

Bentgrass Oversowing The Forgotten Practice



For further information contact your PGG Wrightson Turf Representative or free phone 1800 DURATURF



pggwrightsonturf.com.au info@pggwrightsonturf.com.au **f** facebook.com/pggwrightsonturf I wish to apply for: One year's subscription to Australian Turfgrass Management

(Six editions per year)

PLEASE TICK BOX

ONE COPY PER EDITION

\$55.00

O/S ONE COPY PER EDITION

\$95.00

Prices include GST.







2012

TOCA International Communicators Contest

of 8 awards at the





Royal Melbourne'

ORDERS CAN BE MADE SECURELY ONLINE THROUGH www.agcsa.com.au

Name:		
Company:		
Postal Address:		
Town/Suburb:	State: Postcode:	
I enclose cheque for (a	mount):	
Please charge my cred	iit card: 🔲 MasterCard	
	☐ Visa	
Card Number:	Expiry Date:/_	
Cardholder Name:		
Address:		
	Signature:	
Funds have been	paid by electronic transfer to Westpac BSB 033 380 Acc 385360	
Please send me n	nore information about becoming an AGCSA member	
Forward to:	Australian Turfgrass Management	
	Suite 1, Monash Corporate Centre, 752 Blackburn Road	
	Clayton, VIC 3168 FAX: (03) 9548 8622	

Australian Turfgrass Management Published by:

Australian Golf Course Superintendents' Association ABN 96 053 205 888

Production: Editor:

Brett Robinson Ph:(03) 9548 8600 brett@agcsa.com.au

Art Direction & Design:

Jo Corne Ph: (03) 9548 8600 jo@agcsa.com.au

Advertising:

Peter Frewin Ph:(03) 9548 8600 peter@agcsa.com.au

AGCSA

Suite 1, Monash Corporate Centre 752 Blackburn Road, Clayton, VIC 3168 P: (03) 9548 8600 F: (03) 9548 8622 E: info@agcsa.com.au W: www.agcsa.com.au

AGCSA Board

President: Peter Lonergan Directors: Darren Wilson Tony Fogarty Brett Balloch

General Manager

Peter Frewin peter@agcsa.com.au

Events and Education Manager

Simone Staples simone@agcsa.com.au

Membership and Administration

Lyndel Conway info@agcsa.com.au

Administration

Allison Jenkins admin@agcsa.com.au

Accounts

Philip Horsburgh philip@agcsa.com.au

AGCSATech

Andrew Peart andrew@agcsa.com.au

John Geary jgeary@agcsa.com.au

HR & Best Practice Manager Daryl Sellar

daryl@agcsa.com.au





Know-how for Horticulture™



Printed By Southern Colour Pty Ltd 2 Southpark Close Keysborough Vic 3173



CIRCULATIONS

Copyright © 2012 The AGCSA believes that material sourced and produced for Australian Turfgrass Management is accurate, but gives no warranty in relation thereto, and disclaims liability for all claims against the AGCSA, its subsidiary companies, its employees, agents or any other person which may arise from any person acting on the materials contained within. No portion, in whole or part, may be reproduced without the written permission of the AGCSA.

CONTENTS



COVFR

Lake Karrinyup Country Club: The

par three 8th at Lake Karrinyup Country Club, Perth with the 9th fairway in the background. Lake Karrinyup will host the new \$2 million 2012 Perth International tournament from 18-21 October. Photo: Brett Robinson



COVER STORY: Karrinyup strides back into tournament limelight

Lake Karrinyup Country Club has always been regarded as one of Australia's elite golf courses and after being remodelled throughout the mid-2000s the course will be back in the tournament spotlight when it hosts the new Perth International tournament this October. ATM editor Brett Robinson catches up with course superintendent Trevor Strachan to look back on the Karrinyup redevelopment and learns that even despite notching up over three decades as a turf manager he is still very much learning on the job.

FEATURES

Green on red

Kalgoorlie is better known as the capital of Western Australia's resource-rich mining region, but since 2010 it has also become the home of one of Australia's newest championship courses. Superintendent Andrew Clacy looks at the development of the Graham Marsh-designed desert layout which will host its first Australasian Tour event this October.

Shark attacks The Grange

After revamping the West Course in the mid-2000s, The Grange Golf Club in Adelaide has spent the past 14 months giving the East Course a significant facelift. Superintendent Richard James looks back at the extensive redevelopment works which put the club in the enviable position of having rebuilt both of its championship courses within the last six years.



Distinguished Service Award – John Odell

ATM interviews 2012 AGCSA Distinguished Service Award recipient John Odell, looking back on a venerable turf management career which came to an end earlier this year when he stepped down as superintendent of Royal Sydney Golf Club.



21 years on and still going strong

On the 21st anniversary of the AGCSA's incorporation, ATM brings together the inaugural 1992 board - Doug Robinson, Peter Sawyer, Jeff Lane and Wayne Dale - to look back at the formation of the national superintendent association.

Are your operations really best practice?

Terry Muir provides a timely reminder on turf managers' obligations regarding pesticide usage.



JOHN NEYLAN COLUMN To renovate or not to renovate

30 With greens renovations foremost in

many superintendents' minds at the moment, ATM columnist John Neylan looks at this

most debated issue and also asks what wetting agents are the best to use.

AGCSATECH UPDATE The precision touch

36

John Geary looks at the use of the Toro Precision Sense machine which has been put through its paces as part of AGCSATech's benchmarking project.



TIME FOR SOIL TESTING!

Let us provide you with a truly independent soil report



Ph. 03 9548 8600 Fax. 03 9548 8622 Email. andrew@agcsa.com.au Email. jgeary@agcsa.com.au

Suite 1, Monash Corporate Centre 752 Blackburn Road Clayton 3168 Vic

OPINION

Agents of change

40

Leading on from John Neylan's column, The Pulse quizzes superintendents on their use of wetting agents and what they have found works (or hasn't) worked at their course.



RESEARCH

Optimising water allocation usage

52

University of Western Australia researchers Louise Barton, Sam Flottmann and Tim Colmer outline a new three-year HAL-funded project (TU11012) investigating approaches to best manage current and future water allocations for turfgrass in public open spaces.

DAFFQ research update

54

DAFFQ senior research scientist Matt Roche updates ATM on two of their projects, the recently completed community sportsground wear trial (HAL Project TU08018) and the amended adaptation of warm-season turf grasses for the tropics project (HAL Project TU09001).

Also in this edition...

Foreword Thinking		4
Regional Profile - Kings Cove, VIC		60
Around the Trade		64
Turf Producers	Turf	66
State Reports Australia		68
AGCSA Book Shop		72

Contributors to Australian Turfgrass Management Journal Volume 14.5 (September - October 2012)

Louise Barton (University of WA); Barry Bryant (SAGCSA); Andrew Clacy (Kalgoorlie GC); Tim Colmer (University of WA); Glenn Cross (Mt Lawley GC); Wayne Dale; Gary Dempsey (NSW GC); Peter Donkers (Long Reef GC); Sam Flottmann (University of WA); Jason Foster (Townsville GC); Peter Frewin (AGCSA); John Geary (AGCSATech); Steve Hewitt (VGCSA); Shane Holborn (DAFFQ); Danny Hull (STA ACT); Ryan Irwin (NZGCSA); Richard James (The Grange GC); Jeff Lane (Globe Australia); Peter Lonergan (GCSAQ); Brad Marsden (Kings Cove GC); Craig Molloy (NSWGCSA); Terry Muir (e-par); John Neylan (Neyturf); John Odell; Pat Pauli (Horton Park GC); Andrew Peart (AGCSATech); Doug Robinson (Pacific Golf Operations); Matt Roche (DAFFQ); Des Russell (GCSAWA); Peter Sawyer (Links Golf Services); Tom Smith (Waterford Valley); Trevor Strachan (Lake Karrinyup CC); Anthony Toogood (Commercial Golf Resort); Brad Tucker (Whittlesea GC); Jim Vaughan (Turf Queensland); Darren Wilson (Wembley Golf Complex).

An industry waits

hortly after I started with the AGCSA in mid-2003, the Warringah Golf Club pesticide spill verdict was handed down in the NSW Land and Environmental Court. It was a landmark case for the turf industry and the heavy penalties imposed on both the club and superintendent were designed to send a clear message to the rest of the industry.

The case was certainly a black mark against the industry but one which in the years since effected positive change within the industry. Many superintendents have been proactive in leading the charge for their clubs to improve their environmental credentials and understand the long-term benefits of doing so.

However, all that good work could be undermined and the industry's image again tarnished by the developing situation in NSW. As most will be aware by now, the NSW Environmental Protection Authority and WorkCover NSW are conducting investigations in relation to the alleged misuse of pesticides in contravention of the Pesticides Act 1999. Specifically, the allegations focus on the use and sale of non-turf registered products.

Having extensively covered the Warringah verdict in ATM Volume 5.6, the thing that still resonates with me is the personal toll the saga had on the superintendent. Sure, the club was ordered to pay fines and costs approaching \$600,000, but go to Warringah today and the club is still there and operating. What of the superintendent? Let's remind ourselves. He was fined \$50,000, incurred \$220,000 in legal fees, was forced to sell his home and relocate, while his retired parents loaned money to help fund his legal battle. And all that on top of the deep emotional scars which will no doubt remain with him and his family for the res t of their lives.

This, remember, was the fallout from what was an 'accident'! Granted it was on a large and very public scale, but at the end of the day it was still an accident. There was negligence, yes, but there was no intent. The worrying aspect about the current NSW investigation is that allegations of misuse imply intent and knowledge of breaking the law.

As John Neylan comments in his column this edition: "The challenge... is for the superintendent to operate realistically within the restraints of the site, budgets and resources and not to be 'forced' to work outside of these parameters. The risk is that due to professional pride and a need to please one-self and that of user groups, is to work outside of the regulatory requirements of the industry... There is a need to work closely with (club) management to articulate the reality of the situation with facts and figures – not emotion! Do your homework and (remember) you are not employed to take risks on behalf of others that may take you outside of the law."

While the industry waits with bated breath to see what the outcome of the investigations will be, it is pleasing to see the proactive stance being taken by the NSWGCSA which together with Golf NSW, the NSW EPA and a number of other industry stakeholders, including the AGCSA, is developing a joint NSW golf industry environmental initiative. As this edition was going to print, every golf club in NSW was being sent an invitation to be part of a 40-club pilot study group which will draft up what is hoped will be a groundbreaking environmental compliance covenant for the entire NSW golf industry.

If there was one thing the Warringah verdict did more than anything else, it called into question the professionalism of superintendents. This latest investigation does so again, but this time it also challenges their ethics and morals. Let's hope that whatever eventuates, the industry can again rise to the challenge, just as it did in response to Warringah. Enjoy the read...

A Provide Parking

Brett Robinson, Editor



LOOKING FOR GREENKEEPING STAFF?

Advertise on the AGCSA website - the Australian turf industry's LEADING online job resource Post your job online now at www.agcsa.com.au/jobs or email info@agcsa.com.au

A perfect chance for all to review their practices



t is nice to see the days getting longer and the end of winter drawing closer by the day. I, like many around the country, am looking forward to the warmer days of spring where hopefully you will not only see the sun but feel some of its warmth. I have just received my first power bill since the introduction of the Carbon Tax and it would be nice to get some warmth for free! While not wanting to sound cynical, given time I am sure our elected representatives in Canberra will find some way to tax the warmth generated from the sun!

I have been travelling quite a bit in recent times and have been lucky enough to visit most points of

A few are of the belief that this

issue will 'blow over'... This

attitude is naive to say the least.

the country. No matter where I go the first topic of discussion always leads to the NSW Environmental Protection Agency investigation currently underway in that state regarding alleged breaches of the Pesticide Act (1999).

Before going any further, I must point out that as I write this column in mid-August, to my knowledge no individual or organisation has been charged with any offence under the Act.

While the investigation is continuing, it is not appropriate to discuss what has occurred or what will transpire, however, it does provide a great opportunity for all turf managers to have a close look at what they are doing in the workplace. While I am sure that the vast majority of turf managers are undertaking their duties in accordance with all laws and regulations, developments like this can provide an opportunity to reflect and modify behaviour if it is required.

All those that read this column (and I am sure everyone does, don't they?) would have noticed that

in the last edition the AGCSA Code of Ethics was published as a reminder to all of their obligations regarding membership values and responsibility in the workplace.

Any person empowered with the responsibility to maintain fine turf is under increasing pressure to present first class playing surfaces with at times limited budgets and resources. However, this responsibility should not be at the expense of the law; this is relevant regardless of the state in which you work.

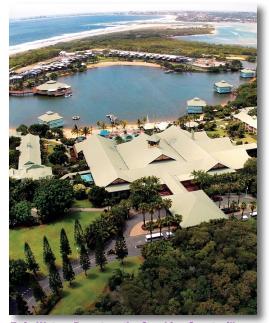
It is interesting to hear some of the conversations relating to this investigation during my travels in

recent times. Some (only a few) are of the belief that this issue will 'blow over' and the relevant authorities don't have the resources to pursue apart from isolated cases. This attitude is naive to say the least.

While the regulatory bodies may be state based, they will communicate with each other and if an issue is perceived to be a 'problem' in one region, you can guarantee preliminary investigations will flow on to other states.

It is great to see the proactive approach to the issue being taken by many organisations (including the AGCSA) in New South Wales with the development of a NSW golf industry environmental compliance/best practice covenant (see Craig Molloy's NSWGCSA report on page 71 for more details). I hope this approach will be set up on a national basis and, while still in the final stages of development, this type of industry-led initiative is seen by the regulatory bodies as a positive way forward.





Twin Waters Resort on the Sunshine Coast will host the 2012 Australian Turfgrass Conference and Trade Exhibition

Golf has always been a great custodian of the environment and any additional work that is carried out can only benefit the industry and all those that work within it. As relevant information comes to hand we will make every effort to keep the industry informed. Rest assured all in the turf industry desire a good outcome from these investigations. Should you have any questions or would like to provide feedback on this issue, please feel free to contact myself or the AGCSA office.

On a lighter matter, we are currently planning for the 2013 Australian Turfgrass Conference and Trade Exhibition which will be held at Twin Waters Resort on the Sunshine Coast (23-28 June 2013, put the dates in your calendar now!).

As with all conferences the hardest part is getting quality topics and presenters and before you ask we can't get Dr Frank Rossi back next year. With this in mind please feel free to contact AGCSA events and education manager Simone Staples (simone@agcsa.com.au) if you have a suggestion. Twin Waters will provide a wonderful venue and the more input we get the more chance we have of providing a great learning outcome.

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





AUSTRALIAN GOLF COURSE SUPERINTENDENTS' ASSOCIATION

MEMBERSHIP APPLICATION FORM

Helping superintendents and their staff to achieve the best possible playing surfaces and adjacent environment within the limitations of the available resources

Surname: First Name:
Preferred Mailing Address:
City/Suburb: State:
Position:
Club/Organisation:
Phone: Landline:
Mobile: Fax:
Email:
Member Category:
• .
State Membership:
PAYMENT
☐ Please send me a tax invoice
Please charge this purchase to my credit card account
☐ MasterCard ☐ Visa
Card Number: Expiry Date:/
CCV No:
Cardholder Name:
Signature:
Send completed application form and payment to:
Send completed application form and payment to: Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager \$292 Consultant \$339
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager \$292 Consultant \$339 International \$195
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager \$292 Consultant \$339 International \$195 Trade \$292
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager \$292 Consultant \$339 International \$195
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager \$292 Consultant \$339 International \$195 Trade \$292
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$130
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$88
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$88 SA - South Australian Golf Course Superintendents Association \$75
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$75 TAS - Tasmania Golf Course Superintendents Association \$60
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$88 SA - South Australian Golf Course Superintendents Association \$60 WA - Golf Course Superintendents Association of Western Australia \$110
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$75 TAS - Tasmania Golf Course Superintendents Association \$60
Suite 1, Monash Corporate Centre, 752 Blackburn Rd, Clayton, 3168, Vic Phone: 03 9548 8600 Fax: 03 9548 8622 Email: info@agcsa.com.au AGCSA MEMBERSHIP Superintendent \$339 Assistant Superintendent \$292 Ground Staff/Foreman/Irrigation Technician/3IC/Arborist \$145 Sports Turf Manager. \$292 Consultant \$339 International \$195 Trade \$292 Retired \$130 STATE MEMBERSHIP NSW - New South Wales Golf Course Superintendents Association \$88 QLD - Golf Course Superintendents Association \$88 SA - South Australian Golf Course Superintendents Association \$60 WA - Golf Course Superintendents Association of Western Australia \$110

For superintendents and two or more staff joining AGCSA, a discounted membership rate may be available. For further information send your list of names and positions to info@agcsa.com.au





WHY THE ESD WASTE2WATER WASHDOWN SYSTEM IS THE BEST IN THE WORLD... NO QUESTION!

Firstly it is important to make a few points clear. Bioremediation is not new technology – it has been used for decades particularly in de-contaminating water – and ESD were not the founders. Waste2Water is simply the best closed loop wash system application of its type in the world.

HOW IT WORKS:

The **ESD Waste2Water** system is a patented fixed film biological treatment system that utilises specially engineered microbial blends for the breakdown of hydrocarbon based organic contaminants including oil, grease, petrol, diesel, herbicides, insecticides, fungicides,

etc; into carbon dioxide and water. Odour is controlled through an oxygen rich water that does not allow the water to go septic - producing a clear, odourless water for re-use.

FEATURES:

- Waste or wash water is delivered to the treatment system from the collection sump in the wash pad. Additional sumps can be connected to the system to collect contamination arising from re-fuelling and/or chemical mixing in other areas.
- Grass clippings have the same nutrient content per kilo as animal waste. These are separated using a special hydro screen, diverted into a mobile cart for easy removal before entering the system.
- Two separate solids settlement tanks allow any residual 'fines' to settle and be purged out before entering the main bioreactor.
- Primary treatment is performed in the 3-stage bioreactor that is designed so that the waste water stream travels up and down through the baffled tanks, maximising water circulation through the treatment process.
- The genetically "fingerprinted" microbe blend is provided fresh monthly and is exclusive to ESD Waste2Water.
- The patented fixed film ESD biomedia used for breeding the "good bacteria" increases the capacity of the bioreactor up to 10-fold allowing longer contact between the microbes and any contaminants.
- The increased surface area also creates a longer path for air to flow, creating a smaller bubble and improved oxygen transfer. The warm air blower continually operates to oxygenate the bioreactor, maintaining an ideal environment

- for the microbe colony to breed. Biological growth and digestion of organic contaminants is greatly increased in this environment.
- Water flows to the finish tank where it is "polished" and sterilised using high output ozone producing clear, odour free water.
- The treated water is available for re-use via hose connections on the side of the unit, delivering up to 50psi high pressure high volume flow.
- A liquid float level is used to maintain a constant water level throughout the system, replacing any water lost through evaporation and drive-off.
- A pressurised bladder tank is utilised to provide a buffer for the pressure pump and ensure a constant pressure flow.
- The entire tank system is constructed of marine grade aluminium and carries a 10 year warranty.
- Maintenance, service and inspection is simple with access to all components at ground level.
- The latest auto purge valve system is used to clear sludge daily from the settlement tanks. Critically, though, this has a manual over-ride to either open or close the purge lines for both safety and function.
- ESD Waste2Water provide CAD drawings for the complete wash bay and this can be incorporated into a complete Environmental centre with re-fuelling, chemical mixing, chemical storage and leachate handling.





"Sounds good... but does it work?"

The simple answer is YES. Often well beyond expectations. Fortunately, Australian facilities equipped with ESD Waste2Water units have not (yet) had any catastrophic incidents that would provide the ultimate test. Let's hope this continues – but others have, putting the supplier's claim to the test.

FUNGICIDE AT BADGEMORE PARK GC, UK

Lindsay Anderson, course manager of Badgemore Park Golf Club, Henly-on-Thames, recently had an outbreak of fusarium. Preparations were made to spray the disease with a well known fungicide (active ingredient chlorothalonil). The sprayer was part filled with 150 litres of water and 15 litres of chemical added through the induction bowl as normal – only to discover the product beginning to congeal in the tank despite adequate agitation. He decided to abandon the mixing procedure.

Remembering the claims of **Waste2Water** when they installed his new wash-off system earlier in the year – that the system "eats" chemicals – Lindsay put the system to the test and emptied the complete contents of the sprayer onto the pad and into the **Waste2Water** system.

The only slight problem was that although the system readily ingests (eats) these contaminants, large quantities should normally be metered in over a reasonable period to avoid overwhelming the microbe colony. To play safe, particularly as the system installed is the smaller capacity Model 750, **Waste2Water** UK recommended that the system should not be used for 7 days and the recirculating valve be opened to the maximum. An additional 2 x 0.5 litre containers of ESD microbes were added to ensure sufficient microbes were present to thoroughly clean the water.

A week later a water sample was taken from the main body of the bioremediation tank to evaluate progress and this was assessed visually before packaging it for independent analysis. The water in the container was crystal clear and had no odour. Very promising. The question, though, was whether the unseen pollutant was still present in the water.

Twenty-four hours later they had the answer. The water sample fully complied with the UK Drinking Water Directive. The analyst further tested the sample to the highest possible level and could find no trace of chlorothalonil or other contaminants to a range of less than 0.01 parts per billion.

Pretty impressive! Or, as Lindsay put it, "Absolutely amazing. I don't plan on doing this regularly but this incident has given me full confidence in the **Waste2Water** system to cope with whatever we throw at it. This is a serious piece of equipment which has proved invaluable. I don't know what I would have done without it and if you have not already installed one I strongly recommend you install a **Waste2Water** ASAP".

DIESEL SPILL AT LILLEY BROOK GC, UK

Lilley Brook Golf Club (UK) endured their worst nightmare. Thieves attempted to steal diesel and accidentally ripped off the tap at the bottom of the tank causing a catastrophic failure. Worse still, the tank had only recently been filled. In theory the concrete bund should have retained the diesel but, due to the pressure of the volume of diesel, a large percentage overshot the bunding. Fortunately the diesel tank had been sited on the edge of the new Waste2Water wash pad which meant that any escaping diesel was collected in the central sump and pumped into the <code>Waste2Water</code> for treatment. Over 1000 litres overshot the bund, which would have caused a potential massive contamination incident if it had escaped. To make matters worse, the maintenance facility is situated at the top of the slope – less than 100m from a nearby stream.

Seemingly incredibly, to those not familiar with <code>Waste2Water</code>, the biological treatment processed (ate) the whole 1000 litres of diesel, converting the contamination to harmless carbon dioxide and water in just four days! Primary containment with the closed loop <code>Waste2Water</code> wash pad saved the day. Exceptional performance of the <code>Waste2Water</code> design and its microbes exceeded its claims. A major incident had left no pollution and avoided massive potential fines, costs and disruption that would have been inevitable.

As Paul Jenkins, then course manager commented: "Installing the **Waste2Water** system at Lilley Brook was a life saver. I don't know what we would have done without it. I recently moved to Westridge Golf Club and with the experience at Lilley Brook I immediately installed a **Waste2Water** system. Who says lightning won't strike twice?"



COUNTRY CLUB INTERNATIONAL - AUSTRALIA'S EXCLUSIVE ESD WASTE2WATER DISTRIBUTOR

Head office: Freecall 1300 138804 **New South Wales:** John McCafferty 0408 611 580 Queensland: **Brendon Hill** 0409 611 580 **Brent Robinson** 0418 669 035 Victoria & SA: Matthew Wrigley 0422 680 640 WA & NT: Mike Baker 0418 314 417

www.countryclub.com.au

After undergoing a significant redevelopment between 2006 and 2008, Lake Karrinyup Country Club returns to the spotlight this October when it hosts the Perth International. Pictured is the 9th

From 18-21 October, Lake Karrinyup Country Club in Perth will host Australia's richest tournament in the form of the \$2million European and Australasian PGA Tour co-sanctioned Perth International, ATM editor Brett Robinson catches up with one of the industry's most respected course superintendents Trevor Strachan to look ahead to the tournament and back at the significant course redevelopment which occurred between 2006 and 2008.



revor Strachan reckons he's just about got it right. It may have taken him over a decade, but come this summer Western Australia's top ranked Lake Karrinyup Country Club will pretty much be where he envisaged when he first set foot in the club.

It's the sort of admission most veteran course superintendents would be hesitant to divulge, however, Strachan is more than happy to acknowledge that even with the mountain of experience he has gained from his 35-plus years as a turf manager, his time at Karrinyup has been one of the biggest learning curves in his career.

On 2 July 2012, Strachan (53) notched up his tenth year at Karrinyup, the longest time he has spent at any one club and surpassing the nine he spent constructing, growing-in and maintaining The Vines Resort. Since arriving at Karrinyup fresh from constructing The Links Kennedy Bay and The Cut (Port Bouvard) – both of which are now firmly entrenched in Australia's top 30 courses – Strachan has helped to transform the course in line with the management's bold mission statement of being the pre-eminent country club in Australia.

In order to achieve those lofty goals, as well as meet the every-day expectations of one of the more demanding club memberships, Strachan has undertaken a mountain of work both in the office and on the course and its only now that the fruits of that labour are starting to shine through.

You would be hard pressed to find a more organised and documented maintenance set-up, while between 2006 and 2008, Strachan, one of the

industry's most experienced golf course builders, oversaw Karrinyup's course redevelopment, the central component of which was replacing all the greens from surface to subgrade.

With the course's new lease on life, the club has wasted little time in promoting its revitalisation, putting its hand up to host the Australian Amateur Championships in 2010 and the 2011 Australian Senior Open. Those were mere warm-ups, however, for last December's announcement that the club would re-enter the international spotlight this October as host of the new Perth International, a \$2million tournament co-sanctioned by The European Tour and PGA Tour of Australasia.

While Strachan along with a few other senior staff members (assistant Jarrod Boyce, turf technician Rick Raison and irrigation tech Chris Langford) have experienced the rigours of major tournament preparation before, for the bulk of the 18-strong Lake Karrinyup crew the Perth International will be their first major televised tournament. Just as it will be their first big test, it will also be the course's first serious examination since the redevelopment, one which has re-established Karrinyup's credentials as one of the country's most celebrated and admired courses.

INHERENT ISSUES

When Strachan took on the Karrinyup job in 2002, he did so with the knowledge that the club was concerned about the state of the course and was desperate to turn it around. As Strachan freely admits now, he rather foolhardily thought he could



effect some sort of change by simply transplanting his successful maintenance operations from The Vines.

Not long into his tenure, however, it became apparent that there were a number of inherent issues with the course that were conspiring to make his management of the playing surfaces increasingly difficult. The greens, in particular, were the prime source of frustration and it was becoming more an exercise in growing grass in order to achieve an acceptable cover rather than fine-tuning the turf and producing a quality playing surface.

During wet weather, many greens were soft, with waterlogging, ball marking and the invasion of algae a particular concern. During hot weather the greens were susceptible to drought stress and when watered the turf would often cook and suffer disease outbreaks. Indeed, during the 2003 Johnnie Walker Classic (JWC), Strachan's first major tournament at the club, he was caught out bad. With a 40-degree day forecast, Strachan pumped the water into the greens on the Friday night only to see the weather turn humid the following day which resulted in a lot of cooked areas. Needless to say, given the high profile nature of the event, it wasn't his finest hour.

"Everything at Karrinyup was completely different to The Vines and I wasn't expecting that," reflects Strachan, who was honoured for his work at The Vines with the 1993 AGCSA Fellowship Award (now the Excellence in Golf Course Management Award). "I thought it would be an easy course to look after, but I had to rehash my whole management approach and theories. I had great greens at

The Vines and thought that should just translate to Karrinyup, but after I had a few failures, which obviously didn't go down too well, that's when I knew something wasn't quite right."

In the spring of 2004, Strachan called in AGCSATech chief agronomist John Neylan to perform an assessment of Karrinyup's putting greens which ultimately showed up several inherent deficiencies in the greens which were necessitating a far more intensive management regime.

The key discovery was the highly variable soil conditions both within and between the greens. Over the years many of Karrinyup's greens had been reconstructed with various sand types used, both native and imported. Soil tests demonstrated significant differences between greens in terms of particle size distribution (the medium and coarse sand fractions were highly variable), drainage rates (hydraulic conductivity ranged from 160-670mm/hr), moisture retention and optimum profile depth. There were also severe question marks raised over the subsoil drainage in the greens.

While structural issues were the primary problem, the inspection also highlighted several other major factors affecting the management of the greens. For a start, the older Penncross bentgrass cultivar simply didn't provide the density and quality of surface compared to some of the newer cultivars on the market at the time. Most of the greens had developed a dense thatch layer and the design of several greens was such that surface drainage was poor. Likewise, the mixed sward composition of the greens surrounds were a breeding ground for *Poa annua* and often became wet and sloppy due to their high thatch levels.

Also compounding matters were significant shade problems. Karrinyup is a beautiful, heavily treed course, but sporadic plantings over the years had meant that shade was having a detrimental impact on many of the turf surfaces. Combined with the dramatic changes in elevation which Karrinyup is famous for, there were significant microclimates which made it a challenge to produce consistent, firm and dry playing surfaces.

After pages and pages of assessment data from the inspection, the recommendations page on the final report was pretty concise and clear cut – rip up the greens, reconstruct them with a consistent



Course superintendent Trevor Strachan notched up his tenth year at Lake Karrinyup Country Club back in July

Lake Karrinyup's iconic par three 8th. The redevelopment saw the reconstruction of all greens and surrounds





 Karrinyup's peerless Wintergreen couch fairways, untouched during the redevelopment, are the legacy of former course superintendent Niel Adams who passed away earlier this year after battling

profile and subsoil drainage, replace the surrounds and seed the new greens with one of the newer bentgrass varieties.

The quest to determine the latter had already begun with Karrinyup's involvement in the AGCSA's bentgrass trials at the time. It quickly came down to a choice between Penn A1, A4, G2 and G6 and as part of the trials the practice putter was reconstructed after the 2003 JWC and sown with G6. Despite minimal differences between the Penn varieties, Strachan ultimately chose G6 because it had performed exceptionally well with minimal extra work and had done so consistently over a number of seasons.

QUALITY AND CONSISTENCY

With a significant body of research in place and management finalising funding, in August 2006 the Karrinyup membership voted unanimously for the course redevelopment with Mike Clayton Golf Design selected as architect.

As well as completely changing the structural nature of the greens, which were to be constructed with a perched water table, a number of bunker complexes were also brought in closer to the putting surfaces. The greens surrounds were turfed with Wintergreen couch, while the cool-season/common couch tees were reconstructed and returfed with Santa ana couch.

To remedy shade issues, recommendations from an extensive tree audit conducted in 2005 were also factored into the redevelopment, with a large

The downhill par three 12th (the par three 17th is in the background) was shortened by 20m in order to make Karrinyup's par threes all differing lengths



number of trees, mostly lemon scented gums and pines, removed for design and agronomic reasons.

In terms of the actual layout, the 11th fairway was remodelled slightly to stop balls rolling off the fairway to the right due to the severe slope and the green moved back by 30m to add some length. By contrast, the downhill par three 12th was shorted by 20m to 130m. In doing so, Karrinyup's par threes are now all different lengths and have greater variety.

The only aspect that wasn't changed during the redevelopment was the fairway turf composition. Apart from widening them in parts, the fairways were always a standout and the legacy of former superintendent Niel Adams, who sadly passed away earlier this year.

Adams, who was at Karrinyup for 20 years, including superintendent from 1984 until his retirement in 1994, undertook extensive couchgrass trials before converting the fairways to Wintergreen couch in the early 1990s. "Niel, bless his heart, was the instigator for giving Karrinyup some of the best fairways in the country," says Strachan. "That was his legacy and there was no way that we were ever going to change that."

The redevelopment, which also saw the upgrading of the club's practice facilities, was staged over an 18 month period. Utilising Karrinyup's nine hole Short Course – which Strachan describes as the club's 'jewel in the crown' and another Adams legacy (he constructed it shortly after taking over as superintendent) – a full 18 holes was maintained during the work. The front nine was tackled first starting September 2006 followed by the back nine in the spring of 2007, with the full course back in play by April 2008.

"We have certainly achieved our goals in terms of improving turf quality," reflects Strachan of the work undertaken. "A fair amount of technical research and analysis went into the redevelopment before we even turned the first bit of dirt. What we have now are greens which are consistent and less intensive to manage and a course which is a lot wider and has better air movement. The greens are a lot tighter with the bunkers brought in and that has created a bit more maintenance for us as we now hand mow every day instead of using triplexes which can wear the edges out.

"The greens were constructed with a perched water table and after the first couple of years I was wondering whether that was the right thing to have done. But after what we went through last year with the drought I quickly changed my mind. In fact, on some days when it was 40 degrees we actually had to turn the water off! Our water use has dropped significantly, by as much as 20 per cent.

"I didn't want to do much coring in the first few years of the new greens because we wanted to build up a bit of body in them. Obviously that led to a bit of organic matter build up and the gun was well and truly loaded last winter. Since then we have cored them three times – September, December and

February, two with 5/8" tines and one with 3/8" tines – and got back on top of them.

"I was a bit sceptical of coring in February because that's when our heat and humidity is at its worst and we can get a lot of bentgrass decline when you start knocking it around. But the newer bents seem to handle the renovation in the hot weather pretty well and now that we have the perched water table the greens don't dry out as much. We also do a lot of needle tyning through winter and are on a fairly strong dusting programme in autumn and spring."

Since completing the redevelopment there have been a few minor modifications required, mainly dealing with surface drainage issues on some greens. The bunkers too have been a work in progress with the club vacillating on the final look that it wants. Initially the rugged edged look was desired but ultimately unsustainable due to the site's naturally dry soils. Numerous trials of different turf varieties such as fescues and bentgrasses were put down but eventually scrapped, while Strachan even revetted some. For now, they have gone back to a harder edged look.

The redevelopment has also meant that Strachan has had to continually fine-tune his management programmes and after plenty of adjustment he thinks he is finally on the right track.

"It has taken me 10 years to fully get on top of this place," admits Strachan. "I reckon this year



I'm just about spot on and after this summer all my programmes will be in place. It's funny. All the things I did at The Vines are completely opposite to what I am doing here. At The Vines we would put out about 2kg of actual N/100m²/yr whereas here we are on around 5kg N/100m²/yr. We used to mow only 3-4 times a week at The Vines, here we are hand mowing every day. I was into organics at The Vines, but here I can't put them out because there's so much moisture that they burn.

"I was never into growth regulators at The Vines and still had very good greens, but this year I have started using The Andersons Paclo-Pro (high N fertiliser with growth regulator) on the greens which has made a big difference. Because we have so much shade we found that the bentgrass can get very leggy if you put too much nitrogen to it. But then if you don't have enough nitrogen, because

Lake Karrinyup is known for its sweeping fairways and dramatic changes in elevation





 The redevelopment saw the Lake Karrinyup greens converted to Penn G6 bentgrass from Penncross

of the traffic and the smaller greens we have, they would thin out and putt slow.

"After some talks with Idris (Evans, superintendent The Western Australian Golf Club) who has been using it for a while, in April I started playing around with it on the chipping green. While it did produce a lot of grass, it kept the surface a lot tighter and we were able to control green speeds a lot better."

TOURNAMENT FOCUS

The learning curves are set to continue for Strachan as he begins to ramp up his preparations for the upcoming Perth International. While no stranger to major tournament preparation, having prepped The Vines for numerous Vines and Heineken Classics in the 1990s as well as Karrinyup for the 2003 JWC, the timing of the tournament will mean a few adjustments from Strachan's past experiences. The most challenging aspect will be the short sixweek window from the start of spring through until tournament week.

"I'll admit I'm a little nervous about how hard we push things seeing as we only have a six week window coming out of winter," says Strachan. "All the surfaces are in order and went into winter where we wanted them; now we are just waiting for the trigger to be pulled on the warm weather. The question is how warm will it be and how much rain will we get? We've had a dry winter, our driest July on record, but they're forecasting a wet spring which wouldn't be ideal."

Since the tournament's announcement, Strachan has been steadily ticking off various works to ensure the course will be at its optimum come mid-October. Weak or bare areas around the course have been turfed out, while extensive tree pruning and removal of dead trees have been undertaken for safety reasons and improving sightlines.

Couch encroachment in the bentgrass greens and collars has been kept in check through regular applications of Tupersan (Strachan puts out two applications in the autumn and another two in spring), while those areas where it is infested have been turfed out. The fairways were also given a

fungicide application to ensure that spring dead spot won't be an issue come the tournament.

As this edition was going to print, Strachan was due to core the greens with 3/8" tines and scarify the greens surrounds in the first week of September. His goal is to have the greens complexes hard, firm and fast in order to protect what will be a relatively short course for the professionals.

"We cored the greens ahead of last year's club championships which were held about the same time as the Perth International will be and they came up beautifully," says Strachan. "I'm not so worried about the greens, it's more the couch surfaces. I want to get the couchgrass surrounds down to 6mm and have them as tight and firm so that the ball runs away, so hopefully the weather will help us a bit.

"Most of our preparations will be pretty much what we would normally do at this time of year. We will give the Santa ana tees a light scarify, spray the fairways for mites, get our crabgrass under control in the roughs and obviously carry out some major fertilising – we'll probably put out about 20 tonnes across the whole joint to kick it along. We've got that history now and we know what practices work, so I'm pretty confident of where we are at.

"A couple of weeks out form the tournament we'll get into a bit more dusting and grooming, which is something I haven't done before. At The Vines we used to just groom them 10 days before, take them down to the sand and they would came back fine, but these newer bents don't like to be worked like Penncross does. So probably about a fortnight out we'll be doing a lot of dusting and grooming and then we'll back off and then get them as true as possible."

As for the tournament itself, Strachan has had a number of meetings with IMG and the PGA of Australasia to discuss course set up. Strachan won an early battle by convincing them not to include a step cut in the rough, while the fairways will be left as they are and not brought in like the 2002 and 2003 JWCs. Green speeds will be relatively conservative too and fairways will be cross cut.

"They (The European Tour) are mindful of not having fast greens and I think they are quite happy to have nothing over 11," says Strachan, who will have four additional paid staff coming in from the start of September to assist with preparations. "At the moment they are probably running 13 so we may have to back off a little, but I can understand where they are coming from.

"These guys are entertainers. They don't like to be made fools of and the people want to see low scores. With events like this you need to get people through the gates and there is nothing to be gained from having a winner at even or +1 like the US Open. At the end of the day, what the members play will be what the pros play. There'll be no bringing in of fairways, no growing the roughs right up, no extra tricks. It'll be Karrinyup as Karrinyup and it'll be good."

As part of the redevelopment, Lake Karrinyup's tees were converted to Santa ana couch



It's not complete without u.



You strive for the best turf. Tribute is your ultimate partner.

- Tribute delivers unparalleled control of cool season grasses in Couch Grass and is effective against your toughest weed problems:
 - Crowsfoot Grass
 - Winter Grass
 - Ryegrass
 - Other annual and perennial grasses
- Tribute has proven results and unsurpassed success in the USA. No other product can offer more.
- With its unique formulation and alternate mode of action, Tribute is the smart tool that offers lower rates, excellent turf safety and outstanding resistance management.

To find out more contact Bayer on 1800 804 479.

Always use according to product label.

Tribute® is a Registered Trademark of Bayer ©2011

www.bayeres.com.au





COURSES

The Graham Marsh - designed Kalgoorlie Golf Course was opened in early November 2010 and has already won many admirers. It's G2 bentgrass greens (pictured is the 14th) and Wintergreen couch fairways will play host to their first Australasian PGA Tour event this October



Better known as the gateway to Western Australia's resource-rich minefields, Kalgoorlie is also home to one of Australia's newest championship golf courses. Kalgoorlie Golf Course superintendent Andrew Clacy looks at the development of the Graham Marsh-designed desert layout as it gets set to host its first major event, the WA Goldfields PGA Championship from 11-14



algoorlie, or correctly referred to as Kalgoorlie-Boulder, is a town in the Goldfields-Esperance region of Western Australia, located 595km east-northeast of Perth at the end of the Great Eastern Highway. The town was founded in 1893 during the Yilgarn-Goldfields gold rush and is located close to the 'Golden Mile'.

The story goes that in January 1893 prospectors Paddy Hannan, Tom Flanagan and Dan O'Shea were travelling to Mount Youle when one of their horses cast a shoe. During the halt in their journey the men noticed signs of gold in the area and decided to stay put. On June 17 1893, Hannan filed a Reward Claim, which led to hundreds of men swarming to the area in search of gold, and Kalgoorlie, originally called Hannans, was born.

A narrow gauge railway reached Kalgoorlie from Perth in 1896 which provided the entire expanding region with goods; however the cost of bringing water from Perth was high. In July 1896 the Western Australian Parliament passed a bill to authorise the raising of a £2.5million loan to construct a pipeline from Mundaring Weir in Perth. The water would be pumped through eight stages along 530km of 760mm diameter pipe.

C.Y. O'Connor devised the scheme and oversaw the design and construction of this monumental project, but in 1902, less than one year before the pipeline was commissioned, he committed suicide. It is believed he did so due to the constant criticisms from the press and parliament that the scheme would not work and that the gold would dry up costing WA tax payers millions.

Some 110 years on, the pipeline still carries water to the goldfields and the mining of gold and nickel continues to flourish, with the Super Pit being the largest operation in Kalgoorlie. An open-cut gold mine, the Super Pit was created by Alan Bond who bought up a number of old mine leases in order to get the land area needed. The Super Pit measures an incredible 3.6km long by 1.6km wide and is over 500m deep – by my rough calculations that's a 2.8 billion cubic metre hole in the ground!

The names Hannan and O'Connor remain synonymous with the city, which now numbers over 33,000 in population, lending their names to the suburbs of Hannans and O'Connor as well as streets and primary schools. Kalgoorlie makes up part of the Federal electorate of O'Connor, while Hannans was also used as a name for one of the city's golf clubs.

WORLD CLASS DESERT LAYOUT

The current Kalgoorlie Golf Course was made possible by the amalgamation of three existing clubs in the city. Kalgoorlie Golf Club, Boulder Golf Club and Hannans Golf Club were all 'natural' golf courses with sand scrape greens and native grasses on the fairways that were able to survive the harsh summer months without irrigation.

The Kalgoorlie Golf Club (KGC) was formed in 1899, making it the third oldest golf club in WA. The club laid out its original nine hole links at the Kalgoorlie Racing Club, but in 1985 the members started to lobby for a new grassed golf course. In 1991 KGC organised to install an effluent main

October.



to the course and the following year trialed some plots of clover on three fairways as suggested by the Agricultural Department. Ultimately the project failed.

The Hannans Golf Club (formerly Returned Soldiers Golf Club) was formed in 1939. In 1973 the members first discussed the idea of using treated effluent water from the city in order to grass the golf course. Hannans also attempted to grass their golf course. The Boulder Golf Club was formed during the 1930s and was relocated in the 1970's as the land was required for sub-division. The new parcel of land occupied by the club was not ideal and became very muddy after rains.

In early 2000 the City of Kalgoorlie-Boulder started negotiations with the WA Government over the development of a new grassed golf course for the city. The final layout was based on a Graham Marsh designed world class golf course, which both the Kalgoorlie-born Marsh and the City anticipate becoming one of the top 10 desert golf courses in the world.

Holes 1 and 2 make up two holes of the Nullabor Links, the world's longest golf course which stretches for 1365km between Kalgoorlie and Ceduna in South Australia. Since opening on 5 November 2010, the golf course has already been the recipient of tourism awards, including the Gold Award for best new development in Western Australia in 2010. The annual 'Chasing the Sun Golf Festival' takes place this year from 30 September starting in Ceduna and finishes in Kalgoorlie on 6 October.

CONSTRUCTION AND MAINTENANCE CHALLENGES

In a region that has an average annual rainfall of just 265mm (Perth by comparison is 740mm), water was always going to be the key consideration with the development of the new course. Mains water and underground water were not to be considered. The city built a large holding pond which holds an abundant supply of grey water that is run off from approximately 30 per cent of the city's streets and verges. This supply of grey water is supplemented by the use of treated effluent water from the city's water treatment plant which gives us a limitless supply of water!

The construction of the golf course was carried out by Victorian based company McMahons. The two biggest challenges faced during the construction were that the site was mostly flat and in the middle was the city's tip. The tip site, which now makes up the majority of holes 17-18 and the driving range, had to be compacted and covered in multiple layers of earth and re-compacted to ensure that there would be no settling over time. The remainder of the site was flat; all contouring had to be created as well as maintaining enough 'fall' over the site for creeks and drainage. For this, over 200,000m³ of earth was shifted around the site.

The greens were constructed using USGA specifications, however, slightly finer sand was used on the greens to slow down percolation rates in order to retain moisture longer during the extreme summer conditions (mean maximums during the summer months can be as high as 37). Because of the finer sand used, I run 8mm solid tines over the Penn G2 bentgrass greens monthly as they can get compacted and 'crusty' very quickly given the amount of traffic and climatic conditions.

The tees are also sand capped and along with the fairways are planted with Wintergreen couchgrass which was trucked in from Perth. The tee tops, green surrounds and bunker surrounds were all solid turfed. This presented its own unique challenge as a Road Train with 30-40 pellets of turf in shrink wrap would arrive on Mondays and we had to have it laid before it started to rot in the 40+ degree



The course's tee plaques are a feature in themselves, carrying delightful anecdotes about Kalgoorlie's mining history and pioneering townsfolk

The truly unique feature of the Kalgoorlie course is the 'raised' fairways and tees. The fairways and tees sit up above the surrounding areas by up to 150mm, creating more than 15,800 linear metres of edging which needs to be maintained





Kalgoorlie's 1st hole (pictured) along with the 2nd form part of the **Nullabor Links, the world's longest** golf course which stretches 1365km between Kalgoorlie and Ceduna, SA

The Kalgoorlie crew is set for

a hectic few months which culminates in the WA PGA

Championships from 11-14

October

temperatures. Maintained areas of turf only occupy 28 hectares of the 70ha site!

by Australian standards, is the 'raised' fairways and tees. The fairways and tees sit up above the surrounding areas by up to 150mm. A wayward shot will fall off the fairway and finish in maintained desert areas of red earth. These areas of red earth are York raked to keep out weeds which grow readily after rain or in areas of irrigation overlap. I am not sure of too many golf courses that use a York Rake on a daily basis as a maintenance tool, however, it is one of my most used items of equipment.

The raised fairways and tees mean we have 15,800 linear metres of edging to maintain which not surprisingly creates a fair amount of work. During the growing season we do the tees every four to five weeks, taking almost two working days to complete. We do the fairways every five to six weeks, taking about 4-5 days to push the power edger around. In addition to the edging, we have to clean out the grass clippings and leaf litter that accumulates along the edge, which is usually done using a blower. Occasionally we have to mechanically re-edge sections that get silted up using a skid steer loader.

The rest of our equipment you would find in just about any workshop throughout the country apart from a recent acquisition of a modified Club

The truly unique feature of the golf course,

Car buggy that has a mounted single boom spray. This is used to control the Wintergreen couch from growing out into the desert from the fairways.

Being in a remote location such as Kalgoorlie has its unique challenges, one of those being able to attract staff. Kalgoorlie is not the cheapest town to live in as rental prices are very high and every-day items being more expensive than in the cities. Five of my staff here are internationals and each state, except for NSW, is represented.

When I took over as superintendent for McMahons, a Canadian backpacker and I were the only two that had ever worked on golf courses. We have since been able to attract experienced staff and all others in the crew of 14 had to be trained from scratch. Some of the crew have never been on another golf course with grassed greens; the nearest course with grass greens is a four hour drive away in Esperance.

Going for a quick drive across town to visit a colleague to chat about golf course management issues and the like is somewhat difficult, however, compared to some of my previous postings in the likes of northern China and Sri Lanka, the remoteness is not that much of an issue.

As far as turf management challenges to date, the one that has required the most work is Takeall patch in the greens. The majority of the site is woodland and coupled with alkaline soils has proven the perfect conditions for the disease. We have been on a diligent acidic fertiliser programme along with the use of some soil amendments to reduce pH levels to control the disease. We also put out some speculative fungicides which helped reduce the severity of the disease. The Take-all is now only in the last few greens to be sown and hopefully after this summer its prevalence will start to diminish.

African black beetles also visit annually and at the tail end of the 2010/11 summer we were invaded by plague locusts. We could not spray them as they just flew off to other sections of the golf course, but thankfully they only damaged small sections in the rough. During the infestation it was mandatory to wear sunglasses/safety glasses as they would launch themselves to avoid being hit by the maintenance vehicles and mowers. Thankfully they have not returned.

BUSY SCHEDULE

Earlier in the year it was confirmed that Kalgoorlie Golf Course would host the Western Australian Goldfields PGA Championships for the first time. The four-day \$110,000 tournament will be played from 11-14 October, a week before the 2012 Perth International at Lake Karrinyup.

Preparations to date for the event have seen us replace all of the bunker sand to a more suitable sand for our conditions as well as improving playability. I have been unable to do my spring coring and topdressing due to the Goldfields Golf





The greens (pictured above is the 7th and left the 12th) were constructed using USGA specifications, however, slightly finer sand was used to slow down percolation rates in order to retain moisture longer during Kalgoorlie's extreme summer conditions

Club tournament schedule. The last two weekends in August we held the club championships, we have the 36-hole Boulder Cup on 8-9 September and the 72-hole Goldfields Classic from the 27-30 September. We solid tined the greens at the end of August and have dusted the greens three times leading into the tournament.

The lead-up to the tournament and tournament week for me is very exciting, not just because of the exposure and everything else that goes with hosting an event such as this. Personally, it is the

development of the maintenance team. Aside from my assistant Fraser Brown and myself, we are a very inexperienced crew, however, what we lack in experience will be made up by determination and the ability to have a 'red hot' go.

Come lunchtime on Sunday 14 October I hope to be sitting down with the crew in our BBQ area with a few cold ales and reflecting on what was a chaotic yet very rewarding couple of weeks. I'm not sure where I read it, but our motto for the preparation is 'intent defines outcome".

Sweep - N - Fill



the ultimate top dressing brush

an innovative new product that will greatly reduce the time you spend maintaining your greens.

- Moves routine top dressing into turf canopy
- Removes grain and increases green speed
- Lifts lateral shoots, promoting healthier turf
- Soft brushes move sand without bruising the turf







go to www.davidgolf.com.au to see the Sweep-N-Fill in action!

to order your Sweep - N - Fill freecall: 1300 790 890

www.davidgolf.com.au dge@davidgolf.com.au





The Grange Golf Club
superintendent Richard
James looks back on
the recent \$3 million
redevelopment of the East
Course which puts the club
in the enviable position
of having rebuilt both of
its championship courses
within the last six years.

fter revamping the West Course in the mid-2000s, The Grange Golf Club in Adelaide has spent the past 14 months giving the East Course a significant facelift overseen by Greg Norman Golf Course Design (GNGCD). Designed by Vern Morcom and opened in 1967, the majority of the original Penncross greens were still in play making for some challenging summer months, not to mention that the course as a whole was tired, lacking strategy and in need of updating.

While a master plan was in place and works had begun, member dissatisfaction with both the design and finishes, particularly the bunkering, led to a rethink from the committee about the design of the course and ultimately the decision was made to seek a new architect.

What might have seemed in the early stages as a romantic notion of Norman returning to redesign the East Course, the scene of his first professional tournament victory in the 1976 West Lakes Classic, it very quickly became a reality. Both Norman and GNGCD showed great interest in the project and in late 2010 were ultimately selected.

What began as a renovation project to be carried out six holes at a time, soon became a project that started in May 2011 at one end of the course and continued on to finish at the other end

in March 2012. During that time we essentially constructed six brand new holes and created a spare hole, along with rebuilding every other green, bunker and tee complex.

GNGCD's Ryan VanDerVeen was onsite during the project, performing the dual role of lead designer and shaper, and we drafted in a second experienced shaper Denis Hardesty who had worked with Ryan and GNGCD on previous projects. Outside of that, the club made the undertaking to provide all other labour, including carrying out all grassing, final bunker shaping and finishing, the vast majority of the irrigation works, along with the myriad other tasks involved with a project of this scope.

We dedicated a minimum of six staff full-time to the project, including East Course assistant Rowan Daymond, who among many other things took on all in-house irrigation works, and leading hand Adam Fry who effectively became the third shaper on the project. All staff were involved in the project at one time or another to the extent that even West Course assistant Aaron Kelly and his crew were working on the renovation, leaving the West Course without staff, save for morning preparations.

In conjunction with the construction project, the club had decided to maintain nine full holes of the East Course open, allowing the club to run as



a 27-hole facility and cater for as many members as possible. It was also our aim through the project to not have any temporary greens in play. Unfortunately we weren't able to achieve this and there was a period mid-way through where we had to have a couple of temporary holes in play to allow the project to continue.

BREAKING GROUND

Following a month of scheduling and planning with Ryan on site in April 2011, the bulldozer fired up at the start of May. The order of construction was scheduled to allow us to carry out the more major changes first, utilising sand we had been stockpiling for a number of years. This sand was used to reshape an area of the golf course previously flattened through the removal of the native sand dunes, which had been sold to a glass company to in-part fund the construction of the original East Course.

Thirty days of bulk earthworks with two 30-tonne dump trucks shifted more than 30,000m³ of sand, returning some movement to the area and offering us the ability to improve the drainage in a notoriously wet section of the course, as well as creating a buffer between the course and the ASR wetlands in the process.



Drainage of this area of the course was originally designed to run into an internal lake bordering holes 7, 8 and 9. The lake in question was purely ornamental and not in any way connected to either the ASR scheme or irrigation system. Unlined and prone to leaking, we had ceased maintaining the level of the lake with bore water in previous years, which although leading to an unsightly, mostly empty lake, was the correct decision environmentally.

Investigations and modelling showed that evaporation would take away any additional water we could harvest if the lake was integrated into the ASR system and when we began considering the costs of engineering and lining, the decision was taken to transform it into a waste area where appropriate, along with using other parts of it to place a vast quantity of sod and soil waste generated through the project.

With the lake now not available for drainage, we utilised a series of local soakage pits to take the water from catchment basins, along with individual bunkers where the sub-soil was heavy having soakage pits installed below them.

Holes 3, 4, 5, 6, 7, 13, 14, 15, 16, 17 and the newly created 37th hole were the first to be reconstructed, which, as noted, formed the outer holes of the East Course and allowed us to shift the bulk fill from the stockpile to where it was required.

During this period staff, including a crew of casual labourers, lifted the Santa ana turf from fairways 16, 4, 5, 6 and 7 and placed it on pallets for reuse. Prior to harvest, we applied a tank mix of Primo and chlorothalonil, aiming to effectively knock the turf into dormancy and stop it growing together on the pallets, with the fungicide assisting control of any leaf disease outbreak. In excess of three hectares of turf was put on pallets and stored for three months over winter.

When the time came to re-lay, the par five 16th took 2ha of the palletised turf alone, all of which was manually laid. It is fair to say that the fairway surface and the quality of the turf led to a lot of questions (see photo bottom page 20), but it is amazing what some warmth and five days of rolling with a 7-tonne vibrating roller can achieve! Once we exhausted the pallet turf the sod crew moved onto fairways 13, 14 and the rest of 7 to continue harvesting.

Above: The East Course redevelopment took part over two stages, starting in May 2011 and finishing March 2012. Pictured is the remodelled 5th hole

Main photo: The \$3million redevelopment of The Grange's East Course was overseen by Greg Norman Golf Course Design. Essentially, six new holes and a spare hole have been constructed along with the rebuild of every other green, bunker and tee complex. Pictured is the 15th, a completely new par three that many members have claimed as the East Course's 'signature hole'



Three hectares of existing Santa ana fairway turf was harvested and stored on pallets for three months over winter for reuse. Prior to harvesting, the turf was given a tank mix of Primo and chlorothalonil to effectively knock it into dormancy and assist with disease outbreak

IRRIGATION DESIGN

During this time irrigation heads were also removed, cleaned and prepared for re-installation. We went away from the existing Toro CDS decoder system and installed VP satellites utilising the existing communication cables to link to the new Toro Lynx control system. Local irrigation company Hugall and Hoile won the tender to install the irrigation system designed by Don Cameron from Hydroplan, as well as installation of the satellites to the rest of the course which our staff then wired into the field.

All other irrigation, from simple alterations to full green, tee and fairway installation, including main lines and associated satellite wiring, was carried out in-house. We also upgraded delivery lines from three bores to the holding tank at the East Course pump station and laid more than three kilometres of communications conduit to allow future upgrades to ASR wetland and bore control networks.

The irrigation design is greatly improved, with single row tee irrigation that over-sprayed into trees and vegetation areas replaced with a dual row design that allows full control of where we place water. Greens and surrounds were redesigned with part circle heads, removing the existing full circle heads, again allowing greater control.

GREENS CONSTRUCTION

Mt Compass grey sand was chosen for the greens mix primarily as it is was performing well on the West Course greens and we had a desire to remain

When the time came to re-lay the Santa ana, the par five 16th took two hectares of the palletised turf alone, all manually laid



consistent. While some testing was carried out, drainage rates were not a major consideration, rather the moisture holding capacity and the ability for the sand to develop into firm playing surfaces, assisting us to resist pitch marks and provide the sandbelt conditions we were striving for.

The greens are all sand-based with no drainage other than ensuring adequate surface runoff. While no drainage was installed, we still created a cavity for the green during construction, ensuring the levels of the sub-base were accurate to the finished surface and hence a consistent depth of profile.

Prior to delivery, the quarry blended Rapid Raiser at 1 tonne:500 tonne of sand which was placed at a depth of 300mm over the shaped subbase. Trace wire was installed around the perimeter of the cavity and run back into the green side QCV box, providing a good future reference point to maintain green shapes.

Penn A4 bentgrass was selected for the greens and collars. Our original intent was to use A1 to remain consistent with the West Course, however, with the seed unavailable when the project began the choice was made to use A4.

We are expecting similar characteristics from the A4 that we see in the A1, including very good heat tolerance – important in the hot Adelaide summers – and an ability to maintain density to handle the large number of rounds the we cater for (approx. 100,000 rounds p/a with a 60:40 split between West and East).

Greens were seeded at a rate of 6g/m² via drop spreader, followed by dimpling of the surface with tyres to ensure good soil contact. The first greens seeded in the winter of 2011 were covered with growth cloth, however, once temperatures warmed into spring we ceased the use of the cloth. We also chose not to fumigate the greens prior to seeding as we were dealing with completely new profiles. Some minor broadleaf weed germination resulted, however, as the height of cut reduced and with some hand weeding any issues were covered.

Starter fertilisers were spread at 2kg/100m² at seeding with germination taking between 5-7 days depending on the season. It was interesting to note the differences in the performance of the native sand prevalent in the collars of the greens to that of the imported sand. Germination and development of the bent was slower in the native sand and the difference in the ability of the sand to hold moisture due to its droughty nature gave us some issues in warmer months.

At the four-week mark a second application of granular starter was applied and we were looking to carry out the first cut (4-6mm) around the sixweek mark. Once mowing started, the switch was made to spoon feeding foliar fertilisers and organic products and we looked to bring the heights down and maintain a high mowing frequency to develop the playing surfaces. Our aim was to have the greens in a playable condition being mown at 3mm



in 15 weeks, which was achieved on all but a couple of greens.

Frequent light topdressing was carried out to assist smooth the surfaces during establishment and has continued following the greens coming into play, with dusting and brushing a big part of our ongoing maintenance regime.

SHARP EDGES, DEEP LIPS

Creating the bunkering throughout the course proved to be one of the most labour-intensive activities of the project, with a huge amount of hours put into shaping, consolidating and sodding the bunker edges. A reconnaissance trip to the Melbourne sandbelt in early 2011 cemented in our minds the style of bunkers that we were looking for, with many of the region's great courses providing inspiration.

Sharp edges and deep lips were the order of the day, which we began to create by folding sod over the edge of the bunker and pegging it to the vertical section of the lip with biodegradable stakes. The aim of this was to enable the couch to develop a strong root system to stabilise the bunker edge and resist undermining and collapse, at the same time establishing a good level of thatch that we will trim back quite hard to create the sharp and defined look we are seeking.

While installing the sod was fiddly and timeconsuming, it was nothing compared to maintaining moisture levels in the turf to allow it to take root and establish on the vertical lip. I thought quite often as I observed the turf drying before my eyes about the amount of time we spend in summer months trimming bunkers and removing couch from them, yet when I wanted it there I could not make it grow!

We found that purchased sod wasn't suitable as less soil on the rolls led to greater drying and turf loss, while turf we harvested from site was able to be cut a little thicker, therefore exhibiting a greater moisture holding capacity.

Following bunker sand trials, the conclusion was that the site's native sand was preferred so we set about finding sand that matched those characteristics and colour. Once again, having the sand perform as per lab analysis was not a primary focus, rather that it met our specific criteria. Depending on the depth of sand under each individual bunker, it was placed at a depth of between 50-100mm and compacted in the bases, as well as spread and compacted on the faces.

Santa ana was the turf of choice for all other playing surfaces, as it is the dominant variety through the course. Along with harvesting from site for reuse, we bought in around 7ha of turf, all in small rolls, which was laid primarily on green surrounds and tees.

We also took the opportunity to bring in commercial harvesting equipment on three separate occasions to cut both small and maxi rolls for reuse, with around 2ha harvested and allowed to regrow The new-look 13th hole after reconstruction and (inset) as it was prior to the project. One of the major focuses of the redevelopment was improving the bunkering on the East Course

Creating the bunkering throughout the course was one of the most labour-intensive activities of the project, with many hours put into shaping, consolidating and sodding the bunker edges. Pictured are Grange staff Jake Laubsch and Jay Gilbertson





Mt Compass grey sand was used for the greens mix. Prior to delivery, the quarry blended Rapid Raiser at 1 tonne per 500 tonne of sand which was placed at a depth of 300mm over the shaped sub-base

into playing surfaces. With the overall project budget firmly in mind, vegetative establishment was also undertaken with 3ha of fairway sprigged, while stripped material and turf scraps were used extensively in roughs to establish a turf cover.

Australian Established Tree Transplanters were engaged to transplant 79 mature trees (callitris, eucalypts, casuarinas and pines) into strategic areas of the course. Keeping the water up to these throughout summer was time-consuming, with a survival rate of 75 per cent achieved. In addition, we have planted in excess of 500 indigenous trees including the above mentioned varieties along with acacias and melaleuca's, native grasses, saltbush varieties and fescues, depending on the location.

STAGE TWO

Following the completion of the large first stage, the second stage of works (holes 1, 2, the green end on 9 and the practice tee) started in early September 2011. Further bulk earthworks were conducted at this time, shifting sand to construct the new practice tee from the old 1st green site, which was shifted back some 40m into a previous turf nursery site.

Construction of the 9th green involved the removal of another ornamental lake complete with a stone bridge that was a favourite with brides for wedding photos, as well as being loved by many members, even though it was never used as it didn't actually go anywhere!

The finished look on 16 East



Mid-November saw the opening of the first of the new holes, including the 15th, a completely new par three constructed on a spare piece of land that many members have claimed as the 'signature' hole of the course (see main photo on page 18). This opening allowed the closure of the 7th and 8th holes along with the remainder of the 9th. The old par three 8th and par four 9th were combined to create a long par five, stretching to 537m from the back tee along the newly created waste area.

The opening of further new holes in late January allowed the final stage of the project to begin, with holes 10, 11, 12 and 18 the last to be reconstructed. Bulk earthworks in this stage created a large supply of topdressing sand that has been stockpiled.

The final in-play green was seeded in late February, meaning we had constructed and seeded 18 greens in just over seven months, with the final green (a large putting green), sown on 8 March, eight months after seeding the first green.

FANTASTIC RESULT

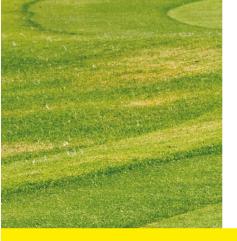
While it would be nice to say that the project was completed with that putter, work continues on the many 'snag list' items required to fully complete works. But when you consider that we reconstructed 18 holes and had them back in play in 13 months, it is understandable that there wasn't enough time to complete everything as we went along.

The overall project budget began at \$2.5 million, with the total spend rising to around \$3m by the time we were complete. This was due to additional cart path works and the purchase of extra turf to allow establishment of the last areas of work prior to winter.

I cannot underplay the role that The Grange groundstaff played in the reconstruction. They took on a massive amount of work that quite often took them out of their comfort zone and knowledge levels. To their great credit everyone involved took to various tasks and assisted us to achieve some fantastic results for the club.

As mentioned earlier, East assistant Rowan Daymond went above and beyond to ensure the project was successful, as did leading hand Adam Fry, although he jumped ship and headed to Kooyonga prior to completion. West Course assistant Aaron Kelly's role was also very important; even though he did not spend all of his time on the project, his ability to maintain the West Course with often a skeleton crew allowed me to oversee the project and provide GNGCD with whatever they needed.

Working alongside GNGCD and their staff was an absolute pleasure, with the professionalism of all concerned and quality of their design and ability to translate it into the field impressive. The result of the project is a fantastic and challenging golf course that our members will enjoy for years to come and one that I believe will be highly regarded within golfing circles around the country.







The First Name in Turf Renovation™

Trusted on the Finest Courses Around the World





Powerup Lawncare Products Golf & Turf

Ph 1300 363 027 www.plpgolfandturf.com.au





There was no more popular recipient of this year's **AGCSA Distinguished** Service Award than recently retired Royal Sydney Golf Club course superintendent John Odell, ATM editor Brett Robinson catches up with the 37-year turf industry veteran and now orchard manager to reflect on a truly rewarding career as one of this country's most admired and respected course superintendents.

Ithough he had no idea at the time, when a young, rugby union-mad John Odell decided to chuck in his Bachelor of Applied Science degree in building construction to take up a greenkeeping apprenticeship at Sydney's Pennant Hills Golf Club, he was doing the Australian turf management industry a huge favour.

It was the winter of 1975 when Odell, at the behest of his father, took on a casual labouring job at 'Penno' under the watchful eye of a man by the name of Winston Richard Church. Odell had first met Church when he started caddying at the club as a 10-year-old and his first memories were of a good-looking, sun-tanned, leathery-skinned chap with character lines all over his face.

He knew from the club's golf professional and all the members he caddied for that Church was a man held in very high esteem, a guru in his field who was not to be challenged on any matter of a greenkeeping or horticultural nature.

As Odell will tell you nearly four decades later, those few weeks labouring were among some of the best times of his life and it was then that he knew the turf industry was for him. Working under the charismatic Church, a trailblazer and innovator who took the industry from the 'greenkeeping' era to the 'superintendent era', and working shoulder-to-shoulder with a great crew (among their number was another keen and eager young charge Martyn Black and knowledgable 2IC Gary Beehag), it was like all Odell's Christmases had come at once.

Odell must have impressed too and soon after Church offered him an apprenticeship. With encouragement from his parents, who told him that if he believed in it to go for it, Odell found himself embarking on what would turn out to a most celebrated career, one which would see him go on and act as a standard bearer for the industry.

Following his days as an apprentice at Penno, as a 21-year-old Odell was entrusted with his first supers posting at Concord Golf Club in 1979. After seven years there, three NSW Opens and major course works, he moved across to Manly Golf Club for two years before arriving at Royal Sydney Golf Club in 1988 following the death of Kim Melville.

It was over the next 24 years as 'custodian of the links' that Odell would carve a niche as one of this generation's foremost course superintendents. He oversaw maintenance of the club's 57 hectares of turf and landscape areas, hosted five Australian Mens Opens (2008, 2006, 1999, 1994 and 1988), an Australian Womens Open (2007), two international tennis ties and in 2002-2003 with his crew remodelled the Championship course.

Despite his many successes and love for the place, just shy of last Christmas Odell informed the industry that he was pulling stumps on his turf management career come late January 2012. After some 37 years in the industry, he was to embark on a new venture with his brother-in-law as manager of a 160 hectare, 30,000-tree plum and cherry orchard in Young, NSW.

Just as the first blossoms of the new season were starting to show on his new crop, ATM was able to catch up with Odell to look back on his recent AGCSA Distinguished Service Award which was bestowed at the Australian Turfgrass Conference in Melbourne and reminisce about his venerable career.

ATM: Congratulations again John on your thoroughly deserved AGCSA Distinguished Service Award. Now that you have had some time to reflect, what does this honour mean for you? John Odell: It was just a very humbling experience and something that I will treasure for the rest of my life. It's something you would never expect. There are so many people in our industry who have made significant contributions and to be put up alongside them by your peers is very special indeed.

ATM: What has being a member of the turf industry meant to you over the years?

JO: The great thing about our industry is that I have met so many interesting people and great characters who over the years have become lifelong friends. There is a camaraderie in our industry. Sure it's a business where there is competition and plenty of friendly rivalry, but if you get on the phone to 99 per cent of the people in our industry they would be more than willing to help you out and vice versa.

I learnt that very early on when I landed my first superintendent job at Concord Golf Club. I was just 21 and didn't really know much (not sure if I do now either!), but I made a point of getting in touch with people in the industry who were the good greenkeepers, the knowledgeable ones – the likes of Bill Hopkinson, Geoff Hatton, Loch Ledford, Bubba Luke (ex-Augusta National), Kim Melville and Vince of course. Our profession isn't an exact science, it's somewhat an artisanship. I took that on board and asked a lot of people a lot of questions and very rarely was I knocked back. That's why I hold the industry in such high regard – it's the people who make it special.

The other great thing is that you are working outdoors. Your office is this beautiful world of nature – turf, plants, trees, flowers, wildlife – and by manipulating them using different techniques you can have them all growing and living in harmony to create a unique environment for the members. Then you throw in the vagaries of the weather, climate, soil types and terrain, not to mention machinery, traffic, pests, diseases and the thousands of experts who are always judging you. There are always nuances you have to balance and if you do so correctly you can end up with something very special.

I have often compared our industry to farming. Farmers produce a crop at certain times of year and they work very hard and maximise production for an optimum return. In our game, we are producing a crop every day of the year and it has to be top notch every day. You are always being challenged.



After a turf management career spanning 37 years, in January Odell left the industry to embark on a new venture as an orchard manager in the NSW town of Young

Above all though, this industry has afforded me the opportunity to meet people from all walks of life – talented teachers, innovators, administrations, greenkeepers, just some very good and generous people. The Doug Robinsons, Niel Adams, John Neylans, Euan Lairds, Les Burdetts, John Lloyds, Peter McMaughs, Peter Martins, Frank Dempseys, Phil Fords, Graeme Logans, Tom Parkers, Geoff Kirks, Bruce Kemps, Steve Fryers, Tony Fogartys, Darby Mullers, Peter Lonergans, Collin Phillips of our industry.

Then there are the guys that I came through the industry with – Gary Dempsey, Mark O'Sullivan, Norm Carr, Richard Kirkby, Dave Warwick, Mark Parker, Mick Bradbery, Phil Knight. And, of course, Martyn Black, a finer Australian I am yet to meet. He is just one in a million, a loyal friend and a true Australian who would put his life on the line for you. It's those great characters in this industry, who make it such fun to be part of.

To steal a line from Albert Facey, I have had a fortunate life working alongside some very talented people many of whom have gone on to very successful careers. I have been fortunate to always

For 24 years Odell, was custodian of the Royal Sydney links. "You never really think about it at the time, but since I've left I look back and can say that a truly loved the place, loved the members, loved the staff, loved going to work. It was such a special place."





Odell pictured with lifelong friends and colleagues Mark O'Sullivan (left) and Martyn Black (right). "I have been very lucky to have developed many lifelong friends through my involvement in this industry and the camaraderie among its members is what makes it so great."

If you are demanding of yourself and your crew and make sure that you always present the place as best you can, if you have high standards and get pretty close to those standards on a regular basis you will keep your members happy.

have had a good crew behind me who knew how and when to put the big ones in and I couldn't have asked for more. Maybe it's because we work with and on the land, but the people in this industry are really grounded, have a strong sense of spirit and are ever-willing to help each other out.

ATM: Vince Church played an integral role in your formative years. What did he engender in you and how much did he mould you into the superintendent you eventually became?

JO: To get a start in the industry under Vince Church and Jack Jones at Pennant Hills was a significant windfall. Vince was just an amazing person. He came from a very underprivileged background, went on to serve his country in WWII and when he returned went on to really professionalise the trade of greenkeeping in this country.

He was a man of many capabilities. He was the knock-about who swore like a trooper and could tear shreds off you with his very sharp wit. Yet when he needed to be serious, whether it was with committees or management or the members, he had this uncanny ability to change his whole demeanour and delivery and when he spoke he was a very commanding, authoritative figure.

The single biggest thing that Vince taught us was the power of observation. You had to keep it simple and not try to solve problems with snake oils or guess work. You had to understand the plant, understand how and why things happen and work out what the problems were through observation. It's through observation that you start to see those little nuances which alert you to a correct diagnosis.

He would ask you questions rather than telling you the answers. Vince would often take us around individually showing us situations and probing for an explanation. It wasn't a matter of guessing the answer; it was about looking at the problem and then ascertaining what were the elements causing the problem. Many times there wasn't a right or a wrong answer, but it made you think.

Vince was the sort of person who encouraged the exploring and inquiring mind. He was also a person who demanded excellence, that if you did it once you did it properly. When I became a superintendent I would often tell the guys that when you do a job you look back and ask yourself 'Are you happy to put your signature on it?' If you are, good, then move on, if not go back and do it properly.

Vince taught us about the value of standards. You've got to have standards, or else you fall to the lowest common denominator and that never brings much success. This became so intrinsic to everything we did, from not having 'windows' when hand topdressing to washing down machinery thoroughly. We would refer to the 'Pennant Hills standard' and were proud of it to the point where all of us who worked under Vince either consciously or subconsciously carried those standards on.

This is an industry where there are plenty of challenges and most of them come from your own club, the management and the members who are always very demanding. But if you are demanding of yourself and your crew and make sure that you always present the place as best you can, if you have high standards and get pretty close to those standards on a regular basis you will keep your members happy.

ATM: As you have mentioned in the past, Royal Sydney is not your average club. What was it like to work there and looking back what were your proudest achievements there?

JO: It is a very unique club steeped in history and tradition, a very generous club, a very demanding club, but the members there were some of the best people that I have ever worked for. I always found the members at Royal Sydney to be very appreciative and I always encouraged my staff to be kind and courteous. We never had an 'us and them' mentality; it was always about working for the membership to make sure they got the most enjoyment out of their club.

I always valued the comments from the members more than I did those from professionals, golfing scribes or the media. The members are the ones you want to keep happy. When the tournament is over they're the ones who are paying your wage and wanting the place back to normal ASAP.

One of the things that I worked very hard on during my career was improving conditions for staff, especially remuneration, and it has been very difficult and sometimes to my detriment. Many of my ilk wanted to create an environment where we could encourage talented people to come into the industry to improve the level of education and professionalism and the perception of greenkeeping in general. Royal Sydney definitely backed me on that as did Concord and Manly when I was there.

CONTINUED ON PAGE 28

Broad Spectrum weed control all year











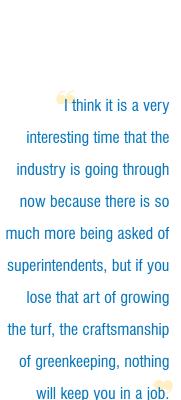
syngenta.

For more information see your Syngenta agent or go to greencast.com.au

Syngenta Crop Protection Pty Limited, Level 1, 2-4 Lyonpark Road, Macquarie Park NSW 2113, ABN 33 002 933 717.

**Registered trademark of a Syngenta Group Company. The Trademark of a Syngenta Group Company. All products written in uppercase are registered trademarks of a Syngenta Group Company. AD 12/495

"I always valued the comments from the (Royal Sydney) members more than I did those from professionals, golfing scribes or media. The members are the ones you want to keep happy."





CONTINUED FROM PAGE 26

You have to look after the staff, educate them, train them well and also pay them a decent wage so that they can afford to stay on and make a career.

I guess now that I am no longer there, to have survived so long at a club like Royal Sydney is something I am very proud of. It was an honour to follow in the footsteps of some legendary greenkeepers like Rube Walkerden, Bert Everson, Bill Lester and Kim Melville. I was privileged to have worked under Leon Thompson who was, I believe, golf's greatest administrator and his understudy Bill Francis. Both were excellent managers of the club's affairs and men who believed in, motivated and supported their most important asset - their staff.

You never really think about it at the time, but since I've left I look back and can say that a truly loved the place, loved the members, loved the staff, loved going to work. It was such a special place and living on the course, it was like having your own 141-acre farm in the middle of Sydney.

There were certainly some exciting and challenging times over the years, but the rebuilding of the Championship course in 2002-2003 was one of those 'moments in time'. It was a major achievement when you look back on it because we did it pretty much all in-house using sand which came from the property.

Everyone thought I was crazy, saying that you needed a USGA-spec greens profile, but John Neylan agreed with my theories and backed by laboratory analysis at the end of the day we did it to a very high standard. We also had a great architect in Ross Watson who was dynamic and his vision of what could be achieved was really quite unique.

I was always interested in the club's history and would say to my crew that this was a moment in time, that what we were creating would be here for the next 30, 40, 50 years and would be something that people would look back on as a period of great achievement for the club.

ATM: Looking back at your time at the coalface, what were some of the significant changes and what ramifications have those had/are having?

JO: The increase in professionalism in our indsutry over the last two decades I believe has been brought about by the development of a strong industry representative body - the AGCSA. If you examine the strength of this organisation, it is clear that education, research, leadership, policy making, planning and a continual focus on the contempoary issues of the day have always been high on the agenda. We have had strong leadership from presidents and committees and a very talented staff to whom we all owe a great debt.

The biggest change in my time has been the influence of new technology. Nowadays your office is your phone; you're on call 24-7. Electronic media demands so much of your time and it can be very difficult to distance yourself from it and still do your job. And one of the worrying things for me is that people will start to lose the art of greenkeeping because they are so tied up with everything else.

That is what makes successful greenkeepers – being able to grow excellent turfgrass. The people who can really produce a surface (like a Richard Forsyth) do so because they have great powers of observation, know the plant and because they are looking at it constantly are able to make those adjustments to keep the plant performing. The worry now is that with the demands on today's superintendents they aren't out on the course enough, not observing, not nurturing.

You can be a good administrator and tick all the boxes when it comes to WHS, HR, environmental management and all the other bureaucratic protocol that is expected these days, but if you can't grow that grass you won't have a job. I think it is a very interesting time that the industry is going through now because there is so much more being asked of superintendents, but if you lose that art of growing the turf, the craftsmanship of greenkeeping, nothing will keep you in a job.

ATM: Finally John, a few words of advice to those coming into the industry now.

JO: I think to be successful in and to enjoy anything that you do, whether it's your work, sport, love (laughs), you have got to be passionate about it. You have to live it and breathe it and want to. It's the same with life. As my dad used to say to me, make every post a winner and if you do it, do it with passion and fervour and make sure you enjoy it.

I have been very lucky to have developed many lifelong friendships through my involvement in this industry and the camaraderie among its members is what has made it so special. I couldn't have chosen a better career.

John Odell

Season-long control of grubs in wet or dry soil conditions





syngenta



renovate...



In the latest instalment of Grass Roots,

ATM columnist John Neylan looks at the ever-vexing topic of greens renovations, wetting agents and asks whether superintendents need to learn to say 'No!'

t a recent VGCSA meeting there was a passionate discussion regarding renovating greens and the impact that it has on the occurrence of *Poa annua*. The general premise of the discussion was that you should minimise inputs to favour the bentgrass over the *Poa annua* and definitely not renovate or cause any surface disturbances because it will allow *Poa annua* to become established.

In a search of the Michigan State University's Turfgrass Information File database, the largest online source of turfgrass literature in the world, there is no published research to support the notion that coring or other renovation techniques stimulate the germination and establishment of *Poa annua*. However, there is extensive anecdotal evidence that states coring during autumn potentially increases the opportunity for *Poa annua* invasion.

We are also well aware that other surface disturbances such as low mowing, vertical mowing, ball marks, spike marks and general wear will facilitate the encroachment of *Poa annua*. Any weakness in the turf surface provides a niche for *Poa annua* seed to become established. It is also

important to note that *Poa annua* thrives in wet and thatchy greens and compacted soils.

There is somewhat of a dilemma when trying to control *Poa annua* while keeping thatch/organic matter levels under control. Thatch accumulation and the lack of effective thatch control programmes has without doubt become the single biggest challenge in managing bentgrass putting greens. In recent times there has been a reluctance to renovate because of the potential to encourage *Poa annua* or renovations are compromised by the golfing programme.

Based on recent studies of problem golf greens in Australia, there is no doubt that thatch accumulation is often the primary problem. Excess organic matter results in reduced infiltration rates, wet and soft surfaces, greater pitch mark damage, reduced root systems, black layer and a greater incidence of disease. These problems have been most apparent during the past two winters where the rainfall patterns have returned to the norm following years of drought.

Pre-eminent University of Georgia turf researcher Dr. Bob Carrow described the number-one problem experienced on sand-based putting greens was the excessive accumulation of organic matter in the upper portion of the soil profile (Carrow et al., 2002). He stated that core aeration and sand topdressing are the two most effective means to control the content and distribution of organic matter in this zone.

Dr. Carrow conducted extensive research (Carrow, 1998) in the mid-1990s on the organic

Left: Based on recent studies of problem golf greens in Australia, there is no doubt that thatch accumulation is often the primary problem. Excess organic matter results in reduced infiltration rates, wet and soft surfaces, reduced root systems, black layer and a greater incidence of disease

matter dynamics in the rootzone of sand-based putting greens. He concluded as organic matter in a sand-based putting green reaches 3-4 per cent by weight, the percentage of soil macropores begins to decrease. The reduction of pore space results in the decline in oxygen diffusion, reduced infiltration rates and increased moisture retention. Dr. Carrow's research shows that core aeration and applying sand can help dilute organic accumulation and create new macropores.

Recent studies undertaken in the AGCSA's benchmarking project has demonstrated quite clearly that a high proportion of moisture is retained in the upper 3.8cm and is strongly associated with the thatch/organic matter layer (Figure 1). It should be noted that the volumetric water content of the sand at field capacity is about 18-20 per cent v/v whereas the thatch layer is retaining over 30 per cent moisture.

We have to acknowledge that core aeration is necessary. On well constructed greens the ideal programme consists of a combination of regular dustings, Verti-draining and an annual coring and sand topdressing. O'Brien and Hartwiger (2001) stated that golf courses with successful, mature greens have been on a core aeration programme where 15-20 per cent of the surface area has been impacted each year.

The greatest advantage of using hollow coring in any renovation programme is that it effectively removes 100 per cent of the organic accumulation with the tine diameter. Imported sand can then be placed in these core holes to provide a homogenous sand from the surface down to the rootzone. This also enables those core holes to remain open after the renovation period.

Dusting is also a key component in managing organic matter levels. O'Brien and Hartwiger (2003)



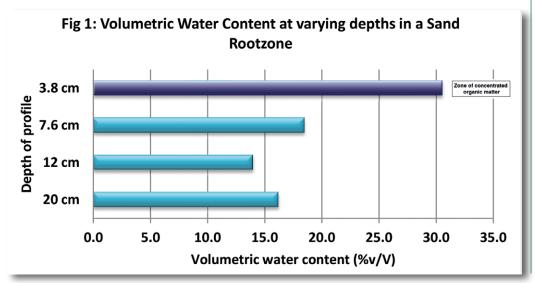
state that applying at least 1.2-1.5m³/100m² per year is recommended to keep organic matter content below 3-4 per cent weight in the upper portion of the rootzone. This rate of sand application is similar to that recommended by Nickson 2003, who suggested an effective dusting programme consists of an application of 0.06-0.1m³/100m² of turf every two weeks in good growing weather and reduced to every month in winter. Such a programme would require a total of around 18-20 dusting applications per year. His research also stated that a hollow coring in addition to dusting provided the most effective control of organic matter.

At the recent 2012 Australian Turfgrass Conference in Melbourne, keynote Dr. Frank Rossi challenged the value of hollow coring. He did state that hollow coring allowed the requisite amount of sand to be applied to the green over the 12 month period, but it was disruptive to the surface. Dr. Rossi emphasised the need to apply sand regularly to dilute the organic matter and is consistent with Nickson's research.

Dr. Rossi provided three different scenarios:

- With dusting only and no cultivation, the greens need to be dusted every 5-10 days;
- With some hollow tining and solid tining, sanding every 7-14 days; and

Recent studies undertaken in the AGCSA's benchmarking project has demonstrated quite clearly that a high proportion of moisture is retained in the upper 3.8cm and is strongly associated with the thatch/organic matter layer



The greatest advantage of using hollow coring in any renovation programme is that it effectively removes 100 per cent of the organic accumulation with the tine diameter



 With some hollow tining and solid tining with other less invasive techniques (e.g. hydroject, needle tynes), sanding every 14-18 days.

The required amount of sand, irrespective of the method employed, was about 7m³/100m² per year. This is considerably higher than other reported figures.

The take home message is that we need to get a lot of sand on the greens to effectively dilute the organic matter. It has certainly been my observation that very few golf courses are dusting either heavily enough or frequently enough to be effective. Another recent observation has been that dusting should take place late in the day when the turf is dry and there will be less damage to the leaf and the sand will more easily settle into the thatch.

After that big diversion, what about the association of *Poa annua* intrusion with cultivation treatments? How are we going to avoid it? *Poa annua* control is not a one shot fix and requires multiple management factors. A few thoughts:

 Poa annua control involves a 'whole of course' control approach.

ROLES AND RESPONSIBILITIES – HOW FAR DO YOU GO?

uring my time in the turf industry there is no doubt that the business of turf management has changed. However, the fundamental issues have not changed; it is still about managing grasses, soils, water and pests and producing playing surfaces. What has changed is the way operations are undertaken, the tools that are available (or, in the case of some pesticides, unavailable), the business of golf (greater emphasis on corporate play) and expectations.

The business of golf has undoubtedly caused superintendents to compromise their management practices so there is less disruption to play (e.g.: reduced renovations) and a higher standard is maintained all year round. There is no doubt that superintendents have been able to produce incredibly high quality surfaces and as a consequence lifted the expectation for many clubs beyond the threshold of long-term sustainability. The consequence can be to produce an ideal and an expectation that in the long-term cannot be delivered.

In my time inspecting golf courses and meeting with committees, there is undoubtedly a strong sense of ownership by members, committee members and the superintendent. Each group can often have a different perspective of what the golf course should be about. Does this place excess pressure on the course superintendent either real or perceived? A difficult one to analyse, however, there is no doubt that a high level

of professional pride and a 'can-do' attitude often achieves outcomes above and beyond what could otherwise be perceived as being realistic. This in itself adds to the unrealistic expectation that this will be the norm.

The challenge that I observe is for the course superintendent or the turf manager to operate realistically within the restraints of the site, budgets and resources and not to be 'forced' to work outside of these parameters. The risk is that due to professional pride and a need to please one-self and that of the user groups, is to work outside of the regulatory requirements of the industry. There is a never-ending temptation to source cheaper products or a 'silver bullet' solution to resolve a problem or to work within budget limitations.

You are not employed to take risks on behalf of others that may take you outside of the law.

Any senior manager that is doing his/her job must be a good communicator and must inform (and document) the management team and the board of the limitations of working within either budgetary restraints or a problem that does not have a turf-related solution. The turf manager must not take on the risks of the club or organisation. As one previous AGCSA board member stated after

again explaining to staff that there were to be more budget cuts but they would make do, his 2IC said "...you need to stop making the board's job easy for them". I am sure many turf managers can relate to that statement.

There is a need to work closely with club management to articulate the reality of the situation with facts and figures – not emotion! Again, do your homework and provide evidence of what is happening and what is required (and the costs). You are not employed to take risks on behalf of others that may take you outside of the law.

If as the turf manager you are feeling pressured or lost, look for assistance. A good turf manager will utilise a wide range of resources to make sure that they are current, relevant and the organisation is operating effectively and efficiently. There is often a reluctance to bring in outside expertise to review, oversee and audit the operation because it can be perceived by the manager as a 'blight' on their ability. The sensible approach is to draw on the available resources so that you can do your job better to the betterment of the organisation.

The expertise required to analyse a golf operation can be very broad; agronomy, budgeting, resource evaluation, environmental management and work place safety are just a few key areas. A knowledgeable consultant will have experienced many different situations and will often draw on those experiences to assist you through a dilemma.

- Use dusting (at the required rates) as the principal means to control organic matter accumulation. Dusting must start on day one of the green's life;
- At least one coring a year is required to break up any layers that can develop even in the best dusting programme. Core when the weather is warmer and less favourable to *Poa annua* (i.e.: late spring and late summer). The new bentgrasses in particular have good heat tolerance.
- Chemical control is still important. Use preemergent and post-emergent control. Where a spring renovation is to be undertaken consider the use of endothal prior to renovation and then once the turf has recovered recommence a programme of paclobutrazol and pre-emergent in the late summer.

WHICH WETTER IS BETTER?

At a recent GCSAWA meeting at Mount Lawley Golf Club in Perth there was discussion about wetting agents. Part of the conversation was about the merits of the numerous wetting agents available and it got me thinking me more widely about what we are trying to achieve when we use such products.

Water repellence (failure to absorb moisture) has been observed in soils and intensively managed turf for many years. Investigations have shown that water repellence has increased in situations where

there is a build up of hydrophobic organic content in the soil, that is the soil particles become coated with a hydrophobic organic layer causing a greater incidence of localised dry patch, poor nutrient uptake and increased water loss due to run-off and evaporation.

One of the most successful approaches used to overcome the problem of water repellence in turf is by the application of wetting agents. In my time in the turf industry there have been several key innovations that have transformed turf management, such as the Verti-drain and laser-levelling equipment and in that same category you can put the old Wettasoil wetting agent.

It was a product of WA used to overcome the water repellency experienced in broad-acre cropping and when it hit the market in the 1980s it provided a very potent control for localised dry spot. Since that time we have seen many new wetting agents on the market, many purporting to provide a variety of agronomic improvements.

In 2000, John Illingworth wrote an excellent article (ATM Volume 2.1 February-March 2000) on wetting agents and is well worth reading. Without going into detail, there are several types of wetting agents in Australia and depending on the type they have different wetting characteristics, phytotoxicity and longevity in the soil. Very briefly they include;

 Anionic surfactants represent the earliest wetting agents in turf and are generally very



On well constructed greens the ideal renovation programme consists of a combination of regular dustings, Verti-draining and an annual coring and sand topdressing



admin@ultimateagri.com.au www.ultimateagri.com.au

JOHN NEYLAN



■ The large range of wetting agents available to turf managers is no doubt confusing and the challenge is to do your homework regarding the type of wetting agent and its properties good at reducing surface tension and therefore improving initial water penetration. However, they tend to degrade quite quickly and can be phytotoxic at the application levels required to meet the demands of the turf industry.

- Nonionic surfactants are widely used to assist the spray application of pesticides in the agricultural industry and are quite efficient at reducing surface tension and therefore can provide short-term assistance for water penetration in a turf situation.
- Polymeric nonionic surfactants appeared in the early 1980s and produced a quantum improvement in the efficiency of water penetration into hydrophobic soils and in the maintenance of high quality turf surfaces. The polymeric structure adsorbs strongly onto soil particles and is slow to degrade. These characteristics lead to good re-wetting performance and long lasting effect. This group of surfactants are the most widely used in Australia and provide the longest term performance, usually requiring only 2-3 applications per year.
- Medium-term polymerics exhibit fair soil retention and water penetration. They are applied at low application rates which ensure very low phytotoxicity and are therefore very safe to use. However, they must be applied frequently under a strictly observed management programme. In severely hydrophobic situations the penetration characteristics of this group of polymerics is often insufficient to achieve adequate performance.
- Ultra-penetrants are a class of surfactant that is radically different to all other classes mentioned above. They are nonionic in nature, yet exhibit outstanding water penetration ability at quite low application rates. They can penetrate any hydrophobic turf area, and quickly restore good water infiltration. They have medium soil adsorption characteristics so they must be applied at regular intervals to maintain maximum effect. They are ideally suited to application by direct injection irrigation methods.

• Humectants are used to supplement the use of wetting agents. Humectants are based on highly hydrophilic components that adhere to the soil particles and attract water to their many hydrophilic sites. In this way they can assist in reducing water runoff and minimise water leaching through the soil profile. However, they degrade rapidly and must be applied regularly to maintain effect.

The large range of wetting agents available to turf managers is no doubt confusing and the challenge is to do your homework and quiz the sales rep regarding the type of wetting agent and its properties. It is important that your supplier is able to identify which category the product fits into so you have some basis on which to judge its suitability to your situation.

Before choosing an appropriate wetting agent, the turf manager must clearly consider several factors including the severity of water repellence, proposed frequency of application, phytotoxicity potential, watering in, other treatments applied, degradability and cost/quality.

In an article by Karnok (2006) he provided a summary of his experience with wetting agents as follows:

- The efficacy may be site specific;
- The frequency of application affects the longterm cost;
- The phytoxicity of wetting agents varies widely;
- Superintendents should request the results of replicated wetting agent trials from their supplier.

This general information is also supported by the extensive wetting agent trials undertaken by the GCSAA-USGA (2004) where 10 wetting agents were evaluated across nine sites in the USA. The amount of data is so complex and extensive, the report separates the results into the individual sites and quite clearly there are local site issues.

So, what to do? Firstly you must understand what you are trying to do – are you trying to control localised dry spot or prevent its occurrence. The wetting agent to serve each situation will be quite different. Second, put out a few test strips – try them for yourself! Finally, monitor what is happening – did it actually wet up the hydrophobic layer (this will usually be the thatch layer). Work out what works for you in your programme and do not change.

REFERENCES

A full list of references for this article can be obtained from the AGCSA. Contact info@agcsa.com.au or call (03) 9548 8600.

Editor's Note: See The Pulse for superintendents' experiences with wetting agents – pages 40-43. Got a turf management topic you would like John Neylan to address within his column? Email your thoughts and ideas to ATM editor Brett Robinson

brett@agcsa.com.au



Tough on grubs. Gentle at the same time.

Application on hundreds of golf courses in Australia has proven it. DuPont™ Acelepryn® insecticide delivers excellent, long lasting control of white grubs plus other key turf pests in as little as one application.

DuPont™ Acelepryn® has an unscheduled poison status with no protective clothing requirements and low toxicity on most non-target animals such as birds, fish and bees - No other grub product can match this outstanding environmental and toxicological profile. It's a little miracle we call Acelepryn®.

DuPont™ Acelepryn®. Kill them. With Kindness.



The miracles of science®

For more information visit www.professionalproducts.dupont.com.au or call 1800 175 039.



The precision to raw

AGCSATech agronomist
John Geary looks at the
Toro PrecisionSense
machine and some of the
data which it has generated
as part of the AGCSA's
current HAL-funded golf
course benchmarking
study.

ver the past 12 months the AGCSATech team has been busy providing a wide range of services to clients across the sportsturf industry. These services have been as diverse as lecturing at conferences and TAFE colleges, providing disease and nematode diagnosis, undertaking soil nutrient and soil physical analysis and also providing extensive sportsturf consultancy services.

While one of the primary objectives of AGCSATech is to provide members and the greater sportsturf community with expert diagnostic and analytical services, it should also be noted that funds generated through the provision of these services is then used to help fund dedicated turf management research projects.

Since its inception in 2000, AGCSATech have initiated a wide range of research projects ranging from bentgrass and couchgrass trials, reclaimed wastewater usage and the effects of effluent water on turf through to work with ANTEP. Information pertaining to all these trials, including final reports, is freely available to be downloaded from the AGCSA website at www.agcsa.com.au/agcsatech/research.

The latest research project AGCSATech has embarked upon is a comprehensive 12-month golf course benchmarking study. Part funded by Horticulture Australia Ltd (TU11003), the study is entitled 'Australian golf course benchmarking project – Developing course quality objectives'.

While most of the study is focusing on greens quality (see ATM Volume 14.3, pg60-62), data has also been collected on the quality of selected fairway surfaces. Of particular interest is data being generated through the use of Toro's new PrecisionSense machine.

Toro has developed the PrecisionSense machine which measures soil moisture, soil salinity, soil compaction, turf quality and elevation.

Measurements are taken every 2-3 metres and the huge amount of data that is generated can be used to measure the variability (both minor and major) in site conditions

Turf systems including soil type, topography and soil conditions (including moisture content and compaction) are naturally variable. On a golf course site that covers many hectares there will be variations in soil conditions and microclimates between fairways and also within fairways.

Turf maintenance practices tend to largely ignore this variation and maintenance practices are implemented across the whole site irrespective of specific requirements. At a time where there is a greater emphasis on resource management and minimising waste, the PrecisionSense technology provides a means of mapping this variability and allows for targeted management.

For those unfamiliar with the PrecisionSense technology, it is founded on the principle of 'precise application of resources based on site needs' while the goal is to 'achieve efficiency in resource use by only applying inputs where they are needed, in the right amounts and at the right time to produce high quality turf'.

To achieve these aims, Toro has developed a mobile sensing platform as shown in the photo opposite. The PrecisionSense machine has a series of sensors which measure soil moisture, soil salinity, soil compaction, turf quality and elevation. Measurements are taken every 2-3 metres with over 1000 measurements recorded every hour of operation. As a result, an enormous amount of data is generated allowing each element to be mapped using geographical information system (GIS) software which in turn can be viewed using Google Earth software.

While still in its infancy, the key to this technology is its potential to measure the variability (both minor and major) in site conditions. For instance, soil type is a dominant influence on fertility and soil moisture storage. By having a better understanding of the variability in soil types across a surface, such as a fairway, will enable turf managers to adapt and prioritise management practices to areas most in need. The technology also maps topographical features which play an important role in influencing surface drainage characteristics and soil moisture levels which in turn influence the amount of irrigation applied.

In late May 2012, selected fairways at the clubs involved in the AGCSA's benchmarking project were surveyed using the PrecisionSense machine. To highlight site variables, data collected from two fairways has been analysed and the results are discussed below.





Top two graphics: Figure 1. Soil moisture maps generated by the PrecisionSense machine using GIS software

Bottom two graphics: Figure 2. Soil compaction maps generated by the PrecisionSense

SOIL MOISTURE -VOLUMETRIC WATER CONTENT

Soil moisture content is measured using Time Domain Reflectometry (TDR). The mobile platform is equipped with two 10cm long metal probes which are inserted into the soil every 2-3 metres. A high frequency electrical pulse is transmitted along the probes with the soil's moisture content affecting the response time for the pulse to be sent and reflected back. The duration of this response time is measured by a sensor and used to calculate volumetric water content in the top 10cm of the soil.

Soil moisture levels can vary depending on the texture of the soils, with heavy textured soils retaining high levels of moisture while free draining sands are quickly drained of excess moisture. Rainfall and the application of irrigation also obviously influence soil moisture levels. For those readers familiar with the UGSA recommendations for a method of putting green construction specifications, they suggest greens sands should have a volumetric water content of between 15-25 per cent.

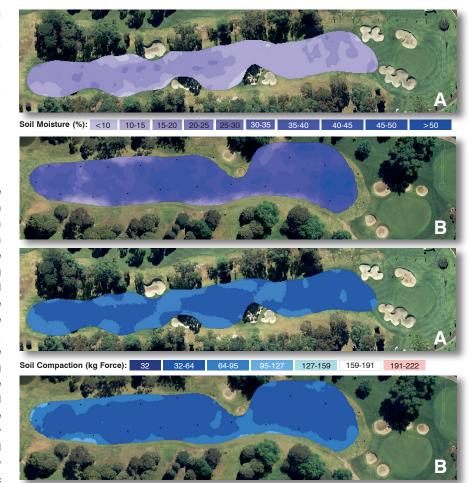
Analysing the maps in Figure 1 (top two graphics, right), there is considerable variation in the soil volumetric content of Fairway A compared to Fairway B. This is primarily due to the varying soil types with the moisture levels for each fairway being consistent with conditions experienced throughout the cooler, wetter months of the year.

Fairway A, which is predominantly sandy loam has a moisture content of around 15-20 per cent or lower while Fairway B consists primarily of clay loam with a volumetric water content of around 40-50 per cent. It goes without saying, but given Fairway B holds an excessive amount of moisture it is more than likely to become waterlogged for extended periods throughout the winter months leading to deterioration in surface quality. It is interesting to note that both fairways have drier sections on their perimeter which is likely to be due to tree root encroachment.

SOIL COMPACTION

Soil compaction is measured by a penetrometer. As the TDR probes are inserted into the soil a cell load sensor measures the force in kilograms required for insertion to a depth of 10cm. The measurement is reported as the maximum insertion value encountered between the soil surface and 10cm.

When analysing the soil compaction data outlined in Figure 2 (bottom two graphics, above)



it is evident that compaction levels are relatively consistent across both fairways. What the mapping does highlight is that the perimeter of both fairways is more prone to compaction than the remainder of the fairway. Based on this information the turf manager can pinpoint what areas are most in need of de-compacting, rather than Verti-drain the entire fairway.

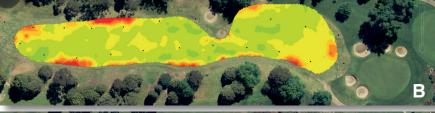
Given soil compaction is closely associated with high wear and turf damage, it is expected this tool will enable turf managers to closely monitor such problem areas, enabling them to adjust their management practices accordingly.

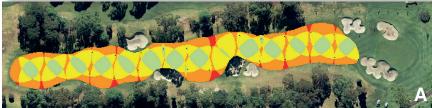
The Toro Precision Sense machine used as part of the AGCSA benchmarking project. 1 – soil sensors measure moisture and salinity content plus compaction; 2 – GPS; 3 – spectrometer measures turf vigour and plant density; 4 – the mobile platform is hooked up to an onboard computer which processes and logs sensor data





Vigour (NDVI):





Irrigation Head coverage: Number of Heads: 0 1 2 3 4 5 6 7



Top two graphics: Figure 3. **Turf vigour maps**

Bottom two graphics: Figure 4. **Irrigation management maps**

In late May 2012, selected fairways at the clubs involved in the AGCSA's benchmarking project were surveyed using the **PrecisionSense machine**

TURF HEALTH

Turf vigour and plant density is measured using a spectrometer. These sensors emit specific wavelengths of energy and measure the amount of each reflected back from the turf canopy. The sensor emits energy in the red and near infrared portions of the spectrum, measuring the amount reflected and calculating a normalised ratio of the two called the Normalised Difference Vegetative Index (NDVI). NDVI values range from 0 to 1. The higher the NDVI value the more vigorous and healthy the turf is.

The NDVI measurement is responsive to physiological changes in turf plants caused by factors such as moisture stress, nutrient deficiency or disease or insect damage which are frequently short-term in nature. Since photosynthesis is a natural process, its intensity can change with the



time of day and microclimatic conditions which can in turn affect NDVI values. NDVI is also responsive to turf canopy and turf density which often reflects longterm or chronic conditions affecting performance.

The NDVI results (Figure 3, top two graphics, left) indicate that there is considerable variability between fairways with Fairway A having an NDVI value of less than 60 which is the equivalent to a low quality/high stress rating. This is in conflict with the visual quality rating taken at the same time. To explain the anomaly, the turf cover on Fairway A consists predominately of common couch grass which in late May had a relatively open, coarse turf cover. As a result, the spectrometer has rated the turf condition as poor.

This data highlights the value of such equipment as a predictive tool, picking up plants that are under stress before it is reflected as deterioration in surface quality. A similar result has been achieved on an AFL training venue where high traffic zones have been identified as being under stress before the turf is substantially damaged.

Fairway B, however, consists predominantly of Santa ana couch grass which when surveyed was still actively growing hence a higher quality rating. The data also highlights the turf cover short of the green and around the perimeter of the fairway is placed under greater stress.

IRRIGATION MANAGEMENT

Potentially the greatest uptake of this technology will be in auditing irrigation system performance together with identifying water conservation measures through improved water use efficiency. To help achieve this the PrecisionSense mobile platform is equipped with a GPS unit which allows the operator to plot stationary objects such as sprinklers, trees, drainage pits, etc.

Once this information has been logged, the GIS software generates a range of maps, charts and data which can be used to analyse sprinkler performance. For example, Figure 4 (bottom two graphics, left) provides information on sprinkler head location, spacings, sprinkler head overlap and performance. All of this information allows the end user to optimise distribution uniformity.

PRECISION INSTRUMENT

The application and uptake of such technology is likely to play an increasing role in the management of large scale turf areas. The PrecisionSense machine itself is easy to operate and the time taken to survey all 18 fairways at a standard sized golf course is expected to take around 10 to 12 hours.

Underpinning the PrecisionSense is the volume of data it is able to generate, however, the key to its uptake is the ability to translate this data into a series of colour-coded maps which are easy to interpret. This enables turf managers to troubleshoot problem areas while the extensive mapping options are seen as invaluable instructional tools.

THE MOWER



The competition doesn't want you to see the Jacobsen ECLIPSE® 322 riding greens mower. They can't match its **ZERO leak points**. They can't provide **individual reel control** to vary cut patterns. They can't offer **programmable frequency-of-clip** from an LED screen. And they can't get anywhere near the true hybrid fuel savings or legendary quality-of-cut. When it comes to the ECLIPSE® 322, the competition can't do anything except hope you don't see it. I guess we just ruined that for them, too.

For more details, please contact:



New South Wales Tel: +61 (02) 9824 0811

K C Farm Equipment

Queensland Tel: +61 (07) 3807 1100 **Gilbert Motors**

South Australia Tel: +61 (08) 8536 2066

Tasmania Farm Equipment Pty Ltd

Tasmania Tel: +61 (04) 2705 1831 Farm World NT Pty Ltd

(

Northern Territory Tel: +61 (08) 8988 9411

Power Turf New Zealand Ltd

New Zealand Tel: (+64) 310 6000

Western Australia Tel: +61 (08) 9475 1600

Godings

Victoria Tel: +61 (03) 9716 9000 The number of wetting agent products now at the disposal of the Australian turf manager means it can be an often confusing process to figure out exactly what product is the right fit. The Pulse quizzes superintendents on their use of wetting agents and what they have found works (or hasn't worked) for them.



Agents of change

ne of the biggest and most constant issues we face at Long Reef Golf Club is weather conditions. Being surrounded by ocean on three sides (see photo below) equates to being vulnerable to constant wind from almost every direction, so wetting agents play a big part in management strategies for this site.

For many years I used quite harsh, older style wetting agents which did a good job but needed to be watered off the leaf and had big burn potential if not washed in correctly. I would mostly use them during the summer months and get around one month out of each application.

For a number of years now I have been using Revolution which I find to be an outstanding product with no burn potential and which is also very friendly to the plant and soil while giving fantastic overall results. In 2011 I was lucky enough to tour the Aquatrols manufacturing and research facility

and was quite surprised at the amount of research and development which goes into these products. The amount of literature available and the science behind many of these products is all there in black and white and much of it often seems over the top or unbelievable.

Personally, Revolution does exactly what I want out of a wetting agent; I use it on a monthly basis for around six months of the year on greens only. The science behind the product says it should be used as a programme over a continual period as it binds to the soil particles with longer term benefits. I recently used it mid-winter as a quick fix when the greens were hard and crusty and water would not penetrate and it also worked very well in this situation.

I find that Revolution gives me very consistent moisture content throughout my greens and it makes hand watering very easy, allowing water to penetrate very well at all times. I also feel it adds to the health of my plant and is environmentally friendly to my soil, as some of the harsher wetting agents are not the best for microbial activity. It is not a cheap product but it certainly works for my situation." Peter Donkers, Long Reef Golf Club, NSW

Because of its exposed location, wetting agents play a key role in the management of Long Reef Golf Club in Sydney



Providing expert advice for Contact AGCSA HR and Best Practice Manager Daryl Sellar 0408 322 397 daryl@agcsa.com.au To improve



"Since 2000 I have had a direct involvement in research with the Aqua-Aid company in the United States and have had first-hand experience with their products, old and new.

In 2003 I started trials of their OARS (Organic Acid Removal System) product and I have used it ever since. This product addresses the cause of isolated dry patch and rectifies the problem rather than masks it. I have used it in combination with other wetters including penetrants and omnidirectional surfactants and enhanced kelp extracts and wetters combined and have had excellent success in rectifying varying soil/water issues.

We found that after just two treatments that up to 17 per cent of organic acids which coat the soil particles were removed. In our case at NSW Golf Club that was enough to see a huge improvement in water penetration and I have not seen any isolated dry patch since using the product. We currently use OARS on a monthly basis at 10-20 litres per hectare and water in, using the higher rate during the summer months.

Along with OARS, and Aqua-Aid Liquid and pellets, we use AquaMaxx which is a surfactant and wetting agent with enhanced kelp extracts. We find that this combination works for us in a number of ways; OARS removes the cause of isolated dry patch, the Aqua-Aid penetrant moves water away from the surface to deep in the profile, and AquaMaxx encourages root growth and density.

Over the years I have seen many wetting agents come onto the market claiming to be the saviour in controlling isolated dry patch, but none have ever lived up to those claims. In our case, by having a system of products working together, like the three named above, it is the closest I have seen that really offers substantial relief from isolated dry patch. Gary Dempsey, NSW Golf Club, NSW

"Perth's summer is extreme to say the least and we have trouble not only retaining water in the profile but actually wetting the sand. At Mt Lawley we use a lot of wetting agents, at least 1600 litres annually. Broadwet is used three times a week, injected through our irrigation system at 2 per cent of water

volume. The proof of its benefits is witnessed particularly on bunker walk-ins and the very edges of the rough where irrigation is at its extremities. The downfall is the amount of weeds we get growing in bunkers.

Aquaforce is used monthly at 30 litres a hectare on greens and for all spraying on greens 5l/ha of Aquaforce is added, generally a fortnightly application. Our programme starts around September and with any luck we'll get a little rain with it which sets us up for the long summer ahead. The programme continues through to April or so when the rains start." Glenn Cross, Mt Lawley Golf Club, WA

"Over the last five years at Whittlesea Golf Club I have introduced a programme of applying wetting agent to all our greens. After a lot of trial and error I found that starting to apply wetting agent in the middle of spring helped our older push-up greens quite a lot. We have 12 greens built to USGA standard that give us very few problems through summer, but our seven old push-up greens that are over 30 years old have always been problematic. Due to the amount of compaction and silt and clay they are made of, without wetting agent they wouldn't get through summer.

My objective with wetting agent is to allow the water to penetrate the surface and retain the moisture at a reasonable depth. Once we got the moisture level in the green at a reasonable depth we could see the increase in root depth. Before using wetting agent, on a regular basis we could see that the water would bead and run off the old greens. The other thing that would happen, which is a sure sign that the moisture level is low, is that they wouldn't develop dew in the mornings whereas the areas that held moisture would be covered by dew.

We now start putting wetting agent out in midspring on the old greens, and then once summer is in full swing we apply it to all the greens. We put the wetting agent out through our injection system once a month with our normal watering programme with the occasional liquid fertiliser added, then as summer really kicks in we hand-water the wetting



Wetting agents are a big part of our budget but the last to be cut. Stay true to a proven product that you know works and don't be tempted by cheap alternatives.

- Darren Wilson,
Wembley Golf Complex, WA

superintendents and golf clubs course maintenance standards

agent in. I have tried a lot of different wetting agents and they all worked quite well but the one I use now is Parform from K&B Adams. This wetting agent is good in that it does not need to be watered in straight away, thus you don't get burning like a lot of other products. When hand watering with Parform I usually spray late in the afternoon then let the irrigation system water it in later.

In summary, for us at Whittlesea we have seen the root depth develop on the old greens making them less susceptible to burning off and the high traffic areas on the greens tolerate a lot more wear." Brad Tucker, Whittlesea Golf Club, VIC

"Wetting agents play a key role in our maintenance programme at Townsville Golf Club and are used to treat a variety of factors. Maintaining greens in the tropics has a unique set of challenges, coupled with site-specific problems which make choosing the correct product vital.

In Townsville we incur two very different seasons – the dry winter months and the hot tropical summer/ wet season. During the wet season, which typically lasts four months, we may average 100mm or more a day which can persist for weeks at a time. This requires a product that can move water very rapidly through the profile and leave the putting surface dry. During the dry season we may not experience substantial rainfall for up to eight months! This then requires a product that can retain moisture.

Adding to the climatic challenges, we have 27 holes with no consistency in greens construction. Most greens have no drainage, some are push-up and others conform to a USGA construction. As you might envisage this makes it very hard to obtain uniformity across all 27 holes. Choosing the correct

uniformity across all 27 holes. Choosing the correct

products when controlling moisture is paramount to providing members with a consistent putting surface and I couldn't imagine life without them." Jason Foster, Townsville Golf Club, QLD

"Here at Waterford Valley we have big undulating greens so wetting agents play an important role. Over the past six years I have used lots of different wetting agents/surfactants. Over the last two wet winters I have incorporated a penetrant programme using Floratine's Pervade at 5 litres per hectare to help pull the water through and thus create more oxygen in the profile. This has been very effective in creating a firmer, dense surface through winter.

In summer I have been using reverse block co-polymers in Tournament Ready and Retain Pro at label rates. I feel that these two products are safe with no burn potential and have the ability to hold water. Our greens have a lot of high slopes causing a lot of hotspots, so the best wetting agent for these areas I have found is the Retain-Max pellets hand watered out of an applicator. These help the turf recover very quickly as we have been pushing our greens close to wilting point the last couple of years in an effort to work on root depth." Tom Smith, Waterford Valley, VIC

"Wetting agents form a critical part of our management operations at Kings Cove and the one product I couldn't manage the course without. Our irrigation water is very hard and given the opportunity will run away before it penetrates the grass canopy. In the main, our topsoils are sandy loam and combined with being on the coast and open to wind from all directions, they dry out very quickly.

I regularly boom spray and inject (we recently installed a MD6 Dositec wetting agent injecting unit) a wetting agent and penetrant combination to give us the best bang for our buck on all our formal playing surfaces. We also hand-water greens hotspots with wetting pellets, which is essential for peace of mind." Brad Marsden, Kings Cove Golf Course, VIC

~~~

choosing the correct
wetting agent product
when controlling
moisture is paramount
to providing members
with a consistent putting
surface... I couldn't
imagine life without

them.
- Jason Foster,
Townsville Golf Club, QLD



Get your signed copy of Thom Nikolai's book.
The superintendent's guide to controlling green speed.
This great book, now on special, through the AGCSA Bookshop

03 9548 8600





"A couple of years ago we had greens that were remaining wet on top and dry at the bottom of the profile. I changed to a different soil wetter and along with a different method of greens renovation I was able to reverse the situation.

I then found I was experiencing isolated dry patch. I was told the so-called wetter that I had changed to was not the best for this dry patch. So I changed wetters again. I now find I am using one type of wetter in the wet season and change to a different one in the dryer part of the year. I believe it is working, but it has taken a while to get there.

"I have also experienced problems on one of our trial plots and also on a new TifEagle putting green where it is constantly dry. I think it needs a different type of wetter, maybe something that helps hold water. The question then becomes, how do you identify these different wetters? When you ask the sales reps, I am not convinced that they know much about it either.

I have injected wetters with our irrigation during the so-called drought that we experienced and it did a great job. I have proven that too because we had a block of sprinklers that could not be operated by the irrigation system and hence did not receive any wetter and the difference between these areas was like chalk and cheese." Pat Pauli, Horton Park Golf Club, QLD

"Although it is winter, I am already getting my mind into gear for the coming spring and the heart of summer. I have a heavy loam golf course and pushup pure bentgrass greens that are more than 50 years old that now have a rootzone formed from years of topdressing. This would probably sound familiar to quite a few supers.

On the subject of wetting agents I have used a certain wetting agent on the greens to reduce localised dry spot for quite a few years. This product is a straight block co-polymer with the active alkoxylated polyols. The claim of this product is that it will last in the profile for up to three months and I have found on my 'non-USGA profiles' that it does help with keeping the greens free of trouble for the time claimed.

e have used wetting agents here for the past 10 years and have been injecting wetting agents through a variable speed proportional pump straight into the mainline for the past six years. Pumping proportional to the mainline flow is the key. We fill up a 1000 litre bulk tank with straight wetting agent at a rate of 5 litres per hectare one night on a weekly basis from October through to early March. This is over the whole golf course through the whole night's programme, with every sprinkler on the course or programme activated.

As much as 150-200 litres of straight wetting agent can be applied during the peak of summer depending on the irrigation ET rate. We have calculated this saves us 15 per cent in water usage along with the many other benefits such as limited dry patch on fairways and tees, no puddling and a deeper penetration of the water through the profile.

We still apply a stronger wetting agent to our greens every six weeks via a boom sprayer which is watered in immediately. This is the only way we reduce the pressure from dry patch on our bentgrass greens through our extreme summer. Once our sands over here become water repellent



they are very hard to re-wet so the key is to get in early before dry patch appears.

Wetting agents are a big part of our budget but the last to be cut. What I find doesn't work are cheap imitation wetting agents that are a waste of time and money. Stay true to a proven product that you know works and don't be tempted by cheap alternatives that appear every now and then promising fantastic results; 95 per cent of the time they don't." Darren Wilson, Wembley Golf Complex, WA



With our heavier fairway soils, now that I have got my head around the different chemistries available, I am using an alkyl polyglucoside product simply to increase the penetration of the irrigation water. I have not really had problems with the fairways but with the addition of wetting agent via an injection unit I feel I have a mixture of more effective irrigation along with a little water conservation." Anthony Toogood, Commmercial Golf Resort, NSW

**Editor's Note:** John Neylan's column continues the discussion on wetting agents – see pgs 33 and 34.



Pick up Dr Frank Rossi's book, now on special, through the AGCSA Bookshop 03 9548 8600





Although a national Australian superintendents association had its origins back in the 1970s, it wasn't until August 1991 that the AGCSA as we know it today became a registered organisation

On 1 August 2012 the Australian Golf Course Superintendents' Association quietly notched up an important milestone, celebrating 21 years as a registered organisation. Inaugural AGCSA president and life member Doug Robinson joins with his fellow directors officially elected at the 1992 national conference - Peter Sawyer, Jeff Lane and Wavne Dale to reminisce on what was a key period in the history of the turf management industry in Australia.





n days gone by turning 21 was the stage in life where one 'came of age', received the key to the door and was considered an adult. It would be inappropriate to suggest that the Australian Golf Course Superintendents' Association has 'come of age' in its 21st year. It matured as an organisation many years ago.

While I have been less active in the turf industry in recent times I maintain a strong interest in the activities of the AGCSA. Being involved with state (NSW and Queensland) as well as the national association for many years, it has been gratifying to see the dreams and aspirations of those in the golf turf industry who worked so hard in the years prior to 1991 recognised and supported.

It has been suggested that the early days of the association were the 'halcyon days'. The definition of halcyon is 'calm and peaceful, tranquil, prosperous, golden'. The years leading up to and following incorporation were far from calm, peaceful and certainly not prosperous and I can recall clearly the issues that divided the state associations in the late 1970's.

From 1978 to around 1985 state relations were at times very turbulent and at a low ebb. The late Niel Adams from Western Australia helped bridge the gaps and calm was restored following the Queensland conference in 1986. The one factor that seemed to always shine through was the need to have a viable national association that could stand

alone and represent the interests of the golf course superintendent. While it took what seemed like an eternity to achieve that goal, it did happen and much of the past was forgotten.

The major event in the association's calendar has been the turfgrass conference and tradeshow. The 1992 conference in Launceston (17-22 May) was the first one organised and hosted by the national body; prior to that the states organised the conference on a rotational roster.

I recall we had the massive sum of around \$6000 to run the Launceston conference. Believe me it took some sweet talking to convince the professional conference organisers that we could meet the cost of staging the event and not to worry that their fee would be met. I think we may have had the invited speakers pay their own fares and we reimbursed them when we had some cash flow from the event.

The Adelaide conference in 1994 was also a first as it was the first time a convention centre was used and the trade show was set indoors as a static display. Again the concern from a financial perspective was present, but the time was obviously right and we came through with flying colours.

Perhaps the most significant move the Board made at that time was to appoint a full time executive officer and it is here that I have to pay tribute to the work of Euan Laird. His tireless efforts certainly contributed to building the positive base that supports today's association.



The AGCSA board members of that time – Peter Sawyer, Wayne Dale and Jeff Lane – were fantastic in their dedication to the task of making this 'new' organisation succeed. Many hours of debate took place on a number of issues, one of which was where should the association's headquarters be based

In the end Melbourne was selected as at that time it was the most central as far as travel was concerned. Melbourne was also the home of the Australian Golf Union (AGU) with whom we forged a working relationship and through Colin Phillips the AGU generously provided office space free of charge at Golf House in South Melbourne.

On reflection I am somewhat amazed at the workload that was undertaken at that time by the Board of four and the CEO. There seemed to be a need to alert the world to the fact that we were now a united group of professionals and all of those dreams and aspirations of our forefathers were to be fulfilled as soon as possible.

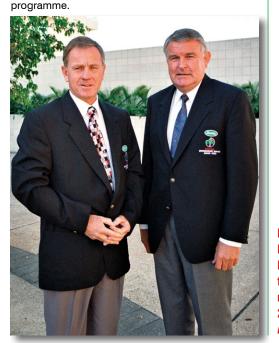
The establishment of an industry journal was one such objective that was undertaken and it proved to be a difficult one to get right. Given that we had no knowledge in journalism and publishing, the first publication we co-established did not meet our editorial objectives and the difficulty in negotiating an outcome that met the needs of the membership proved almost impossible and the need to part ways was difficult but obvious.

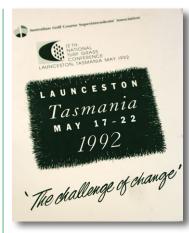
The assurances of the second publisher likewise proved to be misleading and what was believed to be 'our' magazine proved otherwise. I guess these experiences helped make future Boards much wiser and we now have Australian Turfgrass Management and what a success it has been. Congratulations to all those involved with the publication and I have no doubt that those people from the '60s and '70s who saw the need for such a journal would be justly proud.

In the 1990's the GCSAA made moves to be active in South East Asia and there were indications that they had Australia in their sights. Fortunately we did not have to meet that 'threat' and now enjoy a relationship based on equal footing. The relationships that have been developed with the various international associations can only benefit the industry as a whole. Interestingly, the name Australian Golf Course Superintendents' Association was deliberately chosen over the suggested Golf Course Superintendents Association of Australia because the acronym would have been the same as that of the US.

Along with international relations, one of the ideals from those early years was that the national association would be able to work in close harmony with the various state associations. In doing so it was seen that the national office could help reduce some of the administration burdens and eliminate the duplication of activities experienced by the state bodies and in doing so provide a vehicle for closer communication and interaction between states. Sadly, there hasn't been much headway made in this direction.

A frustration from those early days was parochial attitudes and the one that stands out with me is turf research and development. Dedicated efforts were made to try and work with what was then the Australian Turf Research Institute to ensure that Australia could have a viable turf research





The 1992 turf conference in Launceston was the first to be organised by the newly formed AGCSA

Inaugural AGCSA president Doug Robinson (right) and secretary Peter Sawyer (left) were honoured for their efforts in forging the new national association with the 2002 AGCSA Distinguished Service Award Our efforts were treated with little more than contempt and the suggestion was the AGCSA was a 'flash in the pan' and 'what did we know' and 'what could we possibly offer'. I think history has provided the answer to that and I can only hope that AGCSATech can continue to develop and provide the services upon which the industry depends.

It has been extremely gratifying to see the AGCSA develop over the past 21 years into the respected body that it has become. Congratulations to all who have played a part in the development of the association over the past 21 years and I wish the present Board and staff every success for the next 21 years.

#### PETER SAWYER (1992-1994) INAUGURAL AGCSA SECRETARY

Many of the superintendents I knew in the 1980s have now retired or moved to other employment, but looking back it was a vibrant and creative decade which led to the development of what we now know of as the AGCSA. Sadly I have lost contact with many of those superintendents in Australia as I am currently based in South East Asia constructing golf

courses, however, I still remain informed with all the news from home as an international member.

During my time as president of the Victorian Golf Course Superintendents Association (1985-1989), the states (with the exception of Tasmania) all had their own associations with some more advanced than others in terms of membership, policies and financial position. Attempts to bring the groups together as a national body with a uniform voice had been tried, delayed and failed.

Our preliminary meeting of state association board members at that time was tasked with the duty to pull the states together to form a united Australian association. The decision to establish a fraternal association without industrial involvement was finally resolved. The states, as one voice, believed it was integral to be impartial to industrial decisions and establish a fraternal organisation that worked towards improving the profession and the betterment of the association.

The initial AGCSA conference held in Launceston (1992) proved to be a popular and profitable success. Doug Robinson and myself worked tirelessly with the Tasmanian committee



Jeff Lane (left) pictured with Doug Robinson and Euan Laird in 1995

#### JEFF LANE (1992-1994) - INAUGURAL AGCSA VICE-PRESIDENT

hat time as a member of the inaugural AGCSA Board was certainly an interesting period. For the first few years we had to keep the budget pretty tight which wasn't much fun given that I was travelling from Perth. Catching the 'midnight horror' to Melbourne and then having to wait three more hours for the other Board members so we could share a taxi sometimes took its toll. And then there was the time I had to knock on the door and wake up the owner of a shonky hotel in St Kilda at 1am after getting in on a late flight!

However, those first few years were exciting and a privilege to be a part of, especially getting to work with the likes of Doug, Peter and Wayne who were sensational in the way they went about getting the association up and running. Each had a very strong conviction about what we needed to do and what was possible.

One of the biggest obstacles that I remember was getting all the states 'on board'. This was no easy task as some states were happy to have a national association, some didn't know there was a national association and others just thought they were the national association! Slowly, slowly though we kept chipping away and look at it now.

Appointing our first full-time CEO in Euan Laird was an exciting time and I'll never forget that meeting and interview process. The list of candidates was certainly diverse and the process we went through was again quite an experience for me in seeing just how much the other guys thought their way through processes in such detail. Euan turned out to be a great choice and helped get us up and running.

Preparing for our first conference that would start generating the revenue for ourselves was one of the other early projects, along with getting our own magazine started and also dealing with

sponsors and everyone else.

Getting the AGCSA up and running on its own often came with its share of detractors but it's great that, over the past 21 years now, we have had an amazing group of board members continue on with making the hard decisions that have continued to see the AGCSA develop.

The only thing I would like to see improve in hindsight now is more promotion of the

profession as I don't see superintendents getting the respect they deserve. Many superintendents are leaving the profession for better alternatives and many golf clubs are taking far less effort in selecting new superintendents to take charge of their most precious asset – the golf course.

Thanks to all those who have contributed to making this industry such a fantastic one to be a part of and I hope it continues to grow stronger.

Perhaps the most significant move the inaugural AGCSA Board made was to appoint a full time executive officer Euan Laird. Laird is pictured with GCSAA's Steve Mona at the 1993 GCSAA conference headed by Danny Gilligan and Shane Templeton to set up the programme and venue. The first Board of directors – Doug Robinson, Wayne Dale, Jeff Lane and myself – were elected to office at the inaugural AGCSA Annual General Meeting held at the Launceston conference.

The name of the association, logo, constitution and membership rights and categories were all very important decisions that had to be made. Establishing a secretariat, office, funding and our magazine were all established in those early days. The boldest step, however, was to employ an executive officer Euan Laird and establish an office and headquarters. The AGCSA had now made a giant step forward moving away from a volunteer-based operation to operate as a business. This required the association to pay salaries and make a profit if we were to survive.

Our first turf magazine (TurfCraft) editor Ted Drinkwater was a very important move forward to promote the golf superintendent and our association. The magazine was a very high quality production, which quickly gained popularity throughout the turf industry and became the voice and tool for communications to our members and associates.

It is gratifying for me to observe the progress that has occurred during the past 21 years of incorporation. Let's hope the next generation of



superintendents maintains the same passion and incredible skills I have observed during my time in the golf industry. The development in machinery, irrigation, pathology, and plant species has progressed at lightning pace and we need the support of the AGCSA to keep us abreast and informed in our rapidly improving and changing industry.

South Australia's Wayne Hinton (right) served as the AGCSA's second president, taking over from Doug Robinson

#### WAYNE DALE (1992-1994) - INAUGURAL AGCSA TREASURER

B efore incorporation considerable work was carried out by the individual state associations whose delegates, with their members' support, agreed to pursue the establishment of a national body we now know as the AGCSA, as many earlier attempts struggled to get support and failed in one way or another.

It was certainly an exciting time being on the inaugural AGCSA Board, first proceeding with incorporation then drawing up policies and programmes to structure something for superintendents, a professional association to support and educate them in there every day endeavours on the course. Among the key moments in that fledgling period was the appointment of Euan Laird, already an established professional in the turf industry, who had a good feeling for where we wanted to go and how to get there. Another early move was to set up good liaison with the turf trade industry as they were a good financial support.

As policies were structured, implemented and further developed we could see the path which could give superintendents the professional support to carry out their duties and deservingly as time passed the AGCSA came to be looked upon as an industry leader.

My fellow board members were believers in what the association should be and could be and it was a great privilege to work with them. I was proud to be a part of those early days and although I only served one term on the Board I have continued to watch with admiration how the association has developed into what it is today.

I will always look back fondly on that time on the AGCSA board. I would thoroughly recommend to fellow superintendents that they consider putting themselves forward for such a position. Enjoy your 21st anniversary AGCSA and I look forward to many more milestones in the years ahead.



Peter Sawyer, Wayne Dale, Jeff Lane,
Robert Ashes, Wayne Hinton, Paul
Bevan, Jim Porter, David Scaife,
Craig New, Mark Couchman, Peter
Schumacher, Jeff Gambin, Robert
MacDonald, David Warwick, Martyn
MacDonald, David Warwick, Martin
Black, Jon Penberthy, Martin
Greenwood, Allan Devlin, Pat Pauli,
John Odell, Bryce Strachan.

Current AGCSA Board (2012)
President: Peter Lonergan (QLD)
Directors: Darren Wilson (WA), Tony
Fogarty (NSW) and Brett Balloch (VIC)
Current AGCSA Staff

Peter Frewin, Brett Robinson, Phil Horsburgh, Andrew Peart, John Geary, Simone Staples, Lyndel Conway, Jo Corne and Allison Jenkins





## Are your operations really best practice?

Terry Muir takes a timely
look at pesticide usage
compliance and best
practice and argues that
there is a change of focus
required by many golf
clubs if they are to meet
the high expectations of
regulatory agencies.

Above: Any decision to use pesticides requires informed risk evaluation, risk communication and robust risk management strategies

any golf course superintendents are caught in a conundrum, even a moral dilemma, when it comes to trying to maintain perfect turf and the practicality of protecting their jobs. Superintendents provide more than great playing surfaces. They also provide healthy outdoor environs for the game to be played in, but is the focus on presenting perfectly manicured turf free of every pest sustainable?

Superintendents, general managers, club boards and greens committees accept that there is significant risk to the business associated with leaving certain pests uncontrolled on their turf. Left uncontrolled, pests can cause serious consequences and in many cases pesticides are the only viable alternative.

Controlling pests using pesticides also carries risk, so the club has an important business decision to make regarding pesticide use. The club, as a business, is required to demonstrate an understanding of the real, predicted and perceived risks that pesticide use on their course poses to the environment and to the safety and welfare of members, guests, staff, contractors and the public.

When used correctly, pesticides are legitimate turf management tools. When used incorrectly they have the potential to cause illness or harm

to humans, harm non-target organisms, pollute land and water, contribute to the development of resistance in some pests or result in prosecution. If not used at all, turf quality could suffer and compromise club revenue. Therefore, any decision to use pesticides requires informed risk evaluation, risk communication and robust risk management strategies.

Every superintendent requires a simple formula for getting a complete 'story' or understanding of any pesticide activity on their course. Likewise, the general manager and board need to be able to understand that 'story' because if something goes wrong they could all find themselves explaining their 'story' to the regulatory agencies.

#### WHERE TO START

Using a journalism analogy, a purist journalist will argue that no story is complete until six simple questions are answered – who, what, when, where, why and how. Missing any of these questions would leave any story incomplete. This concept is also useful in pesticide management activities because it provides a formula for getting the complete picture on any pesticide decision or activity.

The premise of the 'five W's and one H' is that for a pesticide use best practice assessment to be considered complete it must answer a checklist of the six questions. For example:

- WHO: Who identified the pest; who will order the pesticide; who will supply the pesticide; who will mix the pesticide; who will dispense the pesticide; who could be exposed to the pesticide; who will run out the rinsate; who will complete the spray log?
- WHAT: What is the pest; what are we trying to achieve; what is our pest threshold; what will it cost to spray versus not spraying; what chemical will we use; what regulations must we conform with?
- WHEN: When do we spray; when do we read the label; when do we complete records; when do we mix; when do we advise players/neighbours of spraying
- WHERE: Where is the pest; where are there sensitive receptors (people, environment); where are we proposing to spray; where do we mix; where did we spray; where is the MSDS; where is the label; where do we place warning signs?
- WHY: Why are we applying pesticides; why must we follow all label instructions; why are we using this specific pesticide; why do we wear PPE?
- HOW: How will we apply the product; how will we communicate this to staff and players; how can we respond if something goes wrong; how can we mitigate any spills?

As journalists have found for hundreds of years, all six questions are essential. Missing any of them leaves a gap that must be filled by assumptions or imagination. This process does not leave key decision makers guessing on key questions.

#### CONTROL OF USE OF PESTICIDES

Once a decision is made to order, purchase, store, dispense or dispose of a pesticide, the state and territories of Australia have regulatory controls in place that are administered by state agencies. The extent of the controls exercised by jurisdictions under their respective legislation is very similar with the most significant difference being the use of a pesticide off-label in Victoria.

However, across all jurisdictions it is a basic assumption that everyone applying chemicals takes personal responsibility for the use of that chemical, including any unintended effects. To manage and limit potential liability many clubs are moving to best practice.

#### BEST PRACTICE – PROCEDURES AND PROCESSES

What is best practice? With respect to pesticide management it is 'practices designed to produce an outcome that is effective, of high quality and integrity'. All golf course pesticide management practices must be designed to optimise corporate performance and accountability across the business.



It requires not just documented procedures but also processes of implementation, training, records and competency testing.

In its simplest form a procedure is a way in which one works to accomplish a task. For example, the running out of rinsate can be a sequence of steps that include preparation, conduct and completion of the task. Each step can be a sequence of activities and each activity a sequence of actions. Procedures tell staff how to do something and golf course maintenance staff need procedures whether or not the task they have to perform is complex or routine. Why, because it must be performed consistently.

If a club's management team is not concerned about how rinsate is run out or how a chemical is stored and is interested only in the result, they won't provide procedures for staff but simply issue instructions such as 'run that out over there', or 'put that container in the shed'. These are simply work instructions telling staff to do 'quantitative' work rather than advising them how to do it to a 'qualitative' standard.

All activities involving pesticide use and management on a golf course should be designed with the end user in mind. Any sequence of steps involved in pesticide management can be expressed as a procedure that is intended to cause someone to act in a certain way to accomplish a task. Robust procedures will follow a uniform format with a purpose statement, applicability statement, responsibilities and then activity statements.

While some superintendents and turf managers view policies and procedures as a nuisance put in place by management, many view having things documented as a good thing. They see good reason to document what their staff do, why they do it and how they get the job done.

Today, the work that must be done to be compliant and to properly manage pesticide use is not insignificant and on top of all that work superintendents are now being told that doing the right things isn't enough, you now need to document what you're doing as well.

The law surrounding the use of pesticides is regulated across environmental, health and workplace and safety agencies and compliance with these laws is not optional

The only way to ensure that you can get credit for doing the right things is by documenting what you're doing





Above and far right: Staff must understand the real purpose of why a procedure is necessary in the first place. The most effective way to develop a supportive belief system is to structure learning experiences, such as spill exercises or team challenges, that allow staff to 'discover' the truth

I have seen it in board rooms, in the general manager's office and the superintendent – that rolled eye look which is often accompanied by the question, "Why do I have to document everything I do even if I can show I'm doing the right things?"

US risk management guru David Schneier answers that question in his article "Why do you need policies and procedures?" He discusses how managers, regulators and auditors are human. Some are smart and savvy humans, some are sensible and knowledgeable humans and some are just humans. Or rather, not everyone does their work the same way. The only way to ensure that you can get credit for doing the right things is by documenting what you're doing so that anyone coming in and trying to gain an understanding of how things run within your four walls has it laid out for them.

Schneier comments further that if a regulator/ examiner/auditor/manager wanders logically and physically through your work operations, they're going to look for what they'd expect to find thus leaving you and your organisation opened up to greater scrutiny. They pull out lists that include everything they could ever hope, expect or dream to find and start asking for items on that list.

If you give them your road map explaining at the policy level what your organisation is committed to doing and follow that with supporting procedures breaking out into detail exactly how those procedures are supported, you're paving the path to be followed. You get to steer the examiner in the direction that you want them to go, the direction that your organisation follows.

If everyone had their documentation in order everyone's job would be that much easier. If you knew what regulators and auditors looked for and often found you'd also see where you'd benefit. Schneier cheekily concludes his article by commenting "Oh, and one more reason why you should do it – the regulators require you to do so!"

#### PROCEDURE IMPLEMENTATION — TRAINING AND MONITORING

Education and training is probably the most widely recognised critical success factor because user understanding and buy-in is essential. Management teams often underestimate the level of education and training necessary to implement compliance procedures and protocols. The real benefit from procedures is from the way they are used.

Staff must understand the real purpose of why the procedure is necessary in the first place. If not they won't see the value in following the actions detailed in the procedure. This will require training, monitoring and post implementation training. The challenge is managing behaviours and beliefs.

While documented procedures can force behaviours, we want those staff involved in pesticide use to develop a belief or set of beliefs that support the behaviours we want from them on the job. Beliefs are formed out of experiences so simply telling the spray tech what they should believe is a fairly ineffective way of changing their beliefs. So too is just simply displaying a procedure.

The most effective way to develop a supportive belief system is to structure learning experiences that allow staff to 'discover' the truth and many clubs are doing just that. They are delivering simulated emergency spill exercises for their staff to 'test' both their response capability and competency and their beliefs about spill response and management.

'Team challenges' are also good as the leaders, the laggards, the risk takers, the communicators and the followers are identified and their current beliefs regarding team work, emergency response and cohesion are identified and challenged. This type of post-procedure implementation training can also help identify problems and encourage the exchange of information.

#### THE LAW

Label instructions on pesticides provide users with specific directions for the use of a registered pesticide product. These products and their labels are registered with the APVMA under the Agricultural and Veterinary Chemicals Code Act 1994. This legislation also allows the APVMA to issue a permit for 'off-label' use, on application. Permits can be issued for trial, emergency and minor use purposes.

In Victoria, the DPI encourages the use of products according to the label, however, under certain provisions off-label use can be permitted with the exception of 'restricted use' chemicals. Those provisions are that:

- The maximum label rate is not exceeded;
- The label frequency of application is not exceeded;

#### CHEMCLEAR GEARS UP FOR NSW COLLECTION

NSW turf managers and growers have until Friday 14 September to register for ChemClear's next NSW collection which will take place in October.



As of 20 August more than 23 tonnes of chemical had been registered for disposal from just under 100 chemical users across the state. Nearly 7.5 tonnes of that will be collected free under the stewardship programme because the chemicals come from one of 94 manufacturers participating in the drumMUSTER and ChemClear programmes. Chemicals not registered with the programme will be collected, but there is a per litre disposal fee. To register call 1800 008 182 or visit www.chemclear.com.au.

- Any specific label statements prohibiting the use are complied with (e.g.: DO NOT statements);
- Any person who chooses to use these chemicals in an off-label manner does so accepting total personal responsibility for residues in the environment and any produce and WHS issues.

This approach in Victoria also has the effect of minimising the potential liability to the State Government of any adverse outcomes arising from the use of pesticides.

The law surrounding the use of pesticides is regulated across environmental, health and workplace and safety agencies and compliance with these laws is not optional. If you are a superintendent in Victoria using off-label, or a general manager of a Victorian club allowing the use of off-label, or a superintendent in any other state or territory using pesticides, it is your responsibility to transition your club's pesticide use to a best practice model.

To make a transition from procedures towards overall process management, an organisation must answer whether it has:

- Clearly defined what its pesticide use objectives are and how it will measure and review the success of achieving those objectives;
- Evaluated the impact of those objectives on the interested parties;
- Designed the critical, end-to-end processes necessary to deliver the objectives;
- Assessed and provided the training resources, skills and competence to make the processes work.

#### PERSPECTIVES

Finally, we see four main lenses or perspectives through which to view the effective way forward in meeting the high regulatory compliance performance required in the industry. They are:

The Health Perspective: Pesticide-related illnesses are potentially preventable and the keys are early recognition and surveillance. Every golf course can lower the risk of pesticide-related illness by having in place effective and targeted interventions and educational programmes for staff and contractors. In addition, by monitoring staff and keeping meticulous records of pesticide use you can increase your ability to detect trends.

The Legal Perspective: The prime responsibility for complying with the law, as in any other field, lies with those who are subject to it and ignorance of the law will not shield you from the consequences of breaking it. Put simply, it is much easier to comply than explain why you haven't.

The Professional Perspective: Acts in each state, such as the NSW Pesticides Act 1999, provide a strong compliance mechanism for the appropriate and safe use of chemicals. Overarching state and national laws, any chemical substance used for the control of pests must be APVMA registered.

It is a reasonable assumption that a practicing professional in the turf industry should be more than just aware of their legal and best practices responsibilities. Golf course environmental and safety governance is an increasingly complex challenge and every superintendent and GM must be able to explain their environmental and safety governance arrangements clearly and articulately, including how they support the business strategy.

The Moral Perspective: The professional perspective tests the ability and experience of the individual to make sound judgment and critical assessments on a day-to-day basis testing their own moral and ethical behaviour. Economic pressures, diminishing budgets and demanding timelines can pervade and test good moral judgments. Moral behaviour is seen as determined by a strong sense of doing what is right. A mistake, misuse or misjudgement in the use of chemicals can lead to prosecution, severe impacts at the professional level and terrible disruption to family and personal relationships.

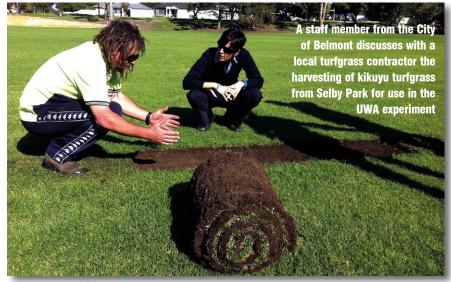
#### CONCLUSION

These days we talk about risk management as the accepted approach for controlling environmental and workplace health and safety hazards. Risk management can be all things to all people, but for the environment and health and safety, it is (at least) three things – identify, assess, control (IAC). IAC can be used to reduce the pesticide use risks in the workplace.

The underlying principles of pesticide use management and the current regulatory climate should leave people in no doubt that the need to change from instructions-only based models to a procedures and processes based model is not about perception or semantics.

There is a very real change of focus required by many golf clubs if they are to meet the high expectations of the regulatory agencies. Adjusting turf expectations rather than trying to achieve television golf perfection at the expense of best practice might be a good place to start.





# Optimising water allocation usage

University of Western
Australia researchers
Louise Barton, Sam
Flottmann and Tim Colmer
outline a new three-year
HAL-funded project which
is investigating approaches
to best manage current and
future water allocations for
turfgrass in public open
spaces.



Know-how for Horticulture™



outhern Australia, like many other regions of the world, is expected to experience a significant decrease in water resources due to changing climate. Turfgrass managers are under continued pressure to restrict water use, while also maintaining high-quality surfaces.

The importance of maintaining sports turfgrass so as to encourage physical activity is well recognised within the community. In addition, there is increasing evidence that well designed and maintained green spaces are also needed for mental health and well-being.

Water allocation is a key water planning method being utilised for irrigating public open spaces in southern Australia. For example in Perth, 7500kL/ha is allocated annually to irrigate public open spaces. It has also been acknowledged that water planning is unlikely to be a one-off process due to the impact of climate change on water supplies, and that an adaptive approach to water supply and planning is required in Australia. Understanding how to best manage turfgrass on current and possible lower future water allocations is critical for managing public open spaces.

The amount of water allocated to turfgrass managers has been established by state governments; however, the most effective way to distribute the allocation during the irrigation season is at the discretion of the turfgrass manager.

In southern Australia, delaying irrigation until late spring or early summer may increase the incidence of water repellency, especially on sandy soils. On the other hand, applying too much water early in spring will leave less water for summer and possibly no water in late autumn depending on when the season 'breaks'.

Research is therefore needed to assist turfgrass managers to best manage their current water allocation and to assess if the same strategies will also be effective should water allocations be further lowered.

#### **PROJECT AIMS**

The overall objective of our field-based project (TU11012) is to investigate approaches to best manage current and future water allocations to turfgrass in public open spaces. Optimising irrigation scheduling and reducing the incidence of soil water repellence have been identified as approaches for optimising water allocations to turfgrass grown on sandy soils. Consequently, the project will:

- Investigate if turfgrass can be maintained with a water allocation and the implications of further lowering the allocation;
- Evaluate how an annual water allocation is best distributed during the year; and
- Assess if applying a wetting agent improves the effectiveness of a water allocation.

#### EXPERIMENTAL APPROACH

Approaches for effectively utilising a water allocation for turfgrass will be investigated at the University of Western Australia's Turf Research Facility in Perth. The site provides the infrastructure necessary for accurately assessing turfgrass management practices, including a variable-speed travelling irrigator that allows water to be applied evenly and at known rates.

Experimental plots were planted in September 2011 utilising turfgrass harvested from a local government park that included a 25mm mat layer with the potential to become water repellent. The experiment started in July 2012 which allowed time for the turfgrass to become established.

To address the three research aims, a factorial experimental design will be used so that combinations of water allocation amounts, watering schedules and soil wetting agent use can be evaluated to maintain turfgrass in a public open space scenario. Consequently, the experimental design for a series of 10m² plots is:

#### 3 water allocations x 3 irrigation schedules x 3 wetting agent rates x 3 replicates

The three water allocations are 5000, 6250 or 7500kL/ha/y. Currently, 7500kL/ha/y is allocated to public open spaces in Perth. The three irrigation schedules will be calculated using historical weather data from the Bureau of Meteorology and will be further refined using an onsite weather station and soil moisture probes. Details of the three irrigation schedules are provided in the panel opposite.

Finally, a soil wetting agent will be applied at three rates: nil (control), at the manufacturer's recommended rate, or double the manufacturer's recommended rate. The wetting agent included in the study is widely used by the local turfgrass industry and its effectiveness has been demonstrated in independent studies.

#### **MEASUREMENTS**

Turfgrass growth and quality as well as the development of soil water repellence under the different water allocation treatments will be assessed for three years in the field. Turfgrass growth and quality will be assessed by measuring a number of parameters. Turfgrass growth will be determined by measuring the dry weight of clippings after each mowing event (weekly) and by measuring the shoot biomass at the start and end of the experiment.

In addition to good growth, turfgrass managers are required to produce a turfgrass surface with good colour. Consequently, turfgrass colour will be measured monthly using a Chromameter, and at the same time soil water content in the surface soil will be measured using a portable theta probe. Soil water repellence will be measured monthly during the irrigation season using both the 'water droplet penetration time' and the 'molarity of ethanol droplet' tests.

#### RESEARCH OUTCOMES

The benefits of this research to the turfgrass industry and community include cost-savings, improved turfgrass surfaces, better environmental management and an improved public perception



of turfgrass management. Turfgrass managers have been involved with the design of the project and they will be able to view project outcomes at regular field days. A workshop will be held at the completion of the study and research findings will be presented in journals and at various conferences.

#### **ACKNOWLEDGEMENTS**

This project has been facilitated by HAL in partnership with the turf industry. It is funded by contributions from a consortium of local government authorities, Organic 2000, TGAA WA and the TGA WA, The Botanic Gardens & Parks Authority, Department of Education, Department of Sports & Recreation, Department of Water, GMA, WA Golf and the Cottesloe, Lake Karrinyup, Mt Lawley, Royal Perth, All Seasons Sanctuary Resort, Wanneroo, Busselton and Bunbury golf clubs.

The City of Belmont is thanked for providing turfgrass for the research site. The cities of Perth and Stirling, WA Bowling Association, Globe and MowMaster are thanked for in-kind support. Members of the UWA Turf Industries Research Steering and subcommittees are thanked for their support and advice.



Above: Project research officer
Sam Flottmann measures turfgrass
colour using a chromameter. A
grid is placed across the plots to
locate measuring points and avoid
repeated soil sampling from the
same position

Above left: Turfgrass from City of Belmont relocated to the UWA Turf Research Facility 10 months after planting with plots marked out

#### IRRIGATION SCHEDULES TO BE TESTED (HAL PROJECT TU11012)

#### HISTORICAL MONTHLY BUDGETED

- Water allocated based on historical evaporation and rainfall data for Perth, whereby the allocation is divided into monthly quantities (Sept to Apr).
- The allocation for each month is calculated by multiplying the annual water allocation by the proportion of the annual net evaporation that occurs in that month. For example, if 20% of total annual net evaporation occurs in January, then 0.2 x 7500 = 1500kL/ha would be applied in January.
- Monthly allocation then divided by the number of irrigation days per month to calculate a daily water application.
- Water applied 2-5 days per week, depending on the time of year.
- This approach enables water to be distributed throughout the year based on historical climatic data, but does not enable water to be saved for later in the irrigation season should there be below average evaporation or above average rainfall in particular months.

#### REAL-TIME DAILY

• The first monthly allocation for the irrigation season calculated as above, but expressed as a % replacement of net evaporation. For example, if annual net evaporation is 15000kL/ha based on historical data, and the annual allocation is 7500kL/ha, net replacement is 50%.

- Turfgrass irrigator programmed to replace the calculated replacement net evaporation during the month.
- At the end of each month, the total amount of water applied since the start of the irrigation season is subtracted from the remaining annual allocation and the % replacement value recalculated.
- Water applied 2-5 days per week, depending on the time of year.
- This approach enables day-to-day climatic conditions to influence the irrigation application, with the potential to save water for later during the irrigation season.

#### REAL-TIME DAILY INTEGRATED

- Irrigation decisions based on a combination of sources, including historical climatic data, current climatic data and soil water monitoring.
- The first monthly allocation will be calculated as above, however, irrigation will only proceed if the soil water content is below a critical value.
- At the end of each month, the total amount of water applied since the start of the irrigation season is subtracted from the remaining annual allocation, and the % replacement value recalculated.
- Run times are flexible, but still only watering up to 5 days a week.
- This approach further refines option two given above, with additional potential for water savings during times of low demand (i.e.: lower net evaporation or with rainfall inputs).



DAFFQ senior research scientist Matt Roche

provides an update on the amended adaptation of warm-season turf for the tropics research project.





The Darwin trial site at Wagaman Park was established in mid-2011



he aim of the 'Adaptation of warm-season turf grasses for the tropics' project (HAL Project TU09001), was to obtain a greater understanding of how a diverse range of warm-season turf-grasses would handle the tropics. A total of 25 varieties comprising of 14 species (see ATM Vol 13.3 p77) were chosen to assess their performance against challenging environmental parameters (e.g.: shade, wear and drought) and resources (e.g.: nutrition).

Two trial sites were established in mid-2011 in Mackay and Darwin with the assistance and support from the Mackay Regional Botanic Gardens and Darwin City Council (Wagaman Park) respectively. A third site was to be established at The Centre of Urban Greenery and Ecology's (CUGE) HortPark in Singapore, however, due to unforeseen circumstances CUGE withdrew from the project as a voluntary contributor and the Singaporean site dropped from the project.

CUGE's withdrawal meant that the budgeted sum of over \$145,000 of matched funds would no longer be available to the project. Discussions between the Department of Agriculture, Fisheries and Forestry Queensland (DAFFQ) and potential voluntary contributors (VCs) to buy into the project commenced early in the New Year.

This included a proposal put forward to the Turf Industry Advisory Committee (IAC) to invest \$30,000 of turf R&D levy money to support the project and stop it from folding as a result of CUGE's withdrawal. The project variation request for levy funds was not endorsed by the IAC through communication received by DAFFQ on 12 March 2012. The IAC felt that the project (TU09001) was not aligned with the Strategic Investment Plan initiatives to date, and the project only benefitted a minority of levy payers.

DAFFQ senior management thought that the project still had merit and that significant information

The Mackay Regional Botanic Gardens is one of two trial sites being used as part of DAFFQ's warmseason turf for the tropics project

would still be gained from having the Mackay and Darwin trial sites continue, albeit in a limited capacity. A voluntary contribution of \$30,000 was made from DAFFQ royalty money to support the adaptation of warm-season turf grasses for the project study by DAFFQ on 4 April 2012, which was agreed to by HAL on 14 May 2012.

Following the modified HAL head agreement, the project in its current form (available budget) will allow for a total of three formal assessments to be conducted by DAFFQ research staff of the Darwin and Mackay trial sites to track comparative turf performance only (e.g.: turf quality, colour, mowing requirements, incidence of disease).

Within the original HAL application nutritional studies aimed to reduce nitrous oxide emissions through reduced fertiliser applications and "traffic stress" (implementing wear and compaction) studies using a simulated wear machine (similar to work undertaken during TU08018) were to be undertaken at both the Darwin and Mackay trail sites. However, due to a significantly reduced budget as a result of CUGE's withdrawal and no financial support being made available from the turf R&D levy, these parameters are unable to be researched.

The most recent inspection of the Mackay and Darwin trial sites was conducted on 26 and 27 June 2012 respectively. A summary of the condition of each turf cultivar being trialled to date follows (M = Mackay and D = Darwin). Where plugs were used to establish the plots, these were planted at approximately 150 x 150mm spacings on 12 July 2011 (Mackay site) and 26 July 2011 (Darwin site).

#### **BROADLEAF CARPET GRASS**

Mackay: Planted as sod. The combination sward is nearly equal halves carpet grass and green couch as commonly seen in the tropics (referred to as buffalo grass). The variety is very fast growing and is already in need of a mow after having been cut five days ago. The growth is comparable to the blue couch varieties (Aussiblue and Tropika) being trialled. Nutrition is moderate which is highlighted by the purplish colour in the leaves. Low thatch. Some broadleaf weeds are present as too are ant nests.

**Darwin:** Established by seed. The carpet grass looks to be a good genotype, somewhat finer than other common broadleaf carpetgrass varieties. Has produced a dense sward under close mowing. Approximately 90 per cent of the plot is carpet grass and 10 per cent green couch. Nutrition level and colour are excellent. Fast vertical growth compared with other varieties. Low thatch.

#### OZ TUFF (GREEN COUCH)

**M:** Planted as sod. Good colour. Some dieback in the turf possibly due to disease. Some nutgrass is present. Moderate to high thatch.

**D:** Established by sod. Possible mite damage is evident. Good nutrition level and turf colour. Some encroaching contamination from surrounding plots. Moderate thatch.

#### 25A-1 (GREEN COUCH)

M: Planted as plugs. Rapid cover and growth. The variety has produced an even sward and looks as if it had been planted by full sod and is comparable to other laid grasses, whereas the majority of the plug planted varieties are still forming complete swards. Good colour. Some dieback in the turf possibly due to disease. Thatch moderate. Some weeds present. D: Established by plugs. A high level of contamination present, particularly from the surrounding Aussiblue plot. Turf colour is good. Some mite damage visible. Low thatch.

#### TROPIKA (QLD BLUE)

M: Planted as sod. The variety is very fast growing (equal to Aussiblue) and is already in need of a mow after having been cut five days previous. Good colour and density. Fertility levels are good. Thatch moderate. High level of green couch contamination is present (although surrounding plots are not green couch). Excess clippings are still present across the turf as a result of high moisture levels (the moisture makes it difficult to catch and remove grass clippings from the fast growing turf).

**D:** Established by sod. Fast vertical and lateral growth compared with other varieties. Nutrition and turf colour is good. No weeds present. Thatch level low to moderate.

#### AUSSIBLUE (QLD BLUE)

M: Planted as sod. The variety is very fast growing (equal to Tropika) and is already in need of a mow after having been cut five days previous. Good colour and density. Fertility levels are good. Thatch levels are moderate to high. High level of green couch contamination is present (although surrounding plots are not green couch). Excess clippings are still present across the turf as a result of high moisture levels (the moisture makes it difficult to catch and remove grass clippings from the fast growing turf).

**D:** Established by sod. Fast vertical and lateral growth compared with other varieties. Excellent turf colour and density. Thatch level moderate.

#### SHADEGRO (PANICUM LAXUM)

M: Planted as plugs and additional seed. Variable growth is observed in the purple and lime green colour foliage. Some necrosis within foliage as a result of disease and or sun damage. Density of turf is good in areas that have covered. Low to moderate thatch. Nutrition levels are low.

**D:** Established by plugs. High contamination present. However, where the variety is growing, the sward is very healthy. Good turf colour, even some purpling of the leaves (see photo below).



#### **BLUE DAWN (BRUNSWICK GRASS)**

M: Planted as plugs. Still sparse in areas that have not covered. Very fast vertical growth even after having been mown five days prior. Blue Dawn is probably the fastest vertical growing variety of all varieties being trialled in Mackay. Nutrition is good. Topdressing is required. Ant nests are also present within the open sward.

**D:** The density of the sward looks as if it had been established by sod, not plugs. Excellent cover/density. Has the highest vertical growth of all varieties trialled (see photo below). Broadleaf weeds are present. Thatch levels are low.



The Brunswick grass variety Blue Dawn had the highest vertical growth of all varieties at both trial sites at the most recent assessment

The variety ShadeGro showing

purpling of the leaves at the

**Darwin trial site** 

#### LOWGROW (BAHIA GRASS)

M ONLY: Planted as plugs and additional seed. Slow to spread, but has excellent root development. Moderate to fast vertical growth for mowing. Good (contrasting/different) colour of leaves which are also hairy on both sides of the leaf. Some broadleaf weeds are present. Further seed will need to be sent and added to the plots to achieve full cover. (See photos left)

#### CENTEK (CENTIPEDE GRASS)

**D ONLY:** Established by sod. Excellent turf colour and nutrition. Moderate vertical growth. No weeds. Good turf density. Thatch moderate to high.

#### SEA SPRAY (SEASHORE PASPALUM)

M: Somewhat sparse in cover, however, the variety was established by seed. A mix of weeds is present within the open sward. Some yellowing of foliage is present. Nutrition is moderate. Thatch moderate. D: Established by seed. Excellent colour and density (see photo below). However, moderate to high level of contamination throughout all plots. Moderate thatch.





Although slow to spread, LowGro (bahia grass) exhibited excellent root development and good colour of leaves which are hairy on both sides





Evidence of disease in the leaves of the cultivar Kings Pride

The zoysia variety PristineFlora at the Mackay trial site

Far right: The zoysia variety Royal at the Mackay site. This variety exhibited strong stolons porpoising across the establishing sward

#### KINGS PRIDE (BUFFALO)

M ONLY: Planted as sod. Very high thatch, the most of all varieties trialled in the Mackay trial. Good dark green colour. Fast vertical growth in need of a mow even though the variety had been mown five days earlier. Growth, however, is not as fast as Aussiblue or Tropika. Disease is also present. Porpoising of the stolons is noticeable. Damage is evident to the leaf tips from the self-propelled mower blades.

#### SIR WALTER (BUFFALO)

**D ONLY:** Established by sod. Excellent turf colour. Some scalping from mower blades and or scarification has occurred and recovery is slow because of its stoloniferous growth. Moderate vertical growth compared to blue couch varieties and Blue Dawn. Nutrition level is good as is colour. No weeds present. Thatch moderate to high.

#### PRISTINEFLORA (ZOYSIA HYBRID)

**M:** Planted as plugs. Topdressing is needed. Nutrition is good. Some weeds are present. Seeding profusely (see photo below).Thatch is low to moderate due to its establishment method.

**D:** Established by plugs. A high level of contamination, particularly of Aussiblue, is present within the sward. Mite damage is visible. Colour is OK, nutrition is low. Minor undulations are present within the sward. Thatch is moderate to high.



#### EMPIRE (ZOYSIA JAPONICA)

**M:** Planted as sod. High thatch level. Has produced a good consistent even sward. Good colour. Damage is evident to the leaf tips from mower blades, but regrowth excellent. Nutrition good.

**D:** Established by sod. Scalping present from mower blades. Nutrition level and turf colour is good. Low inflorescence presence.

#### PALISADES (ZOYSIA JAPONICA)

**M:** Planted as sod. Has produced a good consistent sward. Damage is evident to the leaf tips from the self-propelled mower blades. Some disease is also visible. Low incidence of flowering. Nutrition level is good. Thatch moderate.

**D:** Established by plugs. Excellent development – the plots looks as if it was established by sod. Good colour and density. Some weeds are present within the canopy. Thatch level low to moderate.

#### ZT-11 (ZOYSIA JAPONICA)

**M:** Planted as sod. Very high thatch. Good colour and nutrition present. Moderate inflorescence present within the consistent growing sward.

**D:** Established by sod. Vertical growth is the fastest of the Zoysia varieties trialled. Good colour and density. Weeds present within the canopy. High inflorescence density. Thatch moderate to high.

#### NARA (ZOYSIA MACRANTHA)

M: Planted as sod. Some dieback from disease, possibly. Damage is evident to the leaf tips from the self-propelled mower blades. High level of green couch contamination present. No visible inflorescence seen within the sward. High thatch levels. Some broadleaf weeds present.

**D:** Established by sod. Some scalping from mower blades. Nutrition level is moderate to low. Inflorescence density is low. Thatch level is moderate.

#### ROYAL (ZOYSIA MATRELLA)

**M:** Planted as plugs. Low nutrition level. Strong stolons porpoising across the establishing sward (see photo below). Topdressing is needed. Some blue couch contamination is present. Moderate inflorescence incidence. Low thatch level because of the establishment method.

**D:** Established by plugs. Good density and turf colour. Minor undulations present within the sward. Nutrition is moderate. Weeds are present within the canopy. High inflorescence density. Thatch level is low to moderate.



#### SHADETUFF (ZOYSIA MATRELLA)

**M:** Planted as sod. Very high thatch level. Good dark green colour and density. Seeding profusely.

**D:** Established by sod. Good turf density. Nutrition is low. Weeds are present within the canopy. Scalping observed. Moderate to high inflorescence density. Thatch level is moderate.

Over the course of the study images from the Mackay and Darwin trial sites have been uploaded to the Redlands Turf Research photostream on Flickr www.flickr.com/photos/redlandsturfresearch/. Should you wish to discuss activities of the above trial or futher research and development opportunities through DAFFQ, contact Matt Roche via email Matt.Roche@daff.qld.gov.au.



#### There's hype. And there's proven history.

Since 1998, innovation after innovation in 2500 Greens Mowers have led the industry toward improved results. Want to learn more? Take our highlight tour at JohnDeere.com.au/2500e to see all the ways the benchmark 2500 Greens Mowers can help your course make history, too.





## Playing on solid ground

As DAFFQ senior researcher Matt Roche writes, the findings obtained from their community sportsground wear tolerance trials will provide sporting groups and turf managers with solid information on which to base future turf installation and turf management decisions.





n ATM Volume 14.3 we reported that the Department of Agriculture, Fisheries and Forestry Queensland (DAFFQ, formerly DEEDI) community sportsfield studies had come to an end. At that time not all of the assessment data had been processed, but the final report has now been submitted to Horticulture Australia and can be downloaded in its entirety from the AGCSA, STA QLD, STA NSW and STA VIC websites.

Initially the HAL-funded study (TU08018) was to run for a period of two years, however, through industry consultation and support the project was extended by two years to enable researchers to gather a minimum of two years replicated data from each of the three studies assessing 'traffic stress'. The extension also provided DAFFQ researchers with an opportunity to undertake further testing across a range of warm-season grasses suitable for sportsfield, golf and/or recreational use. (For a full list of cultivars assessed during this project see ATM Volume 14.3 – Warm-season wear trials wind up, pages 68-73).

To assess traffic stress, which is a combination or wear and compaction, wear studies were established at the Redlands Research Facility (RRF) and at Redlands Touch Association (RTA) to monitor the effects of simulated wear treatments, using DAFFQ's Wear Traffic Simulator, against actual wear incurred from playing touch football.

Through undertaking comparative assessments of both facilities, results indicated that wear applied using the traffic simulator incurred 50 times more damage (wear) then that observed at the touch football fields (based on *Cynodon* spp. data only).

High wear damage from hockey across the Wintergreen (foreground) and Oz Tuff (rear goal) varieties at the UQ St Lucia campus site (9 May 2012)

However, the figures are relative and researchers are now aware of how many wear applications are required for future testing across turfgrasses being trialled to simulate touch football conditions.

Following 177 wear and turf quality assessments of plots within the simulated wear facility over a four year period, results showed substantial differences in wear tolerance and recovery of grasses that are commonly used on community sportsfields (Table 1, on opposite page).

For example, if a sports club decided to choose between a commercially available variety of green couch (*Cynodon* spp.), blue couch (*Digitaria didactyla*) or kikuyu (*Pennisetum clandestinum*), field closures could vary as much as 89 per cent between species.

Following guidelines by McAuliffe and Roche (2009) of >15 per cent wear (bare ground) is considered unfit for play, if kikuyu was planted on a community sportsfield the field could be closed between 64-100 per cent of the season, whereas blue couch could see the venue shut between 2-90 per cent. Similarly, green couch could see between 0-65 per cent of field closures.

However, varietal difference was also vast, particularly within the green couch species of turf. Wear variation between 2-90 per cent was observed of the green couches which are the primary selection of turf for planting on a sportsfield within sub-tropical and tropical environments.

As well as the RRF site, trials were established across four touch football field at the RTA. Each field played on average 1454 games over a two-year period and on average only incurred approximately 4.9 per cent of wear (damage). The average wear was well under the 15 per cent bare ground recommendations and suggests that more fixtures could potentially be played across these fields in the future.

However, inclement weather must be taken into consideration over the course of the playing season. Damage incurred from allowing games to continue following heavy rain caused significant damage to the turf surface resulting in 40-80 per cent bare ground and compaction issues.

In an effort to relieve compaction, a mixture of irregular (annual and bi-annual) and frequent (sixweekly) verti-draining was conducted across the touch fields and surfaces hardness was monitored. Following 43 collective treatment applications conducted of the RTA and RRF trial sites between 2009 and 2012, no clear pattern in surface hardness reduction was observed. However, soil moisture did play a significant role in reducing surface hardness.

A case study site was also established at The University of Queensland (UQ) St Lucia Campus



As part of the four-year DAFFQ wear tolerance trials a case study site was established at The University of Queensland's St Lucia Campus following the 2011 Brisbane floods to trail unreplicated 1500m' plots of Grand Prix, OZ Tuff, TifSport and Wintergreen couch

following the 2011 Brisbane floods to trail on a larger scale, unreplicated 1500m<sup>2</sup> plots of three high wearing varieties of couch (Grand Prix, OZ Tuff and TifSport) and an industry standard (Wintergreen).

The case study played a significant part within the HAL funded study, as it provided researchers and industry alike to compare disseminated milestone results obtained from small replicated plots of the RRF and RTA studies with in-situ large scale plots undergoing actual use.

Wear tolerance and recovery capabilities of a turfgrass are important, yet so too are the mowing requirements. The morphological-agronomic diversity of  $\mathbf{C}_4$  grasses is vast, but also within a species of turf significant variation exists, particularly between old and new varieties. Regular mowing improves turf quality; nevertheless it can be a financial burden on clubs resources and be very time consuming for turf managers during an active growing season.

Within the present study DAFFQ researchers assessed the performance of the plant growth regulator (PGR) trinexapac-ethyl (active constituent 120g/L) across 19 medium- to coarse-textured grasses suitable for sportsfield use. PGRs are used to reduce leaf and stem growth of a turf plant and in turn reduce mowing requirements. Results from the sportsfield suited grasses indicated that using trinexapac-ethyl could reduce mowing time between 15-29 per cent across the majority of the turfgrasses trialled.

As mentioned, the final report is now available through a variety of channels, including the AGCSA website – www.agcsa.com.au/agcsatech/research. Images taken throughout the project, as well as other DAFFQ projects, can also be viewed through the Redlands Turf Research photostream on Flickr www.flickr.com/photos/redlandsturfresearch/.

Findings obtained within the present study will assist community sporting groups and turf managers who rely on the performance, including safety, of natural turf surfaces with solid information on which to base future turf installation and turf management decisions.

#### **ACKNOWLEDGEMENTS**

This project has been funded by HAL using voluntary contributions from industry and matched funds from the Australian Government. Financial or in-kind support was provided by Redlands City Council, University of Queensland, Redlands Touch Association, Q Turf Machinery, Sports Turf Institute (Aust.), STA QLD, STA NSW, STA VIC, AGCSA, GCSAQ, Golf Queensland, Syngenta, Oz Tuff Turf, Australian Lawn Concepts, Dad and Dave's Turf, Evergreen Turf, Twin View Turf, Turf Force, Turf Solutions, Turf World, Caboolture Turf, Jimboomba Turf and Progressive Seeds. Full acknowledgements and references are included in the final report.





#### TABLE 1. AMOUNT OF WEAR (REDLANDS RESEARCH FACILITY)

| Year 1 (66 assessment dates) <sup>a</sup> |                |                     |          |          |
|-------------------------------------------|----------------|---------------------|----------|----------|
| Cultivar                                  | Time when wear | Mean bare           | Max bare | Wear     |
|                                           | is ≥ 15%       | ground <sup>1</sup> | ground   | ranking* |
| Aussiblue                                 | 77             | 52                  | 93       | 8        |
| Conquest                                  | 61             | 26                  | 65       | 5        |
| Grand Prix                                | 12             | 8                   | 33       | 2        |
| Legend                                    | 30             | 12                  | 44       | 2        |
| OZ TUFF                                   | 0              | 2                   | 8        | 1        |
| TifSport                                  | 8              | 8                   | 30       | 2        |
| Tropika                                   | 76             | 45                  | 90       | 6        |
| Whittet                                   | 76             | 41                  | 93       | 6        |
| Year 2 (55 assessment dates) <sup>b</sup> |                |                     |          |          |
| Aussiblue                                 | 80             | 56                  | 97       | 6        |
| Conquest                                  | 65             | 32                  | 90       | 5        |
| Grand Prix                                | 55             | 21                  | 71       | 2        |
| Legend                                    | 64             | 25                  | 70       | 2        |
| OZ TUFF                                   | 0              | 4                   | 14       | 1        |
| TifSport                                  | 65             | 28                  | 89       | 2        |
| Tropika                                   | 80             | 68                  | 99       | 7        |
| Whittet                                   | 100            | 69                  | 88       | 7        |
| Year 3 (44 assessment dates)°             |                |                     |          |          |
| Aussiblue                                 | 41             | 23                  | 88       | 4        |
| Conquest                                  | 48             | 21                  | 70       | 4        |
| Grand Prix                                | 36             | 14                  | 57       | 2        |
| Legend                                    | 41             | 16                  | 41       | 2        |
| OZ TUFF                                   | 0              | 2                   | 9        | 1        |
| TifSport                                  | 45             | 25                  | 81       | 4        |
| Tropika                                   | 68             | 33                  | 91       | 7        |
| Whittet                                   | 64             | 57                  | 98       | 8        |
| Year 4 (12 assessment dates) <sup>d</sup> |                |                     |          |          |
| Aussiblue                                 | 25             | 10                  | 30       | 4        |
| Conquest                                  | 42             | 15                  | 42       | 4        |
| Grand Prix                                | 8              | 7                   | 24       | 1        |
| Legend                                    | 8              | 8                   | 18       | 1        |
| OZ TUFF                                   | 0              | 0                   | 2        | 1        |
| TifSport                                  | 42             | 14                  | 42       | 4        |
| Tropika                                   | 33             | 13                  | 49       | 4        |
| Whittet                                   | 75             | 57                  | 89       | 8        |

NB: "Year 1 (13 May 2009-6 Apr 2010); "Year 2 (7 Apr 2010-3 Feb 2011); "Year 3 (4 Feb 2011-6 Feb 2012); "Year 4 (7 Feb-1 May 2012). With the exception of wear tolerance, data expressed as percentages. Turf replacement of Whittet plots in Years 1 and 3 mean values for this cultivar are slightly skewed. "Wear ranking based on mean bare ground data collected for each year, 1 = best, 8 = worst. 'LSDs for mean bare ground results = 5 (Yr1), 5 (Yr2), 6 (Yr3) and 9 (Yr4).



## Kings Cove Golf Course vic

Kings Cove Golf Course
superintendent Brad
Marsden gives ATM an
insight into the nine-hole
course which forms part of
the Kings Cove residential
and lifestyle development
on the shores of Victoria's
picturesque Gippsland
Lakes.

Superintendent: Brad Marsden.

Nickname: Marsdo.

Age: 42.

Years as a superintendent: 16.

Years as an AGCSA member: 16.

Other association involvement: VGCSA.

Qualifications: Certificate 111 Horticulture (Turf Management) Weston Creek TAFE, ACT. Advanced Diploma Turf Management (Hortus Australia).

Career: Kings Cove Club Ltd, VIC (superintendent, Jan 2008 – present); Clifton Springs GC, VIC (superintendent, Apr '04 – Jan '08); The Sands Torquay, VIC (superintendent, Feb '03 – Apr '04); Macarthur Grange GC, NSW (superintendent, Apr '01 – Jan '03); Toukley GC, NSW (superintendent, Apr 1996 – Apr 2001); Bonnie Doon GC, NSW (assistant superintendent, Jul '92 – Apr '96); The Lakes GC, NSW (3IC, Jun '90 – Jul '92); Moruya GC, NSW (apprentice, Mar '86 – Jun '90).

Where in Australia is Kings Cove? Kings Cove Golf Course is part of the Kings Cove residential and lifestyle development in Metung. Metung is a little village 6km off the highway between Bairnsdale and Lakes Entrance, situated on the shore of the Gippsland Lakes in Victoria.

Give us a bit about your background in turf management. Golf and golf courses have always been in the family with mum and dad past presidents, captains and directors of our home town golf course, Moruya in NSW. After some sound parental advice, I decided greenkeeping was the way to go as machinery and golf courses had caught my attention from an early age.

After I completed my apprenticeship at Moruya I moved to Sydney and started working at The Lakes Golf Club under Peter Brown. Peter was a consummate professional – a thinker, planner and a very willing teacher. After a while I moved over to Bonnie Doon and came under the instruction of Gary Smith. Gary was a firm believer in getting out there, trusting your skills, developing your abilities and having a red hot go.

During my time in Sydney I got to rub shoulders with a number of other distinguished turf managers and the conduit from the trade for all these supers was Bruce Kemp. I owe them all a debt of gratitude for helping to shape the young confident person I was, into the greenkeeper I am today.

Give us an overview of Kings Cove and some of its unique characteristics? Kings Cove Metung is a residential and lifestyle development set on a large piece of undulating degraded grazing land that borders the Gippsland Lakes. A prominent local realtor Chas Heath purchased the land with the vision of creating a residential housing estate, golf course, marina, resort and health spa facility.

Chas engaged the services of Ted Parslow to design the course, John Neylan to provide all the agronomic detail and a very experienced local greenkeeper Bill Brooker to construct it. The decision was made to have a 9-hole golf course with

18 sets of tees to create two differing nines. From a business point of view this made good sense as it left more land for housing sales and a golf course that, in the main, would cost less to maintain.

Chas sourced locally the specified sands and gravels, automatic irrigation system and drainage systems to all greens, bunkers and fairways. With all these key elements in place, it is repaying the facility daily in regards to achieving a high presentation standard with minimal inputs. The Wintergreen couch came in the form of stolons from Murray Downs G&CC and Chas turned them into a 2ha nursery well before the course was started. The course officially opened on 10 February 2006.

What are some of the unique features about Kings Cove from a turf management perspective? Because the Cove is still relatively new and constructed to a high standard, it has made my role more predictable. This is the first time in my career I have managed a 9-hole course and I really do enjoy it. It allows me the luxury of being able to zone in on nine areas instead of 18. In saying that though the land over which the nine holes are located could easily fit 14 holes so we have large areas to mow and maintain.

The two key features to the Cove presenting well are the Wintergreen couch and the site's openness which creates plenty of wonderful vistas. The Wintergreen requires few inputs and presents like a carpet, even when we have had 20-plus frosts like we have this winter.

How have you fine-tuned your turf management operations during your time as superintendent? When I arrived here the USGA spec greens were suffering. Upon inspection, I found the Dominant bentgrass trying to exist in a 25mm thick organic thatch layer and devoid of a root system. Immediately I set up a spring and autumn greens renovation programme which consists of scarifying, coring, Verti-draining and topdressing. As a result we have a root system and a free draining profile that has made quality putting surfaces achievable all year round.

Because our irrigation water is highly alkaline, it has increased the incidence of Take-all patch in the greens and surrounds. I have introduced manganese sulphate and tweaked the other basic sulphate fertilisers in my programme to defuse the Take-all and lower the pH.

What are some of the major challenges facing Kings Cove from a turf management perspective? Before and during construction, substantial work was done to get rid of an abundance of kikuyu and Parramatta grass across the property with good results. A return to more normal weather patterns and extra rainfall over the last two growing seasons has seen these two flourish again. This growing season, I have been given approval and funds



taken from other areas to embark on a pre- and post-emergent herbicide programme to treat green surrounds, tee tops and fairways.

Outline any major course improvement works completed or coming up. Over the last few years I have had to remove a lot of mulch and shrub landscaping around the course that was installed at construction. The plants had suffered a lot in the weather, some had grown too well and others were just in the wrong spot. The finetuning of these areas will be ongoing. As a compensation measure, we will be carrying out a lot more strategic tree planting to lessen golfers taking short cuts and generally guiding them up the fairways. We are also going to move our 1st tee 25m forward to alleviate a safety issue and construct a practice bunker.

How is Kings Cove faring in the water management stakes? With the combination of our dam storage and bore water license we have an adequate supply to meet our weekly water budget. Currently our irrigation water budget in the growing season is 1.5 megalitres/week for all irrigated areas. In this budget, greens, surrounds and tees are well catered for but the fairways are allocated only one application of 6mm and this is why our fairways generally look lean and dry. I would like to increase this to two applications per week (2.3M/week budget) and have put forward a plan to management with the hope of gaining approval.

The Kings Cove greens are Dominant bentgrass which are renovated spring and autumn. Pictures is the 2nd/11th green looking back down the fairway

The 9th/18th green at Kings Cove. The course is built on a clay base with 300-400mm of sandy to loam topsoil with USGA spec greens





Kings Cove's downhill par three 5th/14th

Our aquifer is high quality but low yield and in simple terms one pump cannot get it out of the ground fast enough to meet present demand. Our annual bore water license is large enough to sustain the installation of another complete bore and pump. With the doubling of our pumping capacity, we will be able to exceed present usage requirements and get a long way towards meeting future needs and give us a back-up in case of a breakdown.

Our irrigation storage dam operates off a stormwater catchment and needs to have its holding capacity increased and there is scope to do this in its present location with no negative impact to its surrounds. Once its holding capacity has been increased, the incidence of excess stormwater leaving the property when it rains will be reduced and even when it is a dry winter the low yield aquifer can happily fill the dam so that we can start the season full.

#### **OFF THE COURSE - BRAD MARSDEN**

Family: Wife Brenda (the brains of the operation, married 17 years), sons Ryan (14) and Drew (11).

Claims to fame outside of turf management: When I could play golf, I won the 1989 Moruya Golf Club Championships and was South Coast District match play champion. Back in the day at Moruya, I played a lot of golf with a junior Brendan Jones and at The Lakes Golf Club with a trainee professional Andre Stolz, both of whom are now playing abroad earning thousands.

Interesting hobbies/past-times away from turf? I still enjoy playing golf but don't seem to find the time as much as

I should. I am always helping my sons out at their sports. In summer I am a manager/ instructor at Nippers (surf club) and cricket manager, while in winter I am a junior AFL footy manager.

Favourite sporting team? Sydney Swans. The best thing about Kings Cove/Metung (aside from the golf club) is... All in all Kings Cove and Metung is a very relaxed place and operates in its own time void know as 'Metung Time'.

What do you do to get away from it all? Catching a wave at Lakes, carving up a run at Mt Hotham or travelling to Canada to catch up with my wife's family. It's all good!

Are expectations of course presentation and conditioning any less than that placed on your metropolitan counterparts? No I don't think so. My members' expectations are what they are and it is my job to try and meet that or possibly surpass it. I am no different to any other superintendent – squeezing blood from stone was never a subject taught at TAFE but we have all become bloody good at it!

Do you have to be more resourceful as a regional-based superintendent? With only a small staff to maintain a golf course and estate, the key for me is to make those staff as effective as they can. Last winter we purchased a second-hand wide area rough mower that has reduced our rough mowing from eight days with the good old 72" out-front to 3.5. Also purchasing a second hand Buffalo debris blower means we are now an emu-bob free zone and trying to eliminate as many fiddly handwork areas as possible. All these have been massive for our operation.

What have you got in your shed? John Deere 2500B greens triplex, John Deere 2500 tee triplex, Toro 3100 Sidewinder surrounds, John Deere 3235C fairway unit, Kubota F3680 72" out-front rough mower, John Deere 1600T wide area rough mower, John Deere Z910 54" zero turn tee surrounds mower, Toro 5020 Sand Pro bunker rake with dozer blade, two Toro Workmans – MDX and 2100, Kubota 2710 hydrostatic tractor with 4-in-1 loader bucket, Hardi 300l boom sprayer, Buffalo debris blower, Massey Ferguson tractor, Berends flail mower and Daihatsu two tonne tipper truck.

We have just traded in our old Iseki out-front rough mower with 8000 odd hours on the clock. The work that it had done here defies belief. Next year I am hoping to update our chemical spraying system with a John Deere ProGator and 750I Select Spray quick mount spray unit. Again, the places I have taken the current tractor and boom defies belief. As I age I think keeping all four wheels on the ground is a better option than previous.

Our operation would be dead in the water without the quality work of our mechanic/groundsperson Alan Kendall who is fantastic in constructing things. When you can build an outdoor dangerous goods storage unit out of a discarded kitchen plate warmer, left over clubhouse construction materials and advertising signs, I think that shows great vision and skill.

If you could change one thing about your job as a regional superintendent what would it be and why? That would have to be getting my old mate Rob Bradley from Curlewis Golf Club working at the club next door, as was in the past when I was at Clifton Springs. We have had some fun times and I do miss the 'Heeeeee broooooo ya accent is soooooo broad', the great bib and brace overall

exorcism, poaching my staff and the pinnacle of his career in training the shed goat to change holes. Apart from all of that, for a Kiwi he is a bloody good super!

What are some of the more unusual requests/
things you have had to do as a regional course
superintendent? At the same time each year I
get requested by the Ladies Captain (with a very
serious face) to go down to the 2nd tee and stop the
magpies from swooping them on their competition
day. She must think I am some sort of magpie
whisperer! I will say it is a heck of a good laugh to
watch the ladies cop a flogging off the maggies –
punishment maybe for not raking bunkers or fixing
pitch marks!

Most pleasing/rewarding moment during your time there? When course designer Ted Parslow came back to visit in late 2010. Ted had not seen the course since just before the opening (five years or so). He was very complimentary of the way I had grown in and shaped his design to the present and the overall direction I am taking the facility.

#### AT A GLANCE - KINGS COVE GOLF COURSE, VIC

Course specs: 9-hole golf course with 18 sets of tees, par 72 and 6085m. 0.7ha Dominant bentgrass greens and collars; 0.5ha Dominant bentgrass/creeping red fescue/Wintergreen couch surrounds; 0.7ha Wintergreen tees and clubhouse lawns; 7ha Wintergreen fairways; roughs are a mix of Wintergreen/kikuyu/Parramatta grass/paspalum and various seasonal weeds.

Members: 250.

Annual rounds: 15,000.

Annual course budget: \$225,000 (incl wages).

Staff structure: Brad Marsden (superintendent), Alan Kendall (mechanic/groundsperson), Eden Searl (groundsperson – estate and golf course).

Climate: We are 3.5hrs by car east of Melbourne on the edge of the Gippsland Lakes and ocean and 2.5hrs south of Mt Hotham. Bad weather tends to deflect off the mountains or stay out at sea and miss us so our weather patterns are a lot more stable and fluctuate much less than they do in Melbourne and elsewhere. Summer temps average 22°C and winter around 15°C. We do get many heavy dews in summer and frosts in winter.

Soil types: The golf course is built on a clay base with 300-400mm of sandy to loam topsoil. Greens are USGA spec construction, tees on a clay subgrade and blended 80/20 sand mix and fairways on the native topsoil.

Water sources: 14M irrigation storage dam

(stormwater fed). Bore water licence 25M/yr. Irrigation system: Hunter Viking Genesis 2 wire decoder system. Greens are all valve-in-head Hunter G60E series low precipitation sprinklers. Tees are all block control Hunter I20 series sprinklers and Hunter PGV 50mm valves. Fairways are all block controlled Hunter G60B series low precipitation sprinklers and Hunter PGV 50mm valves.

The pump station consists of four Grundfos CR 16-80 variable dive pumps controlled by a Grundfos Hydro Maxi 2000 module. The bore water pump is a Grundfos SP8A-12 pump controlled by a Grundfos CU3 module and 24-hour programmable timer. We have recently installed a MD6 Dositec wetting agent injecting unit.

**Cutting heights:** Greens 3-3.5mm year round, greens collars and surrounds 11mm, tees 8mm and tee surrounds 50mm, fairways 14mm and rough 65mm.

Renovations: We carry out a major spring greens renovation which normally consists of a pedestrian scarify at a 15mm depth (one pass with blades placed at 20mm apart), cleaned off with triplex thatching heads and catchers. This is carried out in house before contractors come in to core greens and collars with 15mm hollow tines at 75mm depth and topdress at 35mm depth using 90/10 sand. We then rub in with a drag mat and bunker rake machine until all holes are filled. A granulated renovation blend fertiliser is applied after the last rub in.



Autumn sees a minor greens renovation which consists of dethatching using triplex thatching heads and catches at 1.5mm depth (two passes with blades spaced 10mm apart) and cleaned up with a greens triplex mower in-house. Contractors Verti-drain all greens and collars using solid 8mm tines to 200mm depth. We then topdress at 12mm and rub in with a drag mat.

Major disease pressures: In summer we deal with dollar spot. It always starts in the surrounds where there is more thatch and spreads towards the greens. I always spray a contact and systemic fungicide together which gives good longevity of control. In winter, depending how wet it is, we can get a bit of winter fusarium.

#### SYNGENTA UNVEILS LATEST TURF MANAGEMENT TOOLS — CASPER AND AGADOR

Agador



Syngenta's latest additions to its suite of turf management tools – Agador nematicide/miticide and Casper broadleaf herbicide



yngenta has released two new products into the Australia turf market recently – the dual purpose nematicide/miticide Agador and the broad spectrum, post-emergent broadleaf herbicide Casper.

Agador is an abamectin formulation (active constituent 20g/L abamectin) that can provide control of sting and ring nematodes and couch mites for up to three months on golf and bowling greens, fairways, turf farms, sports fields, parks and ovals.

"We are very excited about this product," says Dr Mark Walker, technical manager, Syngenta Lawn & Garden Australasia. "Abamectin has been known for some time to have great potential as a treatment for nematodes, but its inherent trait of becoming bound in thatch and moving no further meant its potential has remained unrealised.

"To release this potential Syngenta has produced a formulation in which the abamectin is coated in an iron chelate sphere. This 'coating' allows the product

to slip straight past the thatch and be easily washed into the soil to place the active ingredient (abamectin) with the target pest (nematodes).

"Its potential to also be a miticide has not been overlooked with a dual registration for mites and nematodes on the registered label. The bonus when used as a miticide is the greening effect the release of the chelated iron can offer."

Available in a one litre pack size, Agador can be used on various warm-season and cool-season turf varieties including common and hybrid couch, kikuyu, bentgrass, fescue, Kentucky bluegrass and perennial ryegrass. Label rates are 2l/ha or

20ml/100m² for the control of sting and ring nematodes and 1L/ha for the control of couch mite. Agador can also be tank mixed with many commonly used fungicides and liquid fertilisers.

Syngenta has also unveiled the dual active broad spectrum broadleaf herbicide Casper which covers some of the hard-to-kill species not commonly catered for in older chemistries. Weeds such as burr medic, wireweed, fleabane and oxalis are all labelled targets as are a number of more common weeds such as bindii, lambs tongue, clover and thistle.

"The impressive spectrum of coverage is due to combining Dicamba (500g/kg) with Prosulfuron (50g/kg),

a brand new active not seen before in the Australian market," says Dr Walker. "It is characterised by efficacy with exceptional turf safety."

For more information about Agador and Casper and to download the full registered labels and MSDSs, contact your Syngenta agent or go to www.greencast.com.au





Rain Bird's new HV Valve with flow control

#### RAIN BIRD IN REVERSE

Rain Bird's new reverse-flow HV Valve is making it possible for contractors to stay competitive by combining an affordable low price with long-lasting performance. "We built the HV with the features that the market demands, but at a price point that fits within even the tightest budgets," says Paul Lierheimer, Rain Bird's marketing manager for residential products.

With a compact spin radius and fewer screws, the HV Valve is easy to install and service. The valve's screws are also 'captive', meaning that they can be fully loosened with a Phillips, hex or flat-head screwdriver but not completely removed from the valve's body. This feature eliminates the possibility of losing the screws somewhere in the landscape during installation or maintenance.

The valve's heavy-duty construction ensures hassle-free performance for years, even in the most challenging environments. If a rare valve failure should occur, the HV Valve's reverse-flow design guarantees that it fails in the closed position to prevent flooding, water waste and landscape damage.

"We engineered the HV Valve for top performance under any conditions," Lierheimer says. "We've tested it extensively and the results show that this valve will stand up to the watering needs of any landscape. Our tests proved that when the HV Valve is exposed to repeated pressure spikes of 13.75 bars, it lasted two to four times longer than its competitors."

For more information about Rain Bird's HV Valve and to view an online demonstration of how the valve operates, visit www.rainbird.com/HVvalve

#### COMPACT TREAT AND DISCHARGE

Enware and David Golf have teamed together to bring the newest model in the WaterStax water treatment system line to the golf and turf industry. The new Compact Treat & Discharge System is based on the same technology used in the intermediate and full recycle WaterStax systems, but at a more affordable price and with a reduced footprint.

WaterStax systems treat golf course, turf industry and agricultural wash water so that it can be re-used as irrigation water, recycled wash water or legally discharged into the sewer. A number of courses around Australia have already installed WaterStax units including the likes of The Australian, Bonnie Doon, Royal Adelaide and 13th Beach.

The Compact Treat & Discharge System is a unique and inexpensive system that is able to

process 1600 litres per day, treating the water to Class B quality for discharge to sewer or for irrigation. Another great feature is the system's compact footprint of approximately 2.5m x 2.5m.

WaterStax is supplied exclusively to the golf and turf industry by David Golf. Visit www.davidgolf. com.au. email dge@davidgolf.com.au or call 1300 790 890 to find out more about the Compact Treat & Discharge System.



#### STORAGE SYSTEM KICKING GOALS

Abel Sports has developed a new on-site storage system for goal posts. The new system is suitable for baseplate, hinged plate and sleeved goal posts for soccer, rugby and AFL grounds and can be located adjacent to a sports field, behind change rooms or next to cricket nets. They can also be securely locked.

New Abel Sports general manager David Vesely is delighted with the results of their new goal post storage system which has already been installed at Gosch's Paddock in Melbourne and at sports grounds in the City of Casey, Wyndham and Darebin. "Our development team are constantly on the lookout for opportunities to make the management of sporting grounds safer and easier for councils and groundsmen," says Vesely.

Danny Edmunds, sportsgrounds co-ordinator for the City of Casey who has installed the new system, says the Abel Sports storage system reduces time taken for removal and storage to depots and also eliminates a lot of the damage issues caused during removal, transportation and storage. "Safety issues in lifting and transporting poles make the new system an attractive alternative," says Edmunds.

For more information on their storage system contact Abel Sports on 1300 193 714.



The Abel Sports goal post storage system

#### INDUSTRY APPOINTMENTS AND ANNOUNCEMENTS

#### MORE CHANGES AT SYNGENTA

Following a recent staff reshuffle as reported in the last edition of ATM (Vol 14.4), Syngenta has announced further changes with the appointment of two new members to its Turf team.



Dave Wells (pictured) has been appointed as senior territory sales manager for NSW, ACT and New Zealand. Wells, who joined

Syngenta at the beginning of August and is based in Sydney, has worked as a senior turf agronomist with the New Zealand Sports Turf Research Institute and has held superintendent positions at golf courses in Australia and the US. His most recent position was as sales/agronomy team manager with Nutri-tech Biological Solutions. Wells can be contacted on 0418 395 632 or email david.wells@syngenta.com



Matthew Holmes (pictured) has also been appointed as senior territory sales manager for Queensland and will be based out

of Brisbane. Holmes rejoined Syngenta at the beginning of September after serving as the industry development manager and general manager at Turf Australia.

#### HERITAGE SEEDS' NEW HQ

Heritage Seeds has moved its head office

to Dandenong in Melbourne's south east. The new office can be found at Factory 2, Prosperity Way, South Dandenong, VIC 3175. Call (03) 9701 4000, fax (03) 9701 4040.

#### FORD JOINS PGG WRIGHTSON



■ PGG Wrightson Turf has appointed 2011 AGCSA Distinguished Service Award recipient Phil Ford (pictured) to the position of turf agronomist.

Ford joins PGG Wrightson Turf's seed division with an extensive background in the Australian sports turf industry and will assist the Turf team and their distributors nationally. Ford, who started his new role at the start of August, is based at the PGG Wrightson Turf research facility in Ballarat, Victoria and can be contacted at pford@pggwrightsonturf.

#### HG APPOINTS HUMPHREYS



HG Sports Turf has appointed Nathan Humphreys as General Manager - Sydney effective from Monday 3 September. Humphreys

(pictured) will be responsible for developing and managing HG Sports Turf's business activities in the ACT, NSW and QLD.

Humphreys began his career in turf management in 1998 with Stadium Turf Management in Canberra. During 2003-

2005 he worked in the USA for The Motz Group, installing natural turf and synthetic turf sports fields. In 2005 Humphreys moved to the UK and worked for MCR Sports Turf Management, specialising in the maintenance and renovation of sports fields. Humphreys returned to Australia in 2010 and rejoined Stadium Turf Management as curator of Canberra Stadium.

#### JAMES MOVES BACK TO NUTURF

After a few years working as wholesale turf sales manager for Amgrow Specialty, Caine James has recently moved back into a Nuturf sales position. James' focus will be on assuming a territory in the Sydney market, focusing on a number of golf course customers. He will also assume some of his old customers in the Central Coast, North Coast and Newcastle regions that he had when working as a former Nuturf territory manager. James can be contacted on 0417 428 501 or email cainej@nuturf.com.au

In other Nuturf/Amgrow news, former Pacific Dunes course superintendent Craig Paget recently accepted a role as agronomy services manager with Amgrow. Working within the business development team, Paget will oversee and be responsible for agronomy services offering of the Nuturf business. Paget started his new role in mid-August.



The turf levy-funded erosion and sediment control demonstration facility is now operational writes DAFFQ's Shane Holborn.

he use of natural turf to control and minimise erosion from bare soil areas such as those found on building sites has been identified as an extremely effective measure. Previous research by Dr Rob Loch and DAFFQ (Optimising Turf Use to Minimise Soil Erosion on Construction Sites – HAL Project TU08033) measured the extent to which turf can be used as a sediment capture and erosion control option and drafted up a set of best practice guidelines.

The latest project – Erosion control - turf research and development facility (HAL Project TU10025) – is utilising Australian turf industry levy funds to construct a large-scale erosion control education and demonstration facility at Redlands Research Facility in Cleveland, QLD. The facility

### The recognition and specification of turf for soil erosion and control represents a major opportunity for turf producers to increase sales

is demonstrating the concept to decision-makers and specifiers in the construction industry as well as local and state government representatives from departments of environment and main roads from around Australia.

The recognition and specification of turf for this purpose represents a major opportunity for turf producers to increase sales in this very large market. The main aim of the project is to achieve an increase in turf sales of two per cent (or around \$10 million) within five years of the project's completion. Construction of the facility is complete and workshops are being hosted monthly (the last Thursday of each month) or by arrangement for the next two years.

The project is being led by Shane Holborn (DAFFQ) and employs a part-time industry development officer Lisa Erhart (Turf Australia) whose role is to increase engagement with the target audience. For details about the next event, please contact Lisa Erhart on 0418 822 108 or email idoec@turfaustralia.com.au

The Turf Australia website (www.turfaustralia. com.au) also has a four-page document titled 'Using turf for erosion and sediment control' which summarises the key findings from Dr Loch's HAL-funded project including information on the use of turf for erosion and sediment control, where and when to use turfgrass, turf installation and turf maintenance.



www.turfaustralia.com.au

#### WEATHER BREAK WELCOMED BY QUEENSLAND TURF PRODUCERS



Thankfully in recent weeks in August the unusual rain events experienced across Queensland has abated and we have had a few weeks of fine weather. This has

provided an increase in sales enquiries and allowed turf producers to access their farm for production and harvesting purposes.

Queensland turf production continues to attract attention through the development of the Erosion Control Demonstration Facility at the Redlands Research Facility. The demonstration compares six plots ranging from bare earth through to full turfgrass with astounding results that are well-known within the turf production industry.

Unfortunately there is a considerable amount of education and awareness required as the building and construction industry continues to promote silt fences as a means

of erosion control despite considerable research showing that these are not effective. Use of natural turfgrass halts the erosion and silt movement prior to entering our drains, waterways and catchments.

Turf Queensland has developed its Turf Accreditation Program (TAP) with a large number of state-wide turf producers completing the required assessment criteria. This is third-party audited and thankfully has been taken up by a number of local government councils and property developers as they attempt to reduce their risk processes.

Turf Queensland members now have access to an independently developed Turf Cost Calculator economic tool providing them with accurate costing for their individual enterprise by turf species on:

- A square metre of turf at the farm gate;
- A square metre of turf delivered; and

A square metre of turf installed.

As this edition was being produced the 2011-12 Turf Queensland Annual General Meeting was to be held at Redlands on 23 August. Upcoming events include the Turf Queensland Industry Field Day on 20 September where there will be a display of new turf production technology and presentations on fertigation, along with the opportunity to inspect the Erosion Control Facility and the 130 turf plots on the site.

Turf Queensland will also be joining with the Queensland Department of Agriculture Fisheries and Forestry (DAFFQ) in a display at the Local Government Field Day (LOGOV-EXPO) to be held at Caboolture on 10-11 October. For further information on Turf Queensland visit www.qtpa.com.au



JIM VAUGHAN CEO, TURF QLD

### All Service Enquiries: Freecall 1800 225 512



You chose Rain Bird® equipment for unsurpassed reliability and performance. Choose Rain Bird Service and guarantee that your equipment continues to operate at the highest level.

Rain Bird's new range of Global Service Plans provide Central Control end-users with comprehensive service and support benefits essential to maintaining a healthy irrigation system. Our new Board Exchange Program offers a variety of circuit boards with next business day delivery service at discounted rates. For 100% performance, choose Rain Bird Service. We're here for you!

For all service enquiries **Freecall: 1800 225 512** 



Enrol in our professional irrigation training program. For more information, visit: http://www.rainbird.com/au/training



#### Rain Bird Australia



**2012 GCSAWA Toro Cup winner Mike Healy from Gosnells Golf Club** 

hile the eastern seaboard spends the cooler months relishing the beautiful winter rains, the west has been very dry. At the time of writing this column we have just had our driest July on record - a total of just 34mm for the month which is 120mm short of our normal average. Despite some wet weather in the first week of August we are still on target for one of our driest winters on record.

On the plus side, the greens in WA have been fantastic through the Pennant season as there were only six days that had 3mm of rain or more. Bring on some rain come late August and September or else water restrictions will be in again this year.

As has been mentioned in previous reports, the GCSAWA along with the Department of Water has been developing a Waterwise golf programme. This programme is in the final stages at the moment and keeps us on the front foot. The department has given us a grant to make sure courses in WA can secure their allocations into the future.

On Tuesday 7 August the GCSAWA held its AGM at Wembley Golf Complex (host superintendent Darren Wilson). The committee from last year remains mostly intact for the coming year, with Glenn Cross (Mt Lawley Golf Club) the only man standing down after many years on the committee. Last year's Margaret River state conference will go down as one of the best and is a testament to Glenn's organisation.

We also welcomed Secret Harbour's Allan Devlin back onto the committee after his stint on the national executive. With a mix of youth and experience I am sure the new committee will be able to do our members proud for the coming year. The full GCSAWA committee for 2012-13 is:

President: Des Russell (Bunbury GC)

Vice-president: Neil Graham (Melville Glades GC)

Secretary: Paul Needham (Secret Harbour) Treasurer: Simon Bourne (Cottesloe GC) Golf Secretary: Callum Hitching (Busselton GC) Committee: Mike Healy (Gosnells GC), Peter Fleming (Burswood Park) and Allan Devlin (Secret Harbour).

The Toro Cup was also contested at the AGM with Gosnells superintendent Mike Healy lifting the trophy with a 77 of the stick, finishing one shot ahead of Nick Price. In the stableford, Brad Anderson had an amazing 44 points with Aaron Petrovski piling on 43 points behind him.

The back nine also doubled as Round Four of the GCSAWA Super Series which was taken out by Aaron (25 points), with a beautifully crafted 23 points from yours truly coming a close runner-up. Wembley Golf Complex was in great condition for the day and a big thank you to Darren for hosting us.

And speaking of Darren, the AGM also saw the unveiling of the GCSAWA history document which he has painstakingly compiled. The document was given to members at the AGM and I would like to thank all involved over the last couple of years who have managed to gather all this information together. A lot of our records had been kept in boxes for years until a couple of gents decided to do something about it and it's great that we now have a comprehensive document outlining our proud association. Thank you Darren; your hard work and contribution have not gone unnoticed.

I am off to New Zealand in September for the John Deere Trans-Tasman Team Challenge so if you have been lucky enough to qualify I will see you there!

> DES RUSSELL PRESIDENT. GCSAWA



s this is my first ATM report, I feel this is a good opportunity to thank everyone for the well wishes I have received, from both sides of the 'Ditch', upon my election as NZGCSA president. I would also like to give my sincere thanks, personally and on behalf of the NZGCSA, to Peter Boyd (Pakuranga Country Club) for his 14 years of service with the Board, the last five as NZGCSA president. All is not lost as Peter will still be on the board as immediate past president.

The NZGCSA met in late August with AGCSA general manager Peter Frewin also in attendance. There was some good discussion had about furthering the relationship between the two associations and we look forward to what the future may hold.

We are also now planning for the 2013 New Zealand Turf Conference and Trade Show at the Claudelands Convention and Exhibition Centre in Hamilton. To be held on 17-18 June, the new twoday format includes optional extra activities, while the education component will include four keynote presenters and 15 breakout sessions in each sector group.

It is shaping up to be a great event and we look forward to entertaining a good Aussie contingent! For more information about the conference visit www.turf2013.co.nz

> RYAN IRWIN PRESIDENT, NZGCSA

#### VGCSA 🝮

ew Golf Club was venue for our August education meeting which was sponsored by Globe Australia and attended by more than 70 members. The theme for the day centred on construction works being conducted by host superintendent Adam Robertson. Both Adam and Graeme Grant (Graeme Grant Design) spoke of the challenges faced with firstly obtaining approval to conduct the changes to the course and also the methods and difficulties faced throughout construction.

As part of the construction process, Kew Golf Club has also made the decision to convert its fairways from cool-season and common couch to Santa ana couch. In line with this theme, **Phil Ford** presented on the progress to date of the trial works he has been carrying out on winter dormancy on behalf of the VGCSA.

The couchgrass trials were conducted at Kew Golf Club which worked in well with our meeting as Phil was able to point out on site some of the findings to date from his work. Some of the interesting points to note on the course walk were the benefits of solid turfing fairways compared to line planting and the pros and cons of *Poa annua* greens over bentgrass greens.

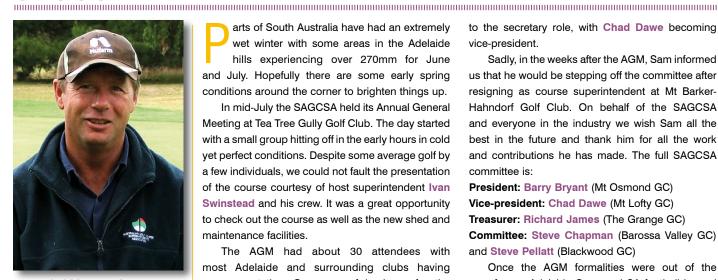


Kew Golf Club hosted the most recent VGCSA education day

The VGCSA Turf Research Golf Day will be held on 15 October at the historic Barwon Heads Golf Club (host superintendent Adam Lamb). Bayer will again sponsor the day and with such a great venue down on the Bellarine Peninsula the day is sure to be a success. The first prize for this event is monetary support for attending a turf registered conference and proceeds from the day are directed towards turf research and member benefits. I look forward to seeing a full field.

STEVEN HEWITT PRESIDENT, VGCSA





**New SAGCSA committee member Steve Chapman** 

arts of South Australia have had an extremely wet winter with some areas in the Adelaide hills experiencing over 270mm for June and July. Hopefully there are some early spring conditions around the corner to brighten things up.

In mid-July the SAGCSA held its Annual General Meeting at Tea Tree Gully Golf Club. The day started with a small group hitting off in the early hours in cold yet perfect conditions. Despite some average golf by a few individuals, we could not fault the presentation of the course courtesy of host superintendent Ivan Swinstead and his crew. It was a great opportunity to check out the course as well as the new shed and maintenance facilities.

The AGM had about 30 attendees with most Adelaide and surrounding clubs having a representative. One area of business for the day was a vote on the adoption of a new draft constitution. This draft was accepted and will now be legally signed off as our new constitution. It is very pleasing that this has come to a conclusion as much discussion has been had on this subject at committee meetings over the last 15 months.

At the AGM we welcomed two new committee members in the form Steve Pellatt (Blackwood Golf Club) and Steve Chapman (Barossa Valley Golf Club). We look forward to their contribution over the coming year. Yours truly was elected as president, taking over from Sam Sherriff who stepped down to the secretary role, with Chad Dawe becoming vice-president.

Sadly, in the weeks after the AGM, Sam informed us that he would be stepping off the committee after resigning as course superintendent at Mt Barker-Hahndorf Golf Club. On behalf of the SAGCSA and everyone in the industry we wish Sam all the best in the future and thank him for all the work and contributions he has made. The full SAGCSA committee is:

President: Barry Bryant (Mt Osmond GC) Vice-president: Chad Dawe (Mt Lofty GC) Treasurer: Richard James (The Grange GC) Committee: Steve Chapman (Barossa Valley GC) and Steve Pellatt (Blackwood GC)

Once the AGM formalities were out of the way, former Adelaide Crow and SA football legend Andrew Jarman shared some stories and reflected on his life and career and the state of football today. Jars, a 110-game veteran for the Crows, is a very colourful character and shared some great stories of him and his brother.

From here we look to The Grange Golf Club for our upcoming 20 September meeting. This will be a fantastic opportunity to check out the East Course redevelopment works (see Richard James' article on pages 18-23 - Ed).

> BARRY BRYANT PRESIDENT, SAGCSA

#### GCSAQ 🖎

t's very pleasing to report that the weather has finally returned to a more traditional Queensland feel with some very warm late winter days and the feel of spring well and truly here. Long-term forecasts are looking very promising, although it makes me wonder sometimes just what we as supers did before radar weather and long-term temperature modelling became available, let alone 7-day forecasts and not to mention El Nino and La Nina? How did we schedule work before we even knew these phenomenons existed? Maybe just some gut instinct I presume.

The improvement in the weather certainly couldn't have arrived at a better time for a lot of clubs, with the prolonged wet weather seriously affecting player numbers and revenue. Reports from most parts of the state mention a sudden surge in player numbers which is great for the game and the bottom line of the club's and ultimately perhaps more funds for course maintenance.

It is not that pleasing to report that our annual bus trip needed to be cancelled after a very poor response from members. I would

like to thank our sponsors - Simplot Partners, Jacobsen and Country Club International for their patience over the weeks while we tried to make it happen, but the numbers were just not there. Apathy has long been a trait of superintendents but it seems to have hit a new high in Queensland of late.

On a more positive note the GCSAQ Turf Research Golf Day is looming large on the horizon and we are very happy to announce that Jacobsen distributor Farm Equipment will be joining Twin View Turf as joint sponsor of this important day on our calendar. The event will once again be played at Robin Doodson's Sanctuary Cove Country Club where we will be playing the Pines Course on Tuesday 30 October.

The GCSAQ Assistant Superintendent Recognition Award will again be bestowed this year with the two successful applicants receiving an internship at the Sentosa Golf Course Tournament Preparation/ Education Programme in November 2012 as part of the Barclays Singapore Open Golf Championship. This is a great reward for our

assistants and would not be possible without the support of Simplot Partners and Toro.

On a personal note, at Coolangatta & Tweed Heads Golf Club there has been a proposal put to the Board to re-grass our bentgrass greens with TifEagle couchgrass, which has their support in principle. A member's information night is coming up and the proposal has been mentioned on my course maintenance blog coolangattatweedgolfcoursemaintenance. blogspot.com.au/

You would think something of this magnitude would create some sort of feedback/discussion from members, but to date I have had only one email which was in support of the proposal. A couple of weeks earlier on the blog I raised an issue about bunkers and to date have had six comments on the blog and 12 emails! Amazing that they are more concerned with bunkers than greens - go figure!

#### **NSWGCSA**

he past 10 weeks have been extremely busy for the NSWGCSA, with the NSW Environment Protection Authority and WorkCover conducting investigations in relation to the alleged misuse of pesticides in contravention of the Pesticides Act 1999. Specifically, the allegations focus on the use and sale of non-turf registered products.

As a result, the NSWGCSA, together with GolfNSW, are proposing to adopt an Environmental Minimum Standard across the state, the first step of which is to develop a pilot group of 40 golf clubs. The proposed NSWGCSA Environmental Minimum Standard will set the direction for state-wide action on environmental best practice with a focus on pesticides management across six key directions for the period to 2017, these being:

- Shared environmental responsibility;
- Enhancing the brand of golf;
- Pursuing sustainability;
- Reducing environmental hazard and risk.
- Tailoring solutions to increase the capacity for metropolitan, regional and country courses to manage their interactions with the environment;
- Capturing and reporting key performance data to key stakeholders.

The NSWGCSA Environmental Minimum Standard will be a key mechanism for improving pesticide management on NSW golf courses. We are taking responsibility for delivering the covenant's objectives which will be shared between Golf NSW, the NSWGMA and the chemical industry.

We are working closely with all golf agencies and the NSW EPA to have the Minimum Standard Covenant endorsed. The NSWGCSA will be a founding signatory to the covenant and contribute funds to support its Phase 1 pilot programme which is expected to commence in early September

2012. We are actively involved with e-par in the covenant's development and implementation and the NSWGCSA has led the consultation and decision-making process for this initiative.

For covenant members, social and environmental responsibilities are fundamental elements and we will be providing education material to ensure every decision signatories commit to considers potential social and environmental impacts. Signatories will also recognise the importance of transparency and have an understanding of the importance of being a responsible corporate citizen. We will provide access to all the necessary information for a course superintendent or golf business to make informed pesticide use and purchase decisions.

When dealing with governments, signatories will not forget that they represent the industry as a whole. We will encourage covenant members to have transparent, fair and efficient relationships with governments and other key stakeholders. We have high expectations of each other and expect each signatory will strive for excellence, act responsibly and work for the advancement of the golf industry.

We know that sustained success depends on our ability to shape the future through resourceful and respectful course maintenance operations. We expect that covenant members will respect our industry by conducting themselves in a manner that earns the respect of others.

Signatories will stay informed about relevant environmental laws that apply in NSW and will understand and comply with all applicable laws, rules, and regulations of any government, regulatory organisation, or professional association governing our professional activities.

CRAIG MOLLOY PRESIDENT, NSWGCSA

#### STA ACT REGION

t was a very cold winter here in Canberra. Daily temperatures hovered around the 11-12 degree mark and overnight temperatures were often well below zero. It was common early mornings to wake up to thick blankets of frost that took until mid-morning to disappear, with shaded areas often covered until well into the afternoon.

The STA ACT annual seminar was again held on 25 July and while numbers were down on previous years, which I believe to be the trend everywhere, it was a very successful day. There were plenty of traders displaying the latest products and some very interesting speakers throughout the day.

Special thanks go to our major sponsors Bayer, Globe Equipment Solutions and Sustainable Turf Renovations for their continued support. A big thank you also to Cameron Hodgkins from the Melbourne Cricket Ground who talked about artificial light technology and its use on the arena. Planning is already underway for next year with a tentative date of 24 July 2013 booked, so I urge everyone to put this date in their calendars.

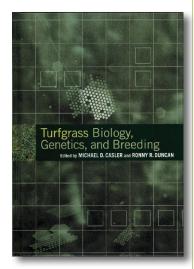
The STA ACT Annual General Meeting will be held this year at Queanbeyan Golf Club on Tuesday 28 August. A meal will be provided with a sports trivia night to follow proceedings at a cost of \$20 per person. Everyone is welcome to come and discuss any ideas that can improve our association or just enjoy a fun night.

DANNY HULL COMMITTEE, STA ACT REGION



Former MCG arenas manager Cameron Hodgkins was guest speaker at the recent STA ACT annual seminar in Canberra

#### **◆**AGCSA



#### **Turfgrass Biology, Genetics and Breeding**

Edited by Michael D. Casler and Ronny R. Duncan Wiley 2003

he cultivation of various turfgrasses has evolved into a dynamic, multi-billion dollar industry. Yet, there is still a lack of information available for those seeking to understand the complex science behind its growth.

Turfgrass Biology, Genetics and Breeding, edited by knowledgeable and highly respected experts Michael Casler and Ronny Duncan, the latter of whom needs little introduction to Australian turf managers, presents a comprehensive study of the various types of turfgrasses, their genetic and biological make-up, and the specifics of when, how, where and why each species was adapted for use.

It provides the basic biological explanations behind adaptation, genetics and breeding of turfgrasses, following the evolution of these grass species up to current (the book was published in 2003) advances in domesticating turf.

The 384-page hardcover book begins with Casler, a research geneticist and professor in the Department of Agronomy at the University of Wisconsin-Madison, and Duncan devoting an interesting chapter on the origin of turfgrasses, before the remainder of the book is split into coolseason and warm-season grass varieties.

The cool-season section contains chapters on Kentucky bluegrass (*Poa pratensis* L.), annual bluegrass (*Poa annua* L.), supina bluegrass, Texas bluegrass, rough bluegrass (*Poa trivialis* L.), perennial ryegrass, tall and fine fescue, creeping bentgrass, colonial bentgrass, velvet bentgrass, three other minor *Agrostis* species (redtop, highland and Idaha) and hairgrasses. The warm-season section covers bermudagrass, buffalograss, zoysiagrass, centipedegrass, seashore paspalum, St. Augustinegrass and bahiagrass.

The chapters are individually authored by a cast of noted and respected international industry experts (among them include Dr Leah Brilman from Seed Research of Oregon who spoke at the 2003 Australian Turfgrass Conference in Adelaide and *Poa* research expert Dr David Huff) and contain comprehensive reference sections at the conclusion of each chapter.

Within each chapter the author(s) present a range of information on that particular variety. For instance, the chapter on perennial ryegrass looks at:

- Adaptation and morphology;
- Distribution, cytotaxonomy and breeding system; and
- Collection, selection and breeding history (which includes information on growth characteristics, turf colour, hardiness, susceptibility to disease, drought tolerance etc)

While very technical in nature, for those with a scientific bent Turfgrass Biology, Genetics and Breeding certainly delivers on its claim that it's the only book that currently deals specifically with the science behind the major types of turfgrasses. With that in mind it provides an invaluable, timesaving reference and research tool for professionals interested or engaged in the genesis of turfgrasses.

Turfgrass Biology, Genetics and Breeding is available through the AGCSA Bookshop. AGCSA members can purchase a copy for \$144 (nonmembers \$167) by contacting Lyndel Conway on (03) 9548 8600 or email info@agcsa.com. au. Visit the AGCSA website – www.agcsa.com. au/products/books - to check out the extensive range of turf management books the AGCSA has available for purchase. w

#### ALSO CURRENTLY AVAILABLE FROM THE AGCSA BOOKSHOP....



The Golden Age of Golf Design

By Geoff Shackelford, Sleeping

#### Bear Press 1999

The Golden Age of Golf Design takes an in-depth look into the course architects of one of the most creative eras of course design - 1910-1940. Shackelford profiles the likes of Alister MacKenzie, Donald Ross, A.W. Tillinghast, C.B. MacDonald, Pine Valley maestro George Crump, Seth Raynor and Hugh Wilson and examines in detail their greatest works All the major classics are represented including Oakmont, Pine Valley, Merion, Baltusrol, Shinnecock Hills, Pinehurst, Cypress Point, August National and Pebble Beach.

AGCSA member price: \$96 Non-member price: \$116



Rootzones, Sands and Topdressing Materials for Sports Turf

By Dr Stephen Baker, STRI (UK)

The selection of the correct soils, rootzone and topdressing materials is the most important factor in achieving high quality sports fields. It is with this tenet in mind that the STRI UK produced Rootzones, Sands and Topdressing Materials which packs in over 25 years of research. Among the chapters are characterisation of sands, rootzones and topdressing; sources and properties of sands; sands and sand-dominated rootzones; soils for cricket pitches and tennis courts.

AGCSA member price: \$42 Non-member price: \$58



The Environmental Stewardship Toolkit

By Anthony L. Williams, Wiley 2012

Dedicated to anyone who is striving to become a better environmental steward, Anthony Williams' 300-plus page soft-cover book titled The Environmental Stewardship Toolkit is a practical, single source guide to all facets of environmental management. With detailed coverage of site assessment, water quality and conservation, wildlife habitat management, IPM and resource conservation, this book offers guidance and customisable implementation plans from a leading golf course superintendent.

AGCSA members: \$92 Non-members: \$110



### Give your grass the breathing space it needs with the ProCore® 648 Aerator.

From the innovative wheels within the coring path, to the large 122 cm aeration swath, there's nothing ordinary about the ProCore® 648 Aerator.

Every ProCore® 648 Greens Aerator features the patented 3-wheel series/parallel traction drive, combined with high-torgue, low-speed wheel motors which prevent slippage for reliable traction and even hole spacing ranging from 3.8 cm to 7.6 cm apart. While **RotaLink™** geometry allows the tines to enter and exit the ground cleanly leaving a high quality result, **TruCore™** ground following sensing system

automatically maintains tine depth on the fly to match the ground undulations providing consistent coring depth of up to 10.2 cm.

Also available a full range of genuine **Toro Titan<sup>TM</sup> Tines** options for durable and better performance. Over 100 tines provide a multitude of aeration choices Years of research, customer input and testing went into making the ProCore® 648 Greens Aerator the most productive and efficient walking aerator on the market and your secret weapon to getting and keeping your greens healthy.







# HYDROVAR, the modern variable speed pump drive is taking pumping to a new level of flexibility and efficiency.

- Motor or wall mountable
- Fully programmable on site
- Software specifically designed for pump operation, control and protection
- High level hardware design
- More flexibility and cost savings
- Energy savings up to 70%
- Simple mounting "clip & work"
- Multipump capability up to 8 pumps

The Hydrovar provides Golf Course Superintendents with the flexibility of watering as required with substantial savings on installation, power usage and maintenance. Just ask Mark Jennings from Box Hill Golf Club in Victoria:



Due to the recent drought and increasing cost of potable water, Box Hill Golf Club took the initiative to remove potable water and the greens, from the irrigation system and to utilise our full allocation of water from Gardiners Creek.

Reliability, flexibility and savings were paramount in our brief to find the correct pump set. Brown Brothers Engineers have a proven track record in all these areas and coupled with the expertise of Jim Waring (Tee's & Greens), our decision was quite an easy one.

The system has proven to be all it promised and more with all areas now irrigated with consistent pressures and uniformity; our irrigation window has decreased also even with the Greens now on the same cycle as the tees, fairways and approaches. I have no hesitation in recommending Lowara HYDROVAR as your next pump set.

- Mark Jennings Superintendent Box Hill Golf Club

For details about the experience of some of Australia and New Zealands most prestigious golf clubs who have installed Hydrovar pumping systems, contact a Lowara distributor near you today.



 Melbourne
 Sydney
 Brisbane
 Christchurch
 Auckland

 (03) 9793 9999
 (02) 9671 3666
 (07) 3200 6488
 (03) 365 0279
 (09) 525 8282

Email: info@brownbros.com.au Web: www.brownbros.com.au