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2011 Rugby World Cup

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COVER:

Forsyth Barr Stadium: Forsyth Barr Stadium in Dunedin, New Zealand is the world's first permanently enclosed sports stadium boasting a natural turf playing surface.

Photo: Phil Walter/Getty Images



COVER STORY: Forsyth Barr Stadium – the undercover story

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When the 2011 Rugby World Cup kicks off this month, New Zealand's premier turf facilities will be under the spotlight during one of the biggest sporting spectacles the country has hosted. One of the most impressive new grounds is Forsyth Barr Stadium in Dunedin which is the world's first permanently-roofed stadium to house a natural turf playing surface. Agronomist Dr. Richard Gibbs, one of the key figures involved in the design and delivery of the playing surface, looks at how this unique facility has come about and the many agronomic challenges it presents.

FEATURES

Flying the Aussie flag

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Among those turf managers taking centre stage during the 2011 Rugby World Cup in New Zealand, there is one who will be quietly hoping that Wallabies skipper James Horwill lifts the Webb Ellis trophy come the end of October. ATM catches up with ex-pat Melbourne Brett Siphthorpe who has been turf manager at Wellington Regional Stadium for the past five years and looks at the build up to the most anticipated sporting event in the country's history.



Trafalgar's first-class turf-glass

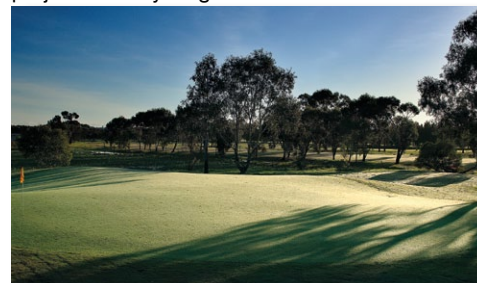
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New Zealand Sports Turf Institute technical director Alex Glasgow looks at the reconstruction of Nelson's Trafalgar Park, one of the smaller provincial venues to be used during the 2011 Rugby World Cup, and the use of recycled glass sand as a rootzone material.

Barwon Valley heads down new road

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The realignment of three holes at Geelong's Barwon Valley Golf Club to make way for improved transport infrastructure seemed a relatively straightforward project on paper. As ATM discovers, unseasonable rain and challenging soil conditions meant the project was anything but.



Eight years, seven courses, six tournaments

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English greenkeeper Simon Blagg has experienced more than most in the world of golf course turf management. Now back in Australia for a second stint, the 23-year-old looks back on his experiences and the role a US internship had in the development of his career.

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Bents and benchmarking

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Andrew Peart reports the latest results from the AGCSA's bentgrass varieties trial and looks at a new golf course benchmarking study.



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OPINION

Does the Award reward?

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A recent survey of AGCSA superintendent members has revealed ongoing dissatisfaction over the set-up of the modern Award.

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In March 2008, researchers at Virginia Tech in the US embarked on a three-year project to compare various cultivation approaches that removed between 10-27 per cent surface area and determine treatment effects on agronomic performance of a mature bentgrass putting green.

Native patch diseases put to the test

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Two new fungal pathogens causing patch diseases in Australia have been studied to determine their temperature, moisture and pH requirements.

TURF TECHNICIANS

Certificate targets turf tech training

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Turf technician Luke Spotalis reports on a new training initiative introduced by the International Golf Course Equipment Managers Association which it hopes will become the yardstick for equipment tech training the world over.

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Kiwi ingenuity

As I write this it's five days, 19 hours, 54 minutes and 23 seconds from the start of the 2011 Rugby World Cup (RWC). Not that I'm counting or anything. I'm a nervous soul at the best of times, but this September and October you can effectively write me off. The RWC has a knack of turning even the most staunch Kiwi into a crumbling, drooling mess and given the world of abject pain I have had to live through for the past 20 years as my beloved All Blacks have gallantly choked when it matters, you can, surely, only but have sympathy (or am I drawing too long a bow with that one...).

I was 12 – yes 12 bloody years young – when diminutive halfback David Kirk held the Webb Ellis trophy aloft after the All Blacks had convincingly dispatched the French in the inaugural final on the hallowed turf of Eden Park. Despite subsequent RWC failings, it still ranks as one of the country's finest moments and one of a number of firsts that New Zealand can proudly claim during its relatively young history. Others include Ernest Rutherford splitting the atom (we'll it had its positives, but also a few, shall we say, negatives...), while some chef in the 1920s invented the pavlova (get stuffed Australia, it has always been ours!) Sir Edmund Hillary was the first man to set foot on top of the world when he conquered Everest (risky, but worth a gamble) and New Zealand was the first country in the world to grant women the right to vote in 1893 (risky, but worth a gamble also).

Such ingenuity extends to the 2011 RWC and of the 12 major stadia hosting matches, by far and away the most striking and unique is the new Forsyth Barr Stadium in the South Island city of Dunedin. Five years in the planning, design and construction, the 30,000 seat stadium opened in August and is the world's first permanent closed-roof stadium to boast a natural turf playing surface.

As this edition's cover shows, the roof of the stadium is completely transparent and after rigorous testing and research to see whether turf could grow under such a structure, the green light was given for the \$NZ198 million development. In this edition Dr. Richard Gibbs, who is the current vice-president of the International Turfgrass Society and who was one of the major players in the design and development of the pitch, looks back at this epic project and some of the distinct turf management challenges that operations manager Coryn Huddy has and will continue to have as the stadium's ryegrass surface matures.

The performance of the Forsyth Barr Stadium surface will not only be closely monitored by Huddy and those involved in its development, but also by their counterparts a few hours north in Christchurch. Already reeling following the series of devastating earthquakes to ravage the city and the subsequent moving of AMI Stadium's allotment of RWC games to other venues, engineer reports have effectively condemned the ground and recommend that the main Hadlee Stand be demolished. The word is that a permanent indoor facility similar to Forsyth Barr Stadium is being eyed as a potential replacement for AMI Stadium with a view that it be ready for the 2013 rugby season.

The innovation at this year's RWC doesn't just end with Forsyth Barr Stadium. At Nelson's Trafalgar Park the surface was redeveloped in the summer of 2009/2010 using recycled glass sand derived from crushed bottles in the profile. As part of ATM's RWC feature, Alex Glasgow looks at the Trafalgar Park project, the first of its kind in the country, while we also touch base with ex-pat Aussie turf manager Brett Siphthorpe who will be preparing Wellington Regional Stadium as it hosts seven matches. Hopefully, he won't be among the tsunamis of emails I'm expecting should the mighty ABs do the unthinkable and falter again. Quick, where are those tablets? Enjoy the read...



Brett Robinson
Editor

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Business as usual during a period of transition



It has certainly been an eventful few months since the 27th Australian Turfgrass Conference and Trade Exhibition in Adelaide and without exception one of the most difficult I have experienced in my seven years representing the AGCSA.

First and foremost I would like to reassure the members, the trade and the wider Australian turf management community that the AGCSA is working hard to make sure it continues to provide the normal exceptional standard of value and support. This has been easier to maintain due to the tremendous effort shown by the great team at the AGCSA headquarters. It is good to know that we, as a Board, can concentrate on some key issues while the day-to-day running of the association continues smoothly in the background.

There are two important matters that the AGCSA Board is focusing its attention on at the moment – the first being the appointment of a new general manager following John Neylan's resignation in July, and secondly the consolidation of the Board.

As most of you are aware applications for the general manager position closed on 19 August and in the following weeks these have been heavily scrutinised by the interview panel and a shortlist finalised. At the time of writing the AGCSA Board is due to meet in mid-September where the shortlisted applicants will be interviewed. The quality of candidates is very high and the panel has a difficult task ahead of it.

As part of the interview process we have asked Jon Griffin, from AGCSA auditors apFinancial, to sit on the panel to give an 'outside of industry' perspective and provide an independent assessment of the candidates. I am sure this panel will have the expertise and diversity to select the best person to lead the AGCSA into the future.

The second matter is far more complex I believe. At the Adelaide conference we unfortunately lost the services and experience of John Odell (Royal Sydney Golf Club) and Pat Pauli (Horton Park Golf Club) who both retired from the Board after providing the association with their priceless input.

The two newly elected Board members, Darren Wilson (Wembley Golf Complex, WA) and Tony Fogarty (Club Catalina Country Club, NSW), will provide excellent knowledge and expertise as they are both consummate professionals in their own right. I was very happy that these two experienced superintendents offered their services to the AGCSA and together with Bryce Strachan we would soon establish a solid Board to develop the association.

No sooner had we sat down for our first meeting in July than we suffered a further setback when Bryce informed us of his resignation from Pambula-Merimbula Golf Club. No longer a superintendent and as per the AGCSA Constitution, Bryce was unable to continue his tenure on the AGCSA Board.

So not only did we have the enormous task of appointing a general manager, we now had the task of finding a new director. At the same meeting it was agreed to co-opt Paul McLean (RACV Royal Pines Resort) onto the Board, however, despite initially agreeing a few weeks later he had to turn down the opportunity.

Fortunately, just as this edition was going to print, we were able to confirm that Coolangatta & Tweed Heads Golf Club superintendent Peter Loneragan had agreed to join the Board and will now serve up until the 2012 AGM in Melbourne. Peter has a vast amount of experience at state association level, having been a former president of the VGCSA and a current long-serving member of the GCSAQ committee.



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To have Peter, who has been Queensland president since 2008, come onto the Board during such a time is a great boost for the association and his wisdom and experience will be invaluable.

I know all of the above appears like a comedy of errors and may be seen by some as an AGCSA problem, but I can categorically state that it is not. It is an industry problem, unfortunately an increasing one, and shows that our industry is changing in many ways.

What has become evident is that there is an increasing number of superintendents who are, for various reasons, unhappy with their current career. It has demonstrated to me that it is becoming more difficult to attract quality representatives to serve on the AGCSA Board and even when good candidates are nominated and join the Board, there is now a growing uncertainty of their tenure for the expected two year term.

Over the last few years we have seen many highly respected and experienced superintendents who have, for different reasons, either left the industry or gained employment in another area of the turf industry. Why? I certainly do not have the answers but I do believe it is a subject worthy of further discussion and examination at future conferences or seminars.

In closing, be rest assured the AGCSA will continue to forge ahead with its operations and initiatives despite the current transitional period and in the next edition of Australian Turfgrass Management Journal I look forward to reporting on some more positive developments. 🌱

CORRECTION

In Volume 13.4 (July-August 2011), Australian Turfgrass Management Journal carried an article on Royal St George's Golf Club, host venue for the recent 2011 Open Championship ('The Royal Treatment', pp12-16).



Graham Royden

Shortly after this article was written by Steve Symmons in 2010, head greenkeeper Neil Metcalfe left the club with turf management operations taken over by his former assistant Graham Royden. Graham (pictured) oversaw all preparations in the lead-up to and during the 2011 Open Championship.

ATM apologies for any confusion created and congratulates Graham and his team on their successful hosting of the Open.

Brett Robinson, Editor



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THE NEXT GENERATION (STUDENT MEMBERSHIP)

When the 2011 Rugby World Cup kicks off this month, New Zealand's leading curators and their facilities will take centre stage in one of the biggest sporting spectacles the country has hosted. While a number of grounds have received upgrades in the lead-up to the event, by far the most impressive development has been the construction of Forsyth Barr Stadium in Dunedin which opened in August. Dr. Richard Gibbs, one of the principal figures involved in this unique project, provides an insight into how the world's first permanent closed-roof stadium boasting a natural turf playing surface came to being and the many agronomic challenges that needed to be overcome.



Forsyth Barr Stadium – the undercover story

The new \$NZ198 million, 30,000-seat Forsyth Barr Stadium in Dunedin has been a massive challenge not only from a political and budgeting perspective, but also because of the significant challenges raised by its design in terms of engineering and turf requirements. Now, five years since the original concept was first put to paper, the stadium is open for business and ready to play its part in one of the biggest sporting spectacles hosted in New Zealand – the 2011 Rugby World Cup.

The story of Forsyth Barr Stadium originates back in 2006 when the Carisbrook Stadium Charitable Trust was formed. Carisbrook, affectionately dubbed the House of Pain by the local population, had been the city's principal sports stadium for many years, but was beginning to show its age.

With New Zealand being announced as host of the 2011 Rugby World Cup back in 2005 by the International Rugby Board, two possible scenarios were subsequently investigated for a new stadium in Dunedin – redevelop the existing Carisbrook Stadium or construct a completely new arena. A new stadium was seen as the better option because it could be combined with a proposed University of Otago development.

A preliminary report completed by the Trust in October 2006 concluded that a new multi-purpose stadium was a feasible option and by February the following year a masterplan and feasibility report which investigated four redevelopment options at Carisbrook and two options for a new stadium had been produced.



PHOTO: PHIL WALTER/GETTY IMAGES

Dunedin City Council voted to proceed with the preferred multi-purpose stadium option in association with the university. The challenge was that the stadium brief required a design for a permanently closed roof under which natural turf was expected to grow, a feat that had not been achieved successfully before. Nevertheless, the report had highlighted that the development of clear cladding and roofing materials such as ethylene tetrafluoro ethylene (ETFE) represented a realistic option for constructing a fully enclosed stadium that could support a grass playing surface.

Over the next two years, a formidable design team assembled by project managers Arrow International set to work on turning this concept into reality. The team included architects Populous and Jasmax, structural engineers SKM and services/civil engineers Aurecon. Sports Surface Design & Management (SSDM), the consultancy division of Recreational Services Ltd, was engaged as turf consultant. Project stakeholders were Dunedin City Council, Otago Regional Council, the University of Otago and the New Zealand Community Trust.

TURF RESEARCH AND PITCH DESIGN

One of the early turf feasibility reports listed so many agronomic challenges that it was clear turf trials

would be needed using a specially constructed ETFE rig. A proposed methodology was determined with input from ETFE manufacturer and supplier Vector Foiltec and submitted in June 2007 for consideration by Arrow International and the Trust.

Turf trials started in July 2007 with the building of an ETFE test rig at Carisbrook's turf nursery. SSDM was engaged to carry out the trials in conjunction with then Carisbrook head groundsman Coryn Huddy. Two formal trials were conducted in the test rig, the first one ending in March 2008 (spring and summer trial) and the second one ending in September 2008 (autumn and winter trial).

From October 2008 until September 2009, testing continued in the rig but at a more informal level. By this time the first two formal trials had validated the concept that turf could grow successfully under ETFE, albeit with some challenges, and the final informal trialling carried out by Coryn allowed the testing of various maintenance techniques that were likely to be required in the real stadium (e.g.: fertiliser management).

The trials also supplied two other important pieces of information for the design team. The first was the supply of data that was used to help model levels of photosynthetically-active radiation (PAR) likely to be found in the real stadium, while the second was that the trials helped guide the pitch design process which started in March 2008.

The pitch design process was split into three distinct stages to mirror those carried out by the wider design team. The preliminary design stage was a robust 'bridging' report that reviewed potential pitch designs and which brought together the results of the ETFE test rig work, the light prediction modelling work and budget and construction timing issues.

The initial pitch design stage also included reviews of the availability of pitch construction materials in the Dunedin region, pitch designs used by other stadia around the country, artificial lighting and turf reinforcement systems, plus liaison with the project's key stakeholders to ascertain pitch performance objectives.

Forsyth Barr Stadium, or Otago Stadium as it will be known during the 2011 Rugby World Cup, will host four pool games during the tournament. Some five years in the planning and costing \$NZ198 million, it is the world's first permanently closed roof stadium with a natural turf playing surface

One of the early turf feasibility reports listed so many agronomic challenges that turf trials were needed using a specially constructed ETFE rig





The transparent ETFE roof is supported by five arch trusses, each with a 105m span. A main truss, 130m in length and weighing 390 tonnes, supports one end of the five arch trusses along the southern grandstand, with the other end of the arch trusses connecting to the top of the northern stand

Installation of drainage, irrigation and rootzone components in late December 2010 with access to the roof an ongoing (and sometimes unexpected) requirement



This was clearly no ordinary 'off-the-shelf' pitch – its design did not need to follow those used for conventional outdoor stadium pitches – and some fairly important design decisions had to be made including:

- What type of rootzone, irrigation and drainage systems would be best suited to the permanently enclosed stadium design?
- How would the environmental conditions within the stadium bowl be monitored and linked to pitch maintenance?
- Would the proposed design stand up to international peer review?

By the end of the developed design stage in October 2008, design components for building the pitch, including subgrade and surface shape, subgrade drainage design, rootzone selection and profile design, irrigation system design, turfgrass species selection and establishment were complete. Serious consideration was given to establishing the surface using turf harvested from Carisbrook as a contingency in the event of construction delays, but a decision was made in late 2009 to establish the surface on site from seed.

There were two other important components of the developed design stage. The first was international peer review, both at a scientific level and at a practical turf management level. This review included using the UK's Sports Turf Research Institute to benchmark the predicted light levels for the stadium against Northern Hemisphere stadia known to suffer from turfgrass decline during the winter period.

The second component was a visit to Gavin Darby at Etihad Stadium in Melbourne to gain a better appreciation of turf management challenges in a stadium with a retractable roof. This was then followed by a visit to the Eden Project in Cornwall, UK, one of the most successful facilities growing plants under an ETFE structure.

The final section of the pitch design stage involved the preparation of specifications and schedules for tender, which were completed in February 2010. By this stage the stadium was about eight months into the building contract. The pitch contract was awarded to Dunedin-based Delta Utility Services, using Parkland Products and Tiger Turf as irrigation and artificial turf subcontractors respectively.

The essential design components of the Forsyth Barr Stadium pitch were:

- A 300mm deep sand profile placed over a drained subgrade, with the top part of the profile being made up of a sand/soil/compost rootzone specially blended off-site;
- A strategically located zeolite-amended sand rootzone layer;
- A subsurface irrigation and conventional pop-up irrigation system (designed by SSDM subconsultant Martin Payne of Water Supply Products);

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St Lucia Golf Links
12 September 2010



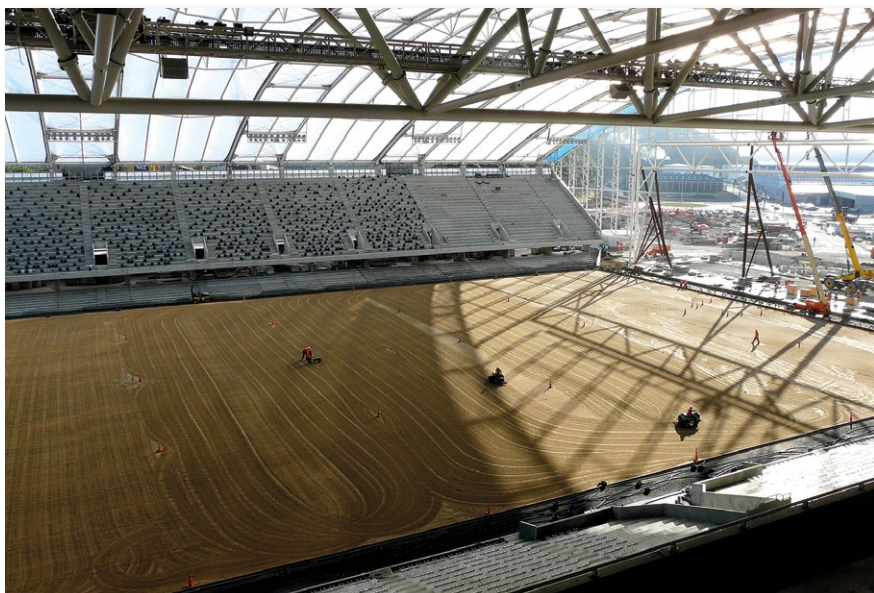
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Final surface preparation and levelling in mid-January 2011 prior to the spreading of the organic-amended sand rootzone

- Buried soil moisture sensors for optimum soil moisture management;
- Desso GrassMaster turf reinforcement, the first stadium in Australasia to use such a system;
- A 3m wide perimeter boundary of artificial turf that was to marry seamlessly with the natural turf; and
- Pitch dimensions (including artificial turf boundary) 132m x 81m.

SUPER STRUCTURE

ETFE was originally developed by German chemical company Hoescht in the 1970s as a film for solar collectors because of its unique properties and resistance to UV radiation and atmospheric pollution (Vector Foiltec, 2006).

ETFE roof structures consist of pneumatic cushions comprising between two and five layers of ETFE. The material is extruded into thin films and supported in an aluminium perimeter extrusion which is supported on the building frame. A typical ETFE foil cushion weighs 2-3.5kg/m² and the



cushions are inflated to about 220Pa which gives the foil a structural stability and the roof high insulation properties.

The material is acoustically transparent so the net effect of using an ETFE roof is that it is similar in feel to an open air venue. ETFE has 1 per cent of the weight of glass, is able to bear 400 times its own weight and can stretch 3-4 times its length before breaking. A total of 20,500m² of ETFE has been used at Forsyth Barr Stadium, which includes the side walls as well as the roof.

The roof itself is supported by five arch trusses, each with a 105m span. A main truss, 130m in length and weighing 390 tonnes, supports one end of the five arch trusses along the southern grandstand, with the other end of the arch trusses connecting directly to the top of the northern stand. The placement of the main truss took six hours to complete and used three of the biggest cranes in the country (one 400 tonne crane and two 280 tonne cranes). The internal roof clearance is 37m from the surface of the pitch.

Stadium construction started in June 2009 and took just over two years. Pitch construction started in September 2010 with work initially confined to main drain installation as the playing area was still required for access to the roof. Once the first three roof trusses were in place, it was possible to start preparing the subgrade and installing drainage and irrigation lines.

The pitch was built from west to east, the same direction as the roof arch truss installation. However, because of the layered design of the pitch and in particular the need for the subsurface irrigation system to run the full length of the pitch, the profile could not be built in multiple sections.

Instead, rootzone material had to be installed in layers, which initially caused some concerns from a timing perspective as it meant the full pitch subgrade area had to be handed over for this purpose. In the end, it was possible to achieve this requirement by leaving only a small section of the subgrade at the eastern end of the pitch available for roof construction access.

With the sowing deadline rapidly approaching, progress increased once the last roof truss was in place and the bulk of the pitch subgrade was available to the pitch contractor. Unencumbered by having to allow access to the roof, the rootzone layers could be spread with ease to the very tight tolerances specified. Almost overnight, a full size pitch began to take shape.

TURF ESTABLISHMENT AND TESTING

The bulk of the pitch was sown with a blend of three perennial ryegrass cultivars on 24 January 2011, with the final 3m wide eastern section being sown nearly two months later. The turf cultivars used were selected from eight industry standards used in the wear and recovery trials carried out in the ETFE test rig. Turf establishment was very rapid with a full and

The pitch was sown with a blend of three perennial ryegrass cultivars in early 2011. A full and dense cover was achieved by 30 March 2011, the date of the first of two surface performance tests

dense ground cover achieved by 30 March 2011, the date of the first of two surface performance tests.

At that time, the pitch had not received any physical treatment and was understandably hard and dense at depth. In order for the planned GrassMaster turf reinforcement installation to proceed, the pitch was Verti-drained to a depth of 180mm, a few centimetres above the subsurface irrigation pipe.

The GrassMaster system involves a 420mm length of artificial fibre folded in half and injected to a depth of 185mm on a 20mm x 20mm grid, leaving 20-25mm of artificial fibre exposed at the surface. Each length of injected fibre is made up of five strands, so that a single fibre results in 10 artificial 'leaf blades' at the point of injection. Once installed, about three per cent of the pitch surface is made up of artificial fibres.

GrassMaster installation started on 21 April 2011 and had to be completed by 9 May 2011 when all machinery was required to be off the pitch to allow the sports lights to be set up and tested. Two GrassMaster machines were shipped to New Zealand from South Africa where they had been involved in reinforcing pitches used for the 2010 Football World Cup. The machines worked for 16 hours a day in two shifts of eight hours in order to meet the deadline. Results were dramatic, with the artificial fibres instantly providing the required reinforcement of the natural turf.

ONGOING MAINTENANCE

With the pitch completed and turf established, the task of implementing an ongoing maintenance programme began. Using results gained from the ETFE test rig, a detailed maintenance specification was prepared by SSDM, in conjunction with Coryn Huddy, who had conducted an overseas stadium study tour in January 2009 in order to gather valuable maintenance experience.

The maintenance programme has focused on taking into account the low light levels in winter and significantly reduced air movement and higher humidity levels in the stadium bowl that are likely to contribute to potential disease outbreaks. Actions such as a preventative rather than a reactive programme to disease management have been specified, at least initially until more experience with the management of the turfgrass surface is gained.

Other maintenance aspects include routine turfgrass clippings removal, prevention of moisture build-up at the surface by regularly removing dew, carefully timed watering programmes to prevent excessive periods of leaf wetness and specialist fertilisation management using both foliar and granular applications. Ongoing maintenance will be reviewed as growing conditions become better understood.

A key component of the pitch construction specification was the design and supply of a customised environmental monitoring system that



Dr Richard Gibbs undertakes surface traction testing

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Right: To reinforce the playing surface, Desso GrassMaster artificial fibres were injected into the surface

Far right: The GrassMaster system involves a 420mm length of artificial fibre folded in half and injected to a depth of 185mm on a 20mm x 20mm grid, leaving 20-25mm exposed at the surface



could measure various characteristics such as temperature, humidity and PAR. A portable wireless weather station located in the centre of the pitch, buried soil moisture sensors and external light capturing sensors are the basis of the system. This monitoring system will help establish how close the light modelling predictions have been, as well as help build an understanding of the actual environmental conditions that directly affect the growth and performance of the surface.

ALL SYSTEMS GO

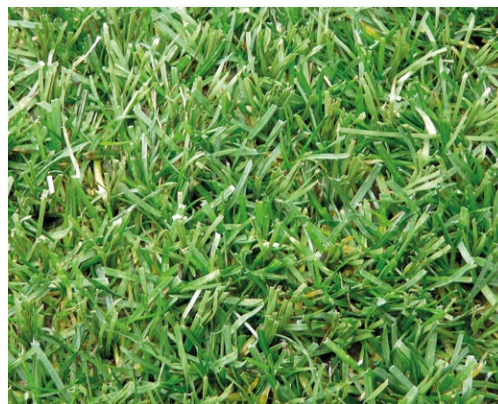
Handover of Forsyth Barr Stadium, which will be known as 'Otago Stadium' during the 2011 RWC due to commercial reasons, occurred on time and on budget on 1 August 2011 following a very successful grow-in by Coryn Huddy (Coryn was officially appointed operations manager of the new stadium in late 2010). Two weeks earlier the pitch had received its second performance testing courtesy of a training session by the All Blacks who had nothing but praise for the surface.

Pitch usage started in early August, first with a local university college rugby game followed quickly by a second tier provincial club rugby game. However, it was somewhat ironic that the first major rugby game scheduled for 17 August had to be postponed until 30 August because of heavy snowfall – it wasn't the stadium that was out of action because of the snow, rather the airport was closed and the teams couldn't get to the venue!

It was therefore not until 20 August that the stadium's ability to cope with a large crowd was fully tested, with more than 15,000 people watching New Zealand's A-League side Wellington Phoenix take on the Brisbane Roar.

EPIC PROJECT

This has been a visionary project. Throughout every stage the Carisbrook Stadium Charitable Trust and the project delivery team lead by Arrow International



ensured that the turf remained at the forefront of the design in this 'whole stadium' solution. The stadium was built around the turf rather than the other way round.

This was a project where the design process was driven by feasibility from day one and it was a rigorous and challenging process, especially with the words "no more time, no more money, find another solution" being a common phrase to the design team.

Not surprisingly, in terms of turf consultancy, this project has been one of epic proportions. The huge time commitment, requirement to meet non-negotiable deadlines with clear decisions and recommendations and overall technical challenges may not be seen again in a stadium in this country for some time. It has been a most rewarding experience to have worked with such a dedicated team of project and delivery managers, consultants, contractors and individuals.

As with any brand new stadium, initial pitch usage needs to be very carefully managed, particularly with four Rugby World Cup games scheduled in September. Managers of this new stadium will be treading very carefully as experience is slowly gained with its unique management requirements.

ACKNOWLEDGEMENTS

Dr. Richard Gibbs is technical director of Sports Surface Design & Management, the consultancy division of Recreational Services Ltd. Dr. Gibbs wishes to thank Lale Ieremia and Mike McCleery of Arrow International and Coryn Huddy of Dunedin Venues for their assistance with this article. With the exception of the main photo on page 6, all photos supplied by Dr. Gibbs and Arrow International.

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A customised portable environmental monitoring system helps to measure various characteristics such as temperature, humidity and PAR within the stadium





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Flying the Aussie flag

Among those turf managers taking centre stage during the 2011 Rugby World Cup in New Zealand, there is one who will be quietly hoping that Wallabies skipper James Horwill lifts the Webb Ellis trophy come the end of October. ATM editor Brett Robinson caught up with ex-pat Melbournian Brett Siphthorpe on the eve of the tournament to check out preparations at Wellington Regional Stadium.

As someone who grew up in the AFL heartland of Melbourne, Brett Siphthorpe knows all too well how a sporting code can galvanise a city. As any Melbournian will attest, the month of September is ingrained from an early age, but this particular September, and October too, Siphthorpe will be experiencing something very unique.

Just as AFL is a religion to Melbourne and Victoria, rugby union is so deep-rooted in New Zealand culture that it borders on obsession and for the past seven years Siphthorpe has had a front row seat when it comes to witnessing just how fanatical Kiwi rugby followers can be. This September and October, however, he is expecting that fervour to hit unprecedented levels.

In what is easily the most anticipated sporting event the country has hosted, the Rugby World Cup returns to New Zealand for the first time since it hosted and triumphed in the inaugural tournament back in 1987. Over the course of six-and-a-half-weeks starting 9 September, 12 of New Zealand's major stadia will host a total of 48 matches and Siphthorpe will be right in the thick of the action as turf manager at Wellington Regional Stadium.

Based in New Zealand's capital city, Wellington Regional Stadium (it is better known as Westpac Stadium, but due to the RWC's strict commercial guidelines the name has had to be dropped for the tournament) will host a total of eight matches, including six pool games and back-to-back quarter-final matches on 8 and 9 October. Of all the RWC venues, only Eden Park in Auckland will host more matches (11), including the 23 October final.

Just as the 2011 RWC will rank as perhaps the biggest sporting spectacle New Zealand has ever seen, it will also rate as the highlight of Siphthorpe's turf management career which began more than 20 years ago as an apprentice at Wesley College in Melbourne. After a nine year stint there, Siphthorpe moved to Punt Road Oval for four years before deciding on a change of scene.

Heading across to New Zealand, for the first 18 months he was based at Okara Park in Whangarei, the main rugby venue in Northland which, as it happens, will also host matches during the 2011 RWC. In July 2006, however, Siphthorpe got the break he had longed for when he was appointed turf manager at Wellington Regional Stadium, which alongside Eden Park, AMI Stadium (Christchurch) and Carisbrook (Dunedin), ranked as the big four stadium venues in New Zealand at the time. (Carisbrook has since been superseded by the recently opened Forsyth Barr Stadium – see article on page 6 – while the future of AMI Stadium is in limbo after sustaining significant damage during the series earthquakes to devastate Christchurch earlier this year).

Since starting at Wellington Regional Stadium, Siphthorpe has seen the ground's event schedule increase significantly. With the advent of the Wellington Phoenix, which made its A-League debut in the 2007-2008 season, the ground is now used pretty much all year round with more than 40 event days scheduled for 2011. As well as a steady diet of international and domestic rugby and soccer, the 'Cake-tin', as it is affectionately called by

Wellingtonians, also hosts cricket (the ground has a portable pitch system) and is the city's premier stadium concert venue. Combine that with the nearby Basin Reserve, one of the country's hallowed first class cricket venues which Siphthorpe also maintains, and it's easy to see why the ex-pat Aussie has his work cut out.

NO STONE LEFT UNTURNED

Of all the matches and events the stadium has hosted during Siphthorpe's time, nothing comes close to the amount of preparation that has gone into hosting the eight RWC games. Those preparations began more than a year ago when the USGA-spec/Colosseum ryegrass surface was audited as per guidelines established for the tournament by the New Zealand Sports Turf Institute which focused on parameters such as turf composition, organic matter content and drainage rates.

Over the past three years Siphthorpe has targeted organic matter levels within the surface which at one stage were up to 14 per cent. Such levels had come about due to the ground's heavy scheduling which meant that renovations had always been problematic, but gradually over the past couple of years the levels had been reduced to around 7.5 per cent. With the RWC on the horizon, however, Siphthorpe had the luxury of a six week uninterrupted period during the middle of autumn which he took full advantage of.

"With the winters in Wellington being quite harsh we knew we had to be ready for the RWC by the end of April," says Siphthorpe. "We had organised for the Hurricanes to play their Super 15 home games in the other provinces to allow us a six week renovation period from mid-March until the end of April.

"This was the longest renovation I've had since starting here five years ago and we absolutely obliterated the surface. We used 18mm hollow tines at 60mm centres to a depth of 100mm and verticut as well. All up we removed more than 100 tonnes – I've never seen a pile so big. The field was then seeded, sanded and fertilised and was back in play by 30 April.

"My seeding rates are pretty extreme here and in this instance we went out at 500kg/hectare. The reason for the high rate was twofold. First we only had the one opportunity to do it and if need be we could always verticut and thin it out later. And second, the biggest problem we have in Wellington is that our climate is so conducive to *Poa annua* that you need to have a very dense ryegrass sward to outcompete it. If there is any bare patch or area of weakness in the surface the *Poa* will take root in a heartbeat.

"Getting rid of *Poa* has also been a major focus over the past three years and we have been very successful. We have achieved control by using paclobutrazol every four weeks plus we individually scarify areas and constantly dimple-seed the field every 10-12 weeks. We are growing Colosseum

ryegrass in a USGA sand profile so there's nothing really underpinning it, so you have to keep a good grass cover to maintain the integrity of the surface.

"The results from that autumn renovation were excellent and in all honestly it has probably added quite a few years to the life of the surface. The renovation has guaranteed our drainage rates and our organic matter levels are now down to 6.5 per cent which is a good level for us. With our sand we need to have some organic content in there or else it just turns to dust.

"So, although we had to do some fairly drastic things this time, it has worked out really well and the surface is looking in great shape for the tournament."

TIGHT SCHEDULE

After that successful renovation, the months leading up to the RWC have been all about carefully managing the surface through a hectic schedule of domestic and international rugby matches. With New Zealand's premier provincial rugby tournament – the ITM Cup – condensed into eight weeks due to the RWC and starting almost a month earlier in the very heart of winter, Siphthorpe had to contend with two sets of three games in an eight day period as well as the All Blacks v South Africa Tri-Nations Test just for good measure.

During the last three games in eight days Wellington experienced snow down to sea level as much of New Zealand was blasted by polar winds which broke all manner of minimum temperature and snowfall records. The last time snow fell to sea level in Wellington was in 1933 and on Monday 15 August the maximum temperature was 4°C which was for all of an hour.

"We actually had quite a mild winter compared to recent years, but that short sharp hit was enough to remind us that it was still winter," says Siphthorpe. "This winter we have used Carbon Trader on the field for the first time and we put out an application in mid-July. It definitely stimulated growth and just kept things ticking over nicely and we were able to slowly repair areas that sustained wear."

CONTINUED ON PAGE 17

Far left: Wellington Regional Stadium will host eight of the 48 matches scheduled during the 2011 Rugby World Cup in New Zealand



Brett Siphthorpe originally hails from Melbourne and has been turf manager at Wellington Regional Stadium since July 2006

With eight international rugby games in the space of a month, the Wellington Regional Stadium surface is set to take a pounding



NEW ZEALAND IN UNION - 2011 RUGBY WORLD CUP VENUES

The 2011 Rugby World Cup will see 12 of New Zealand's principal rugby stadia host a total of 48 matches (40 pool games and eight playoff/championship games). The number of venues was originally 13, but due to irreparable damage sustained during the February 2011 earthquake, all seven matches scheduled for Christchurch's AMI Stadium (turf manager Chris Lewis) were relocated.

A further 47 grounds dotted around the main team base centres are also being used as practice venues, among them 18 rugby clubs and seven schools. As well as the three stadia (Otago, Wellington and Trafalgar Park) featured in this edition's RWC feature, the following venues will also be taking centre stage during the tournament.

EDEN PARK (AUCKLAND)

Capacity: 62,000.

Turf manager: Mark Perham.

Turf: Perennial ryegrass, Motz TS11 stabilised surface.

RWC games: 11 (five pool games, two quarter-finals, two semi-finals, 3 v 4 playoff and RWC final).

Did you know... In November 2009 the top 40mm of the Eden Park surface was stripped to remove organic matter build-up. The Motz stabilising fibres were then road broomed with a total of 800m³ of material removed to achieve a clean sand profile. A further 10mm of sand was applied to correct surface levels and ryegrass sown at a rate of 450kg per hectare in December 2009.

If dealing with 11 matches wasn't enough for turf manager Mark Perham, the ground is also hosting the opening ceremony ahead of the tournament's first game which covers the entire playing surface, runs for 25 minutes and involves 1500 people. Once the ceremony is over Perham has just seven minutes to get everyone and everything off the ground to allow the players on to do their warm-ups.

NORTH HARBOUR STADIUM (AUCKLAND)

Capacity: 30,000.

Operations manager: Alan McKenzie.

Turf: Sports Oval ryegrass, slit drain/sand carpet.

RWC games: Four (including Australia v Italy).

Did you know... Works to improve surface drainage were undertaken in late 2010 with gravel banding placed across the ground's existing slit drains. Irrigation system was also overhauled and additional perimeter drains installed.

WAIKATO STADIUM (HAMILTON)

Capacity: 30,000.

Turf manager: Karl Johnson.

Turf: Perennial rye, Motz TS11 stabilised surface.

RWC games: Three.

Did you know... Waikato Stadium was redeveloped during 2000-2002 to the tune of \$NZD38 million.

ROTORUA INTERNATIONAL STADIUM

Capacity: 26,000.

Curator: Phil Wilkie.

Turf: Perennial rye, slit drain/sand carpet profile.

RWC games: Three.

Did you know... Curator Phil Wilkie (54) has been in the turf industry for more than 30 years.

STADIUM TARANAKI (NEW PLYMOUTH)

Capacity: 26,000.

Curator: Craig Hitchcock.

Turf: Perennial ryegrass.

RWC games: Three.

Did you know... Stadium Taranaki was named the 'third best rugby stadium on earth' in 2009 by New Zealand Rugby World magazine (might have something to do with the stunning Mt Taranaki which acts as a backdrop).

RUGBY PARK (INVERCARGILL)

Capacity: 17,000.

Curator: Russell Thomas.

Turf: Colosseum ryegrass.

RWC games: Three.

Did you know... Rugby Park is the southernmost venue of the 2011 RWC and Russell Thomas will be hoping the recent polar blast to hit NZ doesn't return. He'll be well prepared if it does, however, as exactly a year to the day when Rugby Park is scheduled to host the Argentina v Romania Pool B clash, 20cm fell on the ground nearly forcing the cancellation of a Ranfurly Shield clash between Southland and Auckland. Snow had to be shovelled off the surface and then pumped off over the course of three days (160,000 litres a day).

NORTHLAND EVENTS CENTRE (WHANGAREI)

Capacity: 20,000.

Curator: Ross Hart.

Turf: Couchgrass base oversown with perennial ryegrass. Full sand profile.

RWC games: Two.

Did you know... As the northernmost venue of the 2011 RWC, the Northland Events Centre is the only venue to have couchgrass base. The stadium has undergone a recent NZD\$16 million facelift.

MCLEAN PARK (NAPIER)

Capacity: 15,000.

Curator: Phil Stoyanoff.

Turf: Perennial ryegrass, sand-based surface.

RWC games: Two.

ARENA MANAWATU (PALMERSTON NTH)

Capacity: 15,000.

Curator: Russell Smith.

Turf: Ryegrass, slit drain/sand carpet field.

RWC Games: Two.



Eden Park turf manager
Mark Perham



What's on the line come 23
October – the Webb Ellis trophy



With a bit of luck Siphthorpe will get to see the Wallabies in action when the stadium hosts two quarter-finals back-to-back in the second weekend of October

CONTINUED FROM PAGE 15

Following the end of the ITM Cup – Wellington hosted its last game on 18 August – Siphthorpe and his crew of five had just 22 days to get the field ready for the RWC. Immediately after that last game the field was verticut, swept, seeded again and fertilised. Fortunately the polar blast had subsided by then allowing for growth to pick up. A week out from the first game the field was given a final vertidrain to ensure it was ready for the main event.

"It's an exciting time to be working at the venue and we are looking forward to the tournament," says Siphthorpe. "Looking out across the stadium all the existing advertising is gone and the RWC signage is up and it's now that it sort of hits you that there is a massive tournament just around the corner.

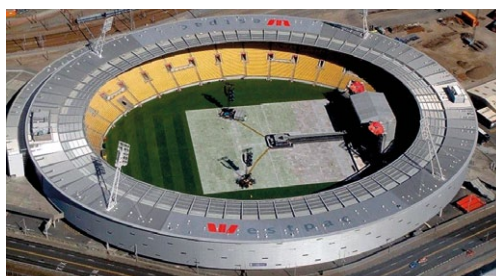
"Because we have had events right up until about three weeks out from the tournament, it has been a mad scramble to try and get everything in place. All the corporate lounges have been gutted and transformed into rooms to house the international media contingent. Things like the outside broadcast area they have had to double in size and to do that they have commandeered half our wash down bay which is now taken up by portable buildings. We now have the situation where we need to get special clearance to go into the media area if we need to wash machinery or clean out spray tanks!

"Just getting into the place some mornings has been a challenge with containers arriving and signage people everywhere. The venue has to be free of all existing advertising for the duration of the RWC which was a tough ask in a two-week period. Everything inside the stadium and up to 500m outside the stadium had to be changed and even the sign on my work vehicle had to be removed!"

Wellington's six RWC pool games kick off on 11 September with the much-anticipated clash between South Africa and Wales. That match could end up shaping the tournament quite dramatically because if South Africa loses Australia could cop them in the quarter-finals. Both quarter-finals to be hosted at Wellington involve the respective winners and runners-up in pools C and D which more than likely means that Siphthorpe will be preparing the ground for one of the Wallabies more crucial fixtures.

"Having the eight games is terrific," says Siphthorpe, who just a week after last RWC match has to get the ground up for the Phoenix's first home game of the 2011/2012 A-League season. "Our games are over the space of a month and as far as the field goes we should be okay.

"At international level the scrums are pretty intense so it'll certainly tax the field, but now that the growth is starting to kick in and the roots are quite deep I think the surface should hold up well. The only area I'm a little bit worried about is around the middle of the ground. It only takes three or four balls to go out from the kick offs and they're back in the middle for a scrum. You can cop maybe a dozen scrums in the one spot over your first three or four games, so there may be a little bit of wear and tear but we have a turf replacement contingency in place. 🌱



Wellington Regional Stadium has been in operation for 11 years and as well as hosting rugby, soccer and cricket it is also the city's major concert venue (pictured is the AC/DC set)



Trafalgar's first-class turf-glass

Trafalgar Park in Nelson is one of the smaller provincial venues to stage games during the 2011 Rugby World Cup. To bring the ground up to tournament standard, in the summer of 2009/2010 the existing soil pitch was replaced with a slit drain/sand carpet surface comprising recycled glass sand. NZSTI's Alex Glasgow looks at the development of this unique rootzone material and how it has fared after two seasons of use.

Shortly after New Zealand was selected to host the 2011 Rugby World Cup (RWC), the New Zealand Sports Turf Institute (NZSTI) was asked to prepare objective standards that the tournament's match and practice venues would be required to achieve. These standards specified the requirements for a range of key variables including surface firmness, surface levels and smoothness, drainage, traction, turf density and turf quality.

In many cases, major upgrading of existing pitches would be required to meet the required standard. This was certainly the case at Nelson's Trafalgar Park where the pitch was constructed from the local river silt soil. While the local soil had poor drainage, the old pitch generally performed well because of the region's low annual rainfall.

It was decided that a slit drain/sand carpet pitch was appropriate for the upgrade of Trafalgar Park, a method which has been widely used for many stadium pitches in New Zealand with good results. As the name suggests, a sand carpet profile has a sand layer between 50-100mm thick across the entire surface of the pitch.

Extensive efforts were made to source a suitable sand locally but due to the strict specifications and quantity required there was no alternative but to use a sand imported from outside the region. It was at this stage that the NZSTI raised the possibility of using recycled glass sand however, such a rootzone material had not been used in a full sportsfield construction anywhere at that stage.

Recycled glass sand is derived primarily from crushed glass bottles and among other things is used as a roading aggregate and blasting sand. Investigations into the use and availability of recycled

Trafalgar Park is situated in the South Island city of Nelson and will play host to three pool matches during the 2011 Rugby World Cup, including Australia's rescheduled clash against Russia

glass sand as an alternative to normal 'quarried' sand were carried out and a possible supplier, CCC Two Ltd, was found in Christchurch. This option was presented to the Nelson City Council which gave the all clear for the use of recycled glass sand provided that it did not compromise the overall performance of the playing surface.

RESEARCH

When recycled glass sand was first considered for this project, there were very few published scientific research reports concerning the use of such a material in winter sports pitches. Three of the main pieces of research related to the use of such material on golf courses and were conducted by the Sports Turf Research Institute in the United Kingdom in the mid-2000s.

Two involved comparing recycled glass sand to conventional sand for use in golf green rootzones (Baker et. al. 2005, Owen et. al. 2005), while the other involved using recycled glass sand as a topdressing material with the aim of reducing earthworm surface casting (Baker et. al. 2005).

In their study Owen et. al. (2005) looked at the physical properties of recycled glass-derived for use in sand rootzones for golf. They found that recycled glass sands can be used to produce rootzones that conform with the performance requirements for hydraulic conductivity (drainage), total porosity, air filled porosity and capillary porosity commonly used in the sports turf industry (golf).

Baker et. al. (2005) examined the performance of cool-season turf on rootzones constructed with recycled glass-derived sand compared to conventional sands. They found that rooting depth was lower in the glass-derived sand compared to conventional sand, however, rooting depths were still acceptable, exceeding 160mm at all measurement dates. They also found that the glass-derived sand rootzones had generally lower soil water contents, higher infiltration rates, greater porosity and lower bulk densities. Overall, they concluded that the physical properties of glass-derived sand rootzones supported healthy turf growth.

From the limited amount of published research and other information gathered, it was concluded that the recycled glass sand would be suitable for construction of a sand carpet winter sports pitch. However, we were also aware of an element of risk based on the simple fact that, as far as the NZSTI was aware, it had never been done anywhere in the world.

DEVELOPMENT AND TESTING

The recycled glass sand manufacturer in Christchurch was provided with a particle size

grading envelope that was required for the Trafalgar Park sand. They then produced test batches which were tested to identify whether adjustments were required. Several test batches were required to achieve a sand that was suitable for use in the pitch reconstruction.

A range of variables were tested, including fertility, particle size distribution, hydraulic conductivity, particle shape, capillary rise, moisture release, porosity, penetrometer (stability), crusting, bulk density and particle density.

Having approved a manufactured sample for the project, it was vital that quality of the sand produced remained consistent during the project. To this end, batches of sand were tested at regular intervals throughout the manufacturing process. Some needed to be rejected and re-processed because they did not meet the specification. Such quality assurance testing was one of the most important aspects of the entire project.

Laboratory analysis of the recycled glass sand was carried out and some of the key aspects were:

Particle size distribution (PSD): The recycled glass sand was manufactured to meet the PSD specification for the Trafalgar Park pitch. Some adjustment of the manufacturing plant was required to achieve this.

Hydraulic conductivity: The hydraulic conductivity of the recycled glass sand samples tested was found to easily exceed minimum requirements for the sand carpet pitch.

Particle shape: The particle shape of the dominant particles in the recycled glass sand is medium-low sphericity and very angular. This angular shape means that the sand has good natural stability due to particle interlocking. At the same time it is important that the porosity is not reduced excessively by particle interlocking.



The very angular nature of the sand also raises the issue of whether the sand is potentially more abrasive than 'normal' sands. In skin abrasion tests conducted in our laboratory, no major differences in skin abrasion could be detected when recycled glass sand was compared to 'normal' sands. Therefore, it was concluded that skin abrasion on winter sports pitches with recycled glass sand was unlikely to be any worse than that already experienced with 'normal sands'.

Capillary rise: Capillary rise is the rise of water upwards through the material. The capillary rise of the recycled glass sand was typical of that found in 'normal' sands with a similar particle size distribution.

Porosity: The porosity of the recycled glass sand was 38 per cent (void volume) which was greater than the required minimum of 35 per cent.

Penetrometer tests: The recycled glass sand has good stability, which is an important factor for winter sports pitch use.

To bring Trafalgar Park up to scratch for the 2011 RWC, the native soil pitch was reconstructed over the summer of 2009/2010 with a slit drain/sand carpet pitch that comprised recycled glass sand



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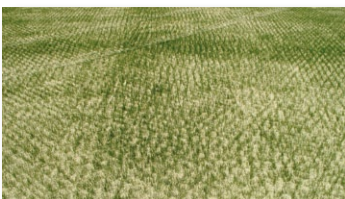
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◀ **Batches of the recycled glass sand were tested at regular intervals throughout the manufacturing process. Such quality assurance testing was an important aspect of the project**



The ryegrass pitch was sown in February 2010 and a full cover was established after six weeks

Feedback from players on the new Trafalgar Park surface has been excellent as has the ongoing performance of the surface from a maintenance perspective

Bulk density and particle density: These parameters were comparable with those of 'normal sands'.

The results of the laboratory analysis for the key characteristics of the recycled glass sand indicated that it was typical of 'normal' sands. There were no test results which indicated that the sand was significantly different from (and hence likely to perform differently) the sands traditionally used on winter sports pitches. Essentially, recycled glass sands are virtually identical, manufactured equivalents of silica sands which have been used widely and successfully for winter sports pitch construction.

TACKLING TRAFALGAR

Development of the slit drain/sand carpet pitch at Trafalgar Park consisted of the following steps:

- Removal of existing turf cover (top 30mm of the profile);
- Cultivation and establishing a new level on the surface of the pitch;
- Installation of irrigation system;
- Installation of perimeter collector drains;
- Installation of lateral drains at a 10m spacing across the entire pitch;

- Installation of slit drains at a 1.0m spacing across the entire pitch;
- Installation of a 100mm deep sand carpet layer across the entire pitch; and
- Sowing and establishment of ryegrass sward.

Construction started in October 2009 and was completed in early February 2010 when the field was sown. Establishment of the grass went very well and a full cover was established six weeks after sowing. Use of the pitch started during New Zealand rugby's National Provincial Championship in July 2010 but it could have been used prior to that. More recently, the Canterbury Crusaders played a number of Super 15 matches on the ground because of the unavailability of AMI Stadium in Christchurch following the February 2011 earthquake.

The feedback to date from players has been excellent – the 2010 Canterbury NPC team said it was the best surface they played on all season – and the ongoing performance of the surface has been as we would have expected if it was 'normal' silica sand. If anything, the establishment process was easier with the recycled glass sand. The pitch is now in its second winter and its performance and its maintenance requirements are very typical of similar sand carpet pitches.

When it was decided to use recycled glass to construct the sand carpet pitch at Trafalgar Park, there was an element of risk because recycled glass hadn't been used in this way previously. However, because of the extensive laboratory testing carried out on the product we were confident that it would be successful. That has proven to be the case and it is clearly a viable option for sports turf construction, especially if natural sand supplies are or become scarce.

ACKNOWLEDGEMENTS

NZSTI would like to acknowledge the support of Nelson City Council. Thanks also to Peter Gray of Nelmac who is responsible for the maintenance of the pitch. Full references for this article can be obtained from the AGCSA.



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Barwon Valley heads down a new road

The realignment of three holes at Geelong's Barwon Valley Golf Club to make way for improved transport infrastructure seemed a relatively straightforward project on paper. As ATM discovers, unseasonable rain, floods and challenging soil conditions meant the project was anything but.



In 2009 the Victorian Government gave the green light for the \$63 million Breakwater Road project to improve traffic conditions along one of Geelong's major transport routes. Breakwater Rd is one of five major roadways which traverse Barwon River and links the centre of Geelong to the suburbs, catering for more than 20,000 vehicles per day.

Over the years Breakwater Rd has caused its share of headaches for the local community and VicRoads, the statutory authority which manages the state's arterial road network. Due to minimal clearance over the river, the road has often been closed due to flooding after heavy rainfall in the river catchment, while the overhead Geelong-Warrnambool railway line has just a 3.5 metre height clearance which has caused issues for some large freight vehicles.

To eliminate these issues and to improve access for the local community and industry, some five years ago it was mooted to realign the stretch of road and separate it from rail by constructing a new bridge over the Barwon River. However, in doing so it would have significant implications for the 18-hole Barwon Valley Golf Club.

In order to realign the road, the 14th hole needed significant redesign due to safety concerns (the new road would be just 20m away) which in turn meant changes would need to be made to the 15th and 16th. Davey Shearer Golf Design principal

Bob Shearer was engaged by project managers VicRoads to come up with a three-hole redesign that not only worked in with the new road but also met the requirements of the club and its members.

Once the design had been approved, VicRoads then awarded the construction contract to Golf Shapes, with a project start date of January 2011. From the outset Golf Shapes faced some unexpected challenges and a combination of unseasonable weather and difficult soil conditions meant the project proved to be far more complex than first expected.

"We thought we had worked on and dealt with just about every situation in golf course construction but what we were about to discover was a whole new ball game," says Golf Shapes director Darby Muller.

ELEMENTS CONSPIRE

Immediately prior to the start of works more than 100 millimetres of rain fell in the upstream catchment of the Barwon River, causing it to flood and leave the course and its facilities half a metre under water. In addition, previous investigations revealed that an old tip lay under part of the project area and early excavations confirmed that it covered nearly three quarters of the job site.

Test holes revealed a depth of about 500mm of suitable uncontaminated topsoil in an area near



PHOTO: SHELLY TAYLOR (SEESHELLS PHOTOGRAPHY)

the 14th hole that was not being used which gave the scope to create a wetland and provide some of the fill material needed for shaping. An estimated 3000m³ of additional fill was still required to carry out the design, and with the site not allowing for any cut, material needed for building tees, green sites and topsoil had to be sourced.

Getting material on site also threw up further issues for Golf Shapes and subcontractors Newcomb Sand and Soil Supplies. A new road across the adjacent construction site was not a viable option, but thankfully the City of Greater Geelong allowed access through a break in a flood bund and a road was built on the course from the council depot. It was soon discovered, however, that the ground was too unstable for heavy trucks due to the high water table, so the clay and topsoil was stockpiled and carted around the course using an articulated dump truck.

No sooner had all the tee and green complexes been built than Mother Nature intervened again. A 45mm overnight dump meant work was suspended for three days and pumps were needed to dewater the site so work could recommence.

Such delays had significant implications for the grassing requirements of the project, in particular the line-planting of the fairways. The use of Santa ana couch was becoming unviable especially as planting was now not due to start until April so the

project partners agreed to solid turf selected fairway locations and tees with the remaining areas to be seeded.

As the site dried out things began to run more smoothly, however, during irrigation installation, ground water was struck as well as the dreaded tip. Concrete, bricks, bottles and old car parts were unearthed and volumes of foreign material meant some trenches had to be backfilled with recycled sand from the old greens.

Advanced Irrigation was awarded the contract to install all irrigation which consisted of:

- 110mm poly mainlines with 63mm poly laterals;
- Rain Bird 700B heads on fairways, controlled by solenoid valves;
- Rain Bird 700E valve-in-head sprinklers on the greens and Eagle 351Bs on the tees;
- Maxi cable was run from the maintenance shed to automate the system and do away with manual watering.

Once the irrigation components were installed and sand for the greens was spread, organics were carefully mixed into the soil with a light rotary hoe and then finished off with a York rake in preparation for grassing.

Turf Renovation Australia was awarded the grassing contract with Santa ana turf supplied from South Australia. Mega rolls were used for the fairways and standard rolls for tees and greens surrounds. Greens were hydroseeded with Penn-A4 creeping bentgrass with all remaining areas sprigged and oversown with a mix of ryegrass, fine fescue and native bent.

The day the Santa ana turf was harvested and loaded for the 10-hour interstate journey, the weather again turned with 30mm of rain falling that evening, leaving the site saturated and making it impossible to lay the turf. The turf was unloaded at the adjacent council depot and it stayed there as the rain continued to fall steadily for the next two days.

A break in the weather enabled the laying of some rolls, however, after a couple of hours it proved too difficult and messy and the call was made to delay any further work until forecast fine weather. When the weather did eventually clear, saturated

Barwon Valley Golf Club's new 15th green. Holes 14-16 have been redesigned to accommodate the realignment of Breakwater Rd, one of Geelong's principal transportation routes which runs next to the course

Heavy rain, flooding to the course and having to deal with an old tip site meant the project had many and varied challenges for all contractors





From left the Golf Shapes team of Darby Muller, Ben Chambers and Brad Willis

low areas of the site were track rolled with a dozer to squeeze as much moisture out of the soil. This proved successful and the next day these areas were prepared with a posi-track and York rake again.

All up it had been a full week since the turf had been harvested and not surprisingly it was looking in bad shape when it came time to be laid. After discussions with Turf Renovation Australia it was decided to apply Carbon Trader at 80 litres/hectare and a week later the turf had recovered significantly.

Led by Ben Chambers, Golf Shapes undertook the 13-week grow-in period and with some favourable weather finally in the last couple of weeks in April the Santa ana started to bed in. The A4 bentgrass had an excellent strike rate with rolling and mowing starting seven weeks after at a height of 10mm and reduced each week thereafter. Local superintendents Adam Lamb (Barwon Heads Golf Club) and Nathan Bennett (The Sands, Torquay) helped during this period by supplying additional mowing equipment.

After the laying of the turf and line-planting of the rough areas, 1000 trees and shrubs were also planted and a new boundary fence erected and bicycle path reinstated.

COLLABORATIVE EFFORT

For Barwon Valley course superintendent Luke

Primus the project has certainly had its moments, but he and his team are looking forward to when the new holes will be open in time for the upcoming season.

"The golf club had been in discussions with VicRoads for over five years previous to the works being started in early January, so to say we were grateful for it to begin was an understatement to say the least," says Primus, who has been superintendent at Barwon Valley for the past eight years.

"Despite the many problems and challenges that arose throughout the project, they were overcome through a collaborative approach from the club, contractors, designers and VicRoads. Golf Shapes and the other contractors went out of their way to keep me involved on an almost daily basis with every part of the construction process and throughout the grow-in.

"Due to outside demands on VicRoads' behalf, the project did not start at the correct time of year which in turn led to trying to establish a full cover of Santa ana couch on fairways, tees, surrounds and roughs in mid-April, which was certainly an interesting project. As a result, the club has decided to wait until October to open the holes for play in an effort to further establish the couch areas so it has a turf-hardy three holes.

"Overall the club is happy with how the new holes have come up and the members are extremely keen to play them. Each of the new greens average about 500m² and have more movement and interest than the former holes.

"From a superintendent's point of view, the last five years has been a long process but the club now has three holes which have been built to the highest standards. The project has also given me an insight into how these projects operate which will stand us in good stead when we undertake further redevelopment works in the future."

ACKNOWLEDGEMENTS

This article has been produced with the assistance of Ben Chambers (Golf Shapes), Steve McGarrigle (Vic Roads) and Luke Primus (Barwon Valley Golf Club). Golf Shapes would like to thank Luke Primus and the Barwon Valley Golf Club and its members/ volunteers for their help and support throughout the project, and the efforts of contractors Turf Renovation Australia, Newcomb Sand and Soil Supplies and Advanced Irrigation.

Below: Due to the many delays encountered it was agreed to solid turf selected fairway locations and tees with Santa ana and sprig the roughs

Below right: While the Santa ana couch struggled due to the late laying, by contrast the hydroseeded A4 bentgrass greens had an excellent strike





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Simon Blagg's first placement on his Ohio State University internship was at Whistling Straits, home to the 2004 and 2010 US PGA Championships

Eight years, seven courses, six tournaments

At just 23 years of age, English greenkeeper Simon Blagg has experienced more than most in the world of golf course turf management. Now back in Australia for a second stint after working the 2009 Australian Open at NSW Golf Club, Blagg looks back on his experiences and the role the Ohio State Program has had in the development of his turf management career.



I am Simon Blagg, a 23-year-old qualified greenkeeper from England. I guess I can thank my older brother for getting me into the turf industry as a 10-year-old when he handed down his unwanted weekly chore of mowing the family lawn! More than a decade on I have now cut greens on some of the world's best golf courses during some of the game's great tournaments and looking back it has ultimately been a fantastic and rewarding journey.

After leaving high school as a 16-year-old, in 2003 I started down the road to getting my horticulture qualifications. I ended up graduating from Reaseheath College in Cheshire with a triple distinction in my final exams. During this time I had the opportunity to cut my teeth at various placements around the country including The Oval cricket ground during the 2005 Ashes victory as well as Keele Golf Course and Leek Golf Club.

In 2007, however, I was faced with a tough decision. I could either stay on as a greenkeeper at Leek where I had learned so much working under a fabulous superintendent and assistant, find a way of pursuing a career as a cricket curator (at the

time I was also maintaining the ground for my local club) or apply for the Ohio State University turfgrass internship programme in the USA.

The thought of new environments and having the chance to explore a different country and pursue a career in greenkeeping at the same time ultimately led me to applying for the Ohio State Program. Although a huge step for any up and coming greenkeeper, looking back now it was a decision that I should not have even thought twice about.

Sending my CV and application through, I was subsequently offered a 'twin location' internship at Whistling Straits in Wisconsin from March to October 2008 before moving south for the winter to the Doral Golf Resort in Florida. After a few days initial orientation in Ohio, I flew into Milwaukee airport and was taken to my first base at Whistling Straits, around 100km north of Milwaukee on the shores of Lake Michigan.

STRAIT INTO IT

A Kohler Resort complex, Whistling Straits boasts two courses – the Straits course and Irish course. The Straits, which runs for about 3km along the lakefront, has hosted the 2004 US PGA Championship, the 2007 US Senior Open and the 2010 US PGA Championship which I was lucky enough to return to as a volunteer. In the coming years, it is scheduled to host the 2015 US PGA Championship and 2020 Ryder Cup.

Both courses at Whistling Straits are designed by Pete Dye, who also created the likes of Sawgrass and Harbour Town Links, and are very much in the mould of a Scottish (or Irish as the name of one of the course suggests) links course.

During my internship, I worked on the Irish course with superintendent at the time Grant Davey and assistant superintendents Travis Schnelle and Emily Shircel. Whistling Straits was both an interesting and challenging course to work at, mainly due to





the incredible amount of bunkers (roughly 1000). Some range from huge sand pro bunkers to tiny pot bunkers and provide a monumental maintenance challenge during the summer.

The internship at Whistling Straits was truly outstanding and from the moment I arrived I was heavily involved with spring greens renovations. This was the first time I had ever seen extensive damage from ice. The winter period from 2007 to early 2008 was particularly bad due to persistent snow and ice cover which created several issues.

The fairways on the Straits course are fescue, with a percentage of *Poa annua*. Depending on conditions, *Poa* will survive around 30-40 days under a cover of ice before the plant is killed, while the fescue will survive around 40 days and bentgrass 60 days. Due to the extreme weather, some of the low lying areas on the fairways of the Straits course were totally wiped out.

In addition to general greenkeeping duties, I was also trained as an irrigation technician throughout the internship. Whistling Straits operates a Rain Bird system and with the cold weather the site is subjected to during the winter months it is a key management area. Due to the cold weather, the irrigation pipes often become brittle and when pressure is pumped back into the lines often a lot of swing joints can blow out. As well as undertaking a variety of repair work on the system, I was also in charge of ensuring that the playing surfaces had sufficient water, irrigation clock maintenance and arc adjustments.

Other tasks performed included several chemical applications to the fairways. The Whistling Straits fairways were sprayed fortnightly with Daconil all weather stick, Banner Maxx and Trimmit, the latter acting as a growth regulator for the suppression of *Poa annua*.

Towards the end of my internship in September, the long fescue rough had to be cut down. Some 21 hectares was cut short to enable a good seed production for the following season. This mammoth task was completed by large strimmer crews of

Far left: After cutting his greenkeeping teeth in both cricket and golf in his native England, Blagg has since journeyed to the US, Scotland and is currently back in Australia for a second stint after working at the 2009 Australian Open at NSW Golf Club



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◀ **The striking look of the dormant cool-season turf at Whistling Straits**

around 10 and two Steiner rough mowers and hole by hole the course was cut and collected.

My internship at Whistling Straits came to an end in October 2008 and before heading to Doral I spent two days at the Ohio State University's short course turf seminar in South Carolina. The seminar included a variety of speakers and provided a great opportunity to meet the other interns as well as tour the famous Harbour Town Links golf course.

RED, WHITE AND BLUE MONSTER

The second part of my Ohio internship was completed on the famous Blue Monster course at Doral (owned by the Marriot Hotel Group). The resort boasts five courses and as well as the Blue Monster tournament course there is the Great White course, a Greg Norman design which is the only course of its kind in southeast USA using a product called Coquina. This product comprises crushed shells and is used to replace the roughs giving the course a very unique and totally different appearance. Doral also has three smaller courses – the Red, Gold and Silver – and at the time of my internship the latter was being significantly reconstructed under the auspices of course architect Jim Mclean.

From managing cool-season turf at Whistling Straits, Doral was all about the management of warm-

season grasses such as TifEagle bermudagrass. Every March, Doral's Blue Monster course hosts the World Golf Championship and my internship was based on this course, working under superintendent Ronnie Rooks as his second assistant.

As soon as I began work here, I was in charge of changing holes for the tournament, as well as helping with the extensive preparation that occurred. Other tasks involved irrigation, fertility management and running the bunker crew.

Having never worked on bermuda greens before, one of the more interesting aspects was the importance placed on plug relocation. Due to the heavy grain of the TifEagle, if you placed the hole plug back in the wrong direction it was very noticeable, so it was important to match it up with the surrounding grain (see photo on page 30).

One of my career highlights was changing the finishing holes on the back nine during the tournament. This particular tournament was when Tiger Woods was making his return to golf following knee surgery. Thankfully, I had months of preparation to ensure that my hole changing was nothing less than 100 per cent. It had to be so perfect that the PGA insisted I lay all of my hole changing tools out on a towel first, just in case the television cameras happened to be shooting!

LOCHED IN

In the spring of 2009, following the completion of my Ohio internship, I headed back to the UK to take up a new position as a seasonal greenkeeper at Loch Lomond Golf Club in Scotland. This had been researched and arranged earlier while still living and working in Florida and included a very interesting and sleepy 5am phone interview with superintendent David Cole.

This was yet again another spectacular summer with Loch Lomond hosting the Barclays Scottish Open in July, the week before the Open Championship. Loch Lomond is in a truly spectacular location, with views of Ben Lomond from the loch shore.

The climate in the west of Scotland was a world removed from where I had just come from. Average rainfall is around 2000mm per year and the weather is significantly cooler, moist and very inconsistent. Such conditions place a premium on the drainage system being very advanced in order to cope.

Originally when the course was built, a lot of road spoil was used to construct the fairways and surrounds. A small amount of drainage was installed but not enough to deal with heavy rainfall, especially when the course was hosting a tournament.

In order to improve the state of the course's playing surfaces, in particular the fairways, the club had purchased a range of drainage equipment and was in the process of installing sand slit drains on a number of areas.

Turf cultivars at Loch Lomond consist of browntop bentgrass/*Poa annua* greens, bentgrass tees and fairways and perennial ryegrass rough.

With the Whistling Straits site boasting an incredible 1000-odd bunkers, the bunker raking crew for the 2010 US PGA Championship had its work cut out



May, June and July were the busiest months on the golf course in the lead-up to the Barclays Scottish Open. My main responsibility for the tournament was mowing the greens using a John Deere 180C walk-behind mower. This was my first experience of greens mowing in a professional tournament, so preparation was essential.

The week before the tournament was very intense getting the greens up to speed with consistent double cutting and rolling. We recorded our clipping yield which gave us a great idea of growth rate and predicted whether we needed to give the greens another cut or roll. As requested by the European Tour management, the greens had be running around 10-10.5 on the stimpmeter. Thankfully, the weather, during the week was perfect and it was great to be able to sit behind the 18th green with the crew and watch the final groups.

SOUTHERN SOJOURN

Having tasted tournament preparations in the Northern Hemisphere, throughout my summer in Scotland I set about making arrangements to venture Down Under to work at the Australian Open. This was an event I had really wanted to be involved with and once again I was lucky enough to be offered a position at New South Wales Golf Club by course superintendent Gary Dempsey.

There is little need to explain to ATM readers this incredible Alister MacKenzie links course in



La Perouse, Sydney which in 2009 was hosting its first Australian Open. In the years leading up to the event the course had gone through some serious renovation programmes, including changing all bunkers to a revetted style and tweaking the layout of the 18th fairway and green.

The particularly cool spring in Sydney ahead of the Open resulted in the couch fairways taking longer than expected to come out of winter dormancy. Fertiliser rates were increased on all playing surfaces to tighten up areas and any weak areas that didn't recover from the winter were plugged out and topdressed.

How many people can you spot preparing this hole on the Blue Monster Course at Doral, host of the World Golf Championship each March?

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Cutting greens at the 2009 Australian Open at NSW Golf Club

The iconic par 5 5th at NSW Golf Club – one of the best settings in the game



A product that I had not come across before – Dynamic Lifter – was applied to all of the tees and specific wear areas, with its dark colour and high organic material encouraging faster recovery. Topdressing and Dynamic Lifter were applied to bunker surrounds to level out any undulations and ensure a smoother playing surface around the bunker.

Not all of the golf course has irrigation in the rough so a system of impact sprinklers attached to a large section of poly pipe were setup and this could then be moved easily and used to water large areas of the rough after a fertiliser was applied.

Unlike the previous tournaments I had worked at, greens preparation was a lot easier. As New South Wales is a links course and exposed to the elements, stimpmeter speeds did not need to be as high. Again, like the Scottish Open, I had the privilege of cutting the NSW greens during the tournament using Toro Flex 18s, although as events would transpire there wasn't much cutting required.

During the lead-up to the tournament the *Poa annua* greens had regular fungicide applications to ensure they were free of disease such as anthracnose and dollar spot. Light but frequent grooming of the greens was achieved using a Toro triplex followed up with a walk-behind mower. Regular dusting and growth regulator applications were also applied to encourage a tighter canopy.

A lot of hard work and planning had gone into preparing the course for its first Australian Open and it was the first tournament that I had worked where even the members got their hands dirty! They assisted with divotting the fairways after one of the practice rounds.

During the week, the greens were single cut and single rolled in the morning and if required we would cut them again in the evening. All was going well until a 75km southeasterly wind blew up on the Friday morning which caused havoc on some of the coastal greens and the second round was suspended.

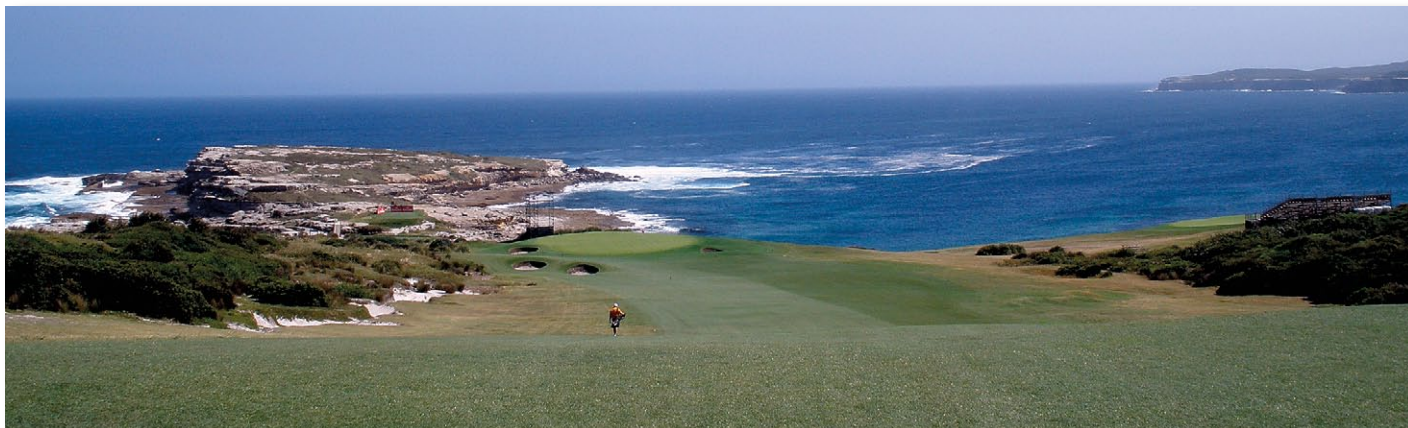
As greenkeepers we can control a lot of things but not the weather and to be subsequently hauled over the coals in the media the following day was extremely hard for the crew to take.

One of the volunteers I met at NSW during the open was Roseville Golf Club assistant superintendent Steve Mallyon and together we worked closely alongside each other and became good friends. After my six months at NSW, I headed back to Loch Lomond for another season during which time Steve came over and volunteered for two weeks at the Barclays Scottish Open before moving on to St Andrews to experience the Open Championship.

Thanks to Steve, I was able to secure a full-time position at Roseville Golf Club on Sydney's North Shore with course superintendent Mark O'Sullivan arranging a sponsorship visa through the club. During the past winter I arrived back in Australia to start my second stint Down Under and have settled in at Roseville and am thoroughly enjoying the Sydney lifestyle again. I am hoping to be here for a few seasons, and look forward to watching Roseville develop through its current projects.

I guess what my story proves is how important networking is in this industry and how it can really take you places if you are game enough to take a punt. I wouldn't be here today if it weren't for a group of people who have taught me some outstanding skills and encouraged me to continue with my hard work. Sure the hours can be long and hard, but the benefits more than outweigh the hard work and it has truly been a life-changing journey.

Editor's Note: For more details about the Ohio State Program, contact director Mike O'Keeffe 00 01 614 688 5653, email okeeffe.1@osu.edu, or visit www.ohioprogram.org. Simon is also available to discuss his experiences and can be contacted by email simon.blagg@googlemail.com 🙌



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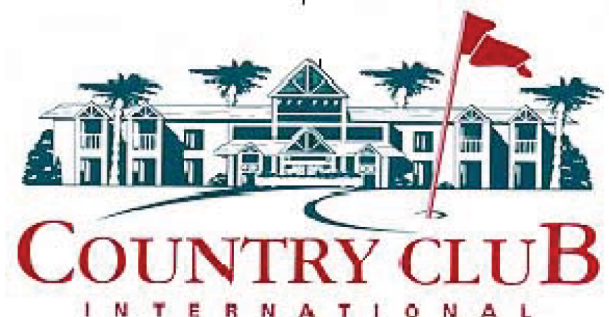
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“On behalf of the Committee and Members of The Metropolitan Golf Club I wish to confirm our satisfaction with the work undertaken and the result.

I have already received many compliments 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 Shorland
Secretary Manager
The Metropolitan Golf Club





In this instalment of AGCSATech Update, senior agronomist Andrew Peart reports on the AGCSA's bentgrass varieties trial which is coming up to the end of its second year and unveils details of a new golf course benchmarking study set to start this spring.

At Keysborough Golf Club, one of project's three trials sites, the plots are being subjected to wear treatments to provide further information on which varieties are able to tolerate a greater amount of wear and tear

Bents and benchmarking

The AGCSA's creeping bentgrass varieties trial (HAL Project TU08002) has now been running for just under two years with a total of 11 assessment dates completed across the three trial sites at Keysborough Golf Club (Melbourne), Cromer Golf Club (Sydney) and Royal Adelaide Golf Club (Adelaide).

To recap, the trial is assessing, over a three year period, the following varieties for their performance under Australian conditions: Tye, 007, Dominant Xtreme, SR1150, SRP1RH93, T-1, Penn G2, Authority, Penn A1, Cobra 2, CY 2, Shark, Declaration, Mackenzie and SRP1GMC. A vegetative selection, called AGCSA1, has also been included as part of the trial, while an RAGC blend and Mariner are included at the Royal Adelaide site.

During the 11 assessments a variety of data has been recorded and includes:

- Turfgrass colour;
- Turfgrass density;
- Surface hardness;
- Thatch accumulation;
- Green speed; and
- Overall quality as a putting surface.

Generally there have been specific seeded varieties that have performed better at each venue with the vegetative variety (AGCSA1) a consistent performer at all three locations to date.

TURFGRASS COLOUR

At Keysborough, the seeded variety T-1 has provided the darkest green colour when averaged over the 11 assessment dates. It has provided a significantly darker green colour than all other varieties apart from Cobra 2.

At Cromer, the seeded varieties T-1 and SRP1RH93, as well as the vegetative variety AGCSA1, were significantly darker green than

all other varieties when averaged over the 11 assessments. There was no significant difference in turfgrass colour between the remaining 13 varieties during the same period. At Royal Adelaide there has been no one variety that has provided a significantly darker green colour since assessments began.

TURFGRASS DENSITY

At Keysborough, there were four varieties that were not significantly different from each other in terms of providing the densest turfgrass coverage, when averaged over the assessment dates. Those varieties were the vegetative variety AGCSA1 and the seeded varieties Shark, Authority and Declaration.

At Cromer there were also four varieties that were not significantly different from each other. The vegetative variety AGCSA1 was again among those as well as the seeded varieties SRP1RH93, Tye and Shark.

At Royal Adelaide, there were 14 varieties that were not significantly different from each other in terms of providing the densest coverage (there are a total of 18 varieties being tested at Royal Adelaide). It is interesting to note, however, that the additional two older varieties being assessed at this site – Mariner and an 'RAGC blend' which consists of Seaside, Highland, Penn G2 and Penncross bentgrasses – are exhibiting poorer turfgrass density, although not significantly sparser than six of the newer varieties. Overall turfgrass density results from this site are presented in Table 1.

TURFGRASS QUALITY

At Keysborough there has been very little difference in the overall turfgrass quality produced by all 16 varieties being assessed. There is no significant difference between 11 varieties in terms of providing the best turfgrass quality, while the three varieties with



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TABLE 1. OVERALL TURFGRASS DENSITY – ROYAL ADELAIDE GOLF CLUB

Variety	29/10/09	16/12/09	11/03/10	22/04/10	9/07/10	15/09/10	30/11/10	3/02/11	21/03/11	24/05/11	14/07/11	Ave
AGCSA 1	6.8	8.8	9.0	8.3	8.8	8.0	3.0	7.7	7.7	7.8	8.2	7.5
Shark	6.8	8.5	8.0	7.5	9.0	8.0	5.0	7.7	7.2	7.5	7.8	7.4
Authority	6.8	7.0	7.2	6.8	7.3	7.0	6.0	8.0	7.7	8.3	8.3	7.3
007	7.2	6.8	7.7	7.0	7.0	6.8	5.7	7.8	7.5	8.3	8.2	7.3
Penn G2	7.0	6.8	7.8	6.8	7.8	7.5	5.3	7.3	7.5	7.7	7.7	7.2
SRP1RH93	6.8	6.8	7.3	7.3	8.3	7.8	5.0	7.3	7.3	7.5	7.7	7.1
Penn A1	6.8	7.2	7.8	6.8	6.7	6.8	5.7	7.8	7.2	7.5	8.0	7.1
MacKenzie	6.8	6.8	7.5	6.8	7.3	6.8	5.5	7.5	7.3	7.7	7.7	7.1
Tyee	7.0	7.5	7.0	7.0	7.8	7.3	4.5	7.3	7.3	7.5	8.0	7.1
SR1150	6.8	6.5	7.3	7.0	7.5	7.0	5.5	7.5	7.0	7.3	8.0	7.1
CY 2	6.8	7.0	7.7	7.0	7.2	6.5	5.0	7.2	6.7	7.0	7.8	6.9
SRP1GMC	7.0	6.0	6.5	6.5	7.2	6.5	5.3	7.3	7.0	7.8	8.3	6.9
T-1	7.2	5.7	6.7	6.5	7.7	6.5	5.3	7.2	7.0	7.3	8.0	6.8
Cobra 2	6.8	6.7	7.3	6.7	6.8	6.3	5.0	7.5	7.0	7.5	7.2	6.8
Declaration	7.0	5.7	7.2	6.3	6.7	6.3	4.3	7.2	7.0	7.0	7.2	6.5
Dominant Xtreme	6.7	5.3	7.2	6.5	6.7	5.8	5.3	7.0	6.7	7.0	7.0	6.5
RAGC blend	6.5	5.5	7.5	6.5	6.8	6.0	6.0	6.2	6.5	6.7	7.3	6.3
Mariner	6.8	6.5	6.8	6.3	7.3	5.8	5.0	6.3	6.3	6.0	6.5	6.2
LSD (P<0.05)	ns	ns	ns	ns	1.0	0.8	ns	ns	ns	ns	ns	0.7

NB: Rated on a scale where 0 = open appearance, 9 = tight surface

the poorest turfgrass quality are only significantly less than Declaration, SRP1RH93, Authority, Shark and Mackenzie.

At Cromer, the vegetative variety AGCSA1 along with the seeded varieties SRP1RH93, Tyee, Shark and T-1 are not significantly different from each other in terms of providing the greatest turfgrass quality when averaged over the initial assessment dates. Dominant Xtreme provided the surface with the poorest quality although it was not significantly less than six other varieties. Overall turfgrass quality results from Cromer are presented in Table 2.

At Royal Adelaide there was some significant difference observed in the overall turfgrass quality of some varieties on two assessment dates (9 July 2010 and 30 November 2010), however, there was no significant difference between varieties when averaged over the 11 assessment dates.

THATCH ACCUMULATION

There has been no significant difference at either Keysborough or Royal Adelaide golf clubs during the two years of the trial for thatch accumulation. Due to an irrigation failure during the first summer of the trial at the Royal Adelaide site, nine plots have been excluded from the ratings for thatch accumulation due to them being re-sown at a later date. Seven varieties have only two replicates being assessed while Shark has just one replicate.

At Cromer Golf Club there was only one assessment date (27 October 2009) that provided a significant difference for thatch accumulation. At that assessment the vegetative variety AGCSA1, had accumulated more thatch than all other varieties with the exception of 007, Shark and SRP1GMC.

SURFACE HARDNESS

There has been no significant difference at any of the trial sites for surface hardness over the

six assessments that have been made to date. It was expected that there may be some correlation between thatch accumulation and surface hardness. Therefore as there has been little difference in thatch accumulation, the lack of any difference for surface hardness is not unexpected.

GREEN SPEED

The results for green speed (ball roll) have been variable at all sites. At Cromer there was no significant difference recorded for green speed for the first, second and fourth assessments, however, for the third (28 September 2010) the variety Penn G2 provided the furthest ball roll and it was significantly more than the varieties 007, Dominant Xtreme, SR1150, SRP1RH93, T-1 and Tyee.

During the May 2011 assessment, Penn G2 again provided the furthest ball roll, although it was only significantly further than the varieties AGCSA1, SR1150, SRP1RH93, Tyee, T-1 and Shark.

During that assessment it was very noticeable that the six aforementioned varieties had rated the

The Cromer Golf Club plots showing differences in quality after they had been sprayed a month before the May 2011 assessment date with a pesticide combination that caused significant phytotoxicity



TABLE 2: OVERALL TURFGRASS QUALITY – CROMER GOLF CLUB

Variety	27/10/09	15/12/09	15/3/10	18/5/10	15/7/10	28/9/10	11/11/10	20/1/11	24/3/11	19/5/11	2/8/11	Ave
SRP1RH93	7.0	7.3	7.2	7.3	7.0	7.0	7.8	6.8	7.2	7.2	6.8	7.2
AGCSA 1	7.7	8.0	7.2	7.0	7.2	6.8	7.3	6.7	7.0	6.2	6.7	7.1
Tyee	7.3	7.0	6.7	7.0	7.0	7.0	7.7	7.0	7.5	6.7	6.0	7.0
Shark	8.0	7.5	6.8	7.3	7.0	7.0	7.7	5.5	6.8	5.8	6.3	6.9
T-1	6.8	6.5	6.7	7.0	7.3	6.8	7.7	6.3	7.0	6.0	6.3	6.8
SR1150	6.7	7.0	6.3	7.3	7.2	6.8	7.3	5.8	7.0	6.0	6.5	6.7
SRP1GMC	7.5	7.2	6.8	6.8	7.0	7.0	7.3	5.2	6.8	4.3	5.8	6.5
Mackenzie	6.7	6.8	6.3	6.8	7.0	6.3	7.2	6.2	6.8	5.7	6.2	6.5
CY 2	6.8	6.2	6.5	7.0	6.7	6.7	7.5	5.2	6.5	5.5	6.0	6.4
Cobra 2	6.7	6.7	6.3	6.5	6.5	6.7	7.3	5.7	5.8	5.2	6.3	6.3
Penn A1	7.2	6.8	6.5	7.3	7.0	6.3	7.0	5.7	6.5	4.0	6.3	6.3
007	6.8	6.7	6.5	7.0	6.3	6.2	6.8	5.5	6.3	5.3	6.0	6.2
Declaration	7.2	6.5	6.3	7.5	6.8	6.3	7.0	5.2	6.2	4.8	6.0	6.2
Authority	7.3	6.8	6.3	6.7	6.8	6.5	7.0	5.2	6.2	4.0	5.8	6.2
Penn G2	7.0	6.7	6.2	6.5	6.5	6.3	7.2	5.0	6.5	4.2	4.5	6.1
Dominant Xtreme	6.0	5.7	6.3	6.3	6.5	6.2	6.7	5.2	5.8	5.2	6.3	5.9
LSD (P<0.05)	0.5	0.5	0.5	ns	ns	ns	ns	1.0	0.5	1.3	0.7	0.4

NB: Rated on a scale where 0 = poor quality, 9 = best quality

TABLE 3. YELLOW TUFT DISEASE INCIDENCE

Variety	17/3/11	17/5/11
007	1.0	1.2
Penn A1	0.7	0.8
Authority	0.3	0.7
CY 2	2.0	2.8
Cobra 2	0.7	0.8
Declaration	0.0	0.7
Dom Xtreme	1.0	2.2
Penn G2	1.0	0.8
Mackenzie	0.3	0.8
AGCSA 1	0.3	1.3
Shark	1.3	1.7
SR1150	1.3	1.8
SRP1GMC	0.3	1.5
SRP1RH93	0.3	1.7
T-1	0.7	0.7
Tyee	1.0	2.5
LSD (0.05)	ns	ns

NB: Rated on a scale where 0 = no incidence to 9 = complete infestation

highest for surface quality. During the previous month the trial area had been sprayed with a pesticide combination that had caused significant phytotoxicity to the plots, with some varieties being more affected than others. The six varieties that were significantly slower than the Penn G2 on this occasion suffered far less and had much greater turf vigour and hence far less ball roll. The photo on page 33 illustrates some of the differences in turfgrass quality that were observed at Cromer.

At Keysborough and Royal Adelaide there has been no significant difference recorded for ball roll for the two assessments undertaken during 2011.

YELLOW TUFT DISEASE

During the assessments undertaken in March 2011 and May 2011 at Keysborough, yellow tuft was observed in many of the plots. Yellow tuft, otherwise known as downy mildew, is caused by a water mould fungus *Sclerophthora macrospora*. It occurs on most turfgrasses and is often seen during periods of wet weather when the area remains wet for prolonged periods of time.

Symptoms on bentgrass initially appear like individual *Poa annua* plants, however, on closer inspection they are bentgrass plants that have just turned a green/yellow colour. They often develop excessive tillering caused by the production of hormones by the pathogen at the crown of the plant.

There was a variance to the susceptibility of all varieties to the yellow tuft during the autumn, although not one variety had significantly more yellow tuft than any other (Table 3).

WEAR TRIALS

As well as the above measurements, another round of wear trials has begun at the Keysborough site in an attempt to provide further information on which varieties are better able to tolerate wear.

This work is being conducted by the maintenance staff at Keysborough with each plot receiving 30

passes twice a week using a specialised wear machine. It is hoped that by the next bentgrass trial field day to be held at Keysborough in late spring 2011 that there will be a noticeable difference in the wear tolerance of each variety.

RECOVERY

Recently 50mm core holes were taken from the corner of each of the plots at Royal Adelaide and backfilled with sand. This is a similar process which occurred at Cromer last year and is designed to provide an indication on which of the varieties has the best recovery rate or lateral movement.

GOLF COURSE BENCHMARKING STUDY

In September 2011 the AGCSA will start a benchmarking study to investigate the performance of selected greens and fairways on nine Victorian golf courses over a 12 month period. The aim of the project, which has received part-funding from Horticulture Australia Ltd (HAL Project TU11003), is to determine the most appropriate test criteria for providing data on course quality as it relates to climate, maintenance and budget.

On greens, the trial will investigate, on a monthly basis, aspects such as green speed, surface firmness, moisture retention, infiltration rate and root depth. Organic matter accumulation will also be measured using a loss on ignition test, however, this will only be conducted at the beginning and end of the trial.

As well as the nine courses in Victoria, the project will also assess similar parameters at three golf courses in NSW and Queensland but not on a monthly basis.

ACKNOWLEDGEMENTS

The AGCSA thanks the course superintendents and maintenance staff for their continued maintenance of the bentgrass trial sites and Horticulture Australia Ltd for their financial support of project TU08002. 🌱

The machine used as part of the wear tolerance trials at the Keysborough site



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Making sense of

dollar spot

In this instalment of Tech Talk, Ben Evans takes a closer look at the causes of dollar spot and techniques superintendents can employ to manage this debilitating disease affecting a wide range of turf species.



PHOTOS: BEN EVANS, BRETT ROBINSON

Dollar spot (*Sclerotinia homeocarpa*) disease is a troublesome recurring problem for golf course superintendents. Although originating as a spot disease, it can quickly form large patches in favourable environmental conditions, and according to Vargas (2005) more money is spent on fungicides to control dollar spot than any other disease of turf.

Dollar spot is identified as small, circular patches which cause small depressions in the turf. These depressions are rarely larger than 5cm, however, they may coalesce into larger patches. These lesions are a tan colour, where the individual leaf blades bear distinct blighted bands, tan to reddish brown, of an hourglass shape.

A silver, grey mycelium (see photo opposite) is present on the surface of the grass when the disease is active. Dollar spot produces a fluffy, white mycelium under controlled conditions, which is felt-like to the touch and turns a shade of grey.

The disease attacks a wide range of turfgrasses including creeping bentgrass (*Agrostis spp.*), winter grass (*Poa annua*), couch (*Cynodon spp.*), seashore paspalum (*Paspalum vaginatum*) and zoysia (*Zoysia spp.*), while in Australia it has also been observed on kikuyu (*Pennisetum clandestinum*). Bentgrass varieties Penncross, SR1020 and Crenshaw are among the most susceptible to dollar spot, while the variety L-93 exhibits strong resistance to the fungus. The 2008 NTEP bentgrass trials in America found Declaration as one of two varieties, to be highly resistant to the disease.

CAUSES

The dollar spot fungus survives as a mycelium in infested plants and plant debris, such as thatch. When temperatures reach 15°C or more, dormancy breaks and the mycelium within the previously

infected tissue colonises the foliage. The build-up of disease may be rapid, and the disease has tremendous persistence once established.

As the mycelium extends outwards into the air, it comes into contact with neighbouring leaves and 'bridges' between them. When the mycelium contacts a neighbouring leaf, it may;

- Enter through the stomata;
- Enter through leaf cuts or mown portions; or
- Cause direct penetration

The sexual parts of the fungus, that is the conidia and ascospores, are of minor importance in the spread of the fungus. Movement is largely brought about by the relocation of diseased and infected materials via human foot traffic and turf maintenance equipment.

The disease is active from spring through to late autumn and is favoured by temperatures from 16°C-32°C, with optimal temperatures between 21°C-27°C. High humidity in the leaf canopy is also required for growth of the fungus and in particular stimulates the spores to germinate.

Dew plays a key role in the infection process and dollar spot increases dramatically when dew presence increases. It is this thin film of moisture on the leaf which facilitates many common turf diseases because fungi need a film of moisture in order to germinate, and also to liberate spores from sporophores. In the case of dollar spot, this process only occurs in the presence of water.

By limiting the amount of time a leaf blade is wet reduces disease severity significantly, as it hampers the fungi's ability to germinate. Leaf wetness is perhaps the environmental variable that permits an infection event, but temperature determines the rapidity and extent of that event. Increased periods of leaf wetness also facilitates the bridging process and the spread of disease.

MANAGEMENT

Turfs with low nitrogen contents are particularly susceptible to dollar spot invasion. Beard (1973) and Liu (1995) suggest high nitrogen contents

Above: Dollar spot attacks a wide range of turfgrasses including creeping bentgrass, *Poa annua*, couchgrass, seashore paspalum and zoysia, while in Australia it has also been observed on kikuyu

stimulate leaf growth causing the host to outgrow and avoid disease development. There is little evidence to suggest phosphorous or potassium levels influence dollar spot and alterations to pH have shown no effect.

In order to control the disease, opinion is divided as to the reliance on cultural control with minimal fungicide use or the insistence on chemicals as a vital tool in controlling the fungus. Research has demonstrated changes in microclimatic conditions conducive to dollar spot disease can markedly reduce dollar spot infestation. Dernoeden (2002) argues the need to ensure the climatic conditions for growing turf are as sound and healthy as possible and a turf manager should resort to chemical control as sparingly as possible.

Ensuring proper air circulation and sunlight is a key consideration in dollar spot prevention. Koh (2003) found more dollar spot disease occurred in shaded and air flow restricted plots than on plots exposed to full sun. By allowing sunlight, particularly morning sunlight over a turf, allows for dew to evaporate readily. Proper air flow over a turf canopy produces a mixing action, which not only lowers the temperature above the turf but reduces the humidity as well.

Dew management is a key consideration in controlling dollar spot germination and movement. Guttation water is rich in amino-acids and carbohydrates which increase the infection process. Leading turf researchers argue that the turf should never be irrigated late in the afternoon, since this will prolong leaf wetness, particularly in humid weather.

Dew should be removed by any or all means, whether by mowing, rolling, squeegeeing or poling. Ellram (2007) conducted an experiment where dew was removed at different times of the day and found that early morning dew removal reduced dollar spot significantly. Removing dew after 10am had little to no effect because the sun had evaporated most dew already. Daily removal of dew resulted in the lowest infection of dollar spot, irrespective of the method of dew removal. The authors believed this was due to the mechanical disruption of hyphal growth on or between the leaf surfaces.

Ellram also found that dull mowers did not appear to increase the incidence of dollar spot compared to sharp mowers. However, mowing turf achieved significantly better dew removal than a squeegee. Sanitation practices such as washing mowers and equipment before entering a non-infected area should also be adhered to.

When disease pressure is high, application of chemicals such as chlorothalonil, propiconazole or triadimefon is recommended. However, resistance is a significant issue in controlling dollar spot, with resistance to benzimidazoles, anilazine and iprodione chemicals widely reported (Couch 1994). Chlorothalonil is a contact fungicide and when applied at 14-day intervals is considered to be highly effective in combating dollar spot particularly



A silver, grey mycelium is present on the surface of the turf when the dollar spot disease is active

when applied to dry foliage. Chlorothalonil has exhibited low susceptibility to developing resistance to disease.

Recent research suggests that the use of composts may reduce the over-reliance on chemicals. The use of organic amendments attempts to produce a long-term change in the soil environment whereby the activities of the indigenous disease-suppressive microbes are favoured (Boulter, 2002). The research indicated that the reduction in disease activity was enough to suggest a viable alternative when disease pressure was low. However, this treatment was not successful when the disease pressure was high.

Fry (2004) argues that the reduction in dollar spot damage was not due to the proliferation of beneficial microbes which antagonise dollar spot, but the increased nitrogen delivered in the composts and fertilisers in the compost products. Fry also discusses an experiment of nine nitrogen sources in controlling dollar spot. Urea suppressed the infestation, while all seven organic sources saw marked increases and outbreaks of disease. Davis (2002) reported similar results where it was found that none of the natural organic fertilisers consistently reduced dollar spot infestation, compared to synthetic organic nitrogen sources.

Smiley (2005) reports on the possibility of biological inoculants. Although, research is not yet to the point of commercialisation, the fungi *Trichoderma harzianum*, *Bacillus licheniformis* and *Pseudomonas aureofaciens* show promise. Vargas (2005) reports that when *Pseudomonas aureofaciens* was applied five times a week directly onto a green it was successful in reducing dollar spot damage. However, when nine biostimulants were trialled against urea in reducing dollar spot, all nine of the biostimulant treatments increased dollar spot symptoms compared to fortnightly applications of soluble nitrogen (Fry 2004).

Editor's Note: At the 26th Australian Turfgrass Conference, Michigan State University green speed authority Dr Thom Nikolai outlined some of his research which found that lightweight rolling of greens three days a week instead of mowing on those days reduced the incidence of dollar spot. Full references for this article can be obtained from the AGCSA email info@agcsa.com.au 📧

Dollar spot is identified as small, circular patches which cause small depressions in the turf, however, they may coalesce into larger patches





Does the Award reward?

A recent survey of AGCSA superintendent members continues to show dissatisfaction over the modern Award set-up.

In August 2011, the AGCSA conducted a short survey of superintendent members to gauge their thoughts on the current modern Award set-up.

As of January 1, 2010 the Federal Government's Award modernisation came into effect, the key objective of which was to reduce the number of Awards in the system by creating those with national coverage across industry and occupational lines. For the golf industry this has seen greenkeepers covered under three Awards, the most relevant being the Registered and Licensed Clubs Award. The Gardening Services Award and the Amusement, Events and Recreation Award also cover some sectors of the turf maintenance industry.

In 2009, the AGCSA put forward a submission to the Australian Industrial Relations Commission regarding the draft Awards, outlining the inclusions thought necessary to bring greenkeeping Awards up to date and more reflective of the skills and knowledge required and existing within the industry.

While a separate Award was not granted, the Registered and Licensed Clubs Award created two levels of 'horticultural management' in the same framework as club managers, the first of which relates best to assistant superintendents/foremen, the second covering superintendents. There were also some important exemption clauses as well as adjustments to the hours of work and related matters which have subsequently had an impact on course operations, in particular in relation to overtime rates.

Following an AGCSA members survey in late 2010, a number of issues were raised in regards to employment and wages. That prompted the AGCSA to release its 2011 AGCSA Salary and Wage Survey Report (see the breakout opposite for more on this),

while more recently the survey on the modern Award set-up sought feedback on how the new Awards were actually being interpreted by golf clubs and whether there were any particular problems and areas which need addressing.

This edition's Pulse differs slightly in that we look at some of the results to emerge from this survey and include some of the comments made by superintendents. In a subsequent edition of ATM, AGCSA HR and best practice manager Daryl Sellar will delve more into the Awards in light of the survey results and will also touch upon other human resource matters including communication skills and clarifying KPIs/maintenance standards.

OUT OF TOUCH?

Overwhelmingly, respondents to the Award survey made the comment the new Award set-up, which has been in place for 18 months now, was still out of touch with the modern day requirements of the profession. Some of the key stats were:

- 74 per cent of survey respondents believed the modern award didn't provide suitable coverage for the golf course maintenance industry;
- More than half of all respondents said that working conditions hadn't improved under the new Award set-up across the various levels (i.e.: superintendent, assistant superintendent, qualified greenkeeper, apprentice greenkeeper). More than a quarter said they were unsure.

When asked to give comments on whether there was any section of the Award they would like to see amended, here is a selection of some of the many responses by superintendents:

- I feel it was written by managers for managers. It needs to be totally revisited.
- Creating a reasonable base rate to start from is essential to help retain staff, especially those keen honest workers.
- There should be an allowance for wet weather days (e.g.: five per year).
- The turf industry is a 24-hour, seven-day-a-week, 365-day-a-year business and requires a workplace agreement to cover all the areas where you go outside the Award.



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- Saturday morning overtime has been reduced to single time. Staff members are no longer interested in working overtime on Saturday mornings to prepare the course for what is generally the most important day of the week.
- It's hard to keep good staff on smaller courses and I would love to see the Award for qualified greenkeepers and apprentices rise to be more comparable to other trades.
- Our profession is not recognised to the level of others, especially when considering the amount of multitasking and skills required.
- I would like to see the Award adapted to the areas in which the course is located. Higher Awards for areas that have higher rents, mortgages.
- Award wages don't reflect pay rates within golf industry. Pay rates are too low for 2nd and 3rd year apprentices.
- Weekends should always be paid overtime not time in lieu.
- Every time the Award has been changed, it looks like a win to the clubs, not the workers.
- The responsibilities of a superintendent far outweigh the remuneration they are offered under the modern Award. Being accountable for the safety of personnel and also the environmental sustainability of a workplace on the scale of the size of a golf course is a major responsibility. I understand that there are some golf courses that pay above the Award but there are also many clubs that continue to pay Award rates and for superintendents it's grossly unfair.
- I think a far better way to set minimum rates would be to set it against each club's budget. For example, a superintendent's minimum wage should be not less than 10 per cent of course budget with the cap being around \$45k for budgets less than 450k. Assistants could be 6.5 per cent, qualified greenkeepers 5 per cent etc...
- Wages are a big problem for the average club. You cannot keep a tradesman in the job unless you pay them over the Award in a big way. Superintendents and assistant superintendents should be a lot higher than what it is now and that will also increase the tradesman wage.

If a tradesman's minimum wage is \$40k plus overtime, an assistant minimum wage should be \$50k with no overtime and a superintendent minimum should be \$60k with no overtime. For the amount of hours we do in summer and the time you have away from the family during this time, you sometimes wonder if it is worth it.

- More flexibility to working hours such as starting times for tournaments and summer rosters.
- I think each club should have its own agreement with the staff. With the GMA we should be looking at a purpose-built Award.
- The spread of ordinary hours worked is restrictive – 5am-5pm would be better. During excessive hot weather, starting at 6am does not prevent exposure to oppressive heat. Spraying pesticides in front of golfers and after daylight is also restrictive due to the current spread of hours. Time off with pay equivalent is also restrictive and needs to be a longer period of 6-12 months, not within four weeks.
- On our current agreement the superintendent and assistant superintendent salaries have had a total increase of 10 per cent over the past six years, while the remainder of the staff have seen a 21 per cent increase. Doesn't seem right. 🙄

AGCSA SALARY AND WAGE SURVEY REPORT



Salaries, wages and conditions of employment have been a key topic at both state and national conferences for many years and unfortunately these discussions rarely conclude with positive outcomes and better wages and conditions for employees due to the lack of reliable data. Course superintendents are frequently enquiring as to what is appropriate remuneration for their position and that of their staff, but the lack of such data has always been a problem.

Earlier this year the AGCSA released to members the **2011 AGCSA Salary and Wage Survey Report** which was compiled in conjunction with Golf Management Australia. The report provides an up to date review of salaries and wages information for four key golf course management positions – course superintendent, assistant superintendent, qualified greenkeeper and mechanic. The survey also presents information based on several different parameters including club revenue, club membership fees, maintenance budget and location.

The report is only available to current financial AGCSA members and is available as a download through the HR and Best Practice section which is housed in the members area of the AGCSA website – www.agcsa.com.au/members.

superintendents and golf clubs course maintenance standards



Research was carried out on 10-year-old Penn A4 practice putting greens at Independence Golf Club (Richmond, Virginia) with various combinations of small tines, big tines and verticutting imposed to provide a range of seasonal surface removal from 0-26.6 per cent

Organic matter dilution programmes for sand-based greens

US researchers investigated several spring and autumn cultivation treatments to minimise both organic matter in the thatch/mat layer and recovery time of bentgrass putting green turf from renovations.

USGA-sponsored research by Dr. Bob Carrow and his colleagues at the University of Georgia in the 1990s provided data for cultivation and topdressing recommendations for sand-based greens commonly known as 'organic matter dilution' programmes. O'Brien and Hartwiger (2003) summarised the details of this approach recommending annual cultivation practices that removed 15-20 per cent surface area and incorporated 40-50ft³ sand/1000ft² (1.2-1.5m³/100m²), with the ultimate goal of maintaining surface rootzone organic matter at 4 per cent or less.

Aggressive organic matter dilution programmes are intended to slow loss of aeration porosity and subsequent infiltration rates, thereby allowing superintendents to more easily manage their putting greens and lessen the effects of summer decline.

In March 2008, researchers at Virginia Tech embarked on a three-year project to compare various cultivation approaches that removed between 10-27 per cent surface area and determined treatment effects on agronomic performance of a mature bentgrass putting green. The ultimate goal was to determine which organic matter dilution programme maintained mat layer organic matter at less than 4 per cent while providing the fewest days of putting quality disruption each year.

MATERIALS AND METHODS

Research was done on 10-year-old Penn A4 practice putting greens at the Independence Golf Club, near Richmond, the state capital of Virginia, which has a humid subtropical climate characterised by hot, humid summers and mild to cool winters.

Prior to starting the research project, analysis of four randomly selected cup-cutter cores revealed

a thatch/mat layer (0-2" deep) with 5.8 per cent organic matter. Various combinations of small tines (¼" inside diameter), big tines (½" inside diameter) and verticutting (3mm blade) were imposed in late March (Northern Hemisphere spring) and early September (Northern Hemisphere autumn) to provide a range of seasonal surface removal from 0 per cent to 26.6 per cent (Table 1). The seven treatments were:

- **Treatment 1:** Control (sand-only);
- **Treatment 2:** ¼" coring, two passes (spring and autumn);
- **Treatment 3:** Verticutting (3mm blade) (spring and autumn);
- **Treatment 4:** ¼" coring + verticutting (3mm blade) (spring); ¼" coring (autumn);
- **Treatment 5:** ½" coring (spring); ¼" coring, two passes (autumn);
- **Treatment 6:** ½" coring (spring and autumn);
- **Treatment 7:** ½" coring (spring); verticutting (3mm blade) + ¼" coring, two passes (autumn);

Verticutter blade spacing was 1 inch and depth 0.75 inches. Coring tine spacing was 1.33x1.5 inches, with a coring depth of 2 inches. Heavy sand topdressing of about 12ft³/1000ft² (0.4m³/100m²) was applied on both days of cultivation, supplemented by four light topdressings (0.004m³/100m²) every 4-6 weeks between cultivations, for a seasonal total of 24.6ft³/1000ft² (0.75m³/100m²).

Cultural management of these greens was identical to all others on the golf course, receiving preventive pesticide applications, daily mowing at 0.125 inches (3.175mm) and annual nitrogen fertilisation of 4.4, 3.3 and 4.3lbs N/1000ft² (2.15, 1.6 and 2.1kg/100m²) in 2008, 2009 and 2010 respectively.

To track per cent cover or recovery rate following cultivation treatments in 2009 and 2010, digital images were taken every 7-14 days with a light box and analysed with SigmaScan software. Linear regression was then used to predict the number of days required for each treated plot to return to 99 per cent cover or a non-disrupted putting surface.

RESULTS

The focus is on measurements of per cent organic matter (from loss on ignition tests) in the thatch/mat layer at the end of each season as affected by the various cultivation treatments, and on estimates (from digital image analysis) of days required to achieve 99 per cent turf cover following cultivation treatments.

At the end of 2008, only those coring treatments that removed 14.8 per cent to 19.6 per cent (treatments 5 and 6) significantly reduced per cent organic matter compared to the topdressed control (Table 1). Use of smaller tines alone (treatment 2), verticutting alone (treatment 3) or combinations of the two (treatment 4), failed to reduce per cent organic matter in 2008.

At the end of 2009, all treatments, except verticutting alone, significantly decreased per cent organic matter in the thatch/mat layer compared to the topdressed control (Table 1). Coring spring and autumn with ½" tines on a tight spacing to remove about 9.8 per cent surface area to a depth of 2 inches (treatment 5) resulted in the least organic matter (3.1 per cent) over the three years. Data also suggest that verticutting to 0.75 inches does not remove enough material for adequate organic matter dilution, even though this procedure removes a large amount of surface area (11.8 per cent) with each pass.

Very little change in per cent organic matter was measured due to treatments between 2009 and 2010. The only changes of note from 2009 to 2010 were an increase from 3.7 to 4.5 per cent in treatment 4 (verticutting + small tine cultivation) and a slight increase (3.4 to 3.8 per cent) in treatment 2 (small tines, twice over). Only where large tines were

TAKE-HOME POINTS

- The control plots finished with the greatest thatch/mat organic matter (4.3 per cent), but this 0.5 to 1 per cent increase compared to more aggressive treatments did not result in lower visual quality.
- At the end of 2008, only those coring treatments that removed 14.8 per cent to 19.6 per cent significantly reduced per cent organic matter compared to the topdressed control.
- At the end of 2009, all treatments, except verticutting alone, significantly decreased per cent organic matter in the thatch/mat layer compared to the topdressed control.
- Using large tines (0.5") at a close spacing both spring and autumn each year (19.6 per cent surface removal) worked best in terms of reducing final organic matter at 3.1 per cent, but required approximately 5-15 extra days of each season for recovery compared to the small tine and/or verticutting treatments.
- Annual removal of 15 to 20 per cent surface area should be the goal for adequate dilution of organic matter in creeping bentgrass greens.



used to remove 14.8 per cent or greater surface area (treatments 5-7) was it observed that per cent organic matter levels were kept at significantly lower levels (3.1 to 3.3 per cent) compared to the topdressed control (Table 1).

Fastest spring recovery (averaged over 2009 and 2010) of 29.5 days was measured for treatment 3 (verticutting) (Table 2). Large diameter coring (treatments 5-7) or small diameter coring + verticutting on the same day (treatment 4) required 35.5 to 40 days for spring recovery (Table 2). Late summer/early autumn recovery data were very similar for cultivation treatments that remained the same as their spring counterpart. In particular, treatment 3 (verticutting) recovered in only 25.5 days (Table 2), while large diameter coring alone (treatment 6) required six fewer days of recovery (34 days versus 40 days) in the autumn compared to the spring coring. Fastest autumn recovery of 8.5 days was observed with treatment 4 where only 2.5 per cent surface removal occurred.

Data interpretation for treatments 2, 5, and 7 is confounded by irregularities in how the treatments were applied. For treatments 2 and 5, when the second ¼" coring pass was made, surface tearing and furrowing occurred, causing a higher per cent

TABLE 1. TREATMENT DETAILS AND ORGANIC MATTER PERCENTAGE

Treatments	Surface Area Removed (%)			Thatch/Mat (%OM)		
	March	Sept	Total	Nov 2008	Nov 2009	Nov 2010
1 Control (sand-only)	0	0	0	5.2 ^a	4.3 ^a	4.3 ^{ab}
2 ¼" coring, two passes (S+A)	5	5	10	4.9 ^{ab}	3.4 ^c	3.8 ^{cd}
3 Verticutting (3mm blade) (S+A)	11.8	11.8	23.6	5.0 ^{ab}	3.9 ^{ab}	4.0 ^{bc}
4 ¼" coring + verticutting (3mm blade) (S); ¼" coring (A)	2.5+11.8	2.5	16.8	5.2 ^a	3.7 ^{bc}	4.5 ^a
5 ½" coring (S); ¼" coring, two passes (A)	11.8	5	14.8	4.8 ^b	3.3 ^{cd}	3.3 ^{de}
6 ½" coring (S+A)	9.8	9.8	19.6	4.8 ^b	3.0 ^d	3.1 ^e
7 ½" coring (S); verticutting (3mm blade) + ¼" coring, two passes (A)	9.8	5+11.8	26.6	5.1 ^{ab}	3.3 ^{cd}	3.2 ^e
			LSD(0.05)	0.38	0.42	0.49

NB: Table shows surface area removed (%) and organic matter content (% wt/wt, loss at ignition) of A4 creeping bentgrass as affected by various cultivation treatments. Tine size shown is inside diameter. S= spring, A=autumn, S+A=spring and autumn. Values with the same letters are not statistically different. March is Northern Hemisphere spring; Sept is Northern Hemisphere autumn



◀ Prior to start of the study, analysis of four randomly selected cores revealed a thatch/mat layer 0-2" deep with 5.8 per cent organic matter

surface damage than the calculated 5 per cent. Our plots were in 6 foot wide (1.8m) lanes that did not allow us to run our second coring pass at an angle to the first pass. Thus, many holes were being hit twice.

Interpretation of the recovery time for treatment 7 should be tempered by the fact that verticutting could not be completed over the top of plots that received two passes of the 1/4" tines. Undue sod heaving was occurring, so verticutting was delayed until three to four weeks after coring, greatly extending the time required for recovery.

Visual quality ratings at various dates in 2008 and 2010 (Table 3) show that the control plots (sand topdressed only) did not suffer summer decline as might be expected without core aeration or deep verticutting for three consecutive years. Statistically, the control plots finished with the greatest thatch/mat organic matter (4.3 per cent), but this 0.5 to 1 per cent increase compared to more aggressive treatments, did not result in lower visual quality.

These results point to the importance of sand topdressing in diluting organic matter and maintaining a high quality putting green. Would only applying sand topdressing of at least 24ft³/1000 ft²/

yr (0.75m³/100m²/yr) continue to provide acceptable putting green quality at this site for another one, three, or five years? Unfortunately this information is unavailable and this data cannot be used to confidently predict if this would be the case. These results demonstrate the need for conducting long-term (5-15 year) field research trials.

The ultimate goal was to determine cultivation treatments that are sufficient to adequately reduce thatch/mat per cent organic matter, while also disrupting putting surface quality for the least amount of time.

The least disruptive treatment in terms of per cent surface removal (treatment 2, 10 per cent) healed relatively quickly (32 days) and reduced thatch/mat organic matter to an acceptable level of 3.8 per cent after three years. However, the fact that ground was lost between 2009 (3.4 per cent) and 2010 (3.8 per cent) may point to this practice not being sufficient in the long-term.

Verticutting alone each spring and autumn (treatment 3) resulted in the second fastest recovery of any treatment (27.5 days), but failed to significantly reduce organic matter to a level below the untreated. Treatment 4 resulted in the fewest average days of disruption over the season (22), but finished 2010 with the same amount of organic matter (4.5 per cent) as the topdressed control. Verticutting and small tine coring may heal fast, but appears to be insufficient for organic matter dilution.

Using large tines (1/2") at a close spacing both spring and autumn each year (19.6 per cent surface removal, treatment 6) worked best in terms of minimising final organic matter at 3.1 per cent, but required approximately 5-15 extra days each season for recovery compared to the small tine and/or verticutting treatments.

Finally, being very aggressive by removing 26.6 per cent surface area (treatment 7) per year did not work in this trial. Recovery time was significantly delayed without achieving greater organic matter dilution compared to treatments that removed 15-20 per cent surface area.

In summary, three years of data indicate that various coring approaches can be combined with verticutting and consistent sand topdressing to

TABLE 2. AVERAGE DAYS OF DISRUPTED PUTTING QUALITY (2009 AND 2010)

Treatments	Spring % removal	Days to 99% cover	Autumn % removal	Days to 99% cover	Total % removal	Disrupted Days
1 Control (sand-only)	0	0	0	0	0	0
2 1/4" coring, two passes (S+A)	5	32.5 ¹	5	31 ¹	10	32
3 Verticutting (3mm blade) (S+A)	11.8	29.5	11.8	25.5	23.6	27.5
4 1/4" coring + verticutting (3mm blade) (S); 1/4" coring (A)	2.5 + 11.8	35.5	2.5	8.5	16.8	22
5 1/2" coring (S); 1/4" coring, two passes (A)	9.8	38.5 ¹	5	30.5 ¹	14.8	34.5
6 1/2" coring (S+A)	9.8	40	9.8	34	19.6	37
7 1/2" coring (S); verticutting (3mm blade) + 1/4" coring, two passes (A)	9.8	38.5	5 + 11.8	41.5	26.6	40

NB: Table shows total estimated days of disrupted putting quality in 2009 and 2010 (averaged) as affected by per cent surface removal by various core cultivation and verticutting treatments. ¹Two passes with the 1/4" tines resulted in undue tearing, hole overlap, and furrowing on the putting surface that served to delay recovery in treatments 2 and 5 in Autumn.



Organic matter sampling was carried out over a three year period. Using large tines (½") at a close spacing both spring and autumn each year worked best in terms of reducing final organic matter at 3.1 per cent, but required longer to recover

achieve the goal of organic matter dilution. Annual removal of 15-20 per cent surface area should still be the goal for adequate dilution of organic matter in creeping bentgrass greens. While verticutting alone provides fast healing, data from this project indicates that it needs to be combined with at least one annual 10 per cent coring for adequate organic matter dilution.

ACKNOWLEDGEMENTS

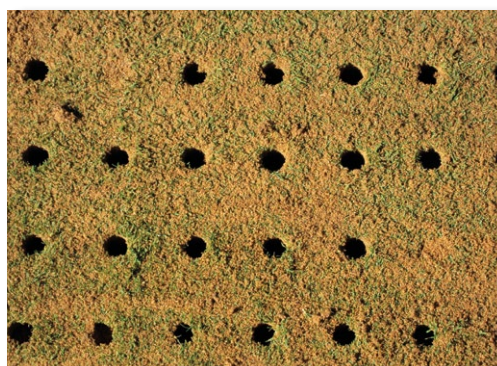
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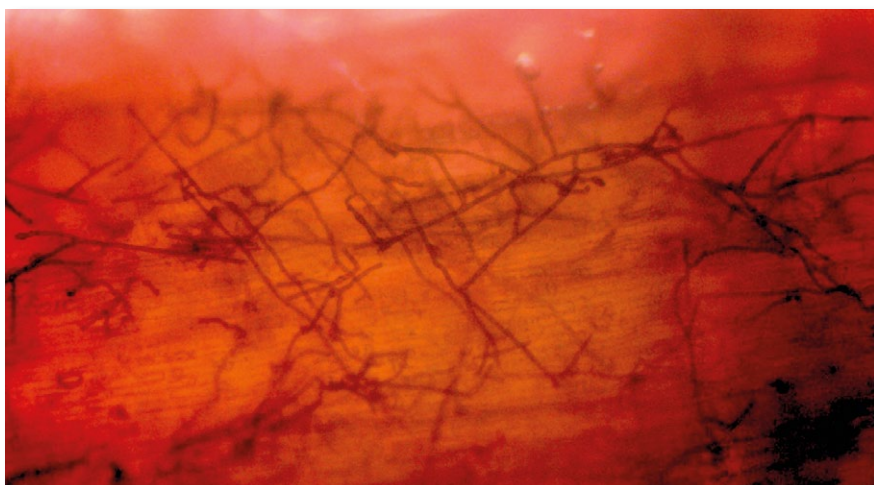


Annual removal of 15-20 per cent surface area should still be the goal for adequate dilution of organic matter

TABLE 3. RATINGS OF PUTTING GREEN VISUAL QUALITY

Treatments	Total % removal	Visual Quality Rating ¹			
		July '08	Sept '08	Aug '10	Nov '10
1 Control (sand-only)	0	6.5 ^{ab}	7.5 ^{ab}	7.1 ^{ab}	7.8 ^a
2 ¼" coring, two passes (S+A)	10	6.3 ^b	6.9 ^c	6.8 ^b	7.8 ^a
3 Verticutting (3mm blade) (S+A)	23.6	6.3 ^b	7.1 ^{bc}	6.6 ^b	7.5 ^{ab}
4 ¼" coring + verticutting (3mm blade) (S); ¼" coring (A)	16.8	6.3 ^b	7.3 ^{abc}	7.3 ^a	7.6 ^{ab}
5 ½" coring (S); ¼" coring, two passes (A)	14.8	6.5 ^{ab}	7.8 ^a	6.6 ^b	7.5 ^{ab}
6 ½" coring (S+A)	19.6	6.1 ^b	7.1 ^{bc}	6.8 ^b	7.5 ^{ab}
7 ½" coring (S); verticutting (3mm blade) + ¼" coring, two passes (A)	26.6	6.8 ^a	7.8 ^a	6.8 ^b	7.4 ^b
	LSD (0.10)	0.4	0.5	0.4	0.3

¹ 1-9 (where 1 = poor, 9 = best). These ratings represent putting green quality either before cultivation treatments or after complete recovery from cultivation



New native patch diseases put to the test

Two new fungal pathogens causing patch diseases in Australia were studied to determine their temperature, moisture and pH requirements in the hope that the information leads to practical methods to manage their impact.

Diseases caused by fungi occur year round and detract from the visual appeal of fine turf surfaces. For such diseases to occur, there are three key factors which are needed – the actual pathogen, a susceptible host and favourable weather conditions.

By understanding this disease triangle, we can gauge what conditions favour the development of two new native Australian turf pathogens, Wongoonoo patch (*Gaeumannomyces wongoonoo*) and an undescribed *Magnaporthe* sp which have been isolated and discovered by Dr Percy Wong from the University of Sydney.

Both of these diseases are ectotrophic root-infecting fungi, or 'ERI fungi', which is a generic name given to fungi which cause a number of diseases in turf, such as Take-all patch (*Gaeumannomyces graminis* var. *avenae*) and spring dead spot (*Ophiosphaerella namari*). These fungi typically produce a black mycelium on the surface of the roots, before they invade the roots inciting disease. As they grow below the turf surface chemical control is often difficult to achieve.

METHODOLOGY

Two isolates of *G. wongoonoo* (GW1 from Perth, WA and GW5 from Brisbane, QLD) and three isolates of the undescribed *Magnaporthe* sp. (TS99 from Indooroopilly, QLD; TS124 from Mackay, QLD; and Dan from Dandenong, VIC) were studied as part of this project to determine their growing requirements. Such knowledge can help turf managers in the future better anticipate and hopefully combat these two diseases.

Essentially, an isolate is the term given when an identical species is found in a different site, usually separated by great distances. It is also interesting to see how these species adapt to different environments, such as different tolerances to heat/cold. For all experiments there were three replicates.

Three experiments were carried out under laboratory conditions and for each experiment the fungi were measured every two days to determine their mean radial growth. The experiments were:

- **Experiment 1:** Fungal growth measured between 10°C-35°C at 5°C increments;
- **Experiment 2:** Osmotic potential of the fungi, in particular, how moisture influences the growth of fungi (the lower the osmotic potential, the 'drier' the conditions are); and
- **Experiment 3:** Response to pH changes from 5.0 to 8 at 0.5 unit increments. (This is an interesting experiment as many turf diseases have been shown to be effectively controlled by altering pH, with the prime example being Take-all on golf greens.

WONGOONOO PATCH

Wongoonoo patch is caused by *Gaeumannomyces wongoonoo* (Wong 2002). The symptoms of this patch disease look very similar to Take-all patch of golf greens. Visual symptoms include patches of unthrifty grass exhibiting yellowing of the leaves, stunting and eventual death of the runners (especially in the centre of patches). These patches can measure up to 50cm in diameter. Under a hand lens, the roots are dark in colour which occurs as a line in the centre of the roots rather than occurring throughout the root.

The disease was originally found on ST1191 buffalograss in Perth, Western Australia and it has also been found on buffalograss in Brisbane, Queensland (*Stenotaphrum secundatum* cv. 'Velvet') and has been identified by Dr. Percy Wong as the cause of a patch disease of common couch in Parramatta, New South Wales.

The results of this research project showed that this disease is favoured by warm weather conditions, with optimum growth at 25°C-30°C. Below this range the pathogen did not grow well, so it can be deduced that the turf will out-compete the fungus in these situations. *G. wongoonoo* also favours a wet soil. As with many fungi, constant irrigation will germinate the fungal spores, which not only incite disease but may also facilitate its spread. The fungus also grew in extremely dry soil conditions, albeit very slowly. This is likely to be an adaptive mechanism of the fungus to accommodate new environments.

Above: Two new native Australian turf pathogens, Wongoonoo patch (*Gaeumannomyces wongoonoo*) and an undescribed *Magnaporthe* sp, which are ectotrophic root-infecting fungi which is a generic name given to fungi which cause a number of diseases in turf, such as Take-all patch



A diseased buffalograss runner infected by Wongoonoo patch (left) compared to a healthy runner (right), in a glasshouse test

Below: Figure 1. *G. wongoonoo* isolates showing severe decline in growth as the growing media becomes more acid

Bottom: Figure 2. Undescribed *Magnaporthe* sp. isolates showing severe decline in growth as growing media becomes more alkaline

This study found the pathogen grew very well on neutral to slightly acid pH ranges (pH 7-6.5) and poorly under acid conditions (Figure 1). As the solution became more acid (<pH 6) growth was stunted.

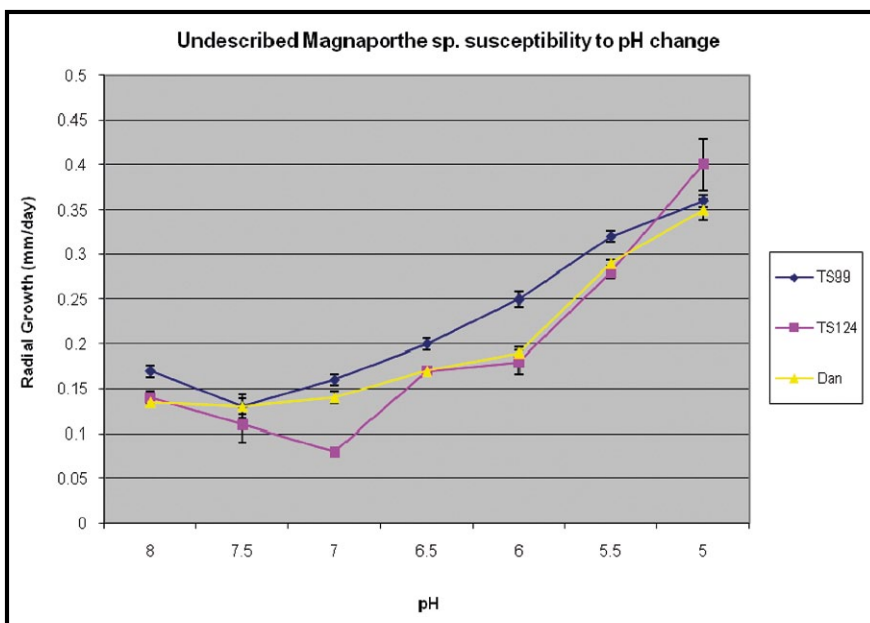
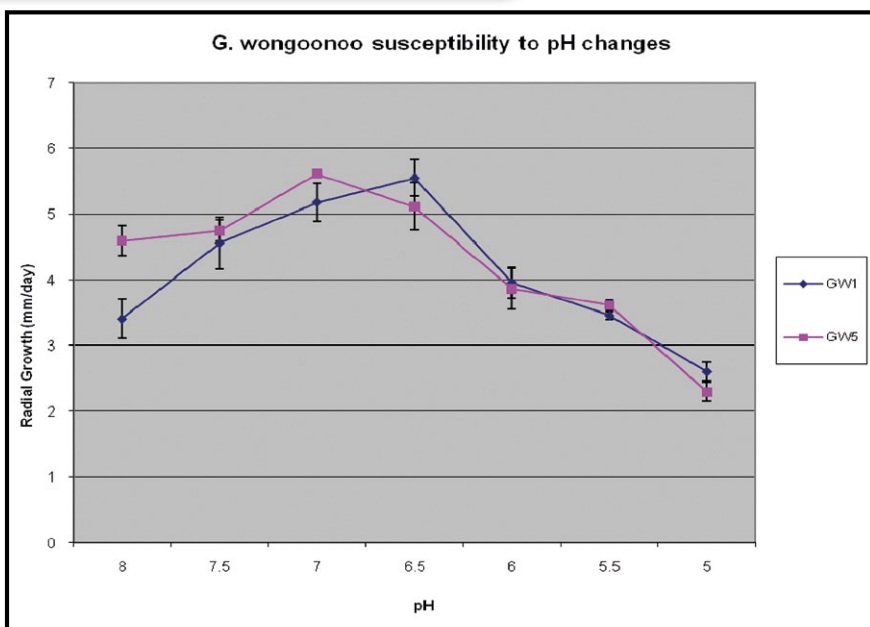
There have been a number of studies examining the control of Take-all patch with acidifying fertilisers. For instance, Dernoeden (1987) found lowering soil pH with ammonium sulphate to be an effective practice. Further research has shown that the use of acidifying fertilisers also increases manganese availability, which has been shown to reduce Take-all patch (Heckman et al. 2003).

As the species tested is a close relative to Take-all patch (*G. graminis*), chemicals which control Take-all may prove effective. Until such chemical trials are undertaken, turf should be watered deeply and infrequently to allow some drying of the soil. Other management practices to consider are:

- Lifting mowing height;
- Syringing on hot days to cool the surface;
- Invasive procedures to the surface, such as de-thatching, will help spread the disease;
- All equipment should be thoroughly cleaned before entering new areas;
- Application of N fertilisers may help to mask symptoms; and
- Liming should not be undertaken if the turf has a history of Wongoonoo patch.

UNDESCRIBED MAGNAPORTHE

This patch disease, called 'summer decline' by golf superintendents, was first discovered on 328 (Tifgreen) couchgrass golf greens in Queensland and has since been discovered as far north as Mackay, Queensland, and in a playing field as far south in Dandenong, Victoria. The cause of the disease is an undescribed fungus which is currently being studied by Dr. Percy Wong from the University of Sydney.





Above: Typical symptoms of Wongoonoo patch on a Velvet buffalograss home lawn



Middle: The undescribed *Magnaporthe* sp. 'TS99' infecting a hybrid couchgrass putting green



Right: Ascospores for this undescribed *Magnaporthe* are unique in size to other members of the genus

The disease begins as small, brown patches which enlarge and coalesce with other patches to form weakened and unsightly turf. These patches are irregular in shape, and exhibit wilted plants with rotted roots colonised by a dark ectotrophic fungus. This is most severe in the summer months, hence the name 'summer decline', when high temperatures exacerbate the symptoms, largely due to the weakened root systems being unable to supply enough water to the grass, therefore causing the grass to die back.

This research project found that this pathogen grows best at 25°C-30°C, while outside these ranges growth was negligible. What separates this *Magnaporthe* sp. from *Magnaporthe poae* (which causes 'summer patch' in the US) was its slow growth. This species grew at 0.8mm/day at its fastest, which in fungi terms is very slow, compared to *M. poae* which grew at 6.5mm/day (Plumley et al. 1997). While it is a slow growing fungus, this shouldn't detract from its severity. If turf roots and microbial antagonists are suffering under extreme heat, this fungus can happily survive such conditions and easily gain a competitive advantage over the turf.

This fungus is also favoured by wet soils. As the growing media became drier, the growth of the fungus deteriorated. Managers who water lightly yet frequently may find this will encourage symptom development.

This fungus is favoured by a soil pH of 5-5.5. As the growing media became more alkaline, growth of the fungus dropped by over 50 per cent. In a recent paper, Heckman (2003) and colleagues in the US found the use of ammonium sulphate, an acid inducing fertiliser, to greatly reduce the severity of summer patch. In an earlier study, ammonium sulphate reduced severity of summer patch by 75 per cent compared with the same rate of calcium nitrate (Thompson et al. 1993).

Since the new pathogen is a *Magnaporthe* species, it is possible they may respond to fungicidal treatments used in the US for the control of summer patch (which has not yet been recorded in Australia). Any process which encourages root growth, such as raising mowing heights, verti-draining and judicious fertilisation is recommended. Any abrasive practice such as grooming or dusting should be avoided.

It is also recommended from this study that liming should be undertaken to combat this disease. At a pH of 6.5 and upwards, this pathogen grew

quite poorly, and it seems this shift in pH will inspire microbial antagonism on this debilitating fungus.

SUMMARY

From this research, both diseases are favoured by high temperatures and wet soils, and have unique requirements for pH. Chemical control for ERI fungi is difficult at the best of times, as the diseased parts exist largely below ground.

It is uncertain as to what mechanisms are triggered to influence disease severity when the soil pH is altered, whether this is a shift in microbial antagonism or greater amounts of Mn becoming more available. Until chemical trials are undertaken, any practice to benefit the health of the turf should be considered, such as raising mower heights and the judicious use of fertilisers.

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Located on the southern doorstep of the Darling Downs, Warwick Golf Club is home to local born and bred course superintendent Craig Cox. Here the AGCSA member provides an insight into some of the unique course and turf management aspects of this south east Queensland club.

Above: Warwick Golf Club is a parkland style course on the outskirts of the Warwick township. The club is in the process of converting its old Seaside bentgrass greens to 328 couchgrass

Warwick Golf Club course superintendent Craig Cox

Superintendent: Craig Cox.

Nickname: Coxy.

Age: 36.

Period as a superintendent: Four years.

Association involvement: AGCSA (four years).

Turf management career: Ten years at Warwick Golf Club including my apprenticeship and four years as assistant superintendent under Charlie Giffard. Returned to Warwick after a four-year absence to current position as course superintendent.

Qualifications: Certificate III in Horticulture.



Tell us a bit about your background in turf management and how you came to be course superintendent at Warwick Golf Club? I was born and bred in Warwick and started out in turf management as a groundsman at a small state school in the local area. I enjoyed the outdoors work and this led me to responding to an advertisement in the local paper for the position of groundsman at Warwick Golf Club. In the following years I was given the chance to complete an apprenticeship and eventually rose to assistant superintendent under Charlie Giffard. I then had a break away from the turf industry pursuing other interests. After four years I returned to the club as superintendent and the rest, as they say, is history.

Give us an overview of Warwick Golf Club and some of its unique characteristics? Warwick Golf Club has a particularly strong junior membership with some really talented young players coming up through the ranks. The general membership numbers remain steady as the town of Warwick slowly grows. Some unique characteristics include the club being used as a convalescence camp during WWII and the fact that a donated cup from Golf-in-Australia Magazine, dating back to 1924, is still contested between Warwick, Toowoomba and Stanthorpe. Known as the Coe Cup, it is believed to be the longest-running inter-city competition in Queensland.

What are some of the unique features about Warwick Golf Club from a turf management perspective? Is it an easy/hard facility to manage? Like every club, Warwick has its unique issues

regarding maintenance. The most challenging aspect is the two different species of turfgrass at the moment. We are in the process of changing the old Seaside bentgrass greens to 328 couchgrass. I guess it is a relatively easy course to maintain given our small number of rounds per year, but by the same token a tight budget can make general maintenance a challenge.

Take us through your turf management operations there and how you have fine-tuned them during your time as superintendent? Since taking on the position I guess I have structured the general maintenance of the course in a way that allows us to get the best result. We have created a family environment for staff so that the course runs like a well-oiled machine. It is an absolute pleasure to turn up to work and this makes a big difference.

Any special environmental considerations that you have to incorporate into the management of the course? The main environmental consideration for me at Warwick would have to be the introduction of Class A effluent water. This has meant more monitoring of soil conditions and modifying the irrigation programmes so the turf is watered during less populated times. The careful management of water storage is important given the dry spells in the past.

What are some of the major challenges facing Warwick Golf Club both from a turf management and general club management perspective? The biggest challenge facing Warwick Golf Club and most regional clubs is the small membership numbers. Being a small town, membership fees have to be kept at a minimum which means there is limited money to go around the whole club. Our club in particular hosts several fundraising golf days to raise money for the replacement of machinery and the upkeep of our aging clubhouse.

Outline any major course improvement works completed recently and highlight any ongoing or future works that the club is undertaking. The major project on the go has been the conversion of our aging bentgrass greens to 328 couch grass. The club's decision to convert the greens from the old strain of Seaside bent was primarily due to a lack of reliable water source at the time and the ability of the 328 to handle the our very hot, dry summers a lot better.

Having all greens converted to 328 will make it a lot easier from a management point of view and will provide members with a more consistent putting surface. As part of the conversion we have upgraded all the ring mains around the greens for better water volume to the sprinklers and taken the opportunity to contour the surrounds and upgrade the bunkers. At this stage there are seven greens left to convert but due to the cost, both in terms of



At the heart of the course maintenance team at Warwick is 2IC/turf tech Pat O'Dea and volunteers Effie Austen (left) and Jill Barnes. Together Effie and Jill work up to 60 hours a week during the peak growing season

money and manpower, these will be undertaken when the budget allows.

Water has obviously been a critical issue around the country in recent times. How is Warwick Golf Club faring in the water management stakes?

With the introduction of Class A water to the course, we are a long way in front of where we were previously. Because of the large storage dams on course, it puts us in better stead for the drier times. With the ever-changing seasons the effluent water availability still remains consistent.

The one product I couldn't manage my course without is... Good wetting agents. The remaining bentgrass greens suffer a lot from dry patch and the dry heat we experience out here can mean the loss of a playing surface within hours.

Since late 2008 Warwick Golf Club has been able to access Class A effluent water from the local treatment plant



What are some pros and cons of being a regional superintendent? Being out of the way of the bigger cities we have a better environment, cleaner air and a good lifestyle. The down side of regional living are that freight costs are a big consideration when ordering stock. Being regional makes it more difficult to attend field days, meetings and seminars.

Are expectations of course presentation and conditioning any less than that placed on your metropolitan counterparts? In my opinion, the demand does not change from city to the country for presentation and condition. The members expect the course to be at its best year round. Having members travelling to more affluent courses means their expectations of our course remain high which we strive to meet the best we can.

Do you have to be more resourceful as a regional-based superintendent? Having a good turf machinery technician maintaining our aging fleet is vital to smooth operations here at Warwick. Many things around the course are either modified

or used in different ways. For example, a carefully operated zero turn mower becomes a debris blower to remove leaf litter from the greens and surrounds after strong winds.

If you could change one thing about your job as a regional superintendent what would it be and why? An increase in budget – with more money, we could do wonders!

How important are the relationships you have with other nearby country course supers/trade reps? It's always good to hear from the local boys in the country. We share information when the need arises or you need reassuring or a different view. Charlie Giffard, my old mentor and good mate, has been a great help in sourcing information when I have needed some answers.

Given your distance from the major metro areas, how do you keep abreast of the latest turf management techniques and methods. The Australian Turfgrass Management Journal has been

AT A GLANCE - WARWICK GOLF CLUB

Where in the world is Warwick? Located on the Condamine River, Warwick is a township of 13,000 about 130km south west of Brisbane on the Darling Downs. It is famous for the Warwick Rodeo.

Course specs: 18 holes, par 69, 5601m (men) and 5186m (women). About 30 hectares is manicured turf, with another eight hectares of bushland and storage dams.

Greens: A mix of 11 328 couchgrass and seven bentgrass (Seaside) greens. It is tough having two different species when it comes to choosing a mowing height. For most of the year, the greens are mowed at 3.5mm and are reduced to 3.2mm in the warmer seasons. Immediate surrounds are maintained at 8mm.

Fairways/Tees/Rough: Native couch fairways are cut at 12mm surrounded by a 50mm intermediate rough and 75mm rough to the treeline. Tees are set at 14mm.

Members: Currently at 350 and growing.

Annual rounds: 3500 social rounds and 9500 competition rounds.

Major tournaments: No major tournaments as such but many fundraisers, social events and corporate days.

Annual course management budget: Approx. \$170,000 per year including power for pumps, purchase of Class A effluent water (metered) and staff wages.

Staff structure: Two full time staff – Craig Cox (superintendent) and Pat O'Dea (turf machinery technician, 2IC) and one part-time groundsman Angus Cargill. Two seriously devoted volunteers – Effie Austen (84 years young and 'the boss') and our precision pilot of the fairway mower and Jill Barnes who combined give us up to 60 hours a week in the peak growing season. We also have an army of volunteer club members.

Climate: Typical border highlands weather patterns. Cold winters with heavy frosts down to as low as -8°C and climbing up to 40°C in hot, dry summers.

Soil types: With the course being situated on a hill, we have to contend with a very shallow growing medium due to the presence of rock shelves and sandstone bedrock. This also hampers us with irrigation work. Generally, we have a lighter sandy soil throughout the course.

Water sources: Six storage dams fed by the Condamine River with an allocation of 60 megalitres storage and 40M direct irrigation licence per year. Also a metered supply of Class A recycled water from the Southern Downs Regional Council sewage treatment plant which came online in late 2008. The effluent water is split 50/50 before the main pump. This allows us to dilute it with other stored dam water before use on the whole course. A series of one way valves ensures there is no cross contamination from the stored effluent water dam and the other storage dams.

Irrigation system: Main irrigation system is a Rain Bird control panel with a recently updated Toro syringe cycle control with three stages of pumping capacity via three separate delivery pumps. Rain Bird 8002 sprinklers service the 328 greens with the older bentgrass greens serviced by Hunter I21 sprinklers. Fairway irrigation is via an I41 twin row system.

Renovations: Renovations are carried out twice a year. Greens are generally heavily scarified and cored in summer and lightly scarified and solid tined for the winter months. Mostly, the harder greens are mini tined as needed throughout the year to aid with drainage and dry spots.

Major disease pressures: The most predominant disease we face in the 328 greens is spring dead spot. The method we use to control this is frequent scarifying to remove excess thatch and a monthly fungicide programme. The remaining bentgrass greens are generally under pressure from dollar spot and winter fusarium.





an excellent source of information regarding new management techniques. Industry reps and other supers in the region are also a great help.

What are some of the more unusual requests/things you have had to do as a superintendent of a regional course? I once had to rescue a litter of kittens from the ceiling of the old pro shop.

What have you got in your shed?

- Toro Reelmaster 4500D fairway mower;
- Toro 325D and 228D out front mowers;
- John Deere 2653A surrounds mower;
- John Deere 220 walk-behind greens mower;
- John Deere 1200A bunker rake;
- Kubota 331 zero turn mower (the latest edition to the fleet);
- Toro 3250D greens mower;
- Toro 3000D back-up greens mower;
- Ford 5000 loader, Ford 4600 tractor and Case 235 tractor with Hardi boom spray;
- Toro 2500 topdresser;
- 7316 Vertidrain and Turfmach CD 36 scarifier;
- Old faithful Honda trike and two old utes to get around the course.

Which piece of machinery gets trashed the most and if you had a wishlist what would be the next major ticket item you would get? Fortunately, our aging fleet of mowers is very well maintained and operated in a manner which avoids major damage. As for the wishlist, there are numerous machines that could do with replacement. Number one on the list would be a new greens mower as the existing one has accumulated plenty of hours.

Do you have any interesting pieces of machinery which have been manufactured out of necessity or any old pieces of equipment that you keep running? The old Ford 5000 loader is in itself an interesting piece of machinery. From the large scraper wheels on the rear to the many patches in the bucket at the front, she is a wild ride for anyone to operate.

Do you think regional/country superintendents have a better work-life balance than their metro counterparts? I think the city course supers have a lot more stress in their accountability for a larger outfit. I also have the ability to be out on the course more frequently rather than stuck in an office behind a computer.

Favourite spot on your course? Next to the dam on the 13th hole at sunrise.

Most pleasing/rewarding moment during your time as Warwick Golf Club superintendent? My most rewarding moment was when the Warwick Golf Club put an article in the local paper welcoming me back to the course as superintendent.

Name three golf courses that you would most like to visit? The first and most obvious one would be the Old Course, St Andrews to see where it all started, Royal Melbourne for its interesting layout and Augusta National for the prestige. 🌳

Warwick's native couch fairways are maintained at 12mm

Having a good turf technician maintaining the club's aging machinery fleet is vital to smooth operations at Warwick

OFF THE COURSE - CRAIG COX

Family: Wife of 13 years, Zoe. Two children, William (9) and Emily (6).

Any claims to fame outside of turf management: Famous for slowing my mates down on the race track when they are trying to get around me when we get a day on our bikes.

Any hobbies/past-times away from turf? Tinkering with my many motorbikes.

Favourite sporting team? Queensland State of Origin side. (Six years and counting!)

What book are you reading now? Mick Doohan – Thunder from Down Under (again).

Golf handicap? My ability...

Favourite golfer? V.J. Singh (the gentle giant).

The best thing about Warwick (aside from the golf club) is... its location. It's only two hours to Brisbane, 2.5 hours to the Gold Coast and it's out of the way of the hustle and bustle of big city living.

What do you do to get away from it all? Waterskiing on the local dam and throwing a leg over my dirt bike and trail riding with mates. Also camping and four wheel driving with family and friends.





GOLF COURSE BIODIVERSITY AND CARBON BENEFIT STUDY TO GET UNDERWAY



This project aims to provide the golf course industry with a detailed and predictive understanding of the biodiversity value their urban green spaces provide

The AGCSA, in conjunction with the University of Melbourne, is about to embark on a joint research project with the objective of improving the understanding of biodiversity conservation and carbon sequestration provided by urban green spaces, in particular golf courses.

Jointly funded by the Australian Research Centre for Urban Ecology (ARC) and the AGCSA, the two-year project due to get underway this spring, has four specific aims:

- To quantify the carbon stored and sequestered in the vegetation biomass and soils of urban golf courses according to management intensity, age and bioregion;
- To quantify the biodiversity benefit of urban golf courses in comparison to the adjacent residential urban areas according to age, bioregion and surrounding urban intensity;
- To combine indirect carbon costs of golf course management with direct carbon benefits to produce an overall 'carbon footprint' using life cycle assessment (LCA); and
- To develop, or apply, spatially-explicit models to predict the carbon and biodiversity benefit of

As part of the biodiversity study, researchers will map those golf courses involved in the project and record flora species present

urban golf courses, parks and gardens, and to validate their predictive capacity.

Nine golf courses throughout the greater Melbourne area have been selected to take part in the study ranging from newly established courses through to golf courses that have been on their existing site for more than 50 years. The study will focus on the following;

- **Bird biodiversity:** Researchers will visit each golf course 4-6 times a year to record birds observed based on sightings and song.
- **Mammal biodiversity:** For bats and frogs this will be based on the installation of recording devices for night-time activity (these will be placed in out of play areas). For larger mammals, researchers will visit the golf course at night on 4-6 occasions through the year to use spotlights.
- **Vegetation surveys:** Researchers will visit each golf course and walk the course with a GPS system to map and record species present.
- **Soil sampling:** The research team will collect soil samples from throughout the golf course. About 60 soil samples will be collected from wooded areas, roughs, fairways and greens.

"The Australian golfing industry recognises the significant threat that continued urbanisation holds for biodiversity," says AGCSATech environmental agronomist John Geary. "Golf courses provide an ideal research framework to investigate urban green space management providing an accessible and well documented network of urban green spaces across an age range and urban landscape."

This project aims to provide the golf course industry with a detailed and predictive understanding of the biodiversity value their urban green spaces provide. It will also provide the world's first comprehensive assessment of the net carbon costs and benefits from the management of golf course vegetation and soils through a detailed life cycle assessment in consultation with the industry. 🌱



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TM



Above: John Deere has launched its newly updated 2020A and 2030A ProGator heavy duty utility vehicles, featuring increased payload capacities and Ezy-Lift system

Above right: John Deere's updated 1600 Series II Turbo wide-area mower has an 11-foot cutting width for large commercial mowing jobs and can mow up to 27.5 hectares in a day



JOHN DEERE REVEALS 2011 PRODUCT YEAR MODEL UPDATES

John Deere has announced model year improvements on a number of golf course products, including the greens mower, trim and surrounds mower and bunker rake product lines. According to John Deere many of the updates have come directly from the customer feedback and are designed to meet the needs of superintendents and their crews. Among the updates are:

- The 2500E E-Cut Hybrid riding greens mowers have a new alternator that powers the electric drive cutting units. In comparison with previous models, the alternator has increased to 100 amps, improving overall efficiency. The new alternator increases the amperage available for the reel circuit while maintaining fuel efficiency. Overall noise levels have also decreased with improved radiator fan cooling-to-speed ratios;
- The 7400 TerrainCut and the 7200 PrecisionCut trim and surrounds mowers now have new smooth or ultra trac tyre options. Already standard on the 8000 E-Cut fairway mower, these tyres help to minimise marking in newly seeded areas or areas with heights of cut below 13mm;
- Both the 1200A and 1200 Hydro bunker rakes feature updated fuel systems that meet new emission requirements for 2011. The 1200A also features a new engine that increases displacement from 286cc to 351cc, and provides 7kW (9.5hp).

John Deere has also launched its newly updated 2020A and 2030A ProGator heavy duty utility vehicles, featuring increased payload capacities and Ezy-Lift system. The 2011 ProGator

now handles up to 1568kg with standard factory suspension and tyres, and up to 1905kg with optional heavy-duty front and rear suspension, four-post ROPS and wide rear tyre kit.

To assist with the extra payload, John Deere now offers the Ezy-Lift system, which helps load and unload items into and from the cargo box. This John Deere-exclusive new attachment is designed to handle items weighing up to 385.5kg.

For landscape professionals or local government agencies, John Deere has also made enhancements to the 1600 Series II Turbo wide-area mower. The new 1600 has an 11-foot cutting width for large commercial mowing jobs and can mow up to 27.5 hectares in an eight-hour day.

The 2011 model is equipped with an overhead-valve, 4-cylinder, liquid-cooled 42.5 kW (57-hp) Yanmar diesel engine and an on-demand or full-time mechanical rear wheel drive. Other key updates include standard run flat tyres on the front and wing mower decks and a standard air ride, fully adjustable seat. New folding ROPS design and a new engine monitoring and diagnostic console in the operator station adds to ease of operation.

John Deere has also made new hydraulic updates to the 1600, including a new mow valve and a new wing deck hydraulic motor, allowing the mower to run at less pressure and cooler temperatures. A new B20 Biodiesel kit is also available.

For more information on these model updates visit www.JohnDeere.com.au or freecall 1800 800 981 (Australia) or 0800 303 100 (New Zealand) to contact your local John Deere dealer.



SYNGENTA PUTS UP A NEW BARRICADE AGAINST WEEDS

Syngenta's new pre-emergent herbicide for the control of *Poa annua*, crab grass, summer grass and crow'sfoot, Barricade, has been released. The low odour, non-staining liquid formulation contains the

active ingredient prodiamine and although available in the US for a number of years has recently achieved registration in Australia.

Barricade provides weed control for up to six months, with a flexible window of application. The application window is further enhanced by flexibility

around the need to water in Barricade. It can be delayed for up to seven days after application as proflumicarb has low volatility and high UV stability.

Due to its low toxicity, Barricade has been exempted from scheduling and it can be applied to all turf species including couch (blue, common, hybrid), kikuyu, buffalo, zoysia, etc. It can also be tank mixed with Syngenta's selective post-emergent herbicide Monument Liquid.

Barricade forms a band within the top 10-20mm of the soil profile and, combined with low leaching potential, provides a long-lasting herbicidal barrier within the soil. The low leaching potential is brought about by a combination of an extremely high Koc (an indication of the binding potential to soil) and very low solubility (0.013ppm), meaning that it will not move off target after application and incorporation, with either irrigation or rain.

For more information on Barricade, visit www.greencast.com.au

GLOBE GOES ON TOUR OF DISCOVERY

Nearly 650 superintendents, turf managers and their crews attended Globe Australia's 2011 Turf Discovery Tour which was held across eight venues during early August. The series began on the Sunshine Coast before stopping off in Brisbane, the Gold Coast, Sydney, Newcastle, Canberra, Melbourne and Adelaide. Melbourne's gathering at Etihad Stadium attracted the largest turnout of more than 130.

The series included presentations from Dr Henk Smith (Syngenta), Paul Jackson (Barmac), Jyri Kaapro (Bayer Environmental Science), Mick Ahearn (Advanced Seeds), Peter Frewin (Globe) and Mica McMillan (Aquatrols, USA).

JACOBSEN RELEASES GP400 TRIPLEX



Jacobsen's new GP400 ride-on triplex greens mower replaces the popular G-Plex III

Jacobsen has unveiled its GP400 ride-on triplex greens mower which replaces the G-Plex III. The new mower retains many of the features of its predecessor including a swing-out centre reel for easy maintenance and adjustment and cutting units with 7, 9 or 11-blade reels.

The GP400 has a choice of engines with either a Briggs and Stratton V-twin, air-cooled gas engine, developing 17.7 hp (13.2kW) at 3400rpm or Kubota 3-cylinder diesel engine developing 17.7 hp (13.2kW) at a slightly lower 3200rpm.

APPOINTMENTS AND ANNOUNCEMENTS

WRIGHT JOINS PJC



Former Cabramatta Golf Club superintendent and president of the NSWGCSA **Craig Wright** has joined the team at PJC Sportsturf based in Sydney's south west. Wright, who stepped off the NSWGCSA board in February after six years on the committee, including the past two years as president, can be contacted on 0409 074 799 or craig@pjcsportsturf.com.au

NEW TERRITORY FOR THOMAS



PGG Wrightson Turf has appointed **Guy Thomas** as its new turf seed territory manager for NSW and ACT. Thomas, who for the past six years has been with

Maxwell & Kemp, will support PGG's distributors along with national turf seed manager Andrew Brooker and QLD/NT territory manager Mark Stidwill. Thomas can be contacted on 0409 846 505 or gthomas@pggwrightsonturf.com.au

REIN'S NEW REIGN



Robert Rein has been appointed as Toro Australia's new national sales manager - equipment. Rein, who has more than 14 years' experience with Toro, will take on responsibility for the entire range of consumer mowing, commercial, professional and construction equipment. Rein can be contacted on 0408 808 567 or robert.rein@toro.com

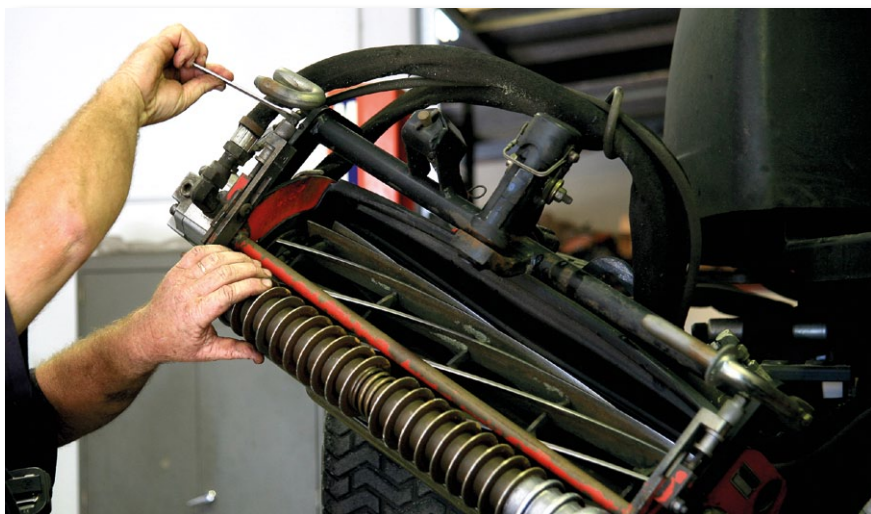
Jacobsen engineers have introduced numerous improvements to the GP400. A new tank design incorporates the fuel and hydraulic reservoirs in a single moulded unit providing better weight distribution and improved stability. As the fuel tank empties it has less effect on the machine's centre of gravity and a sump in the bottom alleviates fuel starvation on slopes. The tank is hinged and can be lifted to provide improved access to the engine compartment with a 70 per cent wider opening than on the G-Plex III.

The control layout and dash has been redesigned to improve ergonomics with more space for electrical components and therefore easier maintenance. The standard Jacobsen joystick control, featuring one-touch lift and lower, sits within the unit, with a factory-fitted optional paddle, mounted on the steering column, available for customers who prefer this form of lift/lower. The battery cover now allows access to the battery without lifting the seat, is double skinned for added strength and incorporates a small storage tray.

An all-new ROPS frame is fitted to a strengthened chassis that reduces vibration. Operator access and visibility have also been improved with the addition of a step behind the front wheel and the angle of the curved steering arm has been adjusted to improve the view of the right-hand cutting unit. The steering arm clamp, which enables the arm to be positioned for operator comfort, has been moved for easier adjustment.

From a maintenance perspective, a new valve block design has reduced the number of individual valves, which makes for easier servicing while reducing the potential for leaks. Better access to the improved engine bay also aids equipment technicians and backlapping is now standard.

For more information on the new Jacobsen GP400 and to find your local Australian distributor, visit www.jacobsen.com



Certificate targets turf tech training

Royal Melbourne Golf
Club turf technician Luke
Spartalis reports on a
new training initiative
recently introduced by the
International Golf Course
Equipment Managers
Association which offers
specific turf industry
training for up and coming
technicians.

The IGCEMA's recently released Certificate programme is designed to identify the baseline knowledge needed to work on and service equipment used specifically for the management of fine turf surfaces

"The only thing worse than training employees and having them quit, is not training employees and having them stay." Sure, when American railway magnate William H. Vanderbilt coined this phrase back in the mid-1800s he was most likely referring to the railway industry, but this quote can be applied to any business or occupation and the golf course equipment industry is no exception.

Because our profession is a bit of a mixed bag if you like, there is no single trade course which covers all aspects of the job. One day we may be servicing a brush cutter or an excavator, the next we may be fabricating or modifying some 'unique' implement for a specific task, and with technicians coming from various trade backgrounds, skill levels differ with some competencies needing development.

While it's probably not reasonable to expect your average technician to hold several trade qualifications, it's probably not necessary either. However, certain aspects of quite a few are necessary for tasks to be carried out safely and efficiently. Obviously the amount and type of training will depend on a few key criteria including;

- The base skills of the technician;
- The expectations of the employer; and
- Availability of training resources.

The first two points are relatively simple to quantify, however, the third point is less so. Training specific to the golf course equipment industry is limited to say the least with the exception being occasional part-day training courses provided by

some equipment manufacturers every now and again at association meetings or national conferences. These are always well received and attendance is high, however, because of time constraints some topics are only lightly touched upon.

Current turf equipment apprentices in Australia undertake a Certificate in Outdoor Power Equipment and through this competency based training package receive a range of information. The course, however, doesn't cover specific aspects of the turf trade in enough detail and is more designed with apprentices from the retail mower sector in mind, with turf apprentices left to glean information from other sources. Of course this doesn't help the already qualified technician looking at building their skills set.

Obviously the equipment manufacturers have a lot of the information we require, but access is limited. While end user factory training is available to our Northern Hemisphere counterparts, it is not yet available to us locally.

YARDSTICK

To address this skills gap, in June of this year the International Golf Course Equipment Managers Association (IGCEMA) released its 'Certificate' programme which it hopes will become the yardstick for equipment technicians training the world over.

The notion of a certificate or certification programme has been in the pipeline for some time and was first touted back when the IGCEMA was in its infancy. In April 2007 an IGCEMA committee was established to investigate a certification programme with various educators and equipment manufacturers being contacted to gather feedback. The response then was favourable and all agreed that there was a definite need for such a programme.

The first IGCEMA board of directors moved forward with the idea later in 2007 and polled the membership to gauge their response. Overwhelmingly, more than 90 per cent of respondents indicated a desire for the association to forge ahead with a certification programme.

The IGCEMA contacted representatives from GCSAA, Toro, John Deere, Jacobsen as well as US-based bodies the Turf Equipment Technicians Association (TETA) and the Equipment & Engine Training Council (EETC) during the 2008 Golf Industry Show to discuss the need for a specific programme.

The outcome of that meeting was mixed with the EETC agreeing to develop an industry-specific programme to be reviewed by the IGCEMA. However, the IGCEMA board and committee reviewed the proposal and subsequently rejected it. IGCEMA representatives then attended the EETC conference in 2008 to discuss the issues and, after reviewing the proposal with members of the EETC committee, the effort was finally abandoned.

In July 2008, the IGCEMA enlisted the aid of a certification consultant to assist the association

with development of the programme and to inform the IGCEMA executive about the options available for credentialing. After lengthy debate, the board eventually decided on a certificate programme as opposed to certification as this was seen as being more beneficial to the industry in the short term. (The IGCEMA is looking at a certification programme in the future. The Certificate programme is designed to identify the baseline knowledge needed to work on and service turf related equipment.)

Since being unveiled the Certificate programme has been well received not only by turf technicians who are members of IGCEMA but equally as important has gained the support and backing from various industry groups and equipment manufacturers. It has been officially endorsed by the likes of the GCSAA, BIGGA and FEGGA as well as major manufacturers Toro, Jacobsen and Bernhard & Co.

The IGCEMA is also in the process of developing a proctors network. Proctors (or supervisors who oversee the testing) have been registered in six countries already, including Australia where Toro (Simon Jones and Garry Price) and Jacobsen (Ray Grech) have signed on.

Said IGCEMA's chief executive Stephen Tucker following the announcement that BIGGA had signed on in support of the programme: "It gives us great pride to know that golf greenkeepers around the world are signing on in support of our programme. A lot of effort went into making this available to everyone. As an international association we have a responsibility to our members to make our programs available to everyone. While sometimes this presents a challenge, it's one that has to be met."

CORE COMPETENCIES

So what does the Certificate programme entail? Basically, there are six core competency modules

that must be passed in order to receive the IGCEMA Certificate. These are:

- Hydraulic troubleshooting;
- Electrical troubleshooting;
- Internal combustion engines;
- Drivelines;
- Sprayer troubleshooting (in development, expected Jan 2012); and
- Cutting units (in development, expected Feb 2012)

The IGCEMA has produced a series of study guides for each module which are available for purchase at minimal cost through the IGCEMA. Testing is carried out online via the IGCEMA's specially developed test site. Each test comprises 60 questions and the turf technician has 90 minutes to complete each exam. A score of 80 per cent or better is required in order to pass the exam. The exams cost \$US50 each to take, but should a student fail first up they are given one extra opportunity to take the exam free of charge.

If you are interested in finding out more about the IGCEMA's Certificate programme, visit www.igcema.org and click on the 'Certificate Program' menu. Alternatively you can contact Rick Raison, turf technician at Lake Karrinyup Country Club in Perth, WA, who is the current IGCEMA vice-president at rick.raison@igcema.org or call Luke Spartalis (Royal Melbourne Golf Club, VIC) on 0418 444 883 for more information. 📞



Luke Spartalis, turf technician at Royal Melbourne Golf Club, heads up the IGCEMA's Certificate programme

The IGCEMA Certificate comprises six core competency modules, from hydraulic and electrical troubleshooting to drivelines, internal combustion engines and cutting units



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Golf Architecture: A Worldwide Perspective – Volume 5

By Paul Daley

Full Swing Golf Publishing, 2009

The fifth instalment of Paul Daley's 'Golf Architecture: A Worldwide Perspective' follows very closely the successful formula which has made the previous volumes in this series such a hit with golf course architecture aficionados.

Since the first offering back in 2002, each volume has blended fascinating essays and stunning photography to provide an insight into the architectural elements and history of some of the world's great golf courses. The latest volume, which opens with a foreword from respected Australian golf course architect Neil Crafter, continues that trend and among those featured are Machrihanish Dunes, Turnberry and Mike Kaiser's new creation The Dunes Club in Michigan.

One of the great aspects of the series, however, has been the inclusion of smaller, less-recognised golf course layouts around the world and the often intriguing history behind their design, construction and development. In this volume several gems are brought to the reader's attention, including a couple of Australian country courses – Yarram Golf Club, located in the Gippsland region of Victoria, which is completely run and maintained by volunteers, and the links landscape of Port Fairy Golf Club, pictured right, in south west Victoria.

Other Australian courses to feature in this volume include Royal Queensland (the essay looks at the recent redesign under the auspices of Mike Clayton), as well as picture essays of Peterborough Golf Club (another links course on the Victorian south west coast) and the beautiful new par three course at Barwon Heads Golf Club.

As well as devoting plenty of space to home grown tracks, the book travels well outside the

traditional golf heartlands of America and the UK, taking in far flung places such as Uruguay, which is home to Alister MacKenzie's little known Club de Golf del Uruguay, Poland (Sand Valley G&CC), The Netherlands (Royal Hague G&CC and the unique heather-clad De Ullerberg), China (Weihai Point Golf & Resort) and Iceland (Geysir GC).

The book includes an essay from US-based golf course superintendent Scott Stambaugh on the work to restore the A.V. Macan-designed Overlake Golf & Country Club, while the essay on Turnberry outlines the changes and preparations in the lead up to the 2009 Open Championship and the role played by then long-serving course superintendent George Brown and his greenkeeping team.

This volume also includes contributions from Michael Hurdzan, who details his involvement in the remodeling of the Scioto Country Club where Jack Nicklaus grew up playing the game, a look into the work of Donald Ross, while architect Tim Liddy writes passionately on how vital the lessons of links golf and links golf architecture and course maintenance are to the future sustainability of the industry.

Golf Architecture: A Worldwide Perspective can be purchased through Full Swing Golf Publishing
www.fullswinggolf.com.au/



CURRENTLY AVAILABLE THROUGH THE AGCSA BOOKSHOP....



Best Golf Course Management Practices (3rd Ed)

By L.B. McCarty, Prentice Hall (2011)

More than 20 leading US turf experts have teamed together to produce the third edition of Best Golf Course Management Practices. This comprehensive 27-chapter, 770-page publication covers all major grasses used on golf courses; ways to build golf courses and greens; latest information on fertilisers; soil amendments and pesticides; how to manage grass with poor quality water; pest identification; environmental issues; and budgeting, management and personnel issues.

AGCSA members: \$179

Non-members: \$215



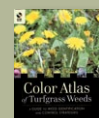
Tournament Management: A Guide to Preparing a Golf Course for Competition

By John Miller, Wiley (2009)

Written for all superintendents and greenkeepers, this 200-page hardcover book addresses the needs and challenges faced in planning and managing golf tournaments. The book looks at evaluating staffing needs, implementing effective agronomic programmes, preparing playing surfaces, and dealing with issues before, during and after tournaments. Includes breakout tips and hints, handy 12-page pre-tournament checklist and comprehensive set of course conditioning guidelines.

AGCSA members: \$105

Non-members: \$120



Color Atlas of Turfgrass Weeds (2nd Ed)

By McCarty, Everest, Hall, Murphy, Yelverton, Wiley (2008)

The second edition of this popular weed identification and management manual stretches to more than 420 pages (150 pages more than the first edition) and includes 50 new weed profiles plus 400 additional, high-quality, full-colour photographs of weeds in habitat, seedhead or flower, and in some cases what the weed looks like when dormant. Includes a CD-ROM which features an image bank of more than 1000 photographs, control strategies and control recommendations.

AGCSA members: \$170

Non-members: \$205

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Bussleton Golf Club superintendent Callum Hitchings is one of two new faces on the GCSAWA committee

Well here goes, my very first report as president of the Golf Course Superintendents Association of Western Australia. First, I would like to thank retiring committee members **Darren Wilson** (Wembley Golf Complex) and **Craig New** (Lakelands Golf Club) for over 25 years combined service to our association.

Darren was always there to go to meetings on our behalf, from the Fertiliser Action Group to the Water Wise Committee which he still sits on with Trevor Strachan (Lake Karrinyup). He has also been instrumental in putting together a draft GCSAWA history document and now, looking for a new challenge, has been elected to the board of the AGCSA.

Craig was on our committee for nearly 15 years during which time he was president and more recently treasurer. He has left us in a very healthy state and he might even get himself invited to our Christmas drinks! Also leaving the committee this year was **Brad Anderson** (Sun City). Brad has a lot of work on his hands in the coming year and his extremely busy life outside work commands a lot of time, so thank you to Brad as well.

I would like to welcome new committee members **Callum Hitchings** (Bussleton Golf Club) and **Neil Graham** (Pinjarra Golf Club) who have stepped in to fill the breach, while the ever-young **Glenn Cross** (Mt Lawley Golf Club) moves into the role of vice-president. **Simon Bourne** (Cottesloe Golf Club) has moved into the very stressful role of treasurer and after lengthening the happy hour at the recent Margaret River Conference it will seemingly take him little time to eliminate the healthy balance Newie left us.

Paul Needham (Secret Harbour) has moved into the secretary role and with the amount of time his boss **Allan Devlin** is spending travelling the world, Paul will have all the time he needs to fill this very important position.

Our biennial conference was held in early August at the Margaret River Hotel and proved to be a massive success. **Glenn Cross** and his faithful sidekick **Simon Bourne** did an amazing job organising everything from great accommodation through to entertaining guest speakers.

Monday started with a couple of local speakers **Darren Wilson**, **John Forrest** (Challenger TAFE) and **Angela Murray** (Cancer Council). The introduction of our first interstate guest **David Warwick** from Avondale Golf Club provided a great insight for some of us into the problems that arise in NSW as well as some resourceful thinking on water storage issues.

The boys from Rain Bird showed us some new initiatives for the future and then another highlight of the conference was the introduction of 'The Dude', **Robin Doodson** from Sanctuary Cove Golf

and Country Club in Queensland. His talk was the highlight for me. After lunch **Phil Moylan** and **Rohan Farrow** did great jobs before **Paul Barber** gave a talk on the health and wellbeing of trees.

Tuesday kicked off with AGCSA president **Allan Devlin** updating us on the activities of the national association, followed by **Adrian Pitsikas**, Toro's WA Apprentice of the Year **Tom Purser** and equipment technician **Rick Raison**, who was the only speaker to get the **Glenn Cross** wind up. After morning tea we were privileged to have encore performances from both David and Robin to cap off a very entertaining morning (Robin just repeated his previous talk, but on this occasion in English!)

The afternoon was set aside for golf at Margaret River Golf Club and host superintendent **Mark Lewis** and his team of many provided us with a course as good as I have ever seen it. With fairways striped up and greens running an easy 11ft (Mark's opinion, although they were more like 12!) it was easy to see why the cream of WA's travelling golfers took out the trophies on offer.

The prestigious Toro Cup was snapped up by **Allan Devlin** with a fine 79 off the stick which included more than a couple of three putts. The hotly contested Neil Adams Shield for the best stableford score somehow went to yours truly with a measly 34 points which included some very ordinary shots. Last but not least was the Alan Barlow Shield for the trade. With a blazing 23 points on the front nine, **Geoff Stephens** stumbled a tad on the back nine (thanks in no small part to some mind games courtesy of Robin Doodson and I), but the well-travelled Toro representative managed to hold his nerve and prevail by a single point.

DES RUSSELL
PRESIDENT, GCSAWA

ON THE MOVE

A quick wrap up of major staff movements around the country...

Mitch Adair: Replaces Shaun O'Leary as superintendent at Bribie Island Golf Club, QLD.

David Gove (pictured): Elevated from assistant superintendent to superintendent at Horsham Golf Club, VIC.

Mat Hose: From assistant superintendent at The National Golf Club (Old Course), VIC to superintendent at RACV Cape Schanck, VIC.

Jeff Kaines: Resigned as superintendent at Royal Adelaide Golf Club, SA.

Bryce Strachan: Left the industry after resigning as superintendent of Pambula-Merimbula Golf Club, NSW.



TGAA VIC

Well, winter has nearly finished and what a wet one it has been. With rainfall levels like we have experienced recently and not seen for many years, let's hope spring rewards us with great conditions for our renovations.

Heading into spring the TGAA VIC committee has been busily organising its upcoming seminar. This will be held at Wesley College, Glen Waverley Campus on 23 November and encompasses the IAL (Irrigation Association), Storm Water Association, TPA and seed industry. It should be a bumper day with trade displays, irrigation audits, couch trial tour (to Mt Scopus) and many quality speakers.

A big thank you to all who attended the recent TGAA/Cricket Victoria Wicket Seminar held at the MCG. It was again a fantastic day attended by over 300 delegates who listened to some exceptional speakers, with guest speaker **Rodney Hogg** finishing the day off with a few laughs. A big thank you also to our sponsors on the day.

While I am thanking people, I would like to acknowledge on behalf of the committee and members, both **Matt Merrick** and **Adrian Black** who have stepped down from the committee. Both

of these guys have been a tremendous help over the past few years and their efforts to help out has been great. In their place we extend a warm welcome to **Rebecca Dynon**, **Tim Elligate** and **Megan Corser** who have come onto the committee for the coming year. The full TGAA VIC committee is:

- **President:** Nathan Tovey (Trinity Grammar)
- **Vice-presidents:** Peter Todd (Glen Eira City Council) and Mike Walker (Mikkat Management)
- **Secretary:** Danny Edmunds (City of Casey)
- **Treasurer:** Garry Woolard (City of Frankston)
- **Activities:** Tim Elligate (ANCO)
- **Marketing:** Megan Corser (Globe Aust.)
- **Membership:** Grant Greenway (ETP)
- **Education:** Rebecca Dynon (RISA)

Please make sure you log onto the website www.tgaa.asn.au and follow the links to each state. You can view calendars of what's on and also check out our accreditation programme. Good luck to all as spring arrives and we head into what should be a great summer.

NATHAN TOVEY
PRESIDENT, TGAA VIC



Inaugural National Sports Turf Graduate of the Year winner Rebecca Dynon is one of three new faces on the TGAA VIC committee

VGCSA

The VGCSA has put in place some great events for the spring season with the main focus our education meeting to be held at Marysville Community Golf and Bowls Club on Monday 26 September. **Trevor Strachan** from Lake Karrinyup Country Club in Perth will be our guest speaker for the day and we will also be able to hear from host superintendent **Rob Christie** about the exciting future development plans for the course.

On Monday 31 October, Peninsula Country Golf Club will play host to the VGCSA Turf Research Golf Day. All proceeds will once again be channelled back into the industry for the benefit of association members. It is a well sponsored event with great prizes available on the day and having played at Peninsula for the superintendent/managers day the course was in magnificent condition.

In July, the second annual assistant superintendent education day was held at Sanctuary Lakes Golf Club and once again was well supported by senior golf course staff. Thank you to all those superintendents for allowing their staff to attend on the day. Theme for the day was 'Taking the next step' and speakers on the day included **Peter Parks** (general manager) and **Mark Prosser** from Commonwealth Golf Club, **Danny Hack** (recently appointed superintendent at Bairnsdale Golf Club) and **Brett Hawkey** (Sanctuary Lakes Golf Club). **Ted Boltong** (Active Safety) sponsored the day and also gave a short presentation.

These gentlemen gave up their own time away from work to attend and educate attendees on some of the aspects of becoming a golf course superintendent. Peter and Mark also elaborated on the working relationship that needs to exist between a superintendent and the general manager. The feedback was again extremely positive.

The Percy Beames Bar at the iconic MCG was venue for the second annual Victorian Golf Industry Awards Night held in July. The night was a celebration of achievements for those that not only call golf their profession but also their passion. Additionally, the night saw the inaugural Hall of Fame Awards. Six nominees were inducted including **Peter Thomson**, **Bob Shearer**, **Jack Harris**, **Burtta Cheney**, **Ivo Whitten** and **Doug Bachli**.

VGCSA Recognition Award winners for the last 12 months were also presented with awards on the night. They were **Mick O'Shannessy** (Recognition Award – Superintendent), **David Blythe** (Recognition Award – Trade) and **Dan Oswin** (VGCSA Graduate of the Year). It was a great night, especially when the Hall of Fame inductees told stories of days gone past. There was no game at the MCG that night obviously and as a result the grow lights were out across the ground which lit up the arena spectacularly.

STEVEN HEWITT
PRESIDENT, VGCSA



The Grange Golf Club hosted the SAGCSA AGM in early July

Jeff Kaines resigned recently as course superintendent at Royal Adelaide Golf Club



South Australia has experienced a long, cold winter in most parts with below to barely average rainfall. I think we are all looking forward to spring and some warmer conditions.

In early July The Grange Golf Club hosted the SAGCSA AGM with a small group of 15 taking the opportunity to have a hit on the West Course. The course played an absolute treat and when you consider all the construction work on the East Course it is a credit to superintendent **Richard James** and his staff that the playing surfaces were in such good condition.

Paul Cameron from Willunga Golf Club took out superintendent honours while Globe's **Andrew Manthorpe** collected the sponsors award. I would like to thank all superintendents and sponsors who participated in the golf event. Morning golf is common at all of our meetings and I do encourage others, whether members or sponsors, to make the most of the opportunity at future events.

Around 30 members attended the AGM which saw some new faces elected to the committee and two long-serving members step down. We bid farewell to **Andrew Blacker** (now Port Lincoln Golf Club), a past president, and **Stuart Gillespie** (West Lakes Golf Club, formerly Riverside Golf Club) who have both done an extraordinary job at committee level. They have been replaced by **Chad Dawe** (Mt Lofty Golf Club) and Mt Osmond Golf Club assistant superintendent **Sam Fraser**. The full SAGCSA committee for the coming year is:

- **President:** Sam Sherriff (Mt Barker-Hahndorf GC)
- **Vice-president:** Barry Bryant (Mt Osmond GC)
- **Secretary/Treasurer:** Richard James (The Grange GC)
- **Committee:** Chad Dawe (Mt Lofty GC) and Sam Fraser (Mt Osmond GC)

Once again it was very pleasing to report that the association finished in a strong financial position for the year which included a number of donations to flood appeals and TAFE. To finish the AGM we had guest speaker **Wayne Phillips** who gave us a humorous insight into his cricketer career. Wayne had some interesting stories to tell from both state and international cricket and some of the characters we all grew up with. On a personal note, I would like to thank all members for their support during my first year as SAGCSA president and I am looking forward to my second stint.

The big news in Adelaide recently was the resignation of **Jeff Kaines** as superintendent at Royal Adelaide Golf Club. I believe Jeff is looking to get out of the industry and we all wish him the best in his future endeavours. At the time of writing, Royal Adelaide was in the process of putting together a shortlist of candidates. **Damien Mangelsdorf** has also been appointed course superintendent at Tanunda Pines Golf Club. Damien was formerly a colleague of mine at Mt Barker and will have a long successful future as a course superintendent.

Preparations for the South Australian Golf Industry Awards Night are going well. I hope to see a good representation of superintendents and greenkeeping staff on the night. This is an important night for our industry in this state and many are looking for this to be a success. Finally, our next meeting is scheduled for mid-October at Penfield Golf Club (host superintendent **Kim Tonkin**).

SAM SHERRIFF
PRESIDENT, SAGCSA



Two new members have joined the TGCSA committee following our association's Annual General Meeting held at Kingston Beach Golf Club in early August. **Mal Godfrey** (North West Bay GC) and **Jeff Jackson** (Launceston City Council) have stepped up and replace outgoing committee members **Doug Ollington** and **James Pyke**.

In other movements, Danny Gilligan (Tasmania GC) has stepped back down to a general committee position while **Adrian Box** (Kingston Beach GC) has taken over the joint secretary/treasurer role. The full TGCSA committee for the coming year is:

- **President:** Tony Smith (Launceston GC)
- **Vice-president:** Mark Johnson (Ulverstone GC)

- **Secretary/Treasurer:** Adrian Box (Kingston Beach GC)
- **Committee:** Dan Gilligan (Tasmania GC), Scott Williams (Bicheno GC), Ricky Barr (Longford GC), Mal Godfrey (North West Bay GC) and Jeff Jackson (Launceston City Council)

The AGM was held as part of our annual conference at Kingston Beach which unfortunately had to be scaled back to just one day after excessively wet weather in the lead-up to the event forced the cancellation of the golf and trade show.

TONY SMITH
PRESIDENT, TGCSA



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NSWGCSA



President Craig Molloy (right) presents New Brighton Golf Club superintendent Norm Foord with the NSWGCSA Excellence in Turf Management Award

The NSWGCSA held its AGM at Roseville Golf Club on 22 August. As this was a non-election year all positions stayed the same, although **Dennis Grounds** (Young Golf Club) has joined the current board until next year's elections 2012 due to the vacancy created earlier in the year following the departure of **Craig Wright**. Once again special thanks to Toro for its sponsorship of the AGM.

This year the NSWGCSA Board awarded the prestigious NSWGCSA Excellence in Turf Management Award to **Norm Foord** from New Brighton Golf Club and also recognised a number of superintendents for their many years of service. Among them were **Darren Jones** (St Michaels Golf Club) – 10 years service, **David Thomson** (Bermagui Country Club) – 10 years service, **Mark Clissold** (Mangrove Mountain Memorial Club) – 20 years service and **Tony Webster** (Shoalhaven Ex-Servicemen's Club) – 30 years.

In July 2010 the NSW Government announced changes to the Associations Incorporation Act 2009 to modernise the law, reduce red tape and allow more flexibility for associations. Now known as the Association Incorporation Regulation 2010, it allows associations to hold their AGM within six months of the association's financial year.

In an attempt to increase numbers at both our AGM and the Rube Walkerden Trophy, the NSWGCSA Board has decided to change the timing of both events and combine them into one big event. The AGM and Rube Walkerden Trophy will now be held in November 2012 and this will now allow us to shuffle other events throughout the year.

July this year saw the retirement of two veterans of the NSW superintendent community in **John Simpson** (Camden Valley Golf Club) and **Robert (Beau) Boyd**. John had spent a remarkable 47 years at Camden Valley, including 37 years as superintendent, while Beau retired after 33 years which included four at Leura Golf Club and the past 29 at Blackheath Golf Club. On behalf of all NSWGCSA members, I wish both these stalwarts all the best in their retirement.

The next NSWGCSA event before summer is the Education Day on Monday 24 October at Manly Golf Club (host superintendent **Michael Bradbery**). Format for the day will be an inspection of the recent course reconstruction works followed by an open forum session. See you there.

CRAIG MOLLOY
PRESIDENT, NSWGCSA

GCSAQ



Robin Doodson (Sanctuary Cove Golf & Country Club) and **Brendan Clark** (Cairns Golf Club) are the new faces on the GCSAQ committee following our Annual General Meeting held at Brisbane Golf Club on 25 July. Robin and Brendan replace **Brent Robinson** (who has joined Country Club International) and Murwillumbah's **Brian Cox** who have both stepped down. The full GCSAQ committee for the coming year is:

- **President:** Peter Lonergan (Coolangatta & Tweed Heads GC)
- **Vice-president:** Charlie Giffard (Indooroopilly GC)
- **Treasurer:** David Morrison (Windaroo Lakes GC)
- **Secretary:** Mark Hauff (The Colonial GC)
- **General Committee:** Brendan Clark (Cairns GC), Robin Doodson (Sanctuary Cove G&CC), Paul McLean (RACV Royal Pines Resort) and Ben Tilley (Headlands GC).

The AGM gave delegates a chance to see the restoration works following the devastating floods which saw parts of the course under 10 metres of water in mid-

January. **Ray Lawrence**, who was interim superintendent following **Ben Cavanagh's** departure, gave an impressive presentation on the repair works which the crew has undertaken, and for a young assistant to speak so confidently in front of his peers was an absolute credit to Ray.

At the time of the AGM the club's new pump shed had only just come on line only to have an excavator break a 200mm main line the following day! The pumps have been mounted on a sled and a loading dock has been installed in front of the shed so that the pumps can be removed if flood waters threaten again.

The AGM kicked off with over 40 players taking to the golf course. Gold Coast Burleigh Golf Club superintendent **Darryl Edwards** won the A Grade championship on a countback from **Paul McLean** (RACV Royal Pines Resort). B Grade was taken out by Peregrine Springs superintendent **Warren Green** by a point from **Ray Lawrence**, with **Danny Beresford** from Middle Ridge GC triumphing in C Grade. **Dave Hanby** took out the Trade trophy while **Glenn Beauclerc** (Robina Woods), **Mark Hauff** (The Colonial),



Brendan Clark

Charlie Giffard (Indooroopilly) and **Gary Kunz** (Byron Bay assistant) snared the nearest the pins. **Robert Apanui** (Rural Buying) won the longest drive.

Much discussion took place after the AGM with respect to arresting the ever-dwindling numbers of attendees at association functions and the general apathy among members. A number of ideas were put forward for the new committee to try and implement in the coming year. All in all, it was an excellent day and our thanks and congratulations to Ray, his staff and Brisbane Golf Club.

PETER LONERGAN
PRESIDENT, GCSAQ

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Rob Christie Course Superintendent Marysville Community Golf & Bowls Club

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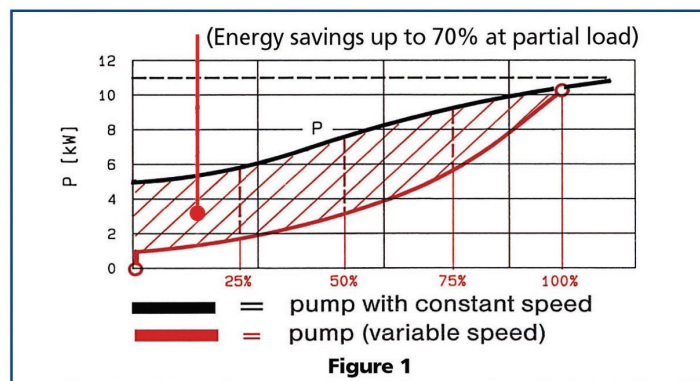
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