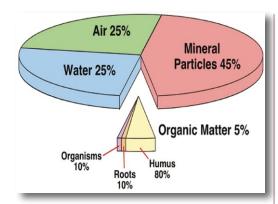
Entomopathogenic nematodes, known as EN nematodes, are another example of microbes controlling pests. Extensive research undertaken by Dr. Robin Bedding of the CSIRO Entomology team in Canberra has proven ENs provide effective biological control of a range of insect pests such as Argentine stem weevil and African black beetle.

This is achieved by the EN nematodes entering the blood stream of the insect larvae whereby they release a bacterium that multiplies and kills the insect. The bacteria then convert the insect into a suitable food for the nematodes which breed in massive numbers, which in turn feed on surrounding stem weevil and black beetle larvae. ENs have been used successfully on sports turf surfaces across Australia to control a variety of insect pests such as billbugs, red headed cockchafers, Argentine scarabs and various cutworm pests (Handreck & Black, 2007).

The concentration of microorganisms is at its greatest in the top 5cm of soils. This area is otherwise known as the 'rhizosphere' which is home to a thriving ecosystem of beneficial fungi, bacteria and actinomycetes. It is through the rhizosphere that all water and nutrients taken up by the plant must pass and it is through the rhizosphere that any microorganisms which will affect plant roots must act (Handreck & Black, 2007).

To help promote a healthy, vibrant rhizosphere it is thought plants leak sugars and nutrients out through their root systems which microbes feed on. In return, beneficial microbes help protect roots from invading pathogenic fungi.

One well known group of rhizophere fungi, the mycorrhizae, have been proved to improve plant hardiness in phosphorus deficient and dry soils by supplying extra P and water to the plant (Ford, 2002). Mycorrhizal plants have also been shown to have improved drought resistance, being able



to tolerate higher soil temperatures than plants not infected.

Having outlined some of the beneficial functions of soil microbes, let's take a more detailed look at the soil microbial community and the roles micro and macro organisms play.

BACTERIA

Bacteria are single cell organisms without a nucleus and are usually present in greater numbers than the other groups combined. Most types feed on simple sugars and organic matter in the soil with bacterial populations contributing a range of benefits to plant growth. Included in these are nutrient cycling, soil aggregation, solubilisation of immobile elements, competition with pathogenic organisms, organic matter decomposition and the production of photohormones (Nelson, 1998).

Some bacteria are able to feed on pesticides and herbicides, preventing their build-up in soils to levels which are lethal to plants, while some bacteria use other soil life such as fungi as a food source.

Bacteria numbers are greatest in clay soils, being held adsorbed to clay and humus particles and in slimy excretions. The type and number of bacteria present can be extremely diverse, being largely dependent on soil type and cultivation practices, with bacterial species found in soils being nearly all beneficial to soil and plant health (Ford, 2002).

Figure 1. The major components that make up soil

In recent years considerable progress has been made in furthering our understanding of microorganisms and their function in soils supporting turfgrass growth





ACTINOMYCETES

The group of microorganisms known as actinomycetes are numerous and widely distributed in soils and composts. They are classed as saprophytes meaning an organism living on dead organic matter. Most actinomycetes need oxygen and many grow best at temperatures between 45-65°C.

Actinomycetes, which are strictly speaking classified as bacteria, produce slender, branched filaments that develop into mycelium. Individual hyphae are similar to those of fungi, but are much narrower in shape.

Actinomycetes are very effective at decomposing thatch, particularly complex organic molecules such as cellulose, lignin and chitin. They are also involved in the formation of humus and humus-type compounds and are quite prevalent in composts and clipping piles. None of the actinomycetes species are pathogenic to turf, with a number of species capable of producing chemicals that repel or kill nearby organisms.

FUNGI

In agricultural soils, fungi are responsible for a large percentage of the soil's biomass due to the large, extensive hyphae they produce. Fungi do not contain chlorophyll and are excellent at decomposing organic matter, being involved in the degradation of complex molecules such as cellulose, pectin, ligin, hemicellulose and starch.

Fungi are generally more dominant in acid soils while improving soil structure and aggregation by physically binding together soil particles. All major turf diseases are caused by fungi such as *pythium*, *rhizoctonia*, *sclerotinia* etc while *basidiomycetes* fungi are associated with the development of hydrophobic dry spots in sandy soils.

ALGAE

Most algae contain chlorophyll and because light is necessary for their survival and growth, most are found on or near the soil surface. The most common types of algae include blue-green and green. Providing improved turfgrass growth conditions, minimising light penetration and reducing surface soil moisture are essential cultural practices for controlling algae.

PROTOZOA

Protozoa are the simplest form of animal life in soils and are generally found in the upper 150mm of soil. Protozoa are single celled animals which feed on organic matter and other soil microbes with some being cannibalistic. Little is known regarding their function, however, it is believed their primary function is regulating bacterial populations.

NEMATODES

Nematodes are microscopic worms, which include species which attack plants as well as free-living, non-pathogenic nematodes. Free-living nematodes feed on fungi, bacteria, algae, actinomycetes, protozoa and other nematodes.

Plant parasitic nematodes have a piercing, sucking mouthpiece (stylet) which is used to suck nutrients from plant roots. Plant parasitic nematodes are considered a major pest of turfgrasses, especially when found in light, well aerated sandy soils. A useful non-chemical control measure is to flood the area for 48 hours during cool weather, limiting the supply of oxygen in the root zone.

EARTHWORMS

Earthworms are probably the most important soil macrofauna and it is well known that a healthy earthworm population improves soils by:

- Earthworm channels increasing the infiltration of water into the soil, while improving soil aeration and drainage;
- Increasing the rate of organic matter decomposition; and
- Increasing the amount of water held in a soil by improving soil structure.

Earthworms also play an important role in soil fertility. While inside the earthworm, organic matter and mineral soil are subject to digestive enzymes and grinding which alter the soil. Earthworm casts are typically higher than native soil in bacteria, organic matter, N, P, K, Ca, Mg, pH and cation exchange capacity (Handreck & Black, 2007)

All microbes are greatly influenced by environmental factors such as pH, temperature, moisture, aeration and organic matter content. In the next instalment of Tech Talk, these environmental factors will be discussed in detail together with an overview of soil microbiology of sand-based constructions.

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GOT A PROBLEM?

If you have a particular technical topic you would like Tech Talk to address in future editions, then contact Australian Turfgrass Management editor Brett Robinson on (03) 9548 8600 or email brett@agcsa.com.au



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RESEARCH

The DEEDI greens test facility at Redlands Research Station. This acted as the centralised testing venue for the duration of the warm-season greens project with a number of additional trial sites in Queensland, NSW, Victoria and South Australia



Matt Roche (DEEDI), Jon
Penberthy (DEEDI) and
John Neylan (AGCSA)
provide a technical
summary of the major
findings to emerge from
the extensive warmseason greens grass trials
conducted at various sites
around Australian between
2006 and 2009.

fter more than 30 years in which Tifgreen and Tifdwarf were the only greens-quality warmseason turf varieties available, the choice for golf courses and bowls clubs in northern Australia has been expanded to include six new *Cynodon* hybrids [*Cynodon dactylon* (L.) Pers x *Cynodon transvaalensis* Burtt-Davy]. Five of these – Champion Dwarf (Texas), MS-Supreme (Mississippi), FloraDwarf (Florida), TifEagle (Georgia) and MiniVerde (Arizona) – are from US breeding programmes, while the sixth, TL2 (marketed as Novotek) was selected in north Queensland.

The finer, denser and lower growing habit of the 'ultradwarf' cultivars allows very low mowing heights (e.g.: 2.5mm) to be imposed, resulting in denser and smoother putting and bowls surfaces. In addition to the *Cynodon* hybrids, four new greens quality seashore paspalum (*Paspalum vaginatum* O. Swartz) cultivars including Sea Isle 2000, Sea Isle Supreme, Velvetene and Sea Dwarf (where tolerance of salty water is required) expands the range of choices for greens in difficult environments.

This project (HAL Project TU05001) was developed to determine firstly the appropriate choice of cultivar for different environments and budgets, and secondly best management practices (BMPs) for the new cultivars which differ from the *Cynodon* hybrid industry standards Tifgreen and Tifdwarf. Management practices, particularly fertilising, mowing height and frequency and thatch control were investigated to determine optimum management inputs and provide high quality playing surfaces with the new grasses.

To enable effective trialling of these new and old cultivars it was essential to have a number of regional sites participating in the study. Drought and financial hardship of many clubs presented an initial setback with numerous clubs wanting to be involved in the study but were unable to commit due to their financial position at the time.

The study was fortunate to have seven regional sites from Queensland, New South Wales, Victoria and South Australia volunteer to be involved in the study which would add to the results being collected at the centralised test facility being constructed at DEEDI's Redlands Research Station. We cannot express enough thanks to the following superintendents and their specialist teams at each of the participating clubs which saw merit in the study and successfully had the request to be a collaborator in the project approved by their committees.

Charlie Giffard (Indooroopilly Golf Club, QLD)

Peter Lonergan (Coolangatta & Tweed Heads Golf Club, QLD)

Pat Pauli (Horton Park Golf Club, QLD); Daryl Sellar (Glenelg Golf Club, SA);

Dave Thomson (Bermagui Country Club, NSW); Gary Topp (Twin Waters Golf Club, QLD).

Thanks also goes to Bruce Macphee at Chisholm TAFE who provided his students with a great opportunity to see how warm-season grasses perform on Victoria's Mornington Peninsula.

The major research findings acquired from the eight trial sites included the following which can be broken down into seven broad categories.



THATCH MANAGEMENT

All of the new second generation ultradwarf couchgrasses tend to produce a large amount of thatch with MiniVerde being the greatest thatch producer, particularly compared to Tifdwarf and Tifgreen. The maintenance of the new *Cynodon* hybrids will require a programme of regular dethatching/grooming as well as regular light dustings of sand. Thatch prevention should begin 3-4 weeks after planting a new ultradwarf couchgrass green, with an emphasis on prevention rather than control.

GREEN SPEED

The ultradwarfs produced faster green speeds than the current industry standards Tifgreen and Tifdwarf. However, all *Cynodon* hybrids were considerably faster than the seashore paspalums (comparable to the speed difference of bentgrass and couchgrass) under trial conditions. Green speed was fastest being cut at 3.5mm and rolled (compared to 3.5mm cut, no roll and 2.7mm cut, no roll).

DISEASE INCIDENCE

All trial sites reported the occurrence of disease in the *Cynodon* hybrids with the main incidence of disease occurring during the dormancy period (autumn and winter). The main issue reported was patch diseases which included both *Gaumannomyces* and *Rhizoctonia* species.

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There were differences in severity of disease between cultivars, however, the severity of the disease was not consistent between cultivars and is largely attributed to an environment (location) effect. In terms of managing the occurrence of disease, the incidence of disease becomes less severe where there is a higher fertility rate (about 3kg N/100m²/year) or when a preventative fungicide programme is adopted.

MOWING HEIGHTS

Cynodon hybrid and seashore paspalum cultivars maintained an acceptable to ideal surface being cut between 2.7mm and 5.0mm. Ultradwarf cultivars can tolerate mowing heights as low as 2.5mm for short periods but places the plant under high levels of stress. Greens being maintained at a continually lower cutting height (e.g.: 2.7mm) of both species is achievable, but would need to be cut daily for best results.

The seashore paspalums performed best when cut at a height of between 2.7mm and 3.0mm. If a lower cutting height is adopted, regular and repeated mowings are required to reduce scalping and produce a smooth surface.

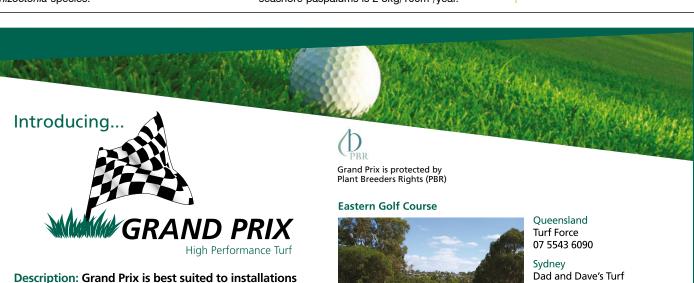
FERTILISATION

At this point in time the optimum rate of nitrogen (N) for the *Cynodon* hybrids is 3kg/100m²/year, while the seashore paspalums is 2-3kg/100m²/year.

Full cover being achieved on both fairways n between ten and fifteen weeks.



DEEDI technical staff remove large amounts of thatch from the *Cynodon* hybrid cultivars. All of the new second generation ultradwarf couches tended to produce a large amount of thatch



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DEEDI technical staff applying fertiliser treatments to the Redlands plots. A key component of the trial was to investigate best management practices for the new ultradwarf cultivars

Below: Cynodon hybrid cultivars

Below right: Seashore paspalum

cultivars trialled as part HAL

Project TU05001

trialled throughout the project

DORMANCY

Dormancy occurred for all *Cynodon* and seashore paspalum cultivars from north in Brisbane (QLD) to south in Mornington Peninsula (VIC) and west to Novar Gardens (SA). *Cynodon* and paspalum growth in the cooler climates of Victoria and South Australia was less favourable.

VARIANCE

After combining the data collected from all eight sites, the results indicated that there can be variation (e.g.: turfgrass quality, colour, disease resistance, performance) depending on the site and climatic conditions. Such evidence highlights the need to undertake genotype by environment (GxE) studies on new and old cultivars prior to conversion or establishment.

From the above findings, if a club is looking to select either a new *Cynodon* hybrid or seashore paspalum cultivar for use at their club it is recommended they should consider the following:

- Review the research data;
- Look at trial plots;
- Inspect greens in play that have the new grasses.
- Select 2-3 cultivars that are considered to be the better types;
- Establish them in large plots/nursery/practice putter which are big enough to putt on. Ideally the area should be subjected to wear;
- Maintain them exactly as they would be on the golf course/bowls green. This is a critical aspect.
 Regular mowing, fertilising etc. is essential;

- Assess them over at least 2-3 years;
- Make a selection and establish it in a playing green so that it is subjected to typical wear.

CONCLUSION

The above data aims to provide just a technical summary of this extensive project. The final Horticulture Australia report is available in its entirety from the HAL website http://www.horticulture.com. au/reports/search_final_reports.asp.

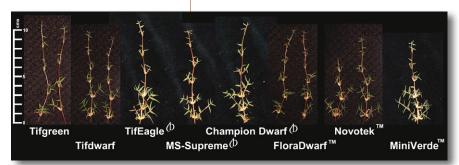
As for the future of the DEEDI warm-season greens trial site, it is likely that additional funding will be sought from HAL to further investigate BMPs for thatch and disease control etc. An application will only be submitted if there is sufficient industry support in the form of voluntary contributions (VCs). For more information on this please contact Matt Roche on (07) 3286 1488 or email Matt.Roche@deedi.qld.gov.au.

ACKNOWLEDGEMENTS

The authors wish to thank the following funding sources which made significant contributions to allow this study to take place. They include: Horticulture Australia Limited; industry organisations Bowls Queensland, Queensland Golf Union, Victorian Golf Association, South Australian Golf Course Superintendents Association, Golf Course Superintendents Association of Queensland, AGCSA and the State of Queensland through the Department of Employment, Education, Development and Innovation.

Commercial industry support for this project was extremely gratifying. Numerous financial or in-kind contributions enabled the construction of essential infrastructure such as the building of the Redlands greens test facility and the collection of necessary maintenance equipment for staff to successfully undertake studies. Supporting companies included: David Burrup Golf Course & Sports Turf Design, Southern Pacific Sands, Twin View Turf, Jimboomba Turf, Root Barrier, Rain Bird, Hydro Pumping & Controls, Globe Australia and Moreton Institute of TAFE, John Deere & BHM Machinery, Power Turf, Tru-Turf and Toro Australia.

Editor's Note: Matt Roche will provide a more in depth look at the results from this project during the 26th Australian Turfgrass Conference on the Gold Coast – (Golf Stream - 8.45am-9.30am, Thursday 24 June).









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Summer **bentgrass** and use of biostimulants

and PGR's

The decline in turf quality and root growth of creeping bentgrass is a major concern in managing bentgrass greens in warm climatic and transitional regions. Rutgers University researchers Bingru Huang and Yan Xu have investigated whether foliar application of trinexapacethyl and two biostimulants containing seaweed extracts would alleviate summer decline.

reeping bentgrass (Agrostis stolonifera L.) grows vigorously during spring and autumn, but turf quality often declines during summer months, referred to as summer bentgrass decline syndrome (Carrow, 1996).

Summer bentgrass decline is a major concern of superintendents growing creeping bentgrass on putting greens, especially in warm climatic and transitional regions. Heat stress is a primary factor leading to the decline in turf quality and physiological activities of creeping bentgrass (Huang, 2001). Summer bentgrass decline is characterised by a thinning of the turf canopy, leaf senescence and root dieback. Root dieback inhibits the production of cytokinins, a class of plant hormone that are primarily produced in roots, which in turn affect shoot growth and senescence.

Management practices such as irrigation, fertilisation, mowing, pesticide use and soil cultivation are primarily used in managing stressed turf. In recent years, however, there is increasing interest in using organic compounds or natural products for promoting turfgrass health due to stringent environmental regulations and negative public perceptions of pesticides and fertilisers.

Some golf courses apply various compounds on bentgrass, hoping to improve turf growth during summer months. Incorporation of management practices such as use of natural products or plant growth regulators (PGRs) that may promote shoot and root growth would favour creeping bentgrass survival in the summer.

Summer decline is a major concern of supers growing bentgrass on greens, especially in warm climatic and transitional regions.

PGRs have been available in turfgrass management for several decades. This broad class of compounds is traditionally used in turfgrass management for suppressing seedhead formation and inhibiting vertical shoot growth to reduce mowing and control weeds in low maintenance areas, such as roadsides and golf course roughs.

Since the 1980s, many new chemicals have been developed that have improved efficacy and reduced phytotoxicity. In recent years, there has been increasing interest among superintendents in utilising PGRs for multiple purposes, such as enhancing overall turf quality, promoting a smooth and uniform playing surface and improving stress tolerance in higher maintenance areas. The use of PGRs has, therefore, become almost a standard practice in turfgrass management on golf courses.

A PGR inhibiting cell elongation, trinexapac-ethyl (Primo), has been mainly used for clipping reduction and improving general turf quality (Fagerness et al., 2002; Lickfeldt et al., 2001; McCullough et al., 2005). Recently, trinexapac-ethyl has been found to be effective in improving turf performance under unfavourable environmental conditions, such as shade (Ervin et al., 2004; Goss et al., 2002), freezing (Fagerness et al., 2002), heat tolerance (Wang et al., 2006), and combined drought and heat stress (McCann and Huang, 2007).

Some natural products can stimulate plant growth and development and are classified as plant growth promoters or collectively named biostimulants. Numerous organic products, claimed to have the functions as biostimulants, have emerged in recent years. The variety of ingredients in these products is remarkable (Karnok, 2000). Biostimulants may include carbon sources. humates, microbial suspensions or powders and hormone-containing products such as seaweed extracts. Among them, seaweed extracts are widely used in various biostimulant product formulations.

Seaweed extracts contain a large number of organic compounds such as cytokinins, auxins, amino acids, vitamins, simple and complex sugars, enzymes and proteins, as well as inorganic nutrients such as N, P, K and Fe. Seaweed extracts are rich in cytokinins and therefore their stimulating effects on turfgrass growth have been attributed mainly to high concentrations of cytokinins, which are plant hormones regulating cell division, leaf senescence and stress defence.

However, not all products may be as effective as anticipated. The effectiveness of growth promotion of biostimulants varies greatly with plant species, physiological conditions of the plants, product formulation/composition, application rate and timing. Many environmental factors and other cultural practices also influence the efficacy of

biostimulants. Therefore, superintendents may find that the effects of biostimulants are inconsistent.

Many biostimulants promise better turf quality and stress tolerance. In most cases, the primary ingredients in biostimulant products have proved beneficial to plant growth in laboratory and/or greenhouse experiments (Zhang and Schmidt, 2000). The effectiveness of PGRs and biostimulants on bentgrass summer performance under field conditions, however, is not well documented.

With the increasing use of biostimulants on creeping bentgrass putting greens, the information on whether and how the biostimulants affect creeping bentgrass summer performance would help turf managers develop more efficient summer stress management practices. This article reports results on a field study carried out in 2007 and 2008, with an aim to address the question whether foliar application of trinexapac-ethyl and two biostimulants containing seaweed extracts would alleviate decline in creeping bentgrass growth during summer.

RESEARCH METHODOLOGY

The experiment was conducted on a USGA specification putting green established with Penncross creeping bentgrass at the Hort Farm II, North Brunswick, New Jersey. The green was mowed six days per week at 4mm and clippings were removed. It was irrigated daily to replace 100 per cent evapotranspiration water loss. A 16-4-8 fertiliser was applied in April (northern hemisphere spring), June (northern hemisphere summer) and September (northern hemisphere autumn) at a rate of 122kg/ha of nitrogen in 2007 and 2008 to maintain adequate soil nutrient status. Fungicides (Spectro 90WDG, Daconil Ultrex, Pentathlon and Banner Maxx) were applied on a curative basis mainly to control dollar spot and brown patch.

The two biostimulants used were CPR and TurfVigor. CPR is a blend of natural sea plant extract, $\begin{tabular}{ll} \hline \end{tabular}$

micronutrients and a surfactant agent. It contains 4 per cent N, 1 per cent K_2O , 0.53 per cent Mg, 1 per cent S, 2 per cent Fe, 0.25 per cent Mn and 0.2 per cent Zn. TurfVigor is a formulation containing 0.014 per cent patented microbial strains (*Bacillus* sp. and *Paenbacillus* sp.) along with kelp extract and macroand micro-nutrients. This product contains 9 per cent N, 3 per cent P_2O_5 , 6 per cent K_2O , 0.6 per cent Fe, 0.05 per cent Mn and 0.05 per cent Zn.

All three products – trinexapac-ethyl, CPR and TurfVigor – were applied following their respective manufacturer recommended rates:

- Trinexapac-ethyl (120g ai/l emulsifiable concentrate) – 0.05kg ai/ha
- TurfVigor 47.75l/ha; and
- CPR 19.10l/ha.

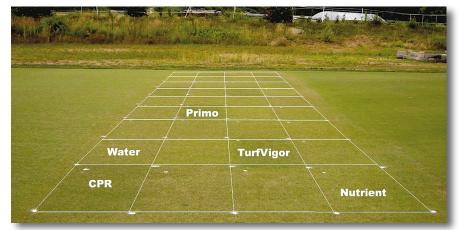
The water volume applied for control and carry volume for TurfVigor, CPR and trinexapac-ethyl was 2 gallon per 1000 ft² (7.6l/92.9m²) Water (control) treatment was also included in the experiment. Each control plot was treated with the same volume of water as the volume of trinexapac-ethyl or biostimulant solutions sprayed on treated plots. Treatments were applied using a CO₂-pressurised backpack sprayer on 23 June, 6 and 25 July, 8 and 24 Aug and 7 Sep, and on 11 and 27 June, 11 and 28 July, 13 and 27 Aug in 2008.

Shoot growth and overall turf performance of creeping bentgrass were examined by measuring turf quality, turf density, leaf chlorophyll content and canopy net photosynthetic rate. Root growth was examined by measuring total root surface area and root biomass.

EFFECTS OF TRINEXAPAC-ETHYL ON SUMMER PERFORMANCE OF CREEPING BENTGRASS

Application of trinexapac-ethyl significantly improved turf quality of creeping bentgrass from mid-August to mid-September in 2007 (see photo page 68)





 Effects of trinexapac-ethyl, CPR, TurfVigor and control treatments on turf quality of creeping bentgrass in August 2007

and from early July to mid-September in 2008. The improvement in turf quality was associated with increases in green colour and turf density.

These positive effects of trinexapac-ethyl are most likely due to a combination of decreased leaf senescence and increased tillering capability. Trinexapac-ethyl has been shown to increase total chlorophyll content per unit leaf tissue and canopy density as measured through tiller counts or visual ratings (Ervin and Koski, 1998 and 2001; Fagerness and Yelverton, 2001; Stier and Rogers, 2001).

Ervin and Zhang (2007) reported increases in cytokinin content in plants treated with trinexapac-ethyl. While cytokinins are known to promote tiller formation, the higher density in trinexapac-ethyl-treated turf may be associated with the increases in cytokinin production. We also observed trinexapac-ethyl application increased canopy net photosynthetic rates on some sampling dates, suggesting trinexapac-ethyl may increase photosynthetic capacity that could favour creeping bentgrass survival under summer stress.

The effects of trinexapac-ethyl application on root growth were not consistent between 2007 and 2008. Trinexapac-ethyl-treated plots had increased root biomass on two of the six sampling dates in 2007, but such effects were not observed in 2008. Some previous studies reported increased root growth (Han et al., 1998) whereas others found no effects of trinexapac-ethyl on root biomass (Fagerness and Yelverton, 2001).

In general, effects of trinexapac-ethyl on root growth are inconclusive. It appeared that the positive impact of trinexapac-ethyl application on improving summer turf performance in creeping bentgrass could be mainly due to its effects on turf canopy, by promoting greener and denser turf.

EFFECTS OF BIOSTIMULANTS ON SUMMER PERFORMANCE OF CREEPING BENTGRASS

The two biostimulants significantly improved visual quality of creeping bentgrass putting green during the summer in both years. Leaf senescence during summer was alleviated, as manifested by suppression of chlorophyll loss and increased canopy density in plots treated with either product.

The maintenance of higher chlorophyll and more photosynthetically active leaves enabled the maintenance of higher canopy photosynthesis in creeping bentgrass treated with TurfVigor or CPR during summer months in both years. There were also some positive effects of both biostimulants on root growth of creeping bentgrass, although the effects were not consistent throughout the entire summer months (July-September) in either year.

Specifically, TurfVigor-treated plots exhibited larger root surface area on 14 Aug in 2007 and 10 Sep in 2008 and higher root biomass on 17 July and 14 Aug in 2007 and 26 Aug and 10 Sep in 2008. CPR-treated plots exhibited greater root biomass on 10 Sep in 2008.

The positive effects of seaweed extract-based biostimulants on shoot and root growth may be due to the function of various organic compounds present in the extract, particularly the relatively high levels of cytokinins. Cytokinins are known for their functions of suppressing leaf senescence and promoting tillering (Xu et al., 2009).

Zhang and Ervin (2008) recently compared the effects of seaweed-based cytokinins to a cytokinin standard (10 mM ZR) on creeping bentgrass under heat stress (35-25°C, day/night) and found that endogenous cytokinin contents increased to comparable levels for the two treatments. Therefore, application of seaweed-based biostimulants could affect the hormone status within plants. The microbial strains in TurfVigor may have some additional beneficial effects, but need further testing.

CONCLUDING REMARKS

If used properly, biostimulants and PGRs provide a promising management tool in promoting turf health and improving summer stress tolerance in creeping bentgrass. The effectiveness of products may vary, depending on environmental factors and how products are applied.

However, one must remember that plants typically grow well without additional PGRs or biostimulants in favourable environmental conditions. When turf is subjected to stressful conditions, a plant's defensive system declines. Pre-conditioning plants with PGRs or biostimulants in anticipation of stress may enhance stress tolerance and improve turf performance. The products may not perform as well if applied later when plants are already stressed.

With continued research and further understanding the mode of actions of different products, it is likely that PGRs and biostimulants, along with proper routine cultural methods, will play a vital role in maintaining high quality turfgrass.

ACKNOWLEDGEMENTS

ATM wishes to thank USGATERO for allowing publication of this research (USGATERO Volume 9, Number 7 – April 1, 2010). For a full list of references for this article please contact the AGCSA on (03) 9548 8600 or email info@agcsa.com.au

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Rated as one of the country gems of New South Wales golf, Young Golf Club has played a pivotal role in the turf management career of AGCSA member Dennis Grounds. Born and bred in Young, Grounds started his apprenticeship at the club in the early 1990s and after a few stints elsewhere returned to take over as superintendent shortly after the club celebrated its centenary in 2006. Here he gives ATM an insight into his maintenance operations.

Superintendent: Dennis Grounds.

Nickname: Groundsy.

Age: 34.

Years as a superintendent: Six. Years as an AGCSA member: Six.

Association involvement: NSWGSA, AGCSA.

Previous clubs: Apprenticeship (Young Golf Club 1992-95); Yowani Country Club (1995-97); Garangular Polo Farm (1997-99); assistant superintendent (Young Golf Club 2000-05); superintendent (Harden Country Club 2005-07); superintendent (Young Golf Club, 2007 to present). Period at current club: 3.5 years.

Turf management qualifications: Trade certificate (Orange TAFE).

Give us a bit about your background in turf management. I started playing golf from a young age which progressed into a keen interest in golf courses and how they are managed, designed and built. So I was lucky enough on completion of school an apprenticeship became available in my home town of Young.

Give us an overview of Young Golf Club and some of its unique characteristics? The club is now 104 years old and was designed by Carnegie Clark. Although the course is not overly long, tight tree-lined fairways and reasonably small, sharply undulating greens make it a good test for all golfers. One of the most talked about characteristics is the cluster of rocks in the middle of the first fairway about 220m from the tee, they have caused much debate among members whether they should be covered or remain as they are. There is an extensive overview of the club on its website.

Take us through your turf management operations there and how you have fine-tuned them during your time as superintendent? All our turf surfaces are pretty intensely managed for a country course. For example we use growth regulators on fairways. If we don't the kikuyu is near impossible to cut in the growing season. Nutrition and plant health is a major part of our management programme at Young. With the use of effluent water comes the associated problems of high pH, sodium and bicarbonate levels and the high degree of nutrient lock up so calcium and other plant health products are an essential tool. During the winter months we carry out any construction work that needs doing, as well as tree maintenance.

Is it an easy/hard facility to manage? For the most part everything runs pretty smoothly. The major hurdle is the manual irrigation system.

What are some of the major challenges facing Young Golf Club both from a turf management perspective and general club management perspective? Like many country clubs they all took a hit when poker machines where permitted in pubs,



One and a half hours northwest of Canberra, Young Golf Club is one of the primary sporting facilities in the small country NSW township of Young

so clubs have had to think laterally to generate other streams of income. Our club could not survive on golf trade alone, but luckily the board is doing a good job in promoting the club as a great function venue, while on the golf side they are setting up free learn to play golf clinics.

Outline any major course improvement works you have recently completed or is in the pipeline? We have started a programme of re-levelling tees and converting them to Santa ana, as well as some bunker refurbishing. We are also working on securing some funding to automate the irrigation system.

Water is obviously a critical issue around the country at present and for country superintendents is probably even more critical. How is Young Golf Club faring in the water management stakes? Although we have an unlimited water supply at the moment we are not resting on our laurels. We have looked into dropping a bore in to secure the club's water for years to come because I am fairly certain we won't be the sole users of the town's recycled water forever.

What are some pros and cons of being a countrybased superintendent? Pros - five minutes to work, go home for lunch. Cons - sometimes it becomes frustrating when you are trying to achieve something and the budget won't quiet allow it; the limitations in further study.





Are expectations of course presentation and conditioning any less than that placed on your metropolitan counterparts? No, not at all. Our members are well travelled and are very proud of the facility we have. We take great pride in providing them with consistent surfaces every week.

Do you have to be more resourceful as a countrybased superintendent? I think all superintendents have to be extremely resourceful in today's climate and it is a huge part of the job. For example our tee markers are made by a local steel company at a fraction of the cost of other products. Also in my time as super at Young we have reduced the amount of pesticides used preferring to do a lot more spot spraying and a lot less blanket spraying which has reduced costs dramatically.

If you could change one thing about your job as a country superintendent what would it be and why? Probably working conditions as a whole in the country aren't that flash compared to the metro guys, but we are improving.

Do you think country supers have a better worklife balance? No I don't think so. If you are happy at work than you will be happy in life.

From left the Young Golf Club maintenance team Michael Rhodes (assistant), Ben Callaghan (apprentice) and superintendent **Dennis Grounds**

Left: The course plays host to the **Young Open every May**

Bottom, page opposite: Young Golf Club is situated on about 40 hectares and has 50-year-old **Penncross greens and kikuyu**



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How important are the relationships you have with other nearby country course supers/trade reps? We have a lot of courses within an hour or two of each other and I think one area we country supers could improve on is getting together more often. I would like to give special mention to Globe rep Colin Scott who provides great assistance and service to a lot of small golf and bowling clubs throughout the area. He takes the time to call in on everyone whether they spend \$1 or \$100.

Given your distance from the major metro areas, how do you make sure you keep abreast of the latest turf management techniques and methods? I find the Internet the greatest tool. You can keep up to date with everything that's going on in the industry. Of course we also look forward to the next edition of ATM.

What are some of the more unusual requests you have had to do as a country superintendent? The last three months the course has been used four times for different school cross country events.

Do you have any interesting pieces of machinery which have been manufactured out of necessity or any old pieces of equipment that you keep alive? Last year we looked into purchasing a greens roller but the budget wouldn't stretch that far. We had an old roller behind the shed which bowling greenkeepers call a polishing roller. With a few modifications we now tow it behind a greens mower and it does a super job. We can roll all greens in about one hour.



The club has recently started a programme of re-levelling tees and converting them to Santa ana

Favourite spot on your course? The 1st fairway which sits high above overlooking the town.

Most pleasing/rewarding moment during your time as Young Golf Club superintendent? Hearing the comments we receive from visiting golfers.

Name three golf courses that you would like most to visit and why? Augusta because it is the pinnacle in golf course management; Barnbougle Dunes – from what I have seen and heard it is course design at its purist; and Royal Sydney – it looked awesome during its last Australian Open.

AT A GLANCE - YOUNG GOLF CLUB

Course specs: 18 holes, par 70, 5680m on 40 hectares with 24 bunkers. Greens Penncross bent (50 years old), kikuyu fairways and roughs, kikuyu tees, three recently rebuilt and converted to Santa ana.

Members: 250 full playing, 40 social and 40 juniors.

Annual rounds: 20,000.

Major tournaments/events: Cherry Festival Veterans Week of Golf (November) and Young Open (May).

Climate: Mild to very warm summers (40+ on occasions) and cool to very cold winters with harsh frosts (temps down to -10).

Annual course management budget: \$75,000.

Staff structure: We have three paid staff including myself, assistant Michael Rhodes and 4th year apprentice Ben Callaghan, plus a few handy volunteers.

Water sources: Back in the early 1980s the club had great foresight in piping recycled effluent to the course, which at the moment we are still the only users. We use between 120-180 megalitres annually. Irrigation system: While the club is lucky to basically have an endless water supply, our irrigation system is rather primitive. Our system is 100 per cent manual from turf valves on all fairways and greens with tees operating off gate valves. Greens and tees are irrigated by Hunter i35s. It takes a full week to irrigate all fairways and that is with a member of staff returning to set up another shift in the



One of the most talked about characteristics of Young Golf Club is the cluster of rocks in the middle of the 1st fairway

evening. We can run about 23 Rainspray heads at a time.

Cutting heights: Greens 3.0-3.5mm, tees and aprons 10mm, fairways 13-15mm and roughs 50-75mm.

Renovations: Major green renovations are carried out at the end of August. Greens are hollow tined or solid tined depending on what is required and scarified. Greens are needle tined periodically through summer and groomed monthly from October to March. Tees and aprons are aerated twice a year and this year we aerated fairways for the first time.

Major disease pressures: Pythium, summer decline, golfers behind the wheel of golf carts!



fits-all solution

Regardless of the method of algae control used, managers of lakes and dams need to first consider their goals, resources and limitations and understand that there's unlikely to be a one-size-



Yes it's coming into winter and algal blooms are probably the last thing on a superintendent's mind, but as Scott Tucker writes with a little forward planning the annual battle of algae control in lakes and dams over summer can be eliminated.

Igae come in many forms with tens of thousands of species being identified so far. It's been around for millions of years, far longer than us, and has adapted to be found in every aquatic environment imaginable. You can thank algae for providing much of the air we breathe but when you're faced with a mess in what used to be your nice clean body of water, the last thing you feel like saying is thanks.

When it comes to lake and dam management, no two golf courses are the same. There are so many variables in areas like water source and quality, discharge options, irrigation requirements, shared resources and the very purpose of the water, that to simply recommend a one-size fits all product for algae control is impossible. It doesn't make sense to recommend chemical spraying to someone whose overflow runs into a national park, nor does it make sense to suggest aeration to a client with a lakeside wedding reception in three days time. So what are some of the options available for algae control?

NUTRIENT REDUCTION

Algae, like most plants, require temperature, food and sunlight in order to grow. Reducing algae's food source is one method most lake owners have available to them. The primary nutrient sources of algae are nitrogen and phosphorus, with phosphorus being the main one for fresh water and nitrogen for salt water. These nutrients are almost always available in manmade lakes thanks to runoff from degraded or fertilised catchments, decomposing organic matter, stormwater inputs etc.

Management techniques for reducing nutrient inputs can be as grand as constructing an artificial wetland or as simple as manually netting or skimming out leaves from falling trees. If you don't have the luxury of a few hundred square metres to build a wetland then floating islands or selected planting of non-invasive aquatic plants is another option.

Phosphate reduction can be achieved using various chemicals or minerals that are sprayed or dispersed over the water to bind up phosphates and drop them to the sediment layer. Nitrogenous nutrients can be controlled using bacteria in a process known as biological filtration that is the same process going on in any kids' aquarium. Nutrient reduction isn't a quick fix for controlling algae but it's a good start and will make it easier on the other methods you employ and should be part of every algae control toolbox.

SUNLIGHT REDUCTION

Like nutrient reduction, limiting the amount of sunlight can also help with algae control. Chemical dves are available that turn water various shades of blue and reduce the amount of sunlight available to plants and algae, but as with any chemical you should make sure it's registered for use.

Another way of reducing sunlight is to selectively plant non-invasive plants in and around the pond, especially those with floating leaves such as lilies. Such plants will reduce the amount of sunlight on the surface water as well as help with nutrient uptake.

STRAW BALES

Straw bales have been an old cow cocky method of algae control for years. Some people swear that throwing a bale of straw into a dam will keep algae at bay. Like all good yarns this is part truth and part

As straw breaks down in water it creates a wonderful environment for micro and macro invertebrates, many of which feed on algae, so it's not the straw keeping the algae at bay but the millions of water bugs that eventually come with it. The downside to this method is you end up with a bunch of decomposing straw at the bottom of the dam that then in turn becomes a nutrient source for future algal blooms.

Barley straw is commonly used in backyard water gardens but its success in lakes doesn't seem as good. While science hasn't yet confirmed the







reasons behind the effectiveness of barley straw, it is believed that as the straw breaks down it releases hydrogen peroxide which is particularly effective at stopping the growth of filamentous algae (the mat forming algae you can pick up as opposed to the microscopic greens or blue greens that discolour the water). Lavender is thought to have similar effects.

FISH

On a recent visit to the USA, I was lucky enough to see the effects of grass carp on aquatic weeds and tilapia on filamentous algae. Unfortunately these wonderful tools are not available in Australia thanks to the mess European carp have made, but depending on your location and water quality there are some species of fish that could help with filamentous algae control. Using fish is a bit hit and miss because in many cases they act like kids leaving the vegies to last so you'll have to be patient or use them in combination with other tools.

CHEMICAL TREATMENTS

Several chemicals have been used for algae control but in large bodies of water many become uneconomically viable. Copper is probably the most common chemical used today but the industry has moved beyond the days of copper sulphate (which is now pretty much banned) to chelated copper products that are registered for most applications.

Nowadays the use of chemical treatments is almost a personal preference based on the environmental beliefs of the individual and other stakeholders of the water body. Although registered and approved for use, some consider the use of chemicals out of tune with society's values.

If you use chemical treatments you must ensure they're applied using appropriate equipment and, if on a commercial property, by trained personnel. Like any chemical used correctly, algaecides work well but when used incorrectly can cause problems so learn as much as you can before applying.

BIOLOGICAL TREATMENTS

In recent years there has been a push towards the use of biological water treatments. Biological treatments are blends of beneficial bacteria or enzymes that support beneficial bacteria already found within the environment. These bacteria break down organic sludge into basic elements and remove it as a food source that would otherwise be used by algae. Like any living organism the bacteria that do this have specific environmental requirements in which they thrive so using them outside these conditions would be pointless.

WATER MOVEMENT

Anyone who has jumped into a dam in summer and gone through the warm surface layer to the freezing cold below has a firsthand understanding



Planting of non-invasive plants in and around lakes and dams, especially those with floating leaves such as lilies, will reduce the amount of sunlight on the surface water as well as help with nutrient uptake



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If the lake is used for irrigation then function is probably more important than aesthetics. A well managed lake will reduce aquatic weeds or algae blocking up equipment or pump inlets and provide better water quality than a lake left to fend for itself

of stratification. Stratification occurs when layers of water form one above the other.

Warmer, oxygen rich water develops near the surface while cooler, oxygen deficient water forms near the bottom. Bottom layers are rich in nutrients and low in beneficial bacteria. These conditions are perfect for anaerobic bacteria that produce hydrogen sulphide and methane gas, the cause of 'rotten egg' smells. A stratified lake provides a warm, nutrient rich environment perfect for algae.

Stratification can be broken by moving water through circulation or aeration. Circulation can be achieved using existing pumps although in most cases this results in increased maintenance costs and excessive power charges. In most cases using existing pumps is inefficient but if it's all you've got then it's better than nothing. If you use existing pumps you should consider adding a venturi system that can provide a degree of aeration.

Aeration reduces sludge and nutrients in the sediment, introduces oxygen to assist biological processes and can reduce the need for chemical treatments. Aeration is more efficient and cost effective provided the correct equipment is used. Floating aerators are a good option for shallow water and can be categorised into true aerators that produce an industrial looking effect, floating

fountains that look great but do little in terms of aeration and hybrids that do a bit of both – they look pretty good and move a decent amount of water.

In deeper water, diffused aeration systems are more effective than surface aerators. Diffused systems work from a shore based compressor that pumps air into diffusers located on the lake bottom. The diffusers release small bubbles into the water column that cause lower layers of water to rise, turning the whole body of water over and breaking stratified layers. Diffused systems are good for swimming lakes as there is no power in the water. Sizing up aeration systems is a mix of art and science and getting it wrong can be an expensive exercise. If unsure, seek help.

Other forms of algae treatment exist but not all are suitable for larger bodies of water. Ultra violet light and ozone are proven methods of algae control but are not economically viable for large systems. Alternative methods of algae control such as magnets and ultrasonic waves have recently entered the market but little work has been done to scientifically prove their methods. Results seem sketchy with some people claiming success and others not.

Regardless of the method of algae control you use, first consider your goals, resources and limitations and understand that there's unlikely to be a one-size-fits-all product. Arm yourself with information and make a decision that best suits your individual circumstances.

ACKNOWLEDGEMENTS

Scott Tucker is an AGCSA member and lake management consultant with Clearwater Lakes and Ponds. **M

LAKE MANAGEMENT - WHY BOTHER?

hether for members or casual players, all golf courses are competing for a limited number of customers and every little bit helps. Given the choice of playing on a course with overgrown, smelly mosquito farms or a similar one with healthy attractive lakes, which one would you choose?

The aesthetics of lakes should not be undervalued. Aesthetics impacts your customers, staff, owners and anyone that visits your course. How your lake looks reflects the total operation and sends a message about how much pride is taken in the course.

If the course is used for weddings, functions or corporate events, you'll find lakes are usually the places that attract people and are almost certainly the place photos are taken.

If the lake is used for irrigation then function is probably more important than aesthetics. A well managed lake will reduce nuisance aquatic weeds or algae blocking up equipment or pump inlets and provide better water quality than a lake left to fend for itself. When used for irrigation, whatever is in the lake will end up on the turf and in the soil so it pays to be aware of what's going on in the water.

In many cases lake management comes down to dollars and cents and prevention is better than cure. Dredging, mechanical weed harvesting and chemical treatments can be eliminated, reduced or prolonged using good lake management practices.

Good lake management practices can also produce income generating activities. A country club in Texas for instance has over the years improved its lake habitat and slowly introduced fish, turning a once barren lake into a fishing haven. This club now has golf only, fishing only or combined memberships where the fishing members now outnumber golfers!

Granted, not everyone has the luxury of having lakes large enough to do this but most courses have dams large enough to stock some fish even if it's just for special events.

Tourism, corporate functions and weddings are always more appealing for customers at sites that have beautiful surroundings and abundant wildlife. Lake management can help achieve this. Lakes can provide safe havens for wildlife such as birds, fish and mammals.

Think outside the square about other income generating activities your lake could be used for. Aqua golf, model boat clubs, canoe training, propagating aquatic plants for wholesale growers? Opportunities do exist.

Lake management is part science, part art and it's unlikely that any superintendent or staff member has the time to become a lake management expert, but being aware of some fundamental principles could help the functionality and aesthetics of your course and save (maybe even make) the club some money.





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Once the issue of access has been addressed, there are a number of areas which require consideration when it comes to using or planning to use effluent water

As traditional water sources become further out of reach, for a wide range of commercial irrigators the future lies in using recycled effluent water from municipal sewage treatment plants. Here Scott Johnstone looks at the key considerations when designing, building, maintaining and operating irrigation systems using recycled water.



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he golf industry has been using recycled effluent water for longer than most and in a survey conducted by the AGCSA in 2006 of golf courses using treated effluent a total of about 6000 megalitres was used per annum. Reclaimed wastewater has the greatest potential as an alternative water source for Australian golf courses and turf facilities, however, increasing costs, location, infrastructure, quality and competition from other users are the greatest impediments for further

When looking at the possibility of implementing recycled water, access is the key issue to address in the first instance. If you believe you have a suitable application and where opportunity to reuse treated water exists, then it pays to discuss the possibilities with the municipal water authority.

If a local reuse water scheme is not in place, start by involving all interested commercial irrigators and map out an overview proposal. Obtain the services of a recognised consultant or industry expert to table a proposal, and seek government support at every level and attract private enterprise investment where possible.

Once the issue of access has been addressed, there are a number of areas which require consideration when it comes to using or planning to use effluent water.

WATER QUALITY

There are several classes of treated effluent water ranging from Class C to A+. The class system is mostly concerned with public health and not necessarily their suitability for irrigation. A thorough review of water chemistry analysis is one of the first and most important steps. The tests should consider parameters that impact both plant and soil health. Some of the common issues found with treated

- pH, typically in the high range;
- Specific negative elements, such as sodium;
- Salinity, total dissolved salts.

If either of the first parameters are outside the acceptable range, they can be readily treated reuse

by commercial irrigators on site using secondary injections systems. Modified 'safe' acids can be used to buffer pH and also improve permeability problems associated with bicarbonate and carbonate levels. Soluble calcium can be used to displace sodium.

Salinity is more challenging. There are few options to reducing total salts, it is expensive and more irrigators would prefer not to attempt desalination or reverse osmosis on-site. Similarly the water authorities would prefer not to introduce desalination because or the high capital and operating expenses.

The smartest way for limiting heavy metals and salinity being introduced to the system is to prevent them at the source. Stop heavy industrial plants dumping unsuitable waste water into the sewage and stormwater systems. Fix up leaks in existing sewage networks along the coastal areas to prevent saltwater inundation.

A good clean water flush or reliable seasonal rainfall event is very useful in helping to manage low quality effluent water supply, particularly in lighter free-draining soils. Monitoring water, soil and plant health are critical in the maintenance regime, as inputs can be variable. Irrigation hardware and components must also be evaluated when using water with aggressive or corrosive elements.

WATER STORAGE

On-site storage is commonly required with effluent systems, which is typically in the form of tanks for smaller systems and dams for larger systems. With either system consider what alternative water sources may be available to cocktail mix/shandy with your effluent or utilise for seasonal flush cycles. With some planning, catchment of run-off water can often be achieved cost effectively.

Good effluent water storage design is important. Where an on-site storage dam or holding pond is required for effluent supply, check the following:

- Capacity is suffice to match seasonal peak outflows;
- The inflow is at the opposite end of the dam from the pump out location and may have multiple inflows to encourage water movement within the dam;
- Avoid dead spots in the dam where water can stagnate and increase in temperate;
- Aim for optimum depth of about 4-6 metres for a healthy irrigation dam;

- Use aeration to improve oxygen levels and reduce potential algae problems;
- Introduce plants that improve dam water health around the edges;
- Eliminate UV-blocking weeds;
- Avoid returning flush water from filters to the source, where possible; and
- Be able to introduce alternative water for mix or flush.

APPLICATIONS

Effluent water has a wide range of uses, however, depending on class and chemistry it may not be suitable for every site or application. Irrigators need to be conscious of their specific site requirements, in particular;

- Effluent Class in terms of human health risk;
- Water chemistry analysis with range of parameters in terms of plant and soil health;
- Plant types dependent on class of effluent and water elements;
- Soil types (e.g.: free draining soils are preferred if undesirable water quality elements);
- Irrigation method (e.g.: spray, drip, flood);
- Environmental conditions (e.g.: intensity and frequency of rainfall and wind);
- Risk assessment surrounding built environment, OH&S, public access, water ways, consumption, native flora and fauna.

Most traditional irrigation methods are acceptable. Aside from some specialised localised irrigation applications (such as vineyards) spray irrigation is still generally the most efficient, reliable and effective for most broad acre turf and landscape applications.

Some of the keys from a design perspective when using treated effluent water are;

 Limit the irrigation window to night time only within hours of limited public access or traffic

- (e.g.: 10pm to 5am seven hours). Some regions may have specific limits; and
- Incorporate more sophisticated control systems that interface with sensing devices such as rain, wind, moisture and flow to better manage the irrigation programmes.

WATER MANAGEMENT PLANS

All irrigation systems, and most importantly systems using effluent water supply, should have an effective Water Management Plan (WMP). As a minimum the WMP should include monthly data for;

- Historical weather data;
- Water use budget (based on historical data);
- Current actual weather data;
- Water use forecast (based on current weather);
- Water use actual.

States have their own Environmental Protection Authorities and either they or the municipal water authority will have a requirement within the effluent water supply agreement to have an environment management plan (EMP) to routinely monitor your system on-site. The WMP described above would normally form part of the EMP although specifics may vary.

Education and progressive training for operations staff should be made available for effective implementation of the WMP and environment management plan. Irrigation Australia Ltd and industry manufacturers have good training programmes available and for effluent operators emphasis should be on;

- Irrigation agronomy;
- Programming irrigation schedules;
- System audits; and
- Irrigation control technology.

Training is an essential element in the overall success in achieving the plan which is as much value commercially as environmentally sustainability.



On-site dosing units, such as this one at Cataline Country Club, can be used to buffer pH and displace sodium, along with using surfactants.



Good storage design and management are important factors in dealing with on-site treated effluent water



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The John Deere 220 E-Cut walkbehind greens mower employs the same type of hybrid drive technology first seen on the 2500E triplex greens mower in 2005

ohn Deere's recently unveiled 220 E-Cut walk-behind greens mower combines hybrid electric drive with a Quick Adjust (QA) cutting unit, and is designed to provide a top quality finish on golf greens, tennis courts, bowling greens and other fine turf areas.

The 220 E-Cut model joins the existing C Series range and features a standard 11-blade, 127mm (5in) diameter reel with a cutting width of 56cm (22in) and simple bedknife-to-reel adjustment. Cutting height is quickly adjustable across a wider range down to 2mm using the patented Speed Link system.

The 220 E-Cut employs the same type of innovative hybrid drive technology first seen on the John Deere 2500E triplex greens mower in 2005. Utilising the 2500's ball-joint yoke design and an electric drive motor eliminates the need

for a mechanical drive link to the cutting unit. According to John Deere these features give the 220 E-Cut mower the largest range of movement in the industry, with the cutting head capable of up to 133mm (51/4in) of travel fore and aft and 32mm (11/4in) side to side. The electric reel makes adjustment of the clip frequency straightforward by turning a dial to set the desired clip rate. On-board back-lapping is another standard

The hybrid design also reduces weight on the cutting head and allows the mower to be run at lower engine revs, making it quieter as well as more manoeuvrable. A weight transfer system linked to the drive roller means that as the standard grass box fills, minimal weight is added to the cutting head, which produces a more consistent height of cut.

Controls and operation are the same as on the rest of the C Series models, with the 2.9kW (4hp) air cooled Honda petrol engine designed to meet the latest emissions and environmental regulations. The mower is equipped, as standard, with an operator presence system, which features a quick release mechanism to disengage traction. An optional gear-driven greens tender conditioner (GTC) counter-rotates to stand the grass up before cutting (alternatively a 60mm (23/gin) rotary nylon brush attachment can be specified).

For more information on the E-Cut walk-behind greens mowers, visit www.JohnDeere.com.au or freecall 1800 800 981 (Aust) or 0800 303 100 (NZ) to contact your local John Deere dealer.

JACOBSEN ANNOUNCES NEW AUST DISTRIBUTION NETWORK

The 26th Australian Turfgrass Conference on the Gold Coast will see the introduction of Jacobsen's new-look distribution arrangement in Australia. While direct distribution channels are new, the companies and players are well known to most in the Australian industry.

The new arrangement will see Australia divided into four territories with the following distributors:

- Western Australia, South Australia and Northern Territory - McIntosh and Son based in Perth (Mike Foskett 0418 950 869);
- Victoria and Tasmania Godings based in Whittlesea (Charlie Payne 0418 363 909 or Trent Saunders 0427 849 248);
- New South Wales ProTurf (Chris Stigg 0419 258 566 and John Purtell 0418 264 290)
- Queensland KC Farm Equipment based in Brisbane (Russell Bryson and Alan Schiller (07) 3807 7193).

These four distributors will supply complete customer support for sales, spare parts and service with Jacobsen's full support and training from Asia Pacific, USA and UK. Managing director for Jacobsen Asia Pacific Garry Kelson says the new distribution model shows "Jacobsen's ongoing commitment to provide quality service to our Australian customers and is a positive for the Australian turf industry".



When Performance Matters.™

IRRIGATION AUSTRALIA CONFERENCE

The upcoming Australian Irrigation Conference & Exhibition at the Sydney Convention & Exhibition Centre (8-10 June) is set to include a number of presentations directly relevant to turf managers and turf growers.

A two-hour workshop entitled 'Getting the best playing surface possible', coordinated by Sydney Water, will aim to make participants aware of the Best Practices Guidelines for Open Space Turf and its associated online tools. Dr Mick Battam and Geoff Hatton will provide an overview of the guidelines, demonstrate how to use the practical tools for assessing the carrying capacity and watering requirements of open space turf areas, and provide practical examples on how renovation



Simplot's new-look website

practices can be used to improve turf quality and achieve water savings.

Open space managers will be the audience for a second workshop 'Alternative water sources for irrigating sports fields and parks'. This session aims to discuss practical challenges, lessons and solutions resulting from real examples of irrigating public open space with alternative water sources. Presentations by professionals that have been involved in planning and delivering such projects will examine the technical, policy and legal issues associated with the use of alternative water sources for irrigation, outline practical lessons in irrigating with alternative water sources, and explore future opportunities for the use of alternative water sources. For more information on the Australian Irrigation Conference & Exhibition and times for the above sessions visit www.irrigationaustralia.com.au.

JOIN THE CLUB

Simplot Proline has switched across to a new-look website. The redesigned site – which is accessed through the same URL www.simplotproline.com. au – has been designed specifically for the turf professional to easily find relevant information and news. As part of the launch of the revamped site, Simplot has introduced the Greenmaxx Club which is a chance for the turf professional to show off their hard work and how Greenmaxx can contribute.

SMART SENSORS

Two recently released Rain Bird products - the Wireless Rain Sensors (WR2) and Soil Moisture Sensor (SMRT-Y) - have been granted the Smart Approved WaterMark certification.

The WR2 Series Wireless Rain Sensors automatically sense and measure both rain and cold temperatures to prevent unnecessary irrigation, saving up to 35 per cent of water and reducing wear on irrigation system components. These sensors depend on reliable signal transmission and other innovations to deliver responsiveness to rainfall and cold temperatures, while user-friendly features cut installation and programming time in half and enable installation by one person. They can be

programmed to shut off as soon as rain is detected or to suspend irrigation once programmed rainfall or temperature thresholds are met.

The WR2 sensors consist of three components – a controller interface with an LCD screen, a sensor unit and a self-levelling sensor mounting bracket which attaches securely to a gutter or any vertical surface. The LCD screen on the controller interface displays signal strength, rain and temperature set points, battery life and more all at a glance.

The SMRT-Y Soil Moisture Sensor can deliver significant water savings of up to 40 per cent. The SMRT-Y can monitor absolute, rather than relative moisture levels and is unaffected by temperature fluctuations or soil chemistry changes, variables that have historically compromised the accuracy of some soil moisture sensors.

For more information on both the Wireless Rain Sensor and the Soil Moisture Sensor, visit www. rainbird.com.au, email info@rainbird.com.au or freecall 1800 424 044 \(\pm\)



The SMRT-Y soil moisture sensor from Rain Bird

NEW APPOINTMENTS



Wild time for Syngenta

Michael Wild has been appointed as the new

Business Manager – Turf and Landscape for Syngenta. Wild, who started his new role on 21 April replaces Sam Hole who after five years has transitioned into a senior role within the Syngenta Australian Crop Protection business.

Wild will lead the turf and landscape business unit in the development and implementation of business strategy and sales and marketing plans. Wild obtained a Bachelor of Science in Agriculture at the University of Sydney, followed by a Bachelor of Commerce (Marketing and Finance) at the University of New South Wales. He completed an MBA in 2009. Wild held a business manager

role with Sunrise and then relocated to Jordan in the Middle East for almost four years as general manager prior to joining Pharmacare as international business manager for consumer markets.

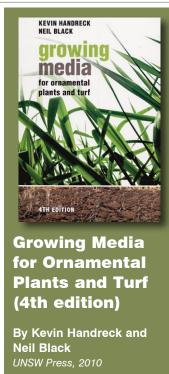


Marshall makes a DINT

Within weeks of departing Monash Country Club in northern Sydney, Marshall

Howarth has been appointed as a field sales representative for DINT Australia. Howarth, who was superintendent at the highly regarded Monash course for more than 20 years, began his new role in mid-April and has taken over from Julian McMillan who has moved on after 18 months in the position. Howarth can be contacted on 0401 064 262 or by emailing marshall@dint.com.au.





or 25 years, 'Growing Media for Ornamental Plants and Turf' has been a core text for horticulture students and an essential reference for horticulturalists, their suppliers and landscape gardeners. This fourth edition has been substantially revised and updated, including the latest on horticultural production systems, fertiliser practice in nurseries, roof gardens and dealing with water shortages. This edition also addresses the major challenges faced by horticulturalists in a changing climate.

Over 540 pages and more than 30 chapters.

Over 540 pages and more than 30 chapters, Handreck and Black cover in depth a large range of subjects from the basics of soil chemistry, organic matter, soil structure and pore space, composting, fertiliser practices and nutrients, soil-borne diseases through to salinity and irrigation. Their words are accompanied by more 800 illustrations, tables and graphs, although it must be said some of the photos could have done with a bit of an update (some were part of the first edition published back in 1984!). ATM will review the fourth edition in full in Volume 12.4

'Growing Media for Ornamental Plants and Turf' normally retails for \$79.95, but the AGCSA has negotiated a special rate with UNSW and AGCSA members can obtain a copy through the AGCSA bookshop for just \$65 (non-members \$79.95)



Compendium of Turfgrass Diseases (Third Edition) By Richard W. Smiley, Peter H. Dernoeden and Bruce B. Clarke APS Press, 2005

Now in its third incarnation, 'Compendium of Turfgrass Diseases' by respected

US-based turf scientists Richard Smiley, Peter Dernoeden and Bruce B. Clarke (who spoke at the 2004 Australian Turfgrass Conference), intends to provide a general and practical reference for all those involved in the culture of fine turf.

Devoted entirely to the diagnosis and control of about 80 diseases affecting grasses maintained for fine turfs on residential and commercial lawns, sod farms, golf courses, sports fields, bowling greens, cemeteries and other areas, it is designed to be of use to those just starting out in the industry as well as those who have been in the industry long enough to have probably seen most of the entries contained within the book.

The authors have made some major revisions for this edition which is presented in six parts – non-infectious diseases; infectious diseases caused by fungi; diseases and disorders caused by other pathogens and biotic agents; ecology and taxonomy of pathogenic fungi; disease control strategy and disease diagnosis. There is also an extensive glossary and index and a wealth of photos and illustrations for easy identification.

AGCSA member price: \$98 Non-member price: \$110



Turfgrass and Landscape Irrigation Water Quality: Assessment and Management

By R.R. Duncan, R. N. Carrow and M. Huck

CRC/Taylor and Francis, 2009

With increased use of alternative irrigation water sources on turfgrass and landscape sites, management challenges related to irrigation water are becoming more complex. In response to this, three of the US turf industry's most prominent figures have combined to produce the authoritative 'Turfgrass and Landscape Irrigation Water Quality: Assessment and Management.'

Over 464 pages they identify and present practical management options for problems that may occur over the whole spectrum of irrigation water movement, from issues occurring at the initial water source, delivery system, storage in lakes or ponds, application on grasses and soils and subsurface or surface environmental concerns. The book is split into four distinct sections – understanding assessment of irrigation water; irrigation water quality situations and management; management options for site-specific problems; and potential environmental concerns relating to the use of variable quality irrigation sources on landscapes and recreational turfgrass areas from the landscape to watershed levels.

AGCSA member price: \$165 Non-member price: \$195

AGCSA BOOKSHOP

The AGCSA has access to a huge variety of turf management books and can offer members substantial discounts off the retail price of many titles. A full list of books currently available through the AGCSA Bookshop can be viewed through the AGCSA website http://www.agcsa.com.au/shop. The website also contains reviews which have appeared in ATM over the years.

Please note that the prices contained within the list are subject to change due to exchange rates. If you want to order a book call the AGCSA office on (03) 9548 8600 or email info@agcsa.com.au to confirm exact price and shipping costs.

Ricotones,
Sanda and
Top
Dressing
Materials
for
Sports Turf

Rootzones, Sands and Topdressing Materials for Sports Turf By Dr Stephen Baker STRI (UK), 2006

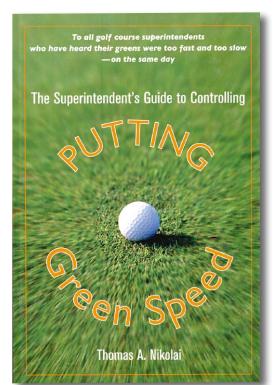
The quality of a sporting surface relies heavily on the

soil or growing medium used in its construction. The selection of the correct soils, rootzone and topdressing materials is the most important factor in achieving high quality sports fields. It is with this tenet in mind that the STRI produced 'Rootzones,

Sands and Topdressing Materials for Sports Turf' which packs in more than 25 years of research conducted by the UK's leading turf body.

Chapters include characterisation of sands, rootzones and topdressing; sources and properties of sands; sands and sand-dominated rootzones in sports turf construction; soils for cricket pitches and tennis courts; topdressing; supply, testing and ordering of materials; and guidelines for sands, rootzones and topdressing material.

AGCSA member price: \$42
Non-member price: \$58



n Volume 11.3 (May-June 2009), Australian Turfgrass Management quizzed superintendents whether they lost any sleep over the speed of their greens. The sheer volume of respondents proved that green speed has and always will remain one of the most contentious topics in golf course management.

It is therefore somewhat fortuitous that at the upcoming 26th Australian Turfgrass Conference on the Gold Coast, delegates will get the chance to hear from one of the industry's principal authorities on this most polarising of topics.

For much of his academic career, Michigan State University turfgrass academic specialist Dr Thomas Nikolai has spent his time amassing a huge bank of knowledge on green speed and in 2005 this culminated in the publishing of 'The Superintendents Guide to Putting Green Speed', a book which he has dedicated "to all golf course superintendents who have heard that their greens were too fast or too slow – on the same day".

Right from the get go, Nikolai's take on the whole green speed argument is quite clear – speed does not kill. As he goes on to say... "Articles in trade magazines about green speed seem to suggest that a superintendent can either manage his or her greens for speed or manage them for healthy turf. The premise seems to be that both aims cannot be accomplished. I strongly disagree. It is my belief that if a superintendent is not managing for an 'ideal green speed', then he or she may be missing out on the best way to manage the greens.

"It has been more than 25 years since the release of the Stimpmeter and it is time that this equipment is used for its intended purpose. It is time to recognize that managing for green speed is an obtainable goal and that staying within an ideal green speed is a reasonable objective."

Superintendents Guide to Controlling Putting Green Speed

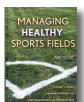
By Thomas A. Nikolai Wiley, 2005

Nikolai embarks by looking at problems associated with green speed before delving into the history of measuring green speed and the development of the Stimpmeter. After chapters on climate, putting green rootzones and turfgrass species and the various impacts they can have on green speed, Nikolai then spends a substantial chunk of book looking at three of the most influential cultural practices affecting green speed – mowing height, fertilisation and lightweight rolling.

The penultimate chapter examines an integrated approach to green speed management and tournament preparation, while the final chapter offers some sagely advice to superintendents and greens committees and owners. There is also a substantial bibliography just in case you need any further reading material before heading into that greens committee meeting.

Overall, Nikolai's book presents an authoritative compilation of applied research to identify how factors such as turf varieties, rootzone characteristics, environmental conditions and cultural practices all conspire to impact on green speed. The overall aim of the book is to make the golf course superintendent 'the' foremost expert when it comes to green speed at his or her club, as well as stimulate further debate between superintendents, golfers and researchers to further understand the many and varied factors influencing green speed.

Copies of 'The Superintendent's Guide to Putting Green Speed' by Dr Thom Nikolai will be available for purchase at the AGCSA stand during the 26th Australian Turfgrass Conference Trade Exhibition. AGCSA members can pick up a copy for \$123 (non-members \$142) \(\pm\)



Managing Healthy Sports Fields By Paul Sachs

Wiley, 2006

Managing Healthy Sports Fields is a hard-cover text which provides turf managers a guide

to using organic materials for low maintenance and chemical-free sports surfaces. Written by American organic land care expert Paul Sachs, the book offers turf managers a variety of alternative methods to chemical treatments that effectively control a wide variety of pests, weeds and diseases while growing high quality turf for a range of sporting applications. AGCSA member price: \$99

Non-member price: \$115



TOP SELLERS FOR 2009-2010

Turf Managers Handbook for Golf Course Construction and Grow-In B. Charles

Destructive Turfgrass Insects, Biology, Diagnosis and Control Daniel A. Potter

Discovering Donald Ross - The Architect and his Golf Courses Bradley S. Klein

Growing Media for Ornamental Plants and Turf – 3rd Edition K. Handreck and N. Black

Turf Management for Golf Courses James B. Beard

Turfgrass Soil Fertility & Chemical Problems Carrow, Waddington and Rieke

GCSAWA

Right: Retiring Collier Park superintendent Norm Ashlin was recognised for his four decades of service to golf course maintenance at the WA Golf Industry Awards night held in March

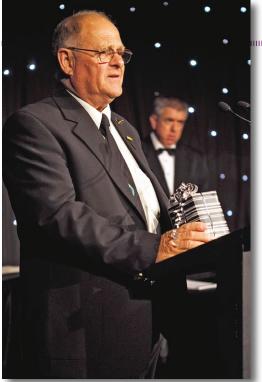
Far right: GCSAWA Environment Award winner Darren Wilson (Wembley Golf Complex)



GCSAWA Apprentice of the Year recipient Shaun Quinsee (Hill View Public Golf Course)

GCSAWA Excellence in Turf Management winner Mike Healy (Mandurah Country Club)





s most of you will know by now, Cottesloe Golf Club superintendent Simon Bourne suffered a severe spinal injury while on holiday in Bali with his family back in February. Since the accident Simon's friends, family, club and the WA turf industry have rallied to support him and his wife Marina and their two daughters Alexandra and Georgia. I would like to thank everyone who has helped with fundraising for the Simon Bourne Fund both within WA and around the country. Your support has been fantastic.

It wasn't until Simon went home for a day visit to surprise his daughter on her birthday recently that his family realised how hard it was for him to move around his existing home. Finding a new home that suits his mobility will be a priority and the funds raised will help out immensely. Simon will be due to return home in June/July with work duties resuming soon after.

It was great to hear that Cottesloe Golf Club are modifying his office and shed to accommodate his mobility and return to work and Geoff Stephens from Toro has kindly donated a new Toro Workman that has been modified with hand controls so that Simon can get around the golf course. Simon will also stay on the GCSAWA committee with his input and enthusiasm gladly welcomed. No doubt the quiz night planned for 22 May will be a great success and I will follow up with report in the next edition.

The recent March hail and thunderstorm was a welcome drought breaker although we didn't need the damage associated with it to overcome the driest summer on record. Although the follow up rains haven't been great they were still welcomed. Not too much damage was done around Perth with minor damage to irrigation systems and a few greens, especially Royal Perth's.



The recent WA Golf Industry Awards were held for the first time and was a huge success. Congratulations to all the winners, especially GCSAWA Excellence in Turf Management winner Mike Healy (Mandurah Country Club) and GCSAWA Apprentice of the Year recipient Shaun Quinsee (Hill View Public Golf Course) who have been nominated for the 2010 AGCSA Awards. I'm sure they will do us proud. Norm Ashlin was also recognised on the night following his recent retirement from Collier Park after 40 years as a golf course superintendent.

The winter sprinkler ban period has been now made permanent which means we cannot irrigate between 1 June and 30 August. The details should be on your license renewal which does allow for certain exceptions such as the watering in of fertilisers and pesticides when needed.

The Fertiliser Action Group is finalising its plan to reduce the amount of phosphorus being allowed in fertiliser bags. The details are sketchy and up for debate which has already sparked some concern, but the end result is to reduce the amount of phosphorus being used in Perth that ultimately ends up in our waterways and native areas.

The GCSAWA AGM is planned for August at Wembley Golf Complex so if you're interested in contributing to our industry in WA please nominate for a vacant position on the board. Your support and opinion is greatly appreciated. It will also be a great opportunity to inspect the new driving range which is the first fully automated range in Australia.

Here is hoping for a wet, safe winter and I look forward to catching up with everyone either on the Gold Coast or at the AGM in August.

DARREN WILSON PRESIDENT, GCSAWA

NSWGCSA

ainfall throughout February and March saw figures released which indicate that only 7 per cent of NSW is now drought affected. Good rainfall inland of the state has been very well received although some further follow up rainfall would be beneficial to keep our affected areas to a minimum.

This has definitely been a year for most Sydney superintendents to remember. There have been many golf courses battling the elements from early in the year and providing temporary greens for players and members has been a common occurrence for some clubs.

On a positive note, in early March the NSWGCSA moved into some office space within the NSW Golf Association headquarters in Arncliffe. This has given our association administration officer Alison Jones the opportunity to help further improve the relationship between all associations who are based at the premises, including NSW Golf Foundation, Junior Golf and the Women's Golf NSW.

Another good result for Sydney is that Liverpool Golf Club has reconsidered its decision on contract maintenance and has gone back to an in-house set-up effective from 1 July. As I am writing Mark Schroeder has been appointed the new course superintendent and we wish him well in his new role.

Our Graduate of the Year Award, which has been renamed the NSWGCSA Vince Church Graduate of the Year Award, was judged at Northbridge Golf Club on 22 March with Adam Shields from Casino Golf Club collecting the prize.

Congratulations to all this year's finalists. All finalists presented very well to the judging panel which made selection very difficult. The day also involved a tour to Roseville Golf Club to view the recent remodelling of the course and water storage

area, along with a trip to Killara Golf Club to view the recently constructed maintenance facility.

We also announced the formation of the NSWGCSA Peter McMaugh \$10,000 University Scholarship. This shall be carried out similarly with candidates required to submit applications to the NSWGCSA and present to a judging panel who will determine the winner.

In the first week of May the NSWGCSA held its annual Rube Walkerden Championship at The Lakes as well as the 2IC Education Day held at Globe's Sydney headquarters. A full review of each day will be in a forthcoming report. Upcoming events include the annual Ambrose event on 31 May at Newcastle Golf Club, while North Ryde Golf Club will host the NSWCGSA AGM on 30 August.

CRAIG WRIGHT PRESIDENT, NSWGCSA

STA NSW <

e have just wrapped up the Turf 10 Conference with Turf Australia. It is so important to the industry to have the different organisations involved with turf come together to create a stronger industry. The event went well with two very busy days of seminars, tours, expo, functions and a race meeting. This event was a great taste of what could eventuate with all sectors of the NSW turf industry working together.

Our focus is now on supporting the sportsfield stream of the AGCSA

conference and we look forward to promoting our association and particularly the Queensland STA at this event. In the coming months we will be hold an irrigation workshop on 7 July, our Regional Seminar on 17 August and a two-day Cricket Wicket Seminar. Plans are coming together for these events and all the details will be available on our website www.sportsturf.asn.au. Until next time

GRAEME LOGAN PRESIDENT, STA NSW

USA



USA

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TGAA ACT ®

reetings from the ACT and welcome to the AGCSA conference issue of ATM. This issue is no doubt one of the most exciting issues of the year, reminding us of previous conferences and a prompt to pay the conference fees and book accommodation for the marquee turf event of the year. For all of you fortunate enough to have been given the green light to attend by your committees, managers and wives, you are in for a treat. If you have missed out make sure you put next year's conference in the diary now and get a head start to avoid disappointment.

On the ACT regional front there hasn't been a great deal to report on. At the risk of repeating myself there is no more important date to put in your diaries than Wednesday 28 July which will see the TGAA ACT annual seminar held at the Hellenic Club in Phillip. Topics and speakers include:

- Pump selection Kevin Styles (Grundfos);
- Filtration: when, why and what types? Wayne Ingram (Netafim);
- Sub surface irrigation: Does it have a place in turf? – Austin Goodfellow (Canberra irrigation consultant);
- Bowling greenkeepers' experiences with irrigation – Matt Keogh (Engadeen Bowling Club);
- Injection systems and associated problems –
 Jerry Spencer (ETP Turf) and
- Natural vs synthetic turf forum Dr Peter Martin (University of Sydney) and Hamish Sutherland (HG Turf).

The association will also be running a wetland and irrigation workshop on the Tuesday before the seminar. Bookings are essential as there are limited places available.

For more information contact Bruce Davies on (02) 6207 4623, email bruce.davies@cit.act. edu.au or Keith McIntyre on (02) 6231 4721, email horteng@bigpond.com. Visit www.tgaa.asn.au for more details and registration forms.

The TGAA Memorial Golf Day was a great success for all players who competed in great conditions at Gold Creek Country Club (superintendent Scott Harris). All members had a great time out on the course and we would like to thank all the trade reps for their support. Over \$300 was raised on the day for charity. Winners were:

- Net: Rob Copper, Scott Fogg and Brent Hull (60)
- Scratch: Micheal Waring, Andy Heskett and Hugh Leister (61)
- NTPs: Adam Crain (5th), Scott Fogg (7th), Glen Huender (10th and 12th) and Matt Wathen (15th)
- Drives: Simon Howarth (10th) and Chris Patrick (18th)

Congratulations to Brad Revill from Bermagui Country Club on winning the Living Turf/TGAA Apprentice of the Year award. Brad acquitted himself well during the interview process and fought off some very stiff opposition to claim the prestigious award. Thanks must go to Rob Cooper and his team at Living Turf for sponsoring what we see as a very important award for the turf industry in our region.

Part of Brad's award will see him off to the AGCSA conference on the Gold Coast where he will hopefully see what our industry has to offer and meet some important industry contacts while 'networking' into the early hours.

BROCK WESTON TGAA ACT COMMITTEE

TGAA VIC ®

nother summer has passed and let's hope for some above average rain over the winter and spring months. As we quieten down over the cooler months the TGAA committee will be busy organising a number of upcoming events.

Our most recent seminar was held at Colac. The TGAA has made a commitment to try and hold one seminar each year in a regional area of Victoria to reach as many members as possible and pass on informative sessions as far and wide as we can.

The Regional Seminar at Central Reserve, Colac, followed a weekend deluge of heavy rain and hail. Biogreen sponsored and hosted a field trip to the facilities at Swan Marsh. TGAA Victoria would like to thank speakers Luke Tresize (Turfcare & Hire), Peter Todd (City of Glen Eira), Daryl Stevens (Arris) and Darren Milverton (Barwon Water). We look forward to going to another part of Victoria in March 2011.

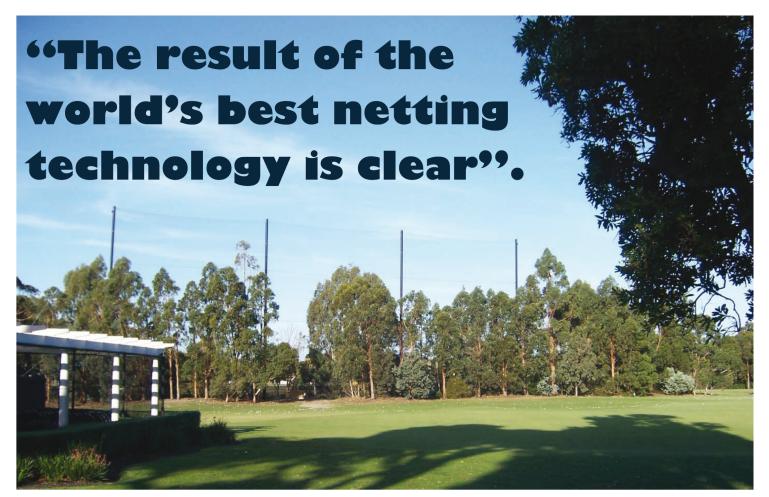
Coming up we have the annual Cricket Wicket Seminar at the MCG on 21 July. This is always a great day and this year will be no different. Following on from that the committee is busy organising 21st

birthday celebrations for the association. That's right, the TGAA is still going strong after 21 years and from the first initial meeting there are now associations in most states and territories around Australia.

To help us celebrate this milestone we will be having an evening on 19 November at the Cohen Room, Trinity Grammar School, Marles Playing Fields in Bulleen. We hope to have as many past and present members who have been involved with the association at the night reminiscing on all the happenings of yesteryear. Look out for more information as it comes.

Finally, I wish all of our colleagues in the industry good luck over the winter months and hopefully you'll get a little hard earned rest before next season is upon us in no time. And remember to help support our valued TGAA sponsors – check our website for more details. See you at the AGCSA conference.

NATHAN TOVEY PRESIDENT, TGAA VICTORIA



The Metropolitan Golf Club - Melbourne. 24m high safety screen adjacent to practice fairway

High safety screens are becoming an important yet sometimes unwelcome development on golf courses and ranges around the world – often driven by risk of litigation but also by responsible management of potential safety issues.

Modern golf equipment technology, restricted land for re-design and new adjacent developments sometimes leave Clubs with limited options. If a safety screen is the right solution there is only one company in Australia capable of providing the right advice and the right end product.

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"On behalf of the Committee and Members of The Metropolitan Golf Club I wish to confirm our satisfaction with the work undertaken and the result.

I have already received many complements from members, most of whom (previously) felt the high fence would be a visual intrusion on our lovely course. That the net is almost completely transparent is quite amazing".

Allan Shoreland
Secretary Manager

Secretary Manager
The Metropolitan Golf Club





s I write this report, night time temperatures are dropping and the humidity is also backing off which leads to absolutely superb autumn days that will hopefully turn in to beautiful winter days when the horde of Mexicans arrive for the AGCSA conference. June is normally a reliably dry month with nice temperatures, although daylight hours are short. Having said that I have seen 610 mm of rain fall in a 36-hour period in June and there have been other years with a bit of rainfall, so it might pay to pack a raincoat just in case.

In late April the GCSAQ ran an education day that finished up with some of the most enthusiastic responses to a meeting this scribe has seen in his time in the Sunshine State. For three days following the meeting my phone ran hot with attendees seeking further information which was satisfying to see. This is exactly why your state associations go to so much trouble to put on these events.

Although numbers were initially slow, we finished

up with just under 50 attendees at the day where topics related to the new USGA Slope handicap system and its impact on golf course set up and the new Award agreements. It would be fair to say that these are two of the biggest changes to golf course management in recent times.

We were lucky enough to secure Daryl Sellar (AGCSA) who was our industry's voice at the coalface when this Award was being put together and it turned out to be a mutually beneficial day as Daryl was able to gain an insight into how the Award is being interpreted in real life. The various interpretations of parts of the Award were very interesting and the discussion among the group was terrific. It shows how remuneration, entitlements and their application can stir up the masses. Just ask the Melbourne Storm!

We were also very lucky to have Golf Queensland communications manager Phil Laurie and one of Queensland's course rating administrators Mike Levick present two very thorough presentations on the new handicap system and the course set up requirements associated with it. Once again a lot of very good information was made available to the audience who can go back to their respective clubs armed with plenty of information.

It was very encouraging to hear both Phil and Mike mention on several occasions of their desire to include the course superintendents at the clubs from the very first contact. A show of hands in the room also demonstrated that supers will be heavily involved in the implementation of these changes.

Speaking of the new handicap system, my club had a member go out to a handicap of 28 from 8 on the first Saturday of the new system. He proceeded to have a net 63 to win the monthly medal and then arrived for Sunday's competition to discover that he was off 36! He then proceeded to have 60 stableford points! Needless to say a manual adjustment was required.

Post-conference, the GCSAQ will be looking ahead to the following events:

- GCSAQ AGM (Coolangatta & Tweed Heads GC)
 Monday 19 July;
- Globe roving seminars (Townsville, Brisbane, Gold Coast and Sunshine Coast (2-5 August);
- Supers-Managers Day (Oxley GC) Tuesday 17 August;

Turf Research Golf Day (Peregian Springs GC) -

- Monday 15 November; and

 Wet n Wild Christmas Party Saturday 4
- Wet n Wild Christmas Party Saturday 4 December.

We look forward to giving all conference attendees a warm welcome to our 'patch' and anticipate another very successful event.

SAGCSA 🕸

ur most recent meeting was held at the Mt Barker-Hahndorf Golf Club on 25 February. Host superintendent Sam Sherriff took us on a course tour and impressed us with the quality of his playing surfaces which have been produced with a relatively small budget and staff.

Sam highlighted many of the initiatives he has introduced to manage the local conditions and his budget which include converting from cool-season grasses to Santa ana on fairways, *Poa* control in greens and managing poor quality soils and high rainfall.

Following the course tour Daryl Sellar presented an informative workshop which looked at the results of a greens renovation trial that he and Sam had undertaken in the previous six to nine months. The trial was set up on one of Sam's practice greens and looked at the results of using different combinations of renovation techniques. Participants on the day got involved in a live infiltration test and Daryl's presentation generated plenty of discussion.

Following a generous BBQ that was kindly cooked by John Cooper and a couple of the local lads, we had a demonstration of the latest renovation machinery. We had very good representation from Toro Australia, Squiers Sales and Service, Metropolitan Machinery and Glenelg

Turf Ace. Special thanks go to these companies who committed considerable resources which helped to make the day a success. This was evidenced by the number of attendees on the day which was around the 70 mark.

Congratulations to Kym Tattersall who has been judged the South Australian Graduate of the Year (Turf) by the SAGCSA board. Kym will go on to contest the national award and we wish him well throughout this process.

Kym is employed by The Grange Golf Club and impressed with his passion for the industry. Kym fought off close challenges by Matthew Sugg (Glenelg GC) and Ashley Pellat (Kooyonga GC). Matthew and Ashley performed admirably throughout the judging process and made it particularly difficult for the judges.

Brendan Clark has resigned from the SAGCSA board along with his position as course superintendent at Mt Gambier Golf Club. Brendan has accepted a position as superintendent in Cairns. I would like to pass on our appreciation at a board level for all of Brendan's hard work and we hope the move is a rewarding and enjoyable one. See you all on the Gold Coast.

ANDREW BLACKER PRESIDENT, SAGCSA

PETER LONERGAN PRESIDENT, GCSAQ

VGCSA 🗢

utumn has certainly dished up some very different weather here in Victoria. Heavy rainfall and higher than average temperatures have provided good growing conditions leading into winter and with the rain came the lifting of water restrictions from Stage 3a to 3. Not much grace but it is a move in the right direction.

We have just held our annual country meeting at Tocumwal Golf Club. The weather over the weekend was fantastic and the hospitality and golf course were fabulous. A big thanks must go to superintendent Matt McLeod for organising and holding the event.

We started with golf on Sunday afternoon in great conditions. This was followed by dinner at the club and a chance to socialise and chat with colleagues over a few drinks. The meeting kicked off on Monday morning with breakfast and than a fertiliser product update from Paul Jackson (Barmac Australia).

After the talk we ventured outside for a demonstration of the Aerovator and an update on the machinery division of Globe Australia. This was followed by a panel discussion about the water management issues associated with the courses on the Murray. The panel consisted of Matt McLeod, Darren Harvey (Corowa Golf Club) and Terry Howe (Deniliquin Golf Club). Thank you to these superintendents for giving up their time and presenting very interesting topics.

A course inspection followed with Matt leading the group around to different parcels of the property. This was followed with nine holes of golf and a BBQ lunch before everyone embarked on the trip back home. Thank you to Globe for sponsoring this event. It is their continued support of the country meeting which allows the association to venture into the country. A special mention must also be given to Eddie Ruis, course superintendent at Portland Golf Club, who travelled seven hours each way to attend this meeting.

The PGA Industry Awards night was held on Monday 3 May. Along with the VGCSA the night was also supported also by the PGA, GMV, WGV and the VGA. The philosophy behind the night is to bring all the state golfing associations and industries together as a single entity. Each association presented different awards with the VGCSA bestowing the Recognition Award for both superintendent and trade member.

Our next meeting is the Annual General Meeting to be held at Metropolitan Golf Club on Monday 24 May. The day kicks off with golf at 12.45pm followed by dinner and then the AGM. This year we have two positions vacant for committee so if anyone is interested in becoming a member of the VGCSA committee please let us know. I encourage all members to consider putting their hand up



and joining the committee. The experience and difference you can make to the association is well worth while. Nomination forms have been sent out so please give it some consideration.

Currently we are finalising the assistants/ foremen day to be held at Kingston Links on 15 June. The day will have an open forum panel consisting of newly promoted superintendents, a golf club manager and trade member all discussing the steps required to take that next step. I encourage all superintendents to allow their staff to attend this day so they can begin forming their own networks within the association.

Kingston Links will host the VGCSA's assistants/foremen day 15 June

BRETT CHIVERS PRESIDENT, VGCSA

TGCSA ®

t has been a very dry start to 2010 with only 78mm falling in most southern areas up to the end of April. Around the rest of the state they have fared a little better with Launceston receiving 182mm, Devonport 159mm, Wynyard 196mm and Bicheno 178mm year to date.

The most recent TGCSA meeting was held on 23 February at Wynyard Golf Club (superintendent Michelle Hussey) on the northwest coast. Michelle turned on the beautiful weather and had the course looking at its best. The education day started with morning tea and a warm welcome from the club. Andrew Booker (Wrightson Seeds) and Nadeem Zreikat (Campbell Chemicals) spoke before Michelle took us on a course inspection.

After a very healthy lunch Andrew Riley from KRW Finances and Paul Westo (Toro) spoke on the advantages of leasing and renting of course equipment. It was a very informative day and congratulations to Wynyard GC for hosting the gathering.

Our next meeting will be held at Barnbougle Dunes on 25-26 May. This meeting will provide a fantastic opportunity to view the new Lost Farm course which is scheduled for a soft opening in October and a full opening before Christmas. The planned agenda is as follows:

Tuesday 25 May

10am: Registration/coffee

10.30am: Dean Kohlman - guest speaker

Patrick Madden

11.15am: Paul Woloszyn (Toro Irrigation)

12pm: Lunch

1.30pm: Nine holes at Barnbougle Dunes

4.30pm: Presentations and drinks

6.30pm: Dinner Wednesday 26 May **7.30am:** Breakfast

8.30am: Richard Sattler - Construction of

Lost Farm

9am: Phil Hill - Construction

9.30am-12.30pm: Lost Farm course

inspection

The TGCSA Annual General Meeting is currently being finalised and we are hoping to be able to have the day at Aurora Stadium in Launceston on 25 August. This will be a few days after the last AFL game of the season at the ground and we are hoping to get an insight into AFL preparations. More details will be available shortly. I look forward to catching up with everyone on the Gold Coast.

STEVE LEWIS PRESIDENT, TGCSA



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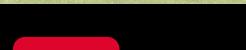




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(CLOWARA



One of two LOWARA Dual SV92 Hydrovar controlled irrigation pump sets installed at the Virginia Golf Club in Brisbane by Australian Irrigation Services. Barry Lemke (pictured right) the Club Superintendent said "he is very pleased with the trouble free operation and considers the efficiency and simplicity of the Hydrovar system far superior to the manual pump system it replaced ". Australian Irrigation Services Dean Smith (pictured left) said "he had now installed several LOWARA Hydrovar systems at Golf Courses in Brisbane with very pleasing results". The second LOWARA Dual SV92 Hydrovar controlled irrigation pump set will be put into service later this year.

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The Hydrovar has gained a reputation as THE pump mounted microprocessor pumping system controller. But it does much more than just change motor speed.

It actually manages the performance of the pump to match a wide range of system conditions and requirements.

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How The Hydrovar reduces energy consumption

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How The Hydrovar reduces maintenance cost

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