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MANAGEMENT

VOLUME 9.4 JULY-AUGUST 2007

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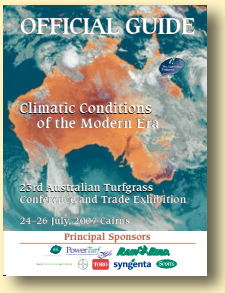
COVER:
Paradise Palms

Looking across to the 18th green at Paradise Palms Golf Club in Cairns. The Graham Marsh-Ross Watson designed course will play host to the 2007 Toro AGCSA Golf Championships during the 23rd Australian Turfgrass Conference. ***Photo: Brett Robinson.***



23rd Australian Turfgrass Conference – Official Guide 31-51

ATM acts as your official guide for the 23rd Australian Turfgrass Conference and Trade Exhibition. In this 20-page guide you will find everything you need for your week in Cairns. ATM previews the education sessions, social functions, AGCSA Awards and pays a visit to one of the region's finest golf courses – Paradise Palms – which plays host to the 2007 Toro AGCSA Golf Championships.

IN EVERY EDITION

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Shaun Satterly (Barbados GC)
Michael Schwarz (UWA)
Justin Sheehan (Coffs Harbour GC)
Brad Sofield (Gosnells GC)
Richard Windows (STRI)

overseas calling

I can clearly recall the day I made one of the biggest decisions of my life. I was sitting on the balcony of my flat in Auckland, New Zealand enjoying a couple of quiet ales with my flatmates when I thought, "Bugger it, I'm 24, I've got my career off the ground, it's time for a change". Less than six months later I was waving goodbye to friends and family at Auckland Airport bound for Europe. That was seven years ago.

Heading overseas is a rite of passage for most young Antipodeans and for turf managers who have the gumption to do so, a world of opportunities await. Just look at the career of Shaun Satterly who we profile in this edition's lead feature. From serving his apprenticeship at a small nine-holer in Tasmania, the 31-year-old now finds himself in charge of operations at Barbados Golf Club in the Caribbean.

Just as my career as a journalist took me to numerous jobs while I was overseas (the highlight being a correspondent for the official website of the 2000 Rugby League World Cup), turf managers are blessed to be in the sort of profession which can taken them almost anywhere in the world.

Australian superintendents have developed a reputation around the globe as being among the most hard-working and most adaptable turf managers in the game. Cast a glance at any maintenance facility the world over and chances are there is an Aussie either on work experience, or in many cases running the joint.

While we concentrate on Satterly's exploits in our lead story, the overseas theme continues in our dedicated opinion section The Pulse. In it we ask five expat Australians from the Middle East to Asia what some of their biggest management challenges are in maintaining their courses. Their answers I am sure you will find quite enlightening.

As you can no doubt tell by this edition's cover, Volume 9.4 acts as the official guide for the 23rd Australian Turfgrass Conference and Trade Exhibition which this year heads all the way to Cairns for the first time. Having missed last year's conference due to the birth of my darling boy Kristian, I am personally looking forward to heading to the tropical climes of Far North Queensland to catch up with the industry.

As in previous years, ATM has a dedicated guide to the conference, including a profile on Paul Earnshaw, superintendent of Paradise Palms Country Club which will play host to the 2007 AGCSA Golf Championships. Having had the privilege to spend some time at the course earlier this year, Paul and his crew do a wonderful job and they are looking forward to hosting some of the industry's big gun golfers. I wasn't brave enough to pull out the sticks for fear of embarrassing myself, but I can envisage there will be a bit of carnage come 23 July.

Elsewhere in the guide you will find a full listing of companies that will be exhibiting at the two-day trade exhibition which forms the backbone of conference week, while we also look ahead to the 2007 AGCSA Awards, including profiling the six finalists for the Graduate of the Year.

Finally, before I let you loose to browse your way through this edition, I would like to personally thank my colleagues, manager Scott Petersen and art director Jo Corne, for all their efforts in putting together ATM over the past year. As some of you may be aware ATM collected a further four awards at the 2nd TOCA International Communicators Contest in May, including a first place in design and photography. The awards are a tremendous fillip for us here at ATM and we look forward to providing you with more award-winning editions in the future.

Enjoy the read and I look forward to catching up with you all in Cairns.

Brett Robinson
Editor

JOHN NEYLAN AND SCOTT PETERSEN, JOINT GENERAL MANAGERS

Over the past nine months or so we have seen several long serving golf course superintendents move on from their golf clubs. Unfortunately in many of these cases they have been moved on somewhat unceremoniously.

The new industrial relations laws seem to have been used as a convenient means by which to move on an unwanted superintendent with little explanation other than "you no longer fit our organisation". It is obviously very distressing to the individual and sends shockwaves through the wider industry, particularly when there appears to be little respect for the individual's long-term service.

When examining the circumstances surrounding these instances there are the time immemorial issues of people not getting on, course presentation, lack of resources creating frustrations over failure to meet unrealistic expectations and even a lack of understanding that the prolonged drought conditions are impacting on the ability of the course to achieve a consistent quality.

While it is easy to point the finger at fickle committees and a lack of understanding of the complexities of golf course maintenance, it is also important to examine what the superintendent may have been able to do better. Communication is again key.

For all the turfgrass conferences and the number of papers and discussions related to communication, the message still fails to sink in. Communication involves both listening and educating and too often there is a failure to hear the message because we believe we know better.

Where individuals are trained in a particular discipline, our superior understanding of the issue can often blind us to the comments of committee members and dismiss them as irrelevant. The most innocuous or seemingly trivial question or request deserves consideration and respect. It is often the failure to respond to the seemingly trivial that often starts the breakdown in communication.

Committees and golf club members don't have the expertise of the course superintendent (though at times sound as if they do) and consequently what is obvious to the trained person is a complete mystery to the uninitiated.

How do we communicate the message we want to get across? There are several ways that you can better improve communications;

- Request regular meetings with key people; they need only be short. Have an agenda, take notes and issue minutes.
- If there is a "hair brain" request, don't argue that it is rubbish. Undertake a cost-benefit analysis or run a trial.
- Present facts and figures in a clear and concise manner and let the committee/board make the decision. It may not fall your way – bad luck, you've done your best and get over it.
- When it comes to course condition and expectation, lead your club through the process of producing a course quality document. Identify the course strengths and weaknesses, develop key indicators for course presentation, document cutting heights, green speeds etc. It may take time to develop it, however, it will define the maintenance requirements and what capital works need to be done. With this documentation it is then possible to develop realistic budgets and resources.
- Undertake a detailed time, motion and resource study for your course so that you clearly understand where the budget is spent and on what particular tasks.

The AGCSA has recognised human resource management as a key area and with the employment of Daryl Sellar now has several projects underway. These include a manual for Boards and GMs that describes the role of a superintendent; a salaries and wages survey for all positions on the turf management team and other workplace templates for better managing staff and resources. The AGCSA can also assist in the preparation of a course quality document to facilitate best practice.

The upward management within a golf club is a challenging and important task for all superintendents to better communicate their needs and wants and what is achievable (or at times unachievable). In these current times, that challenge now appears more real then ever.

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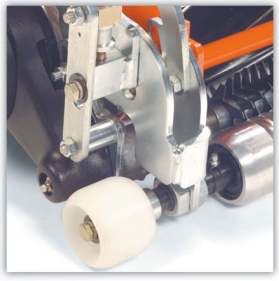

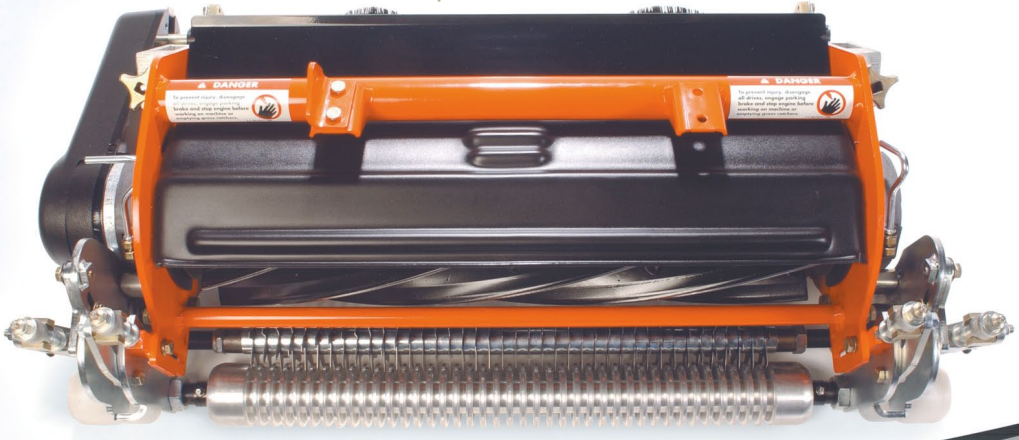

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BY BRETT ROBINSON

Not many golf course superintendents can claim to have prepared the outfield for World Cup cricket venue, but for Barbados Golf Club superintendent and ex-pat Australian Shaun Satterly the unique opportunity presented itself earlier this year. ATM catches up with the former Tasmanian turfie who is now enjoying a super life on what the locals affectionately call 'the rock'.

A super life on 'the rock'

Starting his turf management career in the small Tasmanian town of Wynyard, Shaun Satterly would never have picked that over a decade later he would be a superintendent plying his trade on the small Caribbean island of Barbados.

It's the sort of journey which a number of up and coming Australian superintendents are deciding to take these days and for Satterly, who has just notched up his second year in charge at Barbados Golf Club, it is one that has widened his eyes to not only turf management but life itself.

Barbados is quite literally a world away compared to Australia's beloved southernmost state, but for Satterly the road that has taken him there is just another example of the wide ranging opportunities available to turf managers in this modern era.

Barbados, or the 'the rock' as the locals know it as, is situated east of the Caribbean Sea. An independent nation which boasts a population of around 280,000, the country lies in the southern Caribbean region where it is a part of the Lesser Antilles island chain.

Barbados Golf Club superintendent and expat Australian Shaun Satterly

It is close to the South American continent, around 434 kilometres northeast of Venezuela, while its closest island neighbours are Saint Lucia and Saint Vincent and the Grenadines to the west, Grenada to the south-west, and Trinidad and Tobago to the south. Barbados' total land area is about 430km^2 and is primarily low-lying, with some higher regions in the island's interior.

Satterly's journey to Barbados started, not surprisingly, when he decided to head to the United States to take part in the Ohio State Program. Having served his apprenticeship at the small nine-hole Wynyard Golf Club and then moving to Queensland where he enjoyed stints at Redlands and Brisbane golf clubs, Satterly ventured overseas and was placed at one of South Carolina's leading golf resorts, Daufuskie Island Club and Resort.

Returning to Australia, Satterly joined The Australian Golf Club in Sydney under then superintendent Rob Ashes and was part of the crew that prepared the course for the

Barbados Golf Club is a public access course with around 250 members which attracts 30,000 rounds of golf annually

Centenary Australian Open in 2004. After four years there, during which time he completed a Masters in turf management through the University of Sydney, Satterly decided to see what opportunities were going overseas and through contacts made during his Ohio internship found out about the position at Barbados Golf Club.

Superintendent at the time was a Kiwi chap Ed Paskins who took Satterly on board and literally threw him in the deep end. Five months later Paskins handed the reins over to Satterly who has never looked back.

Barbados Golf Club is one of a handful of golf clubs on the island and is located about 20 minutes from the capital of Bridgetown in the island's southwest corner. Further north there is Royal Westmoreland Golf Club, as well as the exclusive Sandy Lane Golf and Country Club which is home to the highly regarded Tom Fazio-designed Green Monkey (Australian Steve Johnson is superintendent there).

Another 18-hole championship course is currently under construction as part of the Apes Hill Club development, while over the next five years there are plans for a further six courses to be built on the island.

By contrast, Barbados Golf Club is one of the smaller golfing operations . A public access course with around 250 members, it attracts about 30,000 rounds of golf annually, catering mainly to US and European holidaymakers who fly in or stop off on the many cruise ships which sail the Caribbean.

The course is 419 Bermuda throughout with TifDwarf greens which are constructed with local sand profiles. Satterly manages a crew of 20 which includes three mechanics who also service the club's fleet of golf carts.

CHALLENGING ENVIRONMENT

While living on a Caribbean island would be most people's idea of a great working environment, it does bring with it numerous challenges for a turf manager. For a start everything has to be imported and that requires plenty of preplanning or else budgets can quickly blow out.

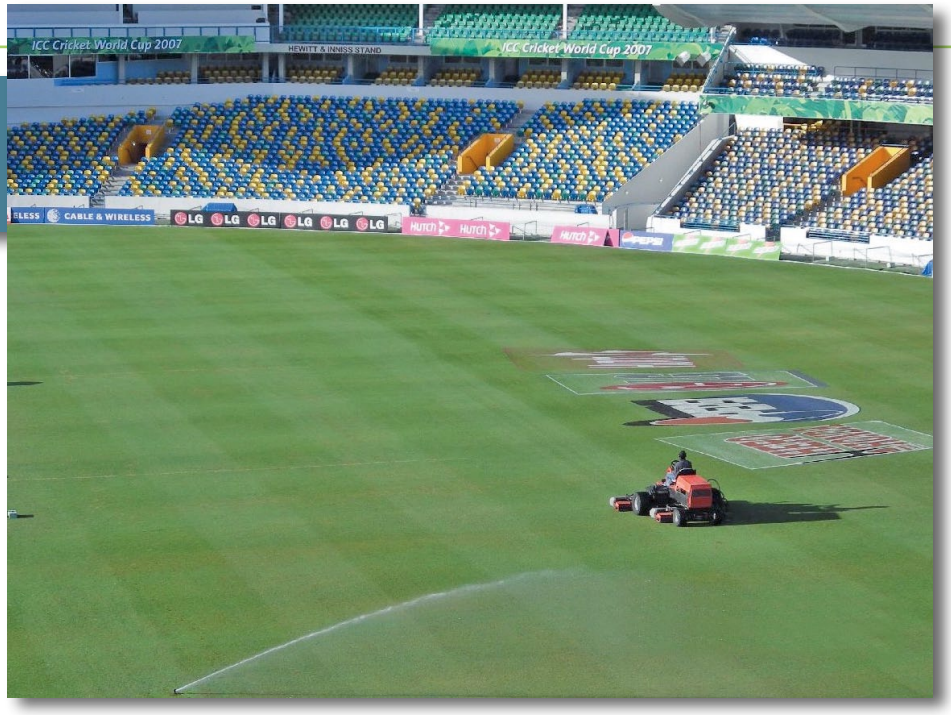
"Back home chances are you've got a distributor down the road and if you need any parts you just jump in the car or have a sales rep drop a few bags around to get you out of trouble," says Satterly.

"Over here you don't have that luxury. You have to think at least six months ahead of what you want to do and have everything brought in in advance to be ready to go. A lot of forward planning goes into simple things like aerification and topdressing greens. You soon learn to get on top of it pretty quickly otherwise you can get into a bit of trouble.

"All soil testing and disease diagnosis is sent offshore. I use a UK-based company and from their results I develop a fertiliser programme and then get a year's worth of supplies shipped in.

"Another issue we have is that some chemicals haven't been registered for turf, especially a number of pre-emergent herbicides. You have to specially apply to use those products on the golf course which takes a lot of time and red tape."

Barbados Golf Club is 419 Bermuda throughout with TifDwarf greens



Satterly and the crew at Barbados Golf Club won the tender to maintain the Kensington Oval outfield which hosted the final of the 2007 Cricket World Cup

Located in the tropics, Barbados also has a distinct wet and dry season which has taken some adapting to. Fortunately for Satterly, Barbados is often spared the worst effects of the region's tropical storms and hurricanes during the wet season as its far eastern location puts it just outside the principal hurricane belt.

"You can see them (the hurricanes) rolling in from the Atlantic on the radar, but most of them miss us," says Satterly. "What we do get are large tropical depressions which will just sit over the island for days and unload a torrent of water. They then move on up the island chain and that's when they turn nasty."

HEY-MAAN RESOURCE MANAGEMENT

Ask any ex-pat Australian who runs a golf course maintenance operation overseas what their biggest challenge is and chances are it will have something to do with managing the local workforce.

The West Indies region has a reputation for producing some of humanity's more laid back and relaxed characters and the local Barbadians are no exception. From a human resource management perspective that has created plenty of interesting challenges for Satterly, but one which he has enjoyed adapting too.

"There's never a dull moment, that's for sure," laughs Satterly. "It can be frustrating and exciting all in the one day. There are a range of emotions that go on. I've been here two years now and I guess I'm comfortable with how everything is but at first it was a big culture shock.

"I came here with my Aussie way of doing things – that things should just happen easily. Simple things like topdressing greens shouldn't be an issue but sometimes it doesn't happen that way. Here you've got to learn to relax and accept that things will eventually get done, even if it's not quite how you had envisaged them.

"Managing staff is one of my most significant challenges. They're a pretty relaxed bunch as you can imagine. One of the problems I have is that a lot of the workers rely on public transport to get to work and during the wet season when the rains set in it can became a big issue.

"The bus system isn't the best and when we get extended rain some people literally can't get out of their houses. They don't like the rain either so sometimes you may get just six or seven staff coming to work, which when

Kensington Oval was the venue for Australia's World Cup final win over Sri Lanka

the grass is growing so fast at that time of year makes it very difficult to manage the course."

Satterly admits that when he first started it was an issue which he had difficulty getting to grips with, but now he deliberately increases his crew to anywhere up to 24 to cater for any such problems. He also has to constantly motivate the staff to produce a top quality product.

"Obviously it's completely different to back home," says Satterly. "For instance, when I was working at The Australian, it was hard not to be motivated, particularly in and around the time of the Centenary Open. Over here it's completely different. You quickly learn how to lead people and manage people, keep them interested and motivated.

"The other thing is that most are just straight labourers. You have to train them up yourself as there are no formal apprenticeships or turf education system in place.

"But with the industry starting to grow there is a career to be made if they apply themselves. There are a lot of projects in the pipeline at the moment so there are opportunities for greenkeepers, assistants and irrigation techs if they want to get in and learn.

Satterly with members of his Kensington Oval maintenance crew

"I do try and project that there are opportunities, but I don't think it has registered with some of my guys. Most just see it as a job, a source of income. I guess once these other projects start coming on line and they see that there is a growing industry then maybe attitudes will change.

"A lot of them don't want the responsibility either. They're just happy to get to a certain point and stay there; they don't want the stress. It's a cultural thing. Back home most people are goal driven and want to be a superintendent one day. Over here they're much more laid back and are quite happy to cruise."

Satterly says it has taken him a while to adjust to the relaxed Barbadian way of life and reckons I took him a good 12 months to fully get his head around how things were done West Indies style.

"Now that I have been here for two years, I'm at a level where I feel I am comfortable with things and the guys are comfortable with me as well," says Satterly.

"I have certainly learnt a lot off the guys here. They've taught me a lot about leadership, people skills, management and being organised. I was fairly easygoing back home and fairly organised to a point I guess, but being here has taken me to that next level in terms of managing yourself.

"They don't teach that sort of stuff when you're doing a turf degree. They teach you how to grow grass but they don't teach you ▶

the psychology side of things, how to lead and motivate staff. That's a whole different ball game and one you don't find out about until you're thrown into that position."

A UNIQUE OPPORTUNITY

While working in Barbados has equipped Satterly with numerous new management skills, there was one rather unique opportunity which presented itself recently. Not many superintendents can say that they have prepared a ground for the Cricket World Cup but for Satterly that unusual chance came about with the West Indies playing host to the 2007 tournament.

Together with the CEO of Barbados Golf Club, Satterly responded to tenders calling for the maintenance of the outfield and practice wicket area at Kensington Oval in Bridgetown, which hosted a number of Super 8 games as well as the final between Australia and Sri Lanka.

After discussions with the UK's STRI and World Cup Barbados, a maintenance program was accepted and from October 2006 Satterly was in charge of putting together a crew to maintain the oval's outfield while at the same time maintaining the golf course.

"It was quite a juggling act," reflects Satterly, who will continue to maintain the oval until the contract is renegotiated later in the year. "We moved one guy full time from the golf course and I was down there overseeing things every other day.

"Logistically it was very challenging moving guys between the two venues and keeping both venues ticking along without sacrificing quality. If we went in to topdress or fertilise we would take a crew of about five down. As the World Cup came closer everything intensified and you had to plan a couple of steps ahead all the time."

Not having a cricket background, Satterly undertook investigations into what was required for a successful outfield and quickly found that it was much like preparing a golf course fairway. A smooth, quick, uniform playing surface was the goal from the outset and with that vision in mind he and his crew set about achieving it.

"Turf quality at the start was fair with approximately 85 per cent coverage," says Satterly. "419 Bermuda was chosen for planting on the outfield. The first step was to obtain an accurate soil and water analysis so as to prepare an effective fertiliser programme which would peak for the first Super 8 match and hold through until the final.

Satterly and his crew helped out where required with any pitch maintenance requirements

"Once the outfield obtained 100 per cent coverage it was then a matter of improving the quality of the playing surface. The field required considerable topdressing to improve smoothness and reduce the undulations which remained post construction.

"All sand topdressing required screening as the local sand contained a high percentage of large aggregates. The screening was time consuming and made a relatively straight forward task a little more difficult."

A few challenges were experienced when working in conjunction with the stadium construction. Debris from the construction efforts were constantly on the field which resulted in areas of turf being killed off, while the use of heavy lifting equipment to install light and sound fixtures made progress slow.

Some shade issues were also experienced on the southern side of the oval with algae quite prevalent. The use of grow lights was investigated but it was decided that with normal cultural practices the playing surface would improve and become manageable as the seasons changed and the position of the sun became higher in the sky. That diagnosis proved correct and that particular section returned to 100 per cent coverage by the start of the tournament.

"For the Super 8 games and the final we cut prior to each match and aided the wicket curator with any pitch requirements," says Satterly. "The goal for those games was to pick the field up to maximum just prior to the first match and hold it through to the finals. Wear and tear and become considerable by the end of the Super 8 matches and we only had seven days to try and restore the health of the grass before the final.

"It really kept you on your toes, but it was exciting to be a part of it and certainly a once in a lifetime opportunity for a golf course superintendent. And to watch Australia take out the title was the icing on the cake."

A SUPER LIFE

So does Satterly see himself coming home in the near future, or has the Barbadian bug bitten him enough to stay on?

"I'd love to go back to Australia' says Satterly. "But that's one of the reasons I left - there weren't the opportunities there. I wasn't prepared to stay in one spot for 5-10 years before moving into a superintendent position. I was keen to go where the opportunities were I suppose and through contacts I landed up in Barbados.

"I love the fact that I'm developing my career but traveling the world at the same time. You can treat it as a stepping stone or you could quite easily stay on for a number of years. There are plenty of other golf courses coming on line soon not just here in Barbados but also around the region.

"I'm just enjoying the Caribbean at the moment. It's a pretty good part of the world, once you get your head around it. You just have to take your foot off the accelerator a little and adapt to the local way of life."

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BY RICHARD WINDOWS

The 136th staging of The Open will be played out on the challenging links of Carnoustie, the northernmost course on The Open rota

Uncompromising Carnoustie

The Championship Course at Carnoustie in Scotland has a reputation as one of the most challenging golf links in the world. Here STRI agronomist Richard Windows gives a brief insight into changes made to the course and preparations as it gets set to stage the 136th Open Championship in July.

For the first time since 1999, The Open Championship makes its return to the famed links of Carnoustie, north east of Dundee. The aim of course preparations for any Open is to provide firm and dry surfaces that facilitate the art of real golf and at Carnoustie that will be no exception.

Since the last Open at Carnoustie, which will be remembered for Frenchman Jean Van Der Velde's dramatic 72nd hole meltdown, some changes have been made to the Championship Course for the 136th Open which tees off on 19 July.

Martin Hawtree was commissioned by The R&A and the Carnoustie Links Management Committee to make these changes, the most notable being the remodelling of the 3rd and the introduction of additional bunkering on the 6th to tempt golfers down the traditional but risky Hogan's Alley route.

The already challenging final stretch of four holes has been made even more difficult with the remodelling of the rough to provide additional dips and swales to the right of the 17th and left of the 18th. Here, naturalised bent and fescue rough, taken from elsewhere on the links, has been introduced. This improves the aesthetics of the hole but crucially makes the hole much tighter off the tee.

OPEN PREPARATIONS

As with all Open Championships, the aim of course maintenance for the 2007 tournament is to provide firm, dry and fiery links conditions. It is these conditions that make The Open so unique and set it apart form the three other US-based 'majors'.

To provide these conditions, Carnoustie links superintendent John Philp and his team have been working hard since the last Open to optimise the performance of the turf for July 2007.

For greens, an intensive programme of sand topdressing combined with solid tine aeration has been implemented over the past three to four years. During the final run in to The Open, irrigation inputs will be minimal to keep the surfaces optimally firm and dry.

The botanical composition of the turf at Carnoustie, the northernmost course on The Open rota, has always been good but great strides have been made over the past couple of years with increasing populations of fine fescue. For The Open, the greens will be dominated by bent and fescue with the latter species making up 30-40 per cent of the turf.

The botanical improvement of the greens has been achieved without compromising playing quality. A concerted effort has been made to set the right environment by relaxing disturbance pressure from routine surface preparations and regular (timely) overseeding.

In a nutshell, cutting heights have been increased slightly, verticutting intensities have been relaxed and rolling using a Turf Iron has been increased. This approach has retained playing quality at the same time as helping to enhance botanical quality.

During the final run in to The Open, it is hoped brushing will be sufficient to refine the texture of the turf without the need for verticutting. What is more, mowing heights will be retained at approximately 4.0mm and all mowing will be done by hand. Regular rolling will provide the final polish to the greens and consistent green pace of approximately 10.5-11 inch on the stimpmeter.

FIRM AND FAST

For the fairways, an intensive conditioning programme has been instituted to provide tight lies and firm running surfaces. To achieve this, sand topdressing has played a crucial part in this process.

As perennial ryegrass is a significant contaminant to the fairways, a programme of light verticutting and differential mowing is implemented to provide tight lies. Such lies are all important to provide optimum control of the

The Carnoustie team (from left) John Philp (links superintendent), Sandy Reid (head greenkeeper), John Gilbert (green convenor) and Paul O'Connor (deputy links superintendent)

ball. Ryegrass control is being achieved with a combination of tight mowing using a triplex (at 6mm) and verticutting to the low-lying sections. The areas not supporting ryegrass populations will be mown at a higher mowing height of 8mm.

In order to optimise the playing quality and presentation of the fairways in the final lead up to The Open, irrigation application will be relaxed from late May/early June. To achieve consistency between the tops of mounds/slopes and the lower lying sections, wetting agent and hydrojecting is concentrated to these areas to achieve uniform moisture penetration.

ROUGH TIMES AHEAD

While the conditioning of the in-play areas at Carnoustie is always a talking point, it is the changes that have been made to the rough that are probably the most dramatic since the last Open. Many of the inappropriately planted conifer plantations have been removed which has restored the links character of the course.

However, most importantly, the quality, texture and botanical composition of the rough has been enhanced by grassland management operations and large scale returfing with bent and fescue grasses.

The initial work was achieved using imported fescue-dominated turf, whereas the latter, including that to the right of the 17th and 18th (as seen in the photo opposite), has been achieved using indigenous turf from elsewhere on the Links. This will provide better quality naturalised rough around the course.

As part of its role as official agronomists to The R&A Championship Committee, the STRI has been monitoring the changes made to Carnoustie and the preparations for the forthcoming Open, as well as for the four local final qualifying courses at Panmure, Monifieth, Montrose and Downfield.

The STRI ecology team has also played an integral role in the management of the out-of-play areas in the lead up to The Open and have just finished an environmental management plan for the entire links encompassing the Championship, Burnside and Buddon courses.

The rich history of Open Championship at Carnoustie combined with the changes to the course and the exceptional conditioning of the playing surfaces make the return of The Open to Carnoustie a mouth-watering prospect for any golf enthusiast. The hope is now for dry weather to see the course at its most challenging.

BY GARY W. BEEHAG

Bunkers are without question one of the most talked about and contentious features of golf courses

Understanding bunker sand behaviour

Bunkers are an obsession of modern strategic golf course design and among golfers an emerging attitude is that the sand surface must to be uniform and predictable. For superintendents and club committees, are there solutions to satisfy golfer's demands of bunker sand? Gary Beehag outlines the fundamental properties of sands to gain a better understanding.

Fortunately for golf, sand is one of the most common materials on earth. Sand is defined as particles 2.0-0.15mm in diameter of various shapes and sizes. The geologic agents of natural sand are wind and water. Sand is formed from the weathering of sedimentary rocks composed of either calcium carbonate (limestone), aluminium silicate (feldspars) or silicon dioxide (quartz).

Siliceous or quartz sand possesses greater resistance against physical and chemical deformation, compared to calcareous or limestone sand, hence its use as construction and bunker sand. The majority of quartz sand is extracted for the concrete construction industry which demands certain petrographic properties of the sand.

Sand occurs throughout Australia and many sand deposits are protected under environmental legislation. Sand is sourced from coastal and inland dunes, floodplains and freshwater rivers and from friable sandstone deposits.

Sand extracted from coastal dunes and freshwater rivers is produced by screening to size to remove foreign material, such as charcoal, and washed to remove very fine particles such as silt. Marine sands formed below the groundwater table may be alkaline by nature. Sand from friable sandstone quarries is crushed and screened to size and finally washed.

The challenge for golf sand suppliers is to source and consistently produce suitable sand possessing adequate infiltration capability combined with sufficient sand stability

FUNDAMENTAL SAND PROPERTIES

Fundamental properties of sand grains are size and shape, surface roughness and colour, all determined by the sand's geological origin and age. Particle grading is established from determining particle size distribution by mechanically shaking a nest of sieves.

Sands which record less than 40 per cent of particles on any two sieves are referred to as having a wide particle distribution. Desert sands typically have a wide assortment of grain sizes. Narrow particle distribution, typical of coastal dune sands, results when the sand records more than 60 per cent of particles on two sieves.

Sand shape and surface roughness have been intensely studied by geologists to understand natural weathering processes. Wind-blown or aeolian sand from desert dunes often produces a more rounded shape of the larger sand grains and more angular shape of the smaller grains. Desert sand grains also have an opaque and frosted surface, the result of chemical action.

Water-borne or fluvial sand of freshwater rivers can possess highly polished and glossy surfaces. Geologically 'young' sand produced artificially from friable sandstone results in highly irregular angularity because of severe shattering. Extreme angularity is rare in natural sand grains.

Sand particle shape comprises two independent geometric concepts of sphericity and roundness. Sphericity is a measure of the degree to which the shape of a particle approaches that of a sphere. Roundness (or smoothness) is a measure of the angularity of the corners regardless of particle shape.

These two concepts are combined when sand grains are categorised as sub-rounded or sub-angular. Grain shape and surface roughness influence sand stability on bunker faces. Angular sand grains have flatter sides and therefore greater friction providing superior interlocking of adjacent grains. Highly-uniform, rounded sand grains will erode from bunker faces partly because of a lower angle of repose.

Like performance, sand colour is a topic among architects and golfers. Sand grain colour provides a clue to their origin. The coastal sand of St Andrews (Scotland) is cream in colour. Depending on the location of sand within coastal dunes, sand colour can vary from brown, grey, yellow to white. The beaches within Jervis Bay (NSW) reportedly possess the whitest coloured sand on Australia's east coast.

Light-grey colour is typical of sand formed below the groundwater table. Dredged river sand can vary in colour from yellow to cream. Red dune sand, such as found within the Simpson Desert, is the result of iron oxides. Dark brown to charcoal coloured sand found within the coastal golf courses of Sydney and Melbourne is the result of accumulated organic humus.

The so-called Botany grey sand of Sydney's eastern suburbs and its equivalent within Melbourne's sandbelt provides a unique physical stabilising property to the sand, favoured by some. By comparison, crushed sand from friable sandstone varies in colour from white to cream.

WHAT DO GOLFERS WANT?

The two-fold challenge for golf sand suppliers is to source and consistently produce suitable sand possessing adequate infiltration capability without surface water ponding on the bunker floor combined with sufficient sand stability for struck golf balls to roll back onto the floor, not bury on the bunker face.

Globally, specifications have been published stating the physical indices to predict bunker sand behaviour. Guidelines ▶

and specifications for bunker sands have been published in the United States (1974), Britain (1984) and Australia (1995). Common indices are particle grading and shape. Other laboratory-derived values include hydraulic conductivity and ball penetration.

Among some golfers, an irony exists which makes it difficult, often frustrating, for course superintendents and sand producers alike to understand what constitutes an acceptable bunker sand.

On the one hand, some players accept the golfing challenge and variability of sand colour and texture when playing coastal golf courses, knowing the bunker sand is natural. On the other hand, for course re-constructions and new golf course developments, often where sand does not naturally exist, imported bunker sand is subject to intense scrutiny by golfers, requiring specification by course architects and construction contractors. What's the answer to this dilemma?

A number of trends are apparent regarding sand performance and the principal criteria are ball plugging and infiltration. Relatively low values for golf ball penetration and low hydraulic conductivity are often recorded for the one sand.

Sands recording golf ball penetration values greater than 2.0kg/cm^3 are uncommon but do possess greater stability on bunker faces. Typically, these sands possess a relatively wide particle size distribution.

By comparison, sands which typically record hydraulic conductivity values greater than 500mm/hr have a relatively narrow particle size distribution. Such sands provide adequate surface infiltration for use on the bunker floor but are unstable on the bunker face. Some course superintendents have even used fine brick sand on bunker faces in an attempt to minimise sand erosion. The stability of sands with sub-rounded particle shape will decrease as the sand becomes coarser.

Bunker maintenance has increased in line with player expectations

What about sand depth? The philosophy of plotting a moisture release curve or calculating grain size uniformity which is commonplace for putting green construction blends has not been adopted to determine optimum sand depth within clay-based bunkers.

Optimum sand depth decreases as the particle grading increases. The depth of sand which allows air to enter a draining surface is known as critical tension. Apart from inferior internal drainage, sand in some bunkers may retain excessive water because of inadequate sand depth.

Golfers appear to have the view that an excessive depth of bunker sand results in buried golf balls. One coastal golf club member stated that the golf ball buried because the bunker sand was too deep.

Grain size uniformity can be characterised by the graduation index (GI) and coefficient of uniformity (CU) which are simply ratios of larger to smaller grains. For construction mixes, most research has stated the GI must be less than 5.0 and the CU from 2-3. Relatively uniform sands will have low values for GI and CU and good resistance against excessive compaction.

Comparing GI and CU of a number of bunker sands against their values for golf ball penetration and hydraulic conductivity, further trends emerge. Some bunker sands with a GI less than 5.0 often record a hydraulic conductivity greater than 900mm/hr.

PRODUCING BUNKER SAND TO SPECIFICATION

Unlike sportsturf construction blends, the majority of current bunker sands are single-sands and are not produced to rigid specification. Binary sands, comprising two or more different sands, are typically blended for construction purposes with the production stockpiles tested to ensure they fulfil the contract specification. Textural and colour variability occurs within any sand deposit, hence why reputable sand suppliers conduct in-house testing of their sand resources.

The blending of sands by suppliers having access to a number of different sand types to meet a specification would assist to reduce the variability of bunker sand and possibly allow to custom blend to colour.

Golf superintendents and construction contractors would at least have some comfort knowing that the better bunker sand has been sourced. The additional cost of blending would require discussion but some assurance of long-term consistency and supply could be given. Imagine the possibilities of being able to select a bunker sand by particle size and colour.

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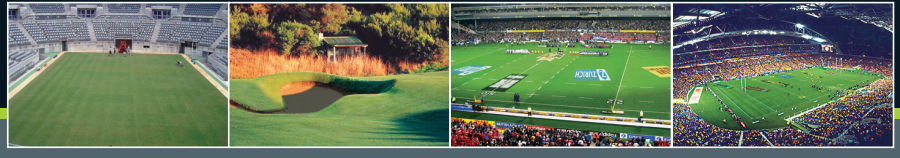

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BY MICHAEL SCHWARZ AND TIM COLMER

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A collaborative project between the QDPI&F and the University of Western Australia (UWA) is aiming to determine best management practices for soft-leaf buffalograss. Here Michael Schwarz and Tim Colmer provide an update on the experiments being conducted by the UWA.

Buffalograss best management

Soft-leaf buffalograss is gaining in popularity in Australia, however best management practices for these turfgrasses have yet to be developed for the various regions around the country.

Knowledge on various aspects of performance for a diverse range of genotypes is becoming available via a collaborative project led by Queensland Department of Primary Industries and Fisheries (QDPI&F), in partnership with University of Western Australia (UWA) and numerous industry groups.

Of importance are our initial findings in experiments conducted by UWA that nine of the 11 soft-leaf buffalograss genotypes that we tested did not differ significantly in water use when compared with an old-style common buffalograss.

Close up of the travelling-boom irrigator watering one block during the UWA buffalograss experiments

BACKGROUND

Horticulture Australia Ltd (HAL) project TU04013 – "Adaptation and management of Australian buffalograss cultivars for shade and water conservation" – is a collaborative project led by Dr. Don Loch from the QDPI&F.

To evaluate the adaptation of various genotypes to a diverse range of climatic and soil conditions, 17 genotypes are currently being assessed at industry sites in Queensland, NSW, Victoria, ACT and Western Australia. In addition to the industry sites, more intensive experiments are being conducted in Queensland and Western Australia.

QDPI&F (Turf Research Group, Redlands) is evaluating a number of agronomic traits: plant morphology and development, the influence of fertiliser management and mowing frequency on growth and aesthetic quality, wear, shade tolerance, and herbicide tolerance.

UWA (Turf Research Facility, Shenton Park) is investigating turf water use and drought tolerance. Performance on a calcareous soil is also under evaluation at Wembley Golf Complex.

UWA EXPERIMENT 1A RESPONSES TO DECLINING IRRIGATION

Irrigation studies have used the following experimental design: 12 genotypes x three treatments x three replicates (12 x 9m^2 plots in nine blocks in a randomised complete block design) under the travelling-boom irrigator at the UWA Turf Research Facility. The 12 buffalograss genotypes are:

GP22	Sir Walter
Matilda	ST26
Palmetto	ST91
Sapphire (B12)	TF01
Shademaster	Velvet
Sir James	WA common

Following establishment, plots received 15kg N ha^{-1} every four weeks (NPK water-soluble fertiliser 'Turf Special') and were mown at a 20mm cutting height.

During the 2006/07 summer, irrigation treatments were imposed for 16 weeks and then recovery was assessed for four weeks, by re-watering all plots. The three irrigation treatments were:

1. 80 per cent daily replacement of net evaporation;

Overview of the soft-leaf buffalograss plots at the UWA Turf Research Facility at Shenton Park. The 12 genotypes studied for water use and responses to irrigation treatments were planted in nine complete blocks (12 9m^2 plots in each block)

2. Replacement of 50 per cent net evaporation summed over two days and applied every second day; and
3. Replacement of 33 per cent net evaporation summed over three days and applied every third day.

Rooting distributions with depth, and above-ground biomass, were determined at the start of treatments. During the treatments, measurements were taken on growth, colour, leaf chlorophyll, leaf water content and sap osmotic potential.

As one example of the data collected, Figure 1 (page 24) shows changes in turfgrass greenness with time, in response to declining irrigation, for the genotype Velvet. Greenness was measured using a chromameter (higher hue angle indicates greener turfgrass). Colour was impacted more quickly, and to a greater extent, in the low irrigation treatment (33 per cent replacement of net evaporation) compared with the intermediate irrigation treatment (50 per cent replacement of net evaporation), relative to the control plots. Colour recovered within a few weeks when plots were re-watered during early autumn at 80 per cent replacement of net evaporation.

Data such as shown in Figure 1 were collected for the 12 genotypes. All showed the same general patterns. Differences in the rates and extents of colour decline, especially for plots with the intermediate irrigation treatment, need to be confirmed during a second summer before we can be confident that these are real genotypic differences.

UWA EXPERIMENT 1B TURFGRASS WATER USE

In addition to the nine blocks used in the irrigation experiment described above, ▶

a tenth block was also planted to house weighing lysimeters. Turfgrass water use was measured using three replicate lysimeters for each genotype, on several days during the summer.

The water use measurements showed that nine genotypes of the soft-leaf buffalograss did not differ significantly in water use from the old-style common buffalograss (WA common), when measured on days with net evaporation of 8-11 mm (i.e. under relatively high evaporative demand).

The data on the WA common buffalograss were in agreement with our earlier measurements (PhD research by Digby Short, HAL Project TU96002). These results are an important finding as there were some perceptions at the start of the study that soft-leaf buffalograss might use more water than the old-style common buffalograss. This perception was not supported in the majority of cases.

Nevertheless, two of the soft-leaf buffalograss genotypes used more water than the old-style common buffalograss (e.g. up to 64 per cent of net evaporation compared with 53 per cent for the common). These results need to be confirmed during the next summer prior to releasing the full set of water use data on all genotypes.

UWA EXPERIMENT 2 PERFORMANCE OF GENOTYPES ON CALCAREOUS SOILS

Another area that is being investigated is the performance of various buffalo genotypes on a calcareous soil. This is being evaluated at Wembley Golf Complex with the site managed in collaboration with course superintendent Darren Wilson (GCSAWA).

The experimental design is: 18 genotypes x three replicates (4m^2 plots in a completely randomised design). The genotypes are: EB1, EB2, GP22, Matilda, MRS2, Palmetto, Sapphire (B12), Shademaster, Sir James, Sir Walter, ST26, ST85, ST91, ST135, TF01, Velvet, WA common buffalograss, and Wintergreen couch.

Following establishment, plots received 15kg N ha^{-1} every four weeks (NPK water-soluble fertiliser, 'Turf Special') and were mown at a 20mm cutting height. Assessments of growth, colour, and turf nutrition are being taken by UWA staff each season (i.e., four times per year). Measurements started during the summer of 2007 and will continue for the next 12 months.

Clippings from all plots were collected weekly to measure growth. The low-irrigation plots had suffered large reductions in growth and colour, but recovered within a few weeks of re-watering at 80 per cent replacement of net evaporation

ACKNOWLEDGEMENTS

This project was facilitated by HAL in partnership with the turf industry. It was funded by voluntary contributions from Brisbane City Council, Buchanan Turf Supplies, Delfin Lend Lease – Springfield Lakes, Delfin Management Services, H & T Whiting Turfgrass Developer LLC, Matilda Trading, Sod Solutions, Richmond Turf, TurfCo, Turf Force, Turf Growers Association (WA), Palmetto Group WA, Sir Walter Group (WA), Betta Turf. The Australian Government provides matched funding for all HAL research and development activities.

UWA also thank for in-kind support: GCSAWA, Wembley Golf Complex, Organic 2000, and CSBP.

Extracting a lysimeter from within one of the buffalograss plots

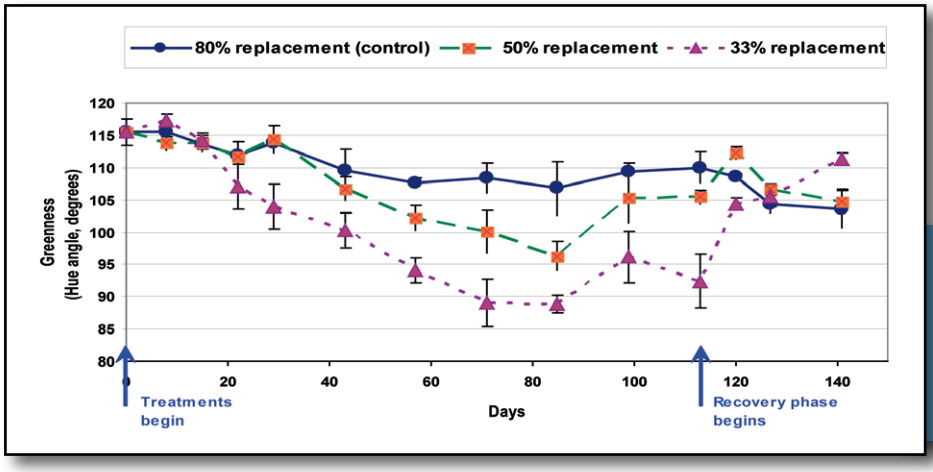

Figure 1. Changes in turfgrass greenness during three irrigation treatments imposed on Velvet soft-leaf buffalograss at the UWA field research site. Greenness was measured using a chromameter (higher hue angle indicates greener turfgrass).

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BY JOHN NEYLAN

With environmental management a hot topic at present, John Neylan looks into the philosophy behind off-label pesticide use, as well as examines the increasing popularity of seashore paspalum.

Registered turf chemical products are priced to include the cost of the testing and registration process which provides assurance of quality and efficacy

THE MANAGEMENT OF PESTICIDES IN AUSTRALIA

At the recent AGCSA environmental management system workshops the implications of what it means to use off-label chemicals was discussed in some detail. If we are to be environmentally responsible there are important considerations when contemplating off-label use.

The following is an extract of a review undertaken by the Western Australian Department of Health into the legislation in Australia affecting the use of pesticides. It provides a useful insight into the philosophy behind why chemicals are registered and the importance of the pesticide label.

Since March 1995, responsibility for the legislative management of pesticides in Australia is shared between the Commonwealth and the States/Territories through the National Registration Scheme for Agricultural and Veterinary Chemicals.

The Commonwealth is responsible for the regulation of agricultural and veterinary chemicals from their import or manufacture up to and including the point of retail sale through the Agricultural and Veterinary Chemicals Code Act 1994, which is administered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) in Canberra.

REGISTRATION OF PESTICIDES

The main role of the APVMA is the registration of agricultural and veterinary chemicals. Registration involves;

- The scientific evaluation of each chemical product for human, occupational and environmental safety;
- Determining the potential impact on crop safety and efficacy on the pest;
- Ensuring there are precise instructions for the use of the product and part of the approved label and any material accompanying the product when sold;
- Label instructions also include information on safety precautions, and restrictions on its use and disposal.

Other government agencies assist the APVMA to evaluate pesticides, including:

- The Office of Chemical Safety (Commonwealth Department of Health and Ageing), which advises on toxicological issues and worker safety.
- Commonwealth Department of the Environment and Heritage, which advises on minimising the impact of pesticides on the environment.
- State/Territory departments and independent reviewers advise on how well the pesticides control pests and diseases.

The APVMA invites public comment on registration applications before making its decision to register. It also invites members of the public to participate in its programmes such as reporting adverse chemical experiences through the Adverse Experience Reporting Programs (AERP), and contributing to chemical reviews.

The AGCSA has been contacted on several occasions by the APVMA to provide comment on the industry requirements for particular chemicals that are being considered for deregistration. There have been several older insecticides placed under recent review and considered through this process.

The role of the States and Territories is to regulate controls over the use of pesticides, i.e. from the point of retail sale to the user, to the final point of use of the chemical or its disposal.

The legislative bases for this regulatory activity vary considerably. Most jurisdictions control pesticide use through legislation administered by their respective Departments of Agriculture or Primary Industry, or other relevant bodies (e.g. Health Dept.).

The extent of the controls exercised by jurisdictions under their respective legislation is largely the same, however, there are some differences. For example;

- In Victoria it is not an offence to use a pesticide off-label unless that use is specifically prohibited by regulation.
- NSW is currently the only jurisdiction that requires all farmers and commercial applicators of chemicals to be trained, although this is under consideration in other jurisdictions.

Tables 1 and 2 show the similarities and differences between the various jurisdictions and the extent to which they address elements of control of use of pesticides.

COMPLYING WITH REGISTERED OR PERMITTED LABEL CONDITIONS

Label instructions provide pesticide 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. The former two types of permits are self-explanatory, and a minor-use permit is one that allows a use that would otherwise be in breach of a State or Territory law.

VICTORIA AND OFF-LABEL USE OF PESTICIDES

In Victoria, pesticide laws allow the use of a

Table 1. PESTICIDE (Agricultural Chemicals) OFF-LABEL USE PROVISIONSUNDER EXISTING STATE CONTROL OF USE

Controls		QLD	NSW	ACT	VIC	TAS	SA	WA	NT
RATES	Use a higher rate than that shown on the approved product label	NO	NO	NO	NO	NO	NO	NO	NO
	Use at a higher frequency (ie. more often than that shown on the approved product label)	NO	NO	NO	NO	NO	NO	NO	NO
PESTS	Use on a different pest in a crop/situation already shown on the approved product label	YES (unless instruction states must not be used to control the different pest)	NO	NO	YES (subject to conditions and certain restrictions)	YES	YES	NO	YES
CROPS & SITUATIONS	Use on a different crop or situation not shown on the approved product label	NO	NO	NO	YES (subject to conditions and certain restrictions)	NO	NO	NO	NO

pesticide for any purpose, whether that use is registered or not, so long as:

- The pesticide is registered for at least one use (e.g., a crop) in Victoria;
- The pesticide is not one of about 25 prescribed restricted pesticides, or is a Schedule 7 poison;
- The intended use is not specifically prohibited in Victoria, or if it is at a greater rate, or shorter interval between uses; and
- The intended use does not lead to a residue which exceeds the maximum residue limit for that crop.

This regulatory regime allows a great deal of freedom to the pesticide user in Victoria in that he/she does not have to apply for a permit to use a pesticide for most off-label uses, as the regulations render a permit unnecessary. However;

- This places the responsibility for minimising public health and environmental risk squarely on the shoulders of the user, who is probably the least informed and least able to make a value judgment on the relative risk he/she is undertaking;
- This approach also has the effect of minimising the potential liability to the State Government of any adverse outcomes arising from the use of pesticides.

As discussed at the EMS workshops, this fact is absolutely critical when making a decision to use a product off-label. The responsibility is entirely with you and the club.

DPI (VIC) is aware that from time to time a small number of growers may be considering using an unregistered chemical product, and the reason is probably related to the price of the unregistered product compared to the price of the registered product.

Registered agricultural chemical products are priced to include the cost of the testing and registration process, and it's this that provides assurance of quality and efficacy. DPI randomly samples and tests produce grown in Victoria and where there is a possibility that unregistered agricultural chemicals may have been used will target tests for them.

It really is a bit like Russian roulette - the more a grower considers using an unregistered chemical, the more likely it is that it will be detected, and that could be bad news both for the person who used the chemical and their entire industry (DPI 2005).

In summary, registered turf chemicals have passed a rigorous testing programme that ensures the products are fit for use and that manufacturers of registered chemical products are providing a warranty when their products are used according to the label instructions.

ENVIRONMENTAL INITIATIVE

During a recent discussion the point was made that some superintendents were losing motivation in preparing an EMS. The reasons were varied including not enough time, too much work and that the local authorities were not that concerned with golf courses as an environmental concern.

Part of the motivation for preparing an EMS seems to be based on an "I have to or the authorities will get me" rationale. In part this is true, however, there are numerous daily activities that take place on the golf course that interact with the environment. Whether it is to do with managing water, native vegetation or pesticide applications, these activities need to be managed appropriately. There is no better way to organise and record how they should be managed than through an EMS.

During the recent EMS workshops the AGCSA was very encouraged by the enthusiasm shown for the Environmental Initiative and recognising the benefits to our industry of formally identifying the environment within which we operate.

As we discussed during the workshops, there are over 350 activities that take place on a golf course that can have an impact on the environment. The process of putting together an EMS provides a logical approach to identifying the risks and putting in place operating procedures that manage these risks.

Whether it is improving how you wash down equipment, store chemicals or manage the native flora and fauna, there needs to be a well documented procedure for all staff to follow. Incidents will invariably happen, however, it is how we handle the situation and in particular minimising the harm to the environment that is critical. An EMS can assist you in this process.

As a strong recommendation, every golf course should undertake a preliminary risk assessment using the risk assessment matrix used during the workshop. If you do not have access to it, then go to www.golfenvironment.com.au.

Table 2. OTHER LEGISLATIVE REQUIREMENTS FOR THE USE OF PESTICIDES

Controls		QLD	NSW	ACT	VIC	TAS	SA	WA	NT
RECORD KEEPING	Records of use must be maintained	YES (Commercial and contractors plus where required by Reg's only)	YES	NO	YES (S7, RCP's and Commercial only)	YES (Commercial & Occupational only)	NO	YES (Aerial only)	NO
TRAINING AND LICENSING OF USERS AND OPERATORS	General user (farmer/ commercial) training required	NO	YES	YES (Commercial only)	YES (S7 & RCP only)	NO	YES (S7 & RCP only)	NO	NO
	Licensing of commercial operators required	YES	YES (Aerial & PCO's only)	YES	YES	YES	NO	YES	YES

SEASHORE PASPALUM

With the effects of drought still with us, many turf managers are searching for alternative and sustainable water sources in an effort to maintain turf surfaces of reasonable quality. The alternative water sources are often of moderate to high salinity and the concern then becomes of what turfgrass options are available that will tolerate these increasing salinity levels.

With an increase in salinity as the main concern, there has been a concerted effort to develop new turfgrass species and cultivars that have a high degree of salt tolerance. Seashore paspalum (*Paspalum vaginatum*) has been a notable success story exhibiting excellent salt tolerance with some ecotypes able to tolerate being irrigated with seawater (total dissolved salts 34,400 mg/L). Seashore paspalum is a turfgrass species that has good resistance to high salinity and sodium and also provides high quality surfaces for putting greens and fairways.

P. vaginatum is a warm-season perennial grass that is found near sea level in tropical and subtropical to warm temperate regions. It is suited to aquatic, semi-aquatic and moist environments and is commonly found in salt swamps, coastal flats and tidal marshes. *P. vaginatum* is a true halophyte (salt loving plant) and can exhibit a positive response to increasing salinity. In fact, where the irrigation water is very low in salinity, applications of chloride may be required as a nutritional supplement.

P. vaginatum is native to South Africa and has been introduced to many countries for erosion control, dune stabilisation and in salt-affected areas as forage and land reclamation. In recent years there have been extensive selection programmes that have resulted in high quality turf cultivars such as Sealsle 1, Sealsle 2000, Velvetene and Salam.

The general attributes of the turf cultivars of seashore paspalum can be described as follows;

- Tolerate salinity levels from 6880-34,400 mg/L depending on the cultivar;
- Relatively low fertility requirement;
- Tolerant of low light intensity (e.g. under cloudy conditions), however, does not do well under heavy shade;
- Good wear tolerance;
- Good heavy metal uptake – suitable for land remediation;
- Cold tolerance similar to couchgrass – does lose colour under frost conditions;
- Does not tolerate scalping;

While seashore paspalum has very high salt tolerance, there is still a requirement for intensive soil management, particularly as the level of irrigation water salinity increases. Seashore paspalum will not produce acceptable playing surfaces on poorly managed high salinity sites.

Seashore paspalum requires low salinity water (i.e. less than 1500 mg/L) for quick establishment and only when the turf matures can the level of salinity be increased. The young roots of seashore paspalum are sensitive to high salt concentrations and the root system needs to be mature before high salinity water is applied.

As the salinity of the irrigation water increases the intensity of management must also increase. On sites where there is high salinity irrigation water the following conditions are necessary;

- Select the most appropriate cultivar based on salinity tolerance data;
- Soils need to be sandy and well drained;
- Need to leach periodically with low salinity water;
- Adequate subsoil drainage to dispose of salts;
- Reduce unnecessary traffic to avoid compaction;
- Minimise traffic to allow wear recovery;
- Monitor soil and water conditions through regular sampling and analysis;
- Irrigation system must have a high degree of application efficiency; and
- Monitor plant health and nutrition.

On salt-affected and clay soils, pre-planting preparation is essential, particularly where high salinity water is to be used. The soils need to be cultivated, amended with gypsum, drainage installed in low lying areas, heavily leached and sand capped in some situations.

Seashore paspalum is a high quality turfgrass species with excellent salt tolerance and will provide turf managers with the opportunity to provide good playing surfaces on high salinity sites. However, it will not compensate for poor management under high salinity conditions and good soil preparation and regular water, soil and plant tissue analysis is essential.

REFERENCES

***WA Government. 2005**. Department of Health review of pesticide legislation and policies in WA. Discussion paper. Sept 2005.*

***DPI, Victoria 2005**. Don't play Russian roulette with unregistered chemicals. Alan Roberts, Bendigo Agricultural Notes. July 2005 AG1208 ISSN 1329-8062.*

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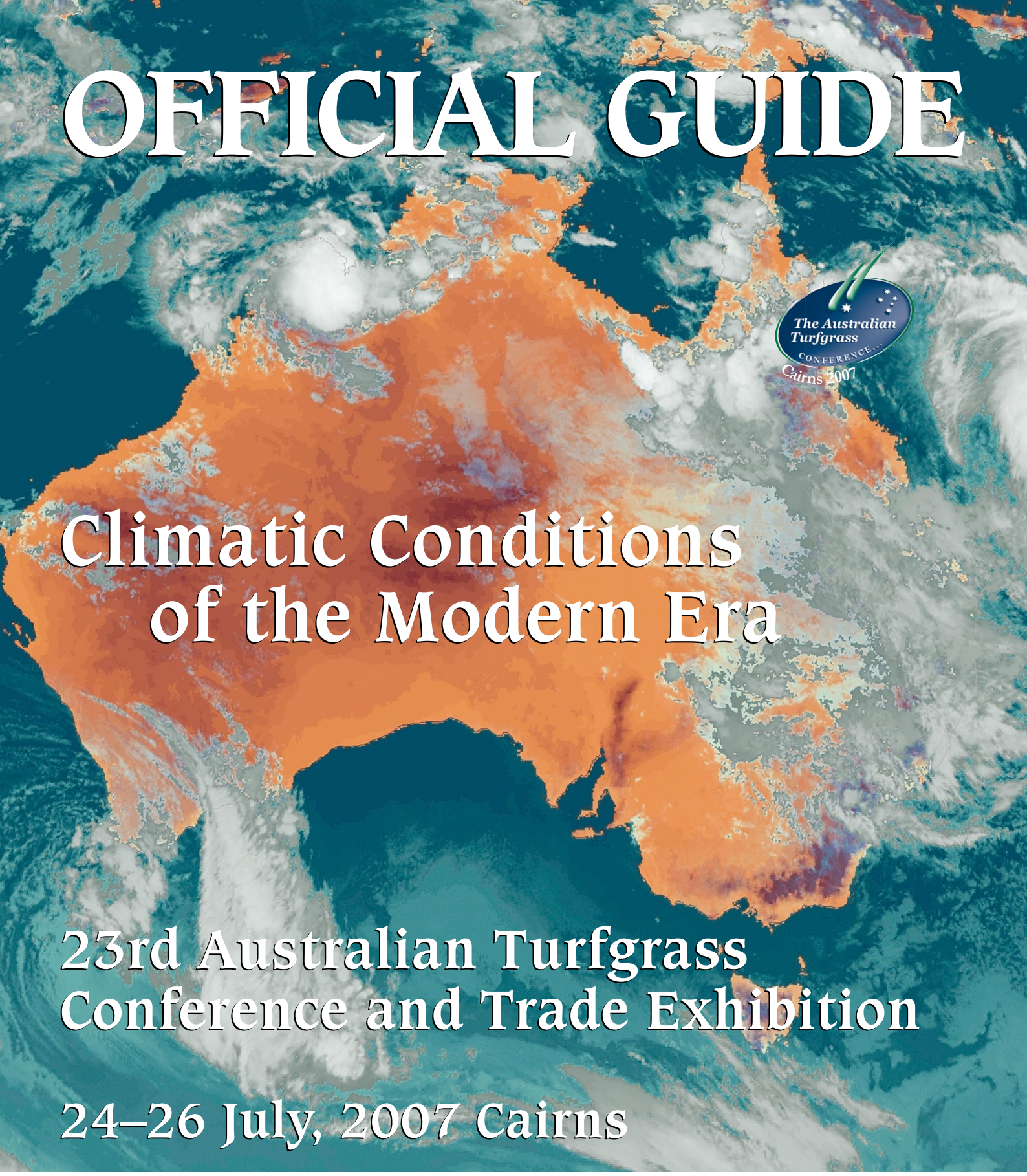

The Australian Turfgrass Conference... Cairns 2007

Climatic Conditions of the Modern Era

23rd Australian Turfgrass Conference and Trade Exhibition

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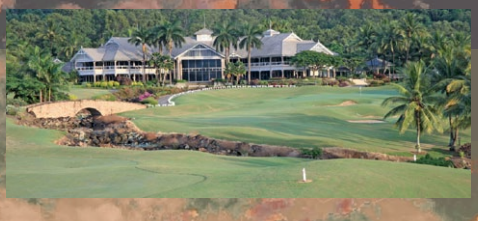


23rd Australian Turfgrass

WELCOME TO CAIRNS

A Far North Queensland warm winter awaits all our members who have decided to make the trek to attend the 23rd Australian Turfgrass Conference and Trade Exhibition in Cairns.

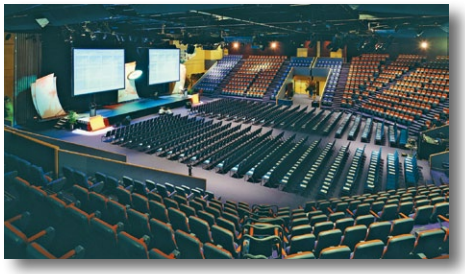
I have only been to Cairns once, for a day back in 1996, so I am very much looking forward to experiencing some new sites while catching up with plenty of colleagues.

AGCSA events manager Simone Staples has done a magnificent job since taking over and has left no stone unturned to make sure we have a series of very informative education sessions. Theme for the conference is 'Climate Conditions of the Modern Era' and I am personally looking forward to the presentations by our fellow superintendents.

Of course what would conference week be without our famous social functions which just seem to get better each year.

On behalf of the AGCSA Board and all members I would like to very much thank all our trade exhibitors for making the big decision to join us in Cairns for our second 'regional conference'. We hope you and all delegates have an enjoyable and informative week.

JEFF GAMBIN
PRESIDENT, AGCSA.



After stopping off in Brisbane in 2006, this year's Australian Turfgrass Conference heads a bit further north in the Sunshine State to Cairns. As in previous years ATM will act as the official conference guide and over the next 20 pages delegates will find all the information they need to get the most out of the week.

The Australian turfgrass industry has faced challenging times over the last 12 months, particularly from climate change, the subsequent shortage of water and declining water quality. Many parts of Australia have suffered from drought or at least felt the pressures of water conservation and this situation has become the norm at many turf facilities across the country.

Not surprisingly, superintendents and turf managers have been feeling the pinch as they try to maintain their surfaces within tighter parameters while at the same time trying to meet the ever increasing demands of committees and members.

As this reality affects so many delegates, the 23rd Australian Turfgrass Conference, which will be held at the Cairns Convention Centre, will focus on such themes. Modern climatic conditions demand we work smart with what we have and to that end the conference will provide insights and examples of what turf managers can do to improve their facilities.

Over three days some of the industry's foremost experts will present a variety of education sessions, ranging from climate change, the latest turf breeding and assessment trials to water management plans, environmental management systems and human resource management. Keynote speakers include:

Dr. Simon Torok (CSIRO): Understanding the regional impacts of climate change on the Australian turf industry

Professor Mike Young (University of Adelaide): Managing water: What changes matter for the turfgrass industry?

Louise Barton (University of Western Australia): Management factors influencing turfgrass water use

Tim Greenall (Madgwicks): WorkChoices: The implications of the new industrial relations laws for the turf industry

Jim Hull and Brett Morris (Plant Breeders Institute): Turf management challenges for the 21st Century

Conference – Cairns 2007

Geoff Connellan (University of Melbourne): Australia's water usage and efficiencies.

After the successful disease diagnosis workshops held in Brisbane, Syngenta is back again in 2007 with another interactive workshop. In Cairns, Syngenta's Dr Henk Smith will team up with Craig Day (Spray Safe & Save) and equipment experts from Toro Australia to present two workshops titled 'The Power of Spray Nozzles: A Syngenta Demonstration'.

THE FUN STUFF

While the Australian Turfgrass Conference has a reputation for providing a top week of educational opportunities, the after hours entertainment is a regular talking point with a number of superb functions and gatherings put on for conference delegates.

This year is no exception and kicks off with the Bayer Environmental Science Welcome Reception which will be held at the Colonial Club on Monday evening. Complimentary canapés and refreshments will be served throughout the evening providing the perfect opportunity to catch up with the Board and staff of AGCSA as well as industry friends and colleagues not seen since the last conference.

For those that feel the need to stretch the legs, Scotts Australia is back with its popular touch tournament which will be held at the Cairns Touch Associations grounds late Tuesday afternoon. As in previous times a State of Origin showdown looms and NSW heads to Cairns as defending champion from Melbourne 2004.

Conference week concludes with the prestigious Syngenta President's Dinner which this year includes the presentation of the 2007 AGCSA Awards (see preview pages 34-35).

The conference will continue the tradition of kicking off with AGCSA Golf Championships, proudly sponsored by Toro, as well as the AGCSA Corporate Cup which will both be held on Monday. Turn to page 36 for the low-down on Paradise Palms Country Club and superintendent Paul Earnshaw.

The post-conference turf tour, held on Friday, 27 July, is a fantastic opportunity to visit unique places of professional interest in a casual informal environment. Take advantage of being in Cairns to see Tropical Lawns, Northern Queensland's premier AFL football venue, Cazaly's Stadium, and Paradise Palms.

2007 TRADE EXHIBITION

Conference week wouldn't be complete without the trade exhibition which will run over two days. As with the first smaller scale regional conference held in Moama in 2005, the Cairns trade exhibition will be similar in make up with each company represented in 3m x 3m booths.

Over 40 of the turf industry's leading companies will be exhibiting their wares on Wednesday and Thursday at the Cairns Convention Centre with a number of companies making their appearance for the first time, including Golflinx, Hydrosmart International, Safe-Tees Down Under and Velvetene.

REGISTER NOW

Although the conference is now just a few weeks away, there is still plenty of time to register. Log on to the AGCSA website (www.agcsa.com.au) to download a delegate registration brochure or call the AGCSA office (03) 9548 8600.

The cut-off date for sending registrations to the AGCSA office is Wednesday, 11 July. After that time the AGCSA asks those who wish to attend the conference to register at the dedicated registration desk which will be set up at the Cairns Convention Centre.

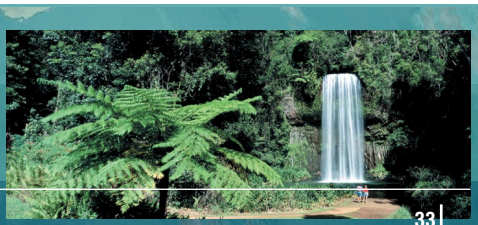
KEY DATES AND TIMES

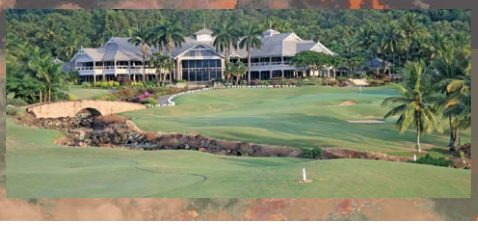
Sunday
Registration (2.30pm-5pm)
Monday
Registration (7.30am-4.30pm)
2007 Toro AGCSA Golf Championships, Paradise Palms CC (6.30am)
2007 AGCSA Corporate Cup, Half Moon Bay GC (11am)
Bayer Environmental Science Welcome Reception, Colonial Club (7pm)
Tuesday
Registration (7.30am-4.30pm)
Education Sessions (8am-3.30pm)
Scotts Touch Competition (4.15pm)
Wednesday
Registration (7.30am-4.30pm)
Education Sessions (8am-5pm)
Trade Exhibition (9am-5pm)
AGCSA AGM (5pm)
Thursday
Registration (7.30am-4.30pm)
Education Sessions (8am-3.45pm)
Trade Exhibition (9am-2pm)
Syngenta President's Dinner and AGCSA Awards, Cairns International (7pm)
Friday
Post Conference Turf Tour (8am)

Conference Inquiries
Contact: Simone Staples 0415 322 213

Trade Exhibition Inquiries
Contact: Scott Petersen 0413 620 252

Conference Registration
The conference registration desk is located in the ground floor foyer of the Cairns Convention Centre. Delegates are requested to visit the registration desk to confirm their arrival and receive their conference accreditation and delegate satchel, which this year is sponsored by Toro.




2007 AGCSA Awards – Recognising Excellence

A strong field has been nominated for the 2007 AGCSA Awards which will be handed out during the 23rd Australian Turfgrass Conference.

Every year the AGCSA rewards excellence in the golf course maintenance industry at its annual awards ceremony held during the Australian Turfgrass Conference. The AGCSA Awards represent the ultimate in recognition for members of the industry, and in turn provides the perfect opportunity for the industry to honour its top achievers.

As in previous years, the AGCSA will bestow four awards – the Distinguished Service Award, Claude Crockford Environmental Award, Excellence in Golf Course Management Award and Graduate of the Year. In a change from recent years the 2007 winners will be presented with their award during the President's Dinner on the final night of the conference which will enable them to be appropriately acknowledged by their peers.

AGCSA DISTINGUISHED SERVICE

Presented in partnership with Scotts

Without a doubt the premier award to be handed down every year, the AGCSA Distinguished Service Award is bestowed by the AGCSA Board in recognition of an individual that has left an indelible mark on the golf course maintenance industry.

The award takes into consideration all aspects – the direction and inspiration handed down to generations of superintendents, involvement at state and national levels, education, communication and research.

One of Western Australia's most respected superintendents Norm Ashlin joined the elite of his profession after collecting the award last year in Brisbane. The life member of the GCSAWA became the tenth winner of the award and just the second to hail from WA.

Superintendent at one of WA's busiest public golf corses, Collier Park, Ashlin has spent nearly 40 years in the greenkeeping trade and played a key role in many aspects of the indsutry, from teaching students through to playing an active roll in turf research projects.

AGCSA CLAUDE CROCKFORD ENVIRONMENTAL AWARD

Presented in partnership with Syngenta

In these times of heightened environmental awareness and regulation, the Claude Crockford Environmental Award takes on great significance. With golf courses now under increasing scrutiny, environmental management has become a primary concern for the modern day superintendent.

The man who this award is named after was a champion of the environment, and the legacy Claude Crockford left at the famous Royal Melbourne Golf Club continues in this award which recognises excellence in golf course environmental management.

In 2006 Peter Donkers from Long Reef Golf Club took home the award, the third New South Welshman to do so inside of four years.

AGCSA EXCELLENCE IN GOLF COURSE MANAGEMENT AWARD

Presented in partnership with John Deere

Golf course turf management in this modern era is without doubt a most challenging profession. With increased environmental, legislative and budgetary restraints, a superintendent must efficiently and effectively manage their staff to produce exacting playing standards for members and guests.

A living, breathing and highly sensitive natural environment, the golf course is the one area of a golf club which requires specialised management. With an increasingly demanding golfing public and fierce competition between clubs to attract members and green fee players, course maintenance and reconstruction plays a vital role in the future viability of any club. The Excellence in Golf Course Management Award seeks to recognise those superintendents who have achieved excellence in their profession within the past two years, whether it is in the presentation of the course or reconstruction.

In 2006 Daryl Sellar from Glenelg Golf Club in South Australia took home the award ahead of Glenn Cross (Mt Lawley Golf Club) and Mark Jennings (Box Hill Golf Club) and from there went on to be named the Australian Golf Digests' inaugural Superintendent of the Year recipient.

2007 AGCSA GRADUATE OF THE YEAR

Presented in Partnership with Toro

The Graduate of the Year Award rates as perhaps the most unique in the AGCSA Awards programme. Today's recipients will go on to become tomorrow's superintendents and turf managers who will play a major role in the development and direction of golf course maintenance in this country.

For the lucky graduate, the award provides a huge boost, helping to launch their career in the best possible way. For 2006 recipient Sean Kinsley from Yamba Golf Club in NSW, the award has led him to the United States where he is currently working at The Breakers in Florida as part of the Ohio State Program.

With Toro coming on board as sponsor in 2004, a lucrative education package goes the way of the winner. The 2007 recipient will be flown, all expenses paid, to the US to attend the Annual Winter School for Turf Managers at the University of Massachusetts. As well as that, the winner will get the opportunity to visit Toro's manufacturing and parts distribution facilities (both Commercial and Irrigation), including the company's Minneapolis headquarters. The 2007 finalists are:

ACT

Name: Brock Weston

Club: Parliament House

This year's ACT representative Brock Weston is a member of the Landscape Services team which looks after the grounds of Parliament House in Canberra. Weston is part of the turf team which tends to the unique tall fescue lawns which cover sections of the Parliament House roof and is currently involved with trials to assess the performance of buffalograss. Outside of work hours Weston, who among other placements has spent time at the MCG, is a key member of the Belconnen Magpies senior team which competes in the NSW/AFL league.

NSW

Name: Stuart Millar

Club: Oatlands Golf Club

NSWGCSA Apprentice Greenkeeper of the Year Stuart Millar hails from Group One Sydney-based Oatlands Golf Club where he works under superintendent Colin Kinghan. A fanatical supporter of NRL side Wests Tigers, Millar is currently studying Certificate IV Horticulture through Ryde TAFE and has been an apprentice at Oatlands for the past year. Millar, who has Cert III and also holds Certificate 8264 Engineering (Mechanical Fitter), worked three-and-a-half years with Marsupial Landscapes prior to joining the crew at Oatlands.

SOUTH AUSTRALIA

Name: Byron Myatt

Club: Tanunda Pines GC

Located in the Barossa Valley, Tanunda Pines is an 18-hole course which has recently undertaken major works, including a programme to rebuild all greens. It is also home to this year's SAGCSA graduate representative Byron Myatt who has played a major role in the redevelopment alongside superintendent Steve O'Donnell. Myatt, who initially trained to be a cooper, switched to turf management and recently completed his course through Urrbrae TAFE.

VICTORIA

Name: Robert Hall

Club: Green Acres Golf Club

Robert Hall beat off the challenges of three other hopefuls to collect the VGCSA Apprentice of the Year Award which was handed out at the state association's AGM. Hall was named ahead of Daniel Young (Huntingdale Golf Club), Mark Hudson (Moonah Links) and Luke Bailey (Kingston Links). Hall has been employed at Green Acres Golf Club since August 2003 during which time he completed Certificate III Horticulture (Turf Management). He is currently studying Certificate III Horticulture (Landscape) at NMIT and once he has finished that is looking at undertaking a Diploma in Turf Management.

WESTERN AUSTRALIA

Name: Peter Beach

Club: Gosnells Golf Club

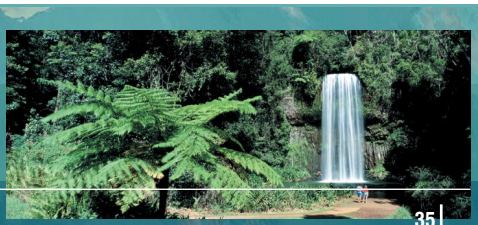
If GCSAWA graduate representative Peter Beach takes home the 2007 Graduate of the Year Award he will become the just the second winner to hail from WA after Craig Webley secured the prize in 2004. Beach started his apprenticeship at Melville Glades Golf Club under GCSAWA president Brad Sofield and has since joined him at Gosnells Golf Club where he is employed as a senior greenkeeper. Beach, who plays off an 11 handicap as a member at Royal Fremantle Golf Club, is responsible for all course and tournament preparation at Gosnells.

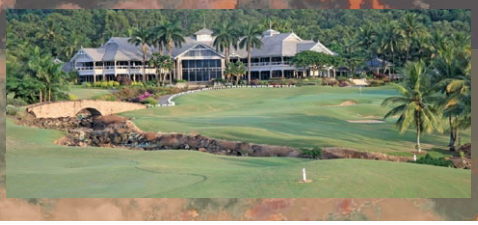
QUEENSLAND

Name: Ray Lawrence

Club: Brisbane Golf Club

As the oldest finalist in the field, Brisbane Golf Club's Ray Lawrence will be looking to emulate the feats of last year's winner Sean Kinsley, who at 35 years of age became the oldest recipient of the Graduate of the Year Award. Lawrence started at Brisbane in March 2003 and has quickly risen to be one of Ben Cavanagh's key members of staff. In recent times the club has upgraded its irrigation main line, including the installation of dual row lines on three holes. Lawrence was a project team leader which saw this project through from start to finish.





2007 Toro AGCSA Golf Championships
Paradise Palms Country Club

Paradise Palms' picturesque closing hole

Paradise Palms Country Club is the setting for the 2007 Toro AGCSA Golf Championships which tee off on Monday of conference week. A full field is set to descend on the championship-length course and here ATM previews the battle for the Toro Red Jacket with superintendent Paul Earnshaw.

One of Far North Queensland's premier resort courses, Paradise Palms Country Club, will play host to the 2007 Toro AGCSA Golf Championships which kicks off the 23rd Australian Turfgrass Conference on Monday, 23 July. Consistently rated in Australia's top 100 courses – it is currently ranked 67th by Australian Golf Digest – Paradise Palms is an 18-hole championship course designed by Graham Marsh and Ross Watson which opened in 1990.

It is home to superintendent Paul Earnshaw, a former Melbourne boy who has been in Cairns for the past 14 years, the past 10 as superintendent. Earnshaw manages a staff of 15 which includes a crew that maintains six hectares of spectacular tropical gardens around the course and clubhouse.

The stunning track, which meanders its way through 78 hectares beneath rainforest clad mountains about 20 minutes north of Cairns, weighs in at a healthy 6464m and is set to test Australia's leading superintendents who will line up for the Toro-sponsored golf tournament.

"I'm not going to set it up ridiculously hard,' laughs Earnshaw when asked what the course has in store for his superintendent colleagues. "I think the course is hard enough in itself. I'll plan to have everything trimmed up as best as possible but won't be going out of my way to make it overly hard.

"I just hope they all have a wonderful time on a great course. I'm sure most will be taking their golf seriously but at the same time I hope they have a good time, enjoy the scenic nature of the course, the weather and the fine surfaces. And a few cans after, of course."

Paradise Palms is a world away from where Earnshaw first started his turf management career. Hailing from Victoria, Earnshaw began as a bowling greenkeeper in the inner suburbs of Melbourne before switching to golf. A three year stint at Riversdale Golf Club followed before he moved to Long Island Country Club where he worked under Glenn Stuart for five years.

While his career was traveling along nicely, a marriage breakup took its toll and it was around that time Earnshaw decided to make a fresh start. With a brother living in Cairns, he decided to pack his car and drive the 3000 kilometres from Melbourne to Cairns to start afresh. Despite not having a secure job to go to, Earnshaw had made inquiries and although there was nothing golf-related available, then Paradise Palms superintendent Steve Williams took him on as part of the gardens crew.

From there a bit of lady luck went Earnshaw's way and with those above him moving on to other positions he was able to make his way up the ranks, eventually taking over from Williams who left in 1997.

"Cairns has been very good to me and even though there was no job for me when I got here, I just chanced it," reflects Earnshaw. "I was pretty confident I wouldn't have any problems because getting qualified staff in this region can be difficult sometimes. It was just a matter of waiting for the right opportunities to come along. That was 14 years ago and I've never looked back."

SEASONS OF CONTRAST

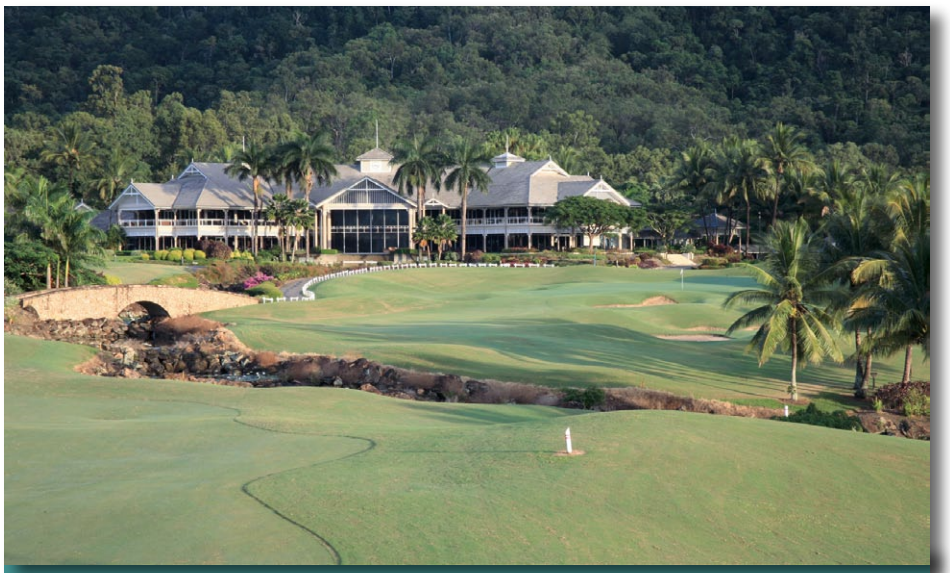
Aside from the occasional cyclone tearing the place apart, Earnshaw's role at Paradise Palms has primarily been one of maintenance with the course having changed little during his tenure as superintendent.

The biggest change came when the course's original Japanese owners Daikyo made alterations to the lake down the right hand side of the 10th. (Rumour has it that the changes were made after the golf ball of an influential Japanese bank manager ended up in the lake. To appease him and negate any possible 'issues' with the bank, Daikyo spent in the vicinity of $850,000 to reshape the lake and change the contouring of the fairway).

Aside from the 10th, Earnshaw and his crew have made minor adjustments to some of the course's 97 bunkers to improve drainage and aesthetics, while over the past four years a greens replacement programme has seen six greens converted across from TifDwarf to TifEagle.

"Everyone loves playing on bent greens, but obviously you'll never get it to grow up here," explains Earnshaw. "While it's not a terribly superior surface to TifDwarf, TifEagle has that finer leaf and is the closest we'll ever get to a bent surface here in the tropics.

"Before we started the conversion programme we trialled TifEagle for about 12 months on our practice chipper and it performed beautifully. We've completed six now but have stopped to give the golfers a bit of a run."



The spectacular approach to the 18th (above) and (right) Paradise Palms superintendent Paul Earnshaw

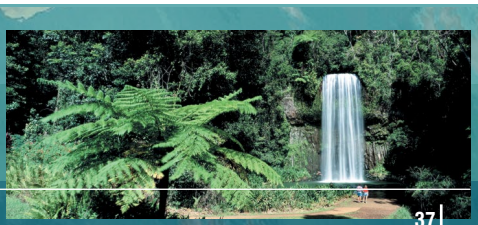
One of Earnshaw's biggest turf management challenges is coping with the contrasting wet and dry seasons, one of the hurdles that comes with operating a golf course in a tropical climate. Paradise Palms gets an average 2.2m of rainfall a year, the majority of that coming in the wet season which runs from October through to March. The dry season, by contrast, runs generally from April through to September which Earnshaw likens to a Melbourne summer.

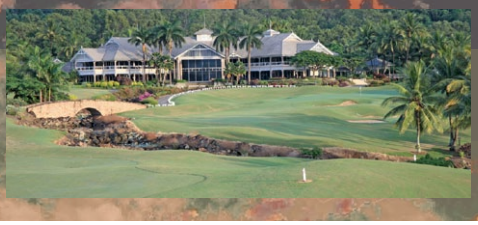
"The bad months are February and March where it can be pretty relentless with temperatures in the high 30s and humidity at 90 per cent plus," says Earnshaw. "On those days when the sun peaks out for an hour or two it can be unbearable. It's like being in a sauna; it hurts to breathe. It's a relief when it rains.

"You have to be very mindful of your staff and don't overwork them during those periods even though there's an enormous amount of growth and work to be done.

"I learnt the hard way when I first came here. Being the new kid on the block I wanted to make an impression and I worked really hard. Everyone kept telling me to slow down but I didn't listen. I should have because I ended up collapsing one day while out on the course."

While Earnshaw has to keep a close eye on his crew during the wet season, the same goes for the course. Massive growth rates combined with humidity, heat and plenty of ▶





Looking from the clubhouse down the par 4 9th

The par 3 16th

◀ precipitation means the Paradise Palms crew has its work cut out. However, there is at least one aspect of the course they don't have to worry about – drainage.

"You would think with the amount of rain we have that drainage would be an issue here," says Earnshaw. "Fortunately when the course was constructed they spent $1.3m, which was a huge figure at the time, just on drainage but it was well worth the investment. With the amount of rainfall here it was a key component to the course and it really is amazing. During the wet season we can get 150mm a day but we can have the course back in play an hour after the rain stops.

"From a turf management point of view the wet season is a very difficult time of year. Fungal problems (*pythium and rhizoctonia*) can hit the greens pretty hard and sometimes with the persistent rain it is difficult to get out and spray. Combine that with the heat and humidity, summer decline is a major factor up here. Maintaining bunkers can also be problematic and washouts are inevitable. Needless to say we have to let them go during the wet season.

"Renovations can be a bit like Russian roulette too. We like to try and core greens in January, weather permitting of course as we are right in the middle of the wet season. Traditionally September is always the time, but pushed by management it's just not acceptable to do any work at that time of year because we are trying to get through as many corporate events as we can.

"September is our busiest month so any major renovations or scarifying at that time is out of the question, so we have to work around the wet season as best as we can. We generally core in January with light grooming wherever possible, while we might do a heavy scarify once every two years. If we can get them (the greens) open and get some air and fresh sand into them, as well as undertake our fungicide programme, it really does pay dividends.

"Because of the weather up here the fairways (Greenlees Park) stay reasonably lush and green for much of the year so we don't do much to them except maybe one or two applications of fertiliser a year which is ample. Without heavy fertilisation we find we don't get excessive thatch build-up."

The wet season is also traditionally cyclone season and during his time in Cairns Earnshaw has witnessed a few, including Cyclone Steve which wrecked havoc on the region in late February 2000.

As Steve tracked inland on the north Queensland coast it caused major flooding between Cairns and Mareeba to the west with a record flood level of 12.4 metres reached at Mareeba. Wind gusts to 140 km/hr caused several buildings in Cairns and Kuranda to lose their roofs while Paradise Palms had over a thousand mature trees brought down.

"We had heavy rain prior to Steve for months so the ground was very soft and when it came through it didn't take much to cause a hell of a lot of damage," recalls Earnshaw. "We didn't finish cleaning up until the end of December that year.' We caught the edge of Cyclone Larry last year but we still had about 100 trees down which took a good six weeks to clean up."

PAVING PARADISE

While the course has remained relatively untouched since its opening, the next couple of years will see that change quite significantly. Parts of the course are set to make way for a series of major residential developments which means the addition of new holes as well as a change in course routing.

Unfortunately one of the courses' signature holes, the 182m par 3 7th will be sacrificed while sections of the 9th and 18th, as well as the driving range, will also be ploughed under.

"The golf course will remain and will still be championship length," says Earnshaw. "It's a shame we are losing the 7th, but from what I have seen of the changes at this early stage they look really good.

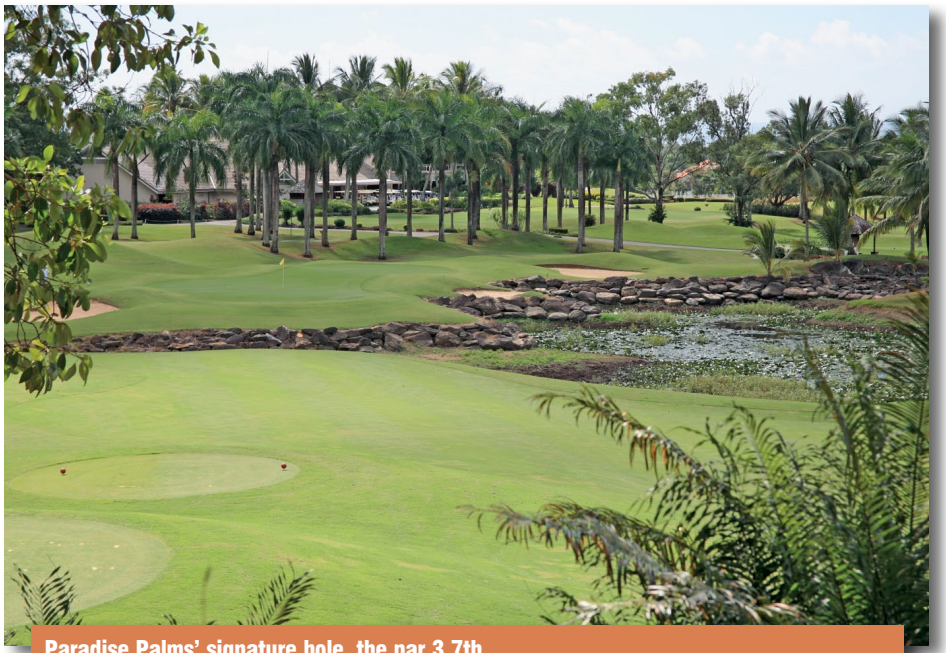
"Fortunately we are on 78ha so there are plenty of areas where the holes can be constructed without losing too much of the character of the course. The routing will be interesting though.

"The redevelopment is still about two years away but I'm really looking forward to it. As a part of that we will be looking at rejuvenating some of the rainforest corridors.

"The course has got some fantastic wildlife – everything from goannas to wallabies to pelicans to snakes – as well as some impressive pockets of rainforest which are protected. We will also try and convert the remaining greens to TifEagle during that time."

While not related to the redevelopment, Earnshaw is also looking forward to an improved supply of treated effluent which should become available in the next year. Paradise Palms was one of the very first golf courses in Queensland to use treated effluent and when it was constructed a pipeline from the Marlin Coast Treatment Plant, situated about eight kilometres away, was built to supply the course with an endless amount of secondary treated effluent.

While the local council supplies the effluent water, it is up to Paradise Palms Country Club to maintain all the infrastructure including pump station, disinfection, sampling and testing. Earnshaw says that the quality of the water has improved greatly over time with upgrades to the treatment plant and in the next 12 months it is expected that tertiary treated water will come online.



Paradise Palms' signature hole, the par 3 7th

THE CHALLENGE AWAITS

So what can superintendents expect when they tee up for the 7.45am shotgun start on 22 July? The course starts and finishes with two par fives, the 1st a 516m beast which is dissected by the major drainage channel which snakes its way through the course (in fact the channel features prominently on nine holes).

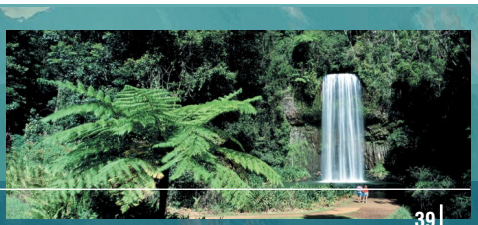
The closing hole measures 505m and is a dogleg right back towards the impressive clubhouse, with massive fairway mounding on the right hand side – dubbed Mt Fuji by the locals – a tempting prospect for the bigger hitters to take on.

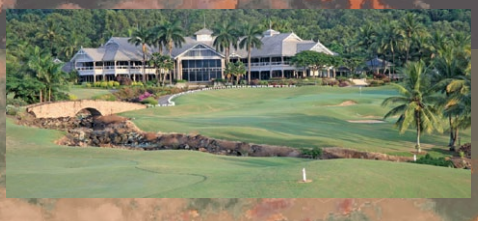
The back nine also starts with a monster par 5 which weighs in at 545m, while holes 6 and 13 are testing par fours which will need to be negotiated with care, especially the latter which plays into the prevailing wind. Then there are the beautiful par threes, with no better examples than 7, 12 and 16.

A strong field of superintendents will line up for the 2007 championships with Steve Jacobsen from Carnarvon Golf Club returning to defend the title he won last year at North Lakes Golf Club. Fellow Red Jacket holders Martyn Black (Castle Hill), Allan Devlin (Secret Harbour), Anthony Toogood (Commercial) and Trevor Ridge (Sawtell) will also tee up, while perennial VGCSA golf champ Brett Balloch (Anglesea) will be aiming to take out his first title.

The par 4 8th

Each entrant in the 2007 AGCSA Golf Championships will score a great apparel pack from tournament sponsors Toro, which includes a Greg Norman polo shirt and wind jacket, while the winners of the stroke and stableford competitions will take home some great prizes.




MONDAY

AGCSA Toro Golf Championship
6.30am-2.00pm Paradise Palms Country Club
Buses depart and return players to Convention Centre

Bayer Environmental Science
AGCSA Bayer Welcome Reception
7.00pm-9.00pm Colonial Club
Buses depart 6.45pm from Convention Centre, returning 9.00pm

TUESDAY

Plenary — **Hall A & B**
Jeff Gambin
Welcome

8.10 - 9.10 *Simon Torok*
Understanding the regional impacts of climate variability and change to the Australian turf industry

9.10 - 10.10 *Prof. Mike Young*
Managing water: What changes matter for the turfgrass industry?

10.10 - 10.30 *Morning Tea*

10.30 - 11.30 *Geoff Connellan*
Australia's water usage and efficiencies; Agriculture, golf, sportsfield, parks and gardens

11.30 - 12.30 *Tim Greenall*
WorkChoices on your turf - the implications of the new employment laws for the turf industry

12.30 - 1.30 *Lunch*

1.30 - 2.30 *Jim Hull, Brett Morris*
Turf management challenges for the 21st Century

2.30 - 3.30 *Louise Barton*
Management factors influencing turfgrass water use

4.15pm **Cairns Touch Assn** Scotts
Scotts Touch Rugby Competition
Free of charge, all welcome

WEDNESDAY

Scotts Australia hosted breakfast Scotts
7.00 - 8.00 **M8 (Attendance optional)**
Slow release K Trial results presented by Professor Peter Martin (Plant Breeding Institute)

Golf 1 — **Hall A**
8.00 - 9.00 *Michael Picken*
Innovative stormwater harvesting for golf course irrigation

9.00 - 10.00 *Gary Chatfield*
Golf course disaster recovery

10.00 - 10.30 *Morning Tea*

10.30 - 12.00 *Ross Watson, Terry Muir, Dean Scullion*
Environmental issues for golf course architecture - Kooindah Waters Golf Club

12.00 - 1.00 *Don Loch, Matt Roche, John Neylan*
Update on warm-season turfgrass trials: Evaluation of new greens grasses

1.00 - 5.00 **Hall 2**
Trade Exhibition
Lunch

4.00 *Trade Exhibition*
Happy Hour

1.00 - 5.00 *Terry Muir*
EMS update;
e-par® computer lab

5.00 - 6.00 **M6+7**
AGCSA AGM
Strictly AGCSA A class members only

Workshop 1 (Pre-registration required)
8.00 - 10.00 *Syngenta*
TBA
The power of spray nozzles, a demonstration of efficiency

Workshop 2 (Pre-registration required)
10.30 - 12.30 *Syngenta*
TBA

THURSDAY

Plenary — **Hall A**
8.00 - 9.00 *Terry Muir & Brett Peterkin*
How to develop a successful grants application for the Federal Government's Community Walter Grants Scheme

Golf 1
9.00 - 9.30 *Darren Moore*
Research on locally collected couch grasses

9.30 - 10.00 *David Aldous*
Cost comparisons of maintaining golf courses in Australia and USA

10.00 - 11.30 **Hall 2**
Trade Exhibition
Morning Tea

11.30 - 1.00 **Hall A**
Peter Frewin, Daryl Sellar, David Lunardelli
Innovative water conservation techniques and reclaimed water use

1.00 - 2.00 **Hall 2**
Trade Exhibition
Lunch

2.00 - 3.00 **Hall A**
John Odell, Peter Frewin & Daryl Sellar
Managing upward, golf course managers & committees

Plenary — **Hall A**
3.00 - 3.45 *John Neylan, Peter Frewin, John Odell, Daryl Sellar, Tony Ware, Graeme Logan and Terry Muir*
Open forum on climate change and the turf industry

Syngenta President's Dinner syngenta
7.00pm- 12.00am Cairns International
Includes AGCSA Awards presentation

Jacket and tie

GOLF

23rd Australian Turfgrass Conference and Trade Exhibition

MONDAY

AGCSA Corporate Cup
11.00am-6.00pm Half Moon Bay Golf Club
Buses depart and return players to Convention Centre

Bayer Environmental Science
AGCSA Bayer Welcome Reception
7.00pm-9.00pm Colonial Club
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Free of charge, all welcome

WEDNESDAY

Scotts Australia hosted breakfast
7.00 - 8.00 **M8 (Attendance optional)**
Slow release K Trial results presented by Professor Peter Martin (Plant Breeding Institute)

Sport 1 **M1&2**
8.00 - 9.00 *Graeme Logan*
Telstra Stadium - Challenges to maintain quality turf

9.00 - 10.00 *Don Loch, Matt Roche*
Shade and wear on sports turf trials

10.00 - 10.30 *Morning Tea*

10.30 - 11.15 *Andrew Peart*
ANTEP ryegrass and tall fescue trial

11.15 - 12.00 *Geoff Connellan*
Sub-surface sportsfield irrigation

12.00 - 1.00 *Craig Henderson*
Managing hardness and turf retention in high wear areas of sports fields

1.00 - 5.00 **Hall 2**
Trade Show
Lunch

4.00 *Trade Show*
Happy Hour

Workshop 1 (Pre-registration required)
8.00 - 10.00 *Syngenta*
TBA The power of spray nozzles, a demonstration of efficiency

Workshop 2 (Pre-registration required)
10.30 - 12.30 *Syngenta*
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8.00 - 9.00 *Terry Muir & Brett Peterkin*
How to develop a successful grants application for the Federal Government's Community Walter Grants Scheme

Sport 1 **M1&2**
9.00 - 10.00 *Gerrard Charlton*
Irrigation management planning and performance reporting - irrigated public open space

10.00 - 11.30 **Hall 2**
Trade Exhibition
Morning Tea

11.30 - 12.30 **M1&2**
Nick Jeffrey
Practical maintenance to ensure a safe sportsfield

12.30 - 2.00 **Hall 2**
Trade Exhibition
Lunch

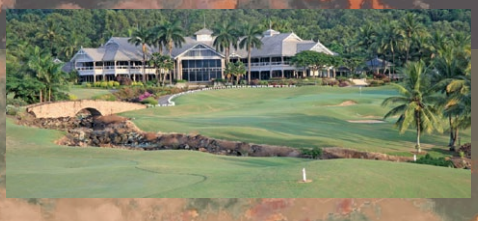
2.00 - 3.00 **M1&2**
Tony Ware
Topic TBA

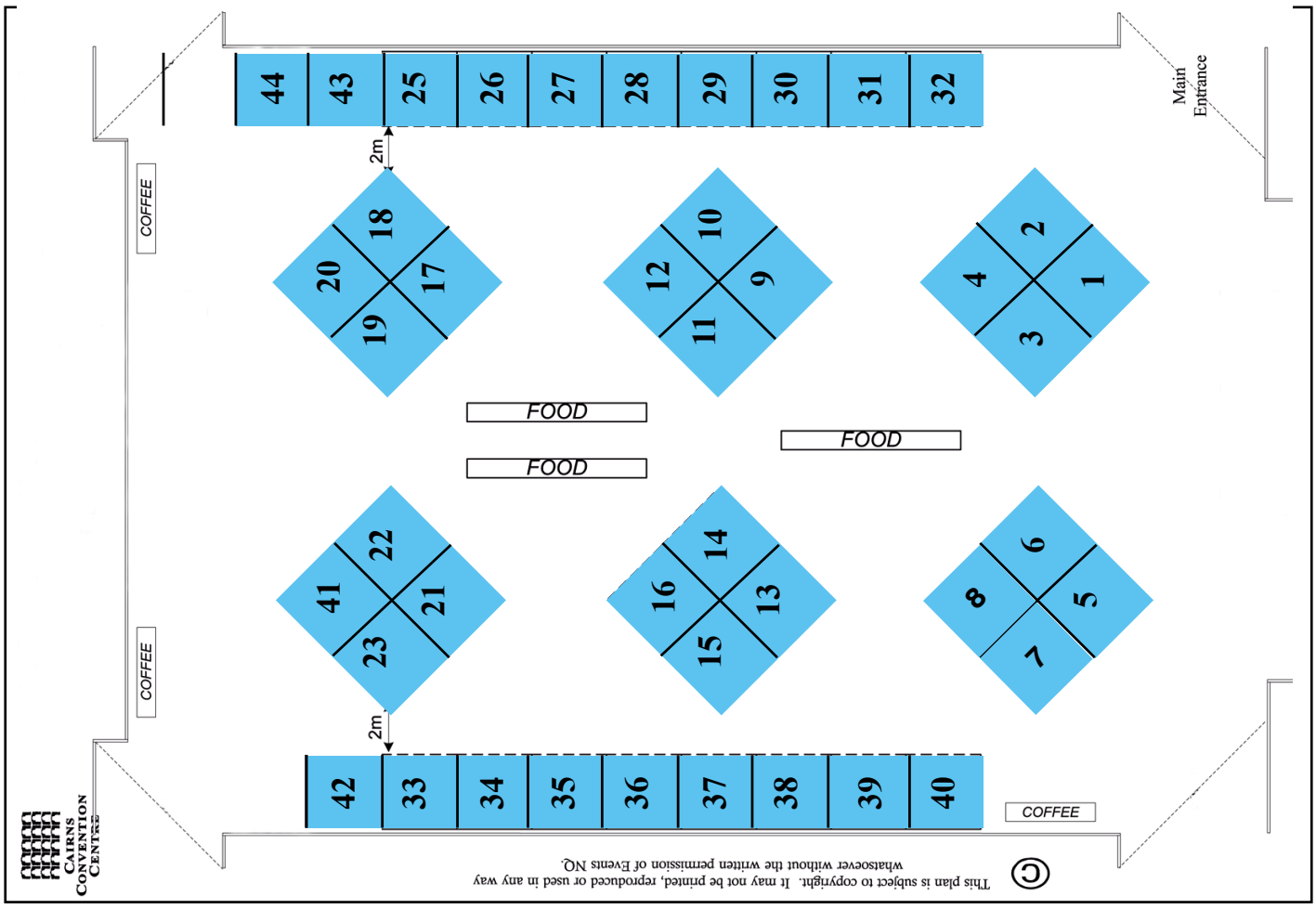
Plenary — **Hall A**
3.00 - 3.45 *John Neylan, Peter Frewin, John Odell, Daryl Sellar, Tony Ware, Graeme Logan and Terry Muir*
Open forum on climate change and the turf industry

Syngenta President's Dinner
7.00pm-12.00am Cairns International
Includes AGCSA Awards presentation

Jacket and tie

SPORT





23RD AUSTRALIAN TURFGRASS CONFERENCE FLOORPLAN

1	Toro Australia - Irrigation	16	Simplot ProLine	31	Conquest Couch Management
2	Toro Australia - Comm. Equip	17	Globe Australia	32	Bayer Environmental Science
3	Legend Couch	18	Barmac	33	AGCSA/TGAA
4	Nuturf	19	Dint Australia	34	Underhill
5	Country Club International	20	Brown Brothers Engineering	35	Redexim Charterhouse
6	Floratine Products Group	21	Syngenta	36	Sealsle Australia
8	Enware Australia	22	Club Car	37	Tycrop
9	Rain Bird Australia	23	TruTurf	38	Tycrop
10	Becker Underwood	25	Velvetene	39	PowerTurf Australia
11	Greencare Industries	26	No Fuss Events	40	Hunter Industries
12	Twin View Turf	27	John Deere	41	Mentay
13	Orica Watercare	28	e-par	42	Hydrosmart International
14	Geofabrics Australasia	29	Wiedenmann GmbH	43	Safe-Tees Down Under
15	David Golf & Engineering	30	Scotts Australia	44	GolfLinx

AGCSA - Stand 33

The Australian Golf Course Superintendents' Association was formed in 1981 to further the profession of golf course management in Australia. Since that time the association has grown steadily and now boasts over 800 members from all states of Australia, New Zealand and around the Pacific.

The AGCSA helps promote the profession of golf course management, provides continuing educational opportunities to members and provides support services and information for superintendents to assist them in their professional development.

Visit the AGCSA booth during the trade exhibition to find out more about joining the association and the benefits of being a member, surf the AGCSA website and peruse the extensive range of turfgrass books and merchandise. Copies of the AGCSA's flagship publication, Australian Turfgrass Management magazine, will also be available.

Delegates will also be able to find out more about a couple of the AGCSA's recently implemented initiatives. The Environmental Management Initiative was launched in 2006 and aims to get all golf courses in Australia to adopt an ISO 14001-compliant environmental management system. The AGCSA has also unveiled a new HR service and Daryl Sellar will be on hand to help members with any issues.

Barmac - Stand 18

As Barmac reflects on its proud history of supplying leading edge technology to the professional turf industry for over 50 years, our proudest strength is that we are still a 100 per cent Australian owned company.

The talk of the town this year is of course the drought. We know that turf changes its nutritional requirements in times of drought and other stress. We also know that lower quality irrigation water and higher salts induce calcium and trace element deficiencies. Simply put, these elements are tied up in the soil almost immediately after they are applied. Failure to adequately address this will result in increased stress to the turf and greatly reduced quality. One of the most successful ways to overcome this is to apply foliar calcium and trace elements.

Visit the Barmac stand to discuss your situation with our technical team and allow us to introduce you to the Manni Turf range of foliar trace elements. Because of their low cost and application rate these are used extensively on greens, fairways and turf farms.

Bayer Environmental Science - Stand 32

Bayer Environmental Science is proud to be associated with the AGCSA's national conference once again. Firstly we hope to see you all at the opening cocktail party which promises to be a great night. Don't forget to dig out those mighty fine Hawaiian shirts from Brisbane a couple of years ago.

This year Bayer will be launching its 2007 Technical Manual. Last issued in 1998, this is an excellent manual with information and helpful hints regarding the use of plant protection products for turf and ornamentals. This will be available from the trade show stand.

Come to the stand and check out the new Chipco Signature Jug packaging as well as new Signature and Merit promotion for 2007. We will also be launching Tempo, the replacement for Gauntlet insecticide.

Be sure to drop by the stand for your free Bayer Science for a Better Life pack. Jyri Kaapro, our resident doctor turf, will be available to answer all your technical turf questions. To register for a copy of the 2007 Bayer Technical Manual please email paul.jackson1@bayercropscience.com.

Becker Underwood - Stand 10

Becker Underwood is the world's leading developer, manufacturer and marketer of innovative, leading edge agribiological products used across a broad range of applications in agriculture, turf and amenity horticulture and commercial horticulture. Come and discuss our range of innovative non-pesticide products that have become part of everyday turf management thanks to the support of our business partners Nuturf, Globe and Maxwell & Kemp.

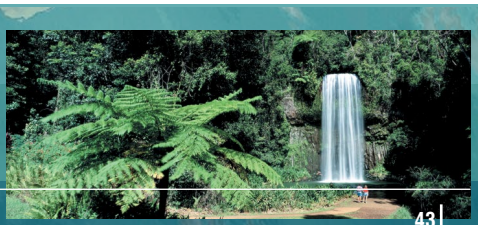
Not only can you discuss the advantages of using Green Lawnger, Turf Mark and Wettasoil Ultra in your applications, but come and ask us about our other specialty products used to assist applicators in industrial vegetation management, soil re-vegetation, spray drift control and spray equipment clean-up.

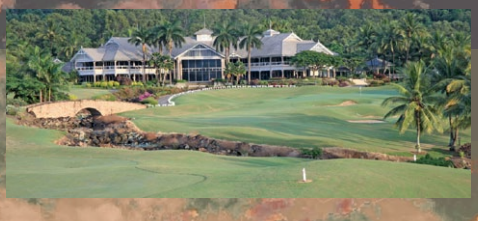
Brown Brothers Engineers - Stand 20

Brown Brothers Engineers Australia Pty Ltd is an importer and distributor of Lowara pumps and pumping equipment, with sales offices in Sydney and Melbourne. Lowara Pumps was established in Vicenza, Italy in 1968 and is part of ITT Industries. Lowara specialises in the manufacture of premium quality pumps and fluid handling equipment and is recognised world wide for quality, efficiency and reliability.

Brown Brothers specialises in the design and fabrication of purpose built booster systems particularly for golf courses in both New Zealand and Australia. Many of these booster systems include a Hydrovar variable speed drive. The Hydrovar is a microprocessor pumping system controller, but it does more than just change speed. It actually manages the performance of the pump to match a wide range of system conditions and requirements.

The Hydrovar software is designed specifically for centrifugal pump operation, control and protection. It can be set up to protect the pump from operating under various unfavourable conditions, eg: cavitation, operating against a closed head, low NPSH etc. The Hydrovar provides the golf course superintendent with flexibility of watering when required with substantial savings on installation, power usage and maintenance.




Club Car - Stand 22

Club Car's dedicated turf maintenance utility range: Freecall 1800 680 088.

Carryall Turf-1: An economical vehicle that's suited for use in almost any golf course application, from cutting cups and setting flags to picking up golf balls on the driving range.

Carryall Turf-2: The most functional vehicle in its class, this vehicle is a real performer. Total vehicle rated capacity of 545kg. The electric version features Club Car's exclusive IQ Plus system.

Carryall Turf-272: This medium-duty vehicle with diff-lock is designed with high performance features plus a sleek, aggressive styling gives it a rugged look.

Carryall Turf-252: The Turf 252 gives you 11.5 hp@3600 rpm, 351cc Kawasaki engine to take you off the beaten path. The electric version features Club Car's IQ Plus system.

Carryall Turf-6: With 681kg and 17.1 cubic feet respectively, the full-size Carryall Turf 6 offers the maximum amount of payload and cargo space in the Carryall Turf line. The electric version features IQ Plus system.

Club Car's new electric model, equipped with the new IQ Plus system, delivers a 48-volt platform and advanced drive train technology. IQ Plus provides best-in-class programmable speed between 19-24kph and superior energy management, range and service capabilities.

Conquest Couch - Stand 31

Conquest is by far Australia's leading warm-season couch. A natural sterile selection, Conquest outperforms it competitors in a number of areas. A variety of industries are now seeing the benefits of Conquest including golf courses, sportsfields, bowling greens and passive recreational areas.

The benefits of Conquest include minimal irrigation requirements, greater colour retention and the ability to perform under low fertility conditions. These factors ensure Conquest looks better all year round and make Conquest a very economical and hard-wearing grass to maintain Australia wide.

Users of Conquest also benefit from its low thatch build-up allowing for a wide range of mowing heights. Now you can mow your surface down as low as 5mm with less scalping. The ability of Conquest to establish rapidly and recover from wear also contributes to making this grass a manager's delight. You will no longer have those long waits for your surface to repair.

Make sure you stop by the Conquest stand at the show and talk to our representatives about how Conquest can and will cater to your needs. Remember, treat it mean, keep it green. Conquest – the professionals' choice.

David Golf & Engineering - Stand 15

David Golf & Engineering is pleased to be exhibiting at the AGCSA's 23rd Australian Turfgrass Conference and Trade Exhibition in 2007. Come and see our new Lawn Grips – footwear to revolutionize the turf industry.

Better Methods products will also be featured with their extensive range of hand tools and there will be many other new products and giveaways.

Products that will be on show include: Tournament ball washer; the Big Ezee and Razor bunker rakes; tournament hole cutter; new generation sprinkler head trimmer; Tuff Guy bins; as well as new course signage.

Come and visit us at Stand 15 and find out about some great show specials. Contact us for all your golf course solutions on 1300 790 890, email dge@davidgolf.com.au or visit website www.davidgolf.com.au

Dint Australia - Stand 19

A swag of new and improved products, a rapid expansion into New Zealand and a greater focus on customer service are what drives the Dint team. The last year has been very busy and the year ahead is looking even busier.

There will be a number of new products on display at the 23rd Australian Turfgrass Conference Trade Exhibition in Cairns and new incentives to announce. Plus, there will be our usual fun approach to the display, so it will be worth your while calling by.

We would like to thank all of our loyal customers for their support over the past year and to those potential customers out there, we would like to let you know that we offer a quality product, at a competitive price, with the best service bar none.

Dint – innovation through experience. We are looking forward to catching up with you at Stand 19 in Cairns.

Floratine - Stand 6

Obtaining the strongest turf comes from having the correct balance of the physical, chemical and biological elements all working together. Floratine is based on a commitment to solid science and works alongside nature itself, creating an entire philosophy and product range geared toward achieving optimal results.

We call our system 'The Floratine Approach'. It involves research, diagnosis, implementation and monitoring. This approach is based upon the objectives and resources of each of our clients and their facilities.

Floratine understands that you need a lot of different tools and hard-earned experience to handle all of the issues you encounter every day on the job. Our tool box of over 50 different products is comprised of four main categories – foliar, soil, biological and additional – and has grown over the past 16 years.

Being a global company that designs, manufactures and distributes its own proprietary technology on over 6000 golf courses and professionally managed athletic facilities in over 40 different countries, gives us a tremendous amount of valuable exposure to new concepts and practices. We are proud of our ability to work with every segment of the turf industry.

Geofabrics - Stand 14

Geofabrics' golf division has been established to supply innovative Australian made golf solutions. Our golf product range includes:

Megaflo: Flat panel drainage. This is a trenchless option of draining greens, tees and fairways, which ultimately reduces costs associated with time and materials. Megaflo also allows the contractor to leave the sub-base untouched. Megaflo has recently been included in the updated USGA specifications for putting green construction.

BunkerMat: A three dimensional sand retention and drainage matting. The bunker sand becomes trapped within the open structure of the fibres which allows the sand to be held on steeper bunker faces. BunkerMat is durable, UV stabilised, resistance to rot, mildew and degradation. BunkerMat comes in two colours and in suitable sized rolls.

Geofabrics is represented in each state along with stock for your immediate requirements. Other Geofabrics golf products include:

Turf Pave: A lightweight plastic grid structure specially designed to stabilise and support turf.

Grassroots: A synthetic turf reinforcement mat which protects underlying soil from erosion and provides a reinforcing matrix for vegetative root growth.

ELCOSEAL: A needle punched reinforced composite clay liner used for water storage reservoirs and water features.

Globe - Stand 17

Globe's commitment and dedication in providing products and services goes back more than 30 years. A truly Australian national distributor, Globe supplies in the industries of turf management and greenkeeping, pest management and pest control, industrial cleaning, turf farms, nursery and horticulture.

Globe proudly leads the industry in offering expert advice and services, as well as offering products to suit all turf needs. These include fertilisers, pesticides, chemicals, turf seed, safety equipment, sprayers, golf course accessories and water management products.

With a strong focus on professionalism, Globe raises the standard of customer service by providing clients with adequate product training and technical support. Our customers come first and our systems continue to develop in order to provide unequalled service.

Globe also takes pride in building partnerships with suppliers such as Aquatrols, Barmac, Bayer, Becker Underwood, B&G, Better Methods, Farm Oz, FMC, David Golf, Nufarm, Rain Bird, Spyker, SST, Syngenta, The Andersons and Turf Tec Australia.

GolfLinx - Stand 44

GolfLinx is an internationally recognised as a leader in innovative water management solutions. GolfLinx has recently released a new generation of soil moisture monitoring equipment developed specifically for the sports turf industry.

GolfLinx's new AquaSpy Turf Probe spearheads a comprehensive range of products that are set to create a fresh level in turf management.

The revolutionary 30cm probe is directly buried just below the turf surface and has moisture sensors at every 5cm, providing the turf manager with accurate information on the effects of surface watering across the whole soil profile. Turf managers can then view graphically displayed water management data using analytical software.

AquaSpy securely stores data for the life of the installation enabling advanced site irrigation scheduling and management. Financial benefits include reduced water and electricity usage, fertiliser savings, and reduced maintenance costs, resulting in a favourable return on investment. Visit the GolfLinx booth at the Cairns conference to discuss your particular needs.

Greencare Industries - Stand 11

Greencare Industries is proud to announce the release of its next generation of CoreMaster turf aerators. After 10 years of rigorous design and testing, David Livingstone and his team have just put the finishing touches to the new CoreMaster 1050 and 1560 tractor mounted turf aerators. We are pleased to have the release of these highly effective new aerators at the 23rd Australian Turfgrass Conference and extend a warm invitation to you to see what a truly all-Australian effort can produce.

The new aerators go faster and deeper with perfect vertical holes and are equally effective with hollow or solid tines. David describes the system as "advanced simplicity" which requires minimal maintenance. Most turf renovation problems occur in the first 150mm of depth so these new aerators penetrate effortlessly down to 165mm.

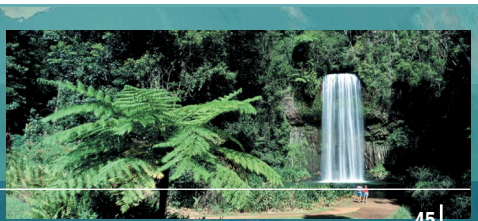
You have a variety of hole patterns and tine sizes to choose from. Tines range in size from needle tines to 1"-25mm hollow monsters. We have also designed a quick tine change system which enables you to change from needle tines to 5/8" solids in a couple of minutes. Greencare plans to release the CoreMaster 1050 pedestrian model and 1050 ride-on shortly. Come see us at Stand 11.

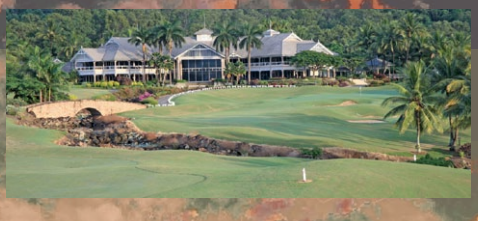
Hunter Industries - Stand 40

Hunter Industries is a worldwide manufacturer of irrigation systems for residential, commercial, municipal, sportsfield and golf applications, offering a complete line of rotors, sprays, valves, controllers, central control and sensors.

Hunter has developed more than 100 innovative products that meet the needs of professional installers worldwide, including the new ACC Controller that was voted the most significant new product at the 2005 International Irrigation Association.

The ACC Controller is Hunter's most powerful controller, for command of large and sophisticated sites. ACC brings new levels




of convenience and modularity to the most advanced controller the company has ever created. Its adaptable modular design not only allows configuration to the number of stations you desire, it also makes it easy to upgrade to true two-way communication with a Hunter central control system. Customise your controller in the field with the features you need: plug-in modules add stations and add central control communication capability.

Hydrosmart - Stand 42

Hydrosmart is bringing good water news to turf growers and users around Australia, UAE, Asia and in the USA (currently being trialled by Golf America).

Salinity, calcium, iron, scale, algae, blue green algae and a variety of chemical problems are being overcome by those adopting Hydrosmart's non-consumable, sustainable solution. It uses a unique particle physics approach to treat water using a computerised water conditioner that puts only frequencies into water to bring about a wide range of beneficial outcomes.

Particle physics research recognises the basic mineral and chemical bonding mechanism which allows for crystals to form and chemical reactions to take place. By using a computerised water conditioner to create a series of highly specific frequencies, Hydrosmart targets and disrupts this bonding mechanism allowing the minerals and chemicals to break down to a smaller non-bonding, non-reactive particle size and keep them in solution.

This provides the ability to produce high quality usable water simply and sustainably without the expense of removing minerals, as is the case with reverse osmosis. In fact, more excitingly for the environment, now that these elements have been unlocked down to available mineral form, they have become plant-friendly nutrients instead of large pore-blocking unavailable crystals.

John Deere - Stand 27

John Deere is proud to be a part of the 2007 Australian Turfgrass Conference in Cairns. We look forward to hosting you at our booth where we can introduce you to the new additions to the John Deere Golf and Turf range for 2007.

New models being introduced this year include the 2653B surrounds mower, 2500B triplex greens mower, an updated 2500E Hybrid triplex greens mower, C-Series walk-behind greens mowers and new ProGator heavy duty utility vehicles. This new range compliments John Deere's full line of turf maintenance equipment, including specialised reel mowers, utility mowers, aeration and debris maintenance equipment, utility vehicles and a comprehensive range of tractors.

We will also be happy to talk to you about how John Deere Credit can provide financial options for either purchasing or leasing equipment and representatives from our nationwide dealer network will be on hand to outline our unmatched after sales support.

As the official golf course equipment supplier to the US PGA Tour, John Deere can be trusted to provide superintendents the tournament-level quality needed on today's golf courses.

Legend Couch - Stand 3

Legend - the king of couch grass. Proven throughout Australasia from rugby league, rugby union, golf fairways and tees, AFL, tennis, cricket wickets, cricket ovals, hockey grounds, equestrian areas, polo fields, recreational areas to home lawns. Available throughout Australia and New Zealand. Please come by Stand 3 for details of your local Legend producer.

No Fuss Solutions - Stand 26

No Fuss Solutions is the Australian distributor for three grass/ground protection products.

Trak mats are used extensively where access to work sites presents challenges for heavy duty equipment. Applications include stadiums as well as golf courses. They have proved to be successful for the reason that they provide safe access through challenging ground conditions- soft soil, dry dusty ground, sandy soil, wet/muddy, sensitive grass, curb and channelling, paved and sealed surfaces. A temporary roadway can be efficiently constructed to allow for safe and easy passage for all heavy duty equipment. The mats can be locked together simply.

Portapath is the ideal product for pedestrian access in grassed areas. It allows for safe passage without compromising the surface. From providing cover for an entire stadium to simple walkways, the rugged anti-slip surface protects turf and prevents soil compaction.

Hexapro is an interlocking tile system which provides for ease of vehicle access and is capable of withstanding a maximum 5 tonnes wheel pressure on gravel and 3.5 tonnes on soil.

See all of these products on display and speak to a company representative to discuss your particular needs. For hire and sale requirements telephone 1300 652 576.

Mentay - Stand 41

Mentay is proud to be exhibiting in Cairns at the 23rd Australian Turfgrass Conference and Tradeshow. We do things a little better to help the turf guys with our reliable cricket pitch rollers of various sizes. Our covers handling equipment is used all over the world for putting down covers and retrieving them. We also make small turf crushers that are used when you cannot buy crushed black soil.

For water absorption we have got that covered too, if it should ever rain again. We have big mobile units and pedestrian units then we have sight screens which can be fixed or mobile for ovals at each end of the ground.

So if it is turf cricket equipment you want then check out Mentay. We have made all sorts of gear and have a total commitment to a trade we all love.

Nuturf - Stand 4

Limited rainfall and the pressures on irrigation water supplies have driven many golf and sporting facilities to access recycled water for irrigation. With the use of recycled water come a number of real issues that if not understood and managed can spell disaster for your turf and soil's health. Irrigation water is by volume the largest input to the turf system so it is critical to understand what makes up your irrigation water.

Nuturf Australia offers a total analytical package that will help you understand the potential impact your irrigation water has. Understanding water characteristics and selecting the correct products to manage its use is where your local Nuturf territory manager can be of assistance.

At the 2007 trade exhibition, Nuturf will be showcasing its improved analytical services, new soil and water treatment options, and will be on site to discuss any concerns you may have regarding water quality. Please feel free to bring your current water and soil tests to discuss with our technical team or book in for your pre-spring analytical requirements and qualify for a five per cent discount.

Orica Watercare - Stand 13

Pesticide clean up is now easier than ever. Landguard OP-A is designed to clean up organophosphate (OP) insecticide-contaminated water in a simple-to-use treatment. Working on certain organophosphate contaminants, including those commonly used in sports turf such as chlorpyrifos, diazinon and fenamiphos, Landguard OP-A is able to reduce the toxicity of contaminated solution by over 200,000 times.

In minutes, Landguard OP-A can reduce OP residue in equipment wash water to levels that can take years to occur naturally. It is simple to use, effective and requires no capital investment. Landguard provides a better environmental outcome, minimising risk while still meeting your primary objective – safe and satisfied patrons and neighbours.

Developed by Orica Watercare, in conjunction with CSIRO, Landguard is proven to reduce the toxicity of contaminated solution by more than 95 per cent overnight. Simply add Landguard to excess spray solution, leave overnight and dispose of the treated water the next morning. Landguard is available from leading distributors nationally.

For more information, visit www.orica-landguard.com or phone 1300 550 036.

PowerTurf Australia - Stand 39

The PowerTurf Australia range includes machinery from Jacobsen, Ransomes, Ryan and Turfco. That's a powerful list of credentials when it comes to golf and turf machinery.

Jacobsen, the 'innovator', has an 86-year history of service in the golf and turf industry, founded on a commitment to world-class products and engineering. Among its many innovations, Jacobsen in 1968 produced the first ride-on greensmower, the GreensKing. In 1989, in another industry first, the LF-100 five-gang fairway mower was specifically designed to be as light as possible, to avoid turf compaction. Turfco, number one in topdressing and material handling, have been topdressing innovators for 35 years.

This year PowerTurf Australia will launch some exciting new products from Jacobsen and Turfco – the fairway turf groomer for LF3800 and LF4677, Performaire 60 and 80 variable depth aerators, Mag System magnetic bedknives, Turfco SP1530 with detachable conveyor and the Triwave 60" seeder.

We are totally focused on our customer service operations, building some real muscle into our dealer network throughout Australia. PowerTurf Australia's philosophy has always been straightforward – to source and distribute the best products and to provide the kind of top-level parts and service that keeps those machines at peak operating performance.

Rain Bird - Stand 9

Install confidence. Complete confidence in your irrigation system gives you peace of mind. Rain Bird understands your need to get the most from your irrigation system. Our industry leadership and sole passion is irrigation and we continue our commitment to innovative irrigation solutions every day.

Complete confidence in the Rain Bird promise to stand behind our product through outstanding service is our commitment to you. Our proven performance and ongoing innovation give you the peace of mind that you need, today and in the future.

Why Rain Bird? Irrigation is our sole focus. We invented irrigation technology and continue innovating every day. We are the world leader in irrigation expertise with a proven reputation for high quality products and services

See the latest in pump stations featuring Smart Pump technology, Otterbine lake management systems, central control, decoders and rotors for outstanding quality and consistent reliability.

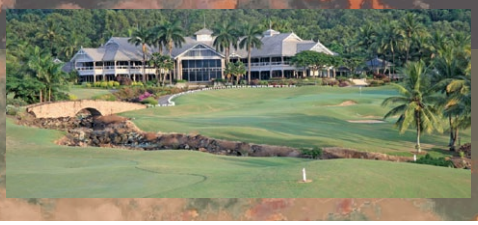
For further information regarding Rain Bird golf course irrigation system expertise, visit us at Stand 9 or contact Rain Bird Australia on 1800424044 or at www.rainbird.com.

Redexim Charterhouse - Stand 35

Redexim Charterhouse continues in its pursuit to meet the ongoing challenges and demands of the turf industry globally be that natural or synthetic surfaces. The world renowned and respected range of verti-drain deep tine aerators with operating widths from 0.7m to 2.6m have proved over the years to be a 'best friend' to many in this demanding industry.

Throughout Australia and other regions of the world drought conditions over recent years have highlighted their worth as a multi-functional machine, which can contribute to the more frugal use of this precious commodity.

The Redexim range of products also includes three models of verti-core machines


with working widths of 1.3m, 1.7m and 2.1m and the new verti-knife linear slicer allows quick adjustments of disc size and spacing.

Turf Tidy, the multi-functional machine, enables scarifying, flail cut or brushing and is available in 1.3m or 1.7m operating widths featuring a dump height of 1.68m and requires small tractor hp. Also the range of Rink topdressers have models to suit all applications, while the SpeedSeed, Proseed, VertiSeed and overseeders cover the varied demands of seeding requirements. For more information call by Stand 35 or call Peter Ellis on 0419 310 546.

Safe-Tees Down Under - Stand 43

In a world with heightening environmental awareness, the existing golf tee market is dominated by timber and plastic both of which cause damage to greenkeeping equipment, visually pollute courses and waste a valuable energy resource. This further contributes to rising maintenance costs. We believe Cane-It golf tees are an ideal fit into an increasingly environmentally conscious industry and were designed with superintendents in mind.

Based on feedback from various clubs who tested our tees, the time will come when not only will this be the tee of choice for golfers but the golf tee of regulation by golf course superintendents which will capture the attention of the golfing media worldwide. Bamboo is a fibrous material, durable yet soft; therefore when hit by mower blades, they will shred into fibres and disappear into the landscape, unlike plastic fragments which damage blades.

Focus has been on how to make a tee last longer, therefore harder plastic is being used and in some cases, steel has been added, yet no one has considered the environment or the maintenance involved in course upkeep.

This Tee will solve many problems associated with course maintenance. Cane-It – the tee greenkeepers have been waiting for.

Scotts Australia - Stand 30

Scotts Australia has serviced the professional turf market in Australia and New Zealand for over a decade. Scotts is a leader in the industry, producing and supplying specialty fertilisers – Sierrablen and Sierraform; pest control products – Scotts MaxGuard (offering fast acting, contact insecticide in a choice of granular, liquid and granular combined with slow release fertiliser); combination products – Dicot II, Premax; wetting agents –Hydraflo II, Hydraflo L and Hydraflo NPK, plus a new range of turf seeds through the acquisition of The Turf Seeds Company.

The latest introduction from Scotts is Sierraform GT, containing unique slow release potassium technology never before seen in the turf industry. Providing distinct advantages:

- Optimum protection against stresses (i.e.: cold, heat, drought and wear).
- Proven increased efficiency of turf water consumption.
- Maintaining a higher bank of 'available K' in the sand/soil profile.
- Recovery from disease is accelerated.
- Maintains equilibrium of magnesium and calcium uptake.

Scotts is pleased to be sponsor of the 2007 AGCSA Distinguished Service Award. In addition Scotts has sponsored the popular 2007 AGCSA NRL Tipping Competition in conjunction with the conference touch football event. You can rely on the Scotts philosophy – a world of local knowledge.

Sealsle Australia (Jimboomba Turf Group) - Stand 36

Sealsle 1 and 2000 certified turfgrasses have been established with great success in various locations since its introduction into the Australian turf market five years ago. Along with many high profile sports and golf situations, the greens-type variety Sealsle 2000 has successfully been installed as an alternative and natural couchgrass encroachment barrier around the perimeters of cool-season putting greens (visit Stand 36 to view and discuss this new protection for your greens).

Sealsle is now grown in Queensland, New South Wales and Victoria and is becoming increasingly popular as turf managers are looking to use alternate water sources.

Throughout the past decade the Jimboomba Turf Group has been exporting turf varieties into various parts of the world including South Africa, Indonesia, Thailand, Singapore, Malaysia and the Middle East. If you have an interest in the international golf development market we are able to assist.

Simplot ProLine - Stand 16

Simplot ProLine is proud to be supporting the 23rd Australian Turfgrass Conference in Cairns. Simplot ProLine prides itself on being specialists in BEST granular fertiliser and liquid nutritional products and now a proactive agent for Syngenta. This year we have been working on providing solutions for the drought-affected turf market and will be demonstrating these new products on our stand in Cairns.

Simplot ProLine will be running the same competition as we did last year, giving away a study tour to the GCSAA Golf Show in Orlando, USA which will be held during February 2008. This is an experience of a lifetime and a great opportunity to network on a worldwide scale. The tour includes three days at the famous Farmlinks, the home of Polyon in Alabama.

Also, don't miss our Grass Roots Tour blues night featuring the Kevin Borich Express. This will take place on Tuesday, 24 July. Contact your territory managers for the details. We look forward to seeing you all there!

Syngenta - Stand 21

The Syngenta Turf Team will endeavour to shine some sunlight on your winter turf issues at this year's conference. Local and international experts will be on hand to provide advice and recommendations regarding your turf issues.

Our stand will showcase some of our unique technology and products, as well as easy-to-read turf management literature. We'll provide you with an insight into the strong suite of products in our development pipeline, while also informing you of our turf specific solutions and management tools already available. In particular we will demonstrate some of the benefits you can receive from implementing a customised preventative program.

Complementing our workshop, 'The power of nozzles: a practical demonstration', we will be providing up-to-date industry information on minimising spray drift and maximising coverage to ensure your turf receives optimal benefits from product application.

With prizes to be won, a wealth of information to be shared and giveaways galore, we're looking forward to catching up with you in Cairns!

Toro Australia – Commercial Equipment - Stand 2

Toro is a world leader in the design and manufacture of commercial turf maintenance equipment. Its comprehensive, integrated solutions aggressively meet professional turf management needs. Golf course superintendents look to us as the best single source for total turf management solutions.

Toro Australia is proud to be affiliated with the majority of Australia's top golf courses and sporting venues, as Toro has grown to be recognised as the only worldwide provider of both turf care maintenance equipment and irrigation systems to match.

By choosing Toro, you are assured satisfaction with innovation, environmentally sound turf management products backed by one of the best service and support teams in the industry. Toro is proud to be involved in the 23rd Australian Turfgrass Conference and we look forward to welcoming you to Stands 1 and 2. Further information visit www.toro.com/golf or www.toro.com/grounds.

Toro Australia - Irrigation - Stand 1

In keeping with the 'Climatic Conditions of the Modern Era' theme, Toro will focus on innovative technologies aiding efficient water management strategies to combat water shortages. Our recent product releases provide users with progressive and tailored irrigation solutions. The VP Satellite demonstrates how increased control flexibility improves watering efficiency and performance. Independent station programming allows you to apply water precisely where you need it. Also the only controller with three operating modes with the addition of 'grow-in' mode specifically created for turf establishment.

The GDC Decoder System enables long wire runs with smaller wire sizes and the ability to control more valves simultaneously. It is available as a stand alone or PC system with the latest SitePro 2.2 software for greater flexibility. Decoders are available in one, two and four station models.

Outstanding acceptance of the 835/855 Series sprinklers, which include features like full and part circle in one sprinkler, precise rotation time and adjustable nozzle trajectory, has lead to more sprinklers that deliver matching efficiencies such as 810G and the upcoming DT Series. The capability to deal with wind, slope and obstacles means greater watering efficiency. Please visit us at Stands 1 and 2 to discuss your water management goals.

Tru-Turf - Stand 23

Tru-Turf's history in designing and building golf greens rollers dates back to the early 1940s with the advent of turf rolling. With innovative design, we have been able to produce a quality, lightweight roller that is exported to England, Scotland, Ireland, Sweden, Spain, Germany, Austria, USA, Canada and Asia.

Since 2003, the US PGA Tour has been using our Roll 'n' Spike golf greens rollers for preparing the greens for their prestige tournament events. In 2006 we rolled the greens at 70 tournaments and 77 events in 2007. At Harrogate in 2007, we displayed the premier RS48-11C roller and MT5000 Tote for walk-behind mowers. Similarly, the Anaheim Golf Industry Show was also very successful.

During 2007, we released the R52-11T, a triple head roller with a width of 52" (1321mm) in both petrol and electric versions. Sales of all rollers have increased significantly over the last four years due to the licensing by the PGA Tour, ongoing product design and improvements and the reliability and ease of use of our equipment.

For more information on our range of equipment, visit us at www.truturf.com

TGAA - Stand 33

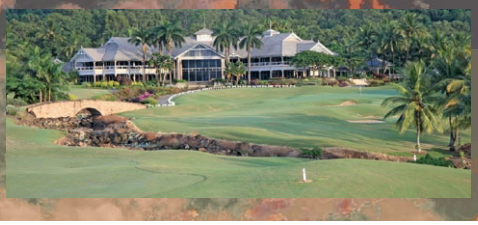
The Turfgrass Association of Australia (TGAA) is a non profit industry body that represents turf practitioners, curators, ground managers, superintendents and groundsmen. Our membership is also complemented by industry representatives from soil, seed, instant turf, industry consultancies and machinery supplies. In addition, we have special working relationships with cricket associations, TAFE colleges and universities in each state.

The TGAA's main objective is to offer quality personal development and educational seminars that will assist our members to keep abreast of new developments, maintain awareness of industry standards and promote and deliver OH&S regulation and training.

Twin View Turf - Stand 12

Twin View Turf is a supplier of quality turf varieties and services to the golf industry, commercial landscape and recreational sports markets. Twin View Turf services the greater Brisbane area, Sunshine Coast, Gold Coast, Northern Rivers and Toowoomba areas. We also support the Sydney bowls market with TifEagle.

Twin View Turf is dedicated to customer service, the growing of quality turf products


and providing the right advice. It is an industry leader for turf varieties grown and equipment technology used in production, harvesting and product delivery.

Twin View Turf is a turf producer of specialty turf varieties for the golf course industry. We are a major producer of 328 Tifgreen, Tifdwarf and TifEagle for golf greens and bowls greens. We also grow TifSport, 419, Wintergreen and Greenlees Park for golf course fairways, tees and roughs as well as Sir Walter and Empire zoysia. Twin View Turf also provides the following services – site preparation, turf installation, maxi rolls, sportsfield renovation services and turf stolon planting.

Tycrop - Stands 37 and 38

Toro is proud to be the exclusive distributor of Tycrop material handling and topdressing equipment in Australia. Since 1985 Tycrop has worked with turfgrass customers to design functional material handling and topdressing equipment. Each product is designed to ease the pressure of daily turfgrass maintenance, enabling crews to work better and faster, with less manpower. Providing turf managers the power to maintain their turf quickly and easily results in exceptional surfaces and improved playing conditions. Tycrop products are manufactured and tested for optimum performance, simplicity-of-use and ongoing reliability – all features that have become hallmark of the Tycrop name. They range in size, configuration and price to accommodate every facility, tow vehicle and budget.

The Toro commercial equipment team looks forward to welcoming you to Stands 37 and 38. For further information including specifications and videos on the Tycrop range of products visit www.tycropturf.com

Underhill International - Stand 34

Underhill International has successfully represented irrigation manufacturers internationally and introduced many irrigation products for over 20 years. In addition, Underhill now introduces its own range of products, specialising in water conservation and niche irrigation challenges.

FCI Profile: Solid metal golf sprinkler nozzles increase the efficiency of existing golf sprinklers by eliminating wet spots, dry spots and sprinkler rings. Saving significant water and pumping costs, these nozzles pay for themselves.

Magnum: Solid metal multi-pattern hose nozzle, already proven in Australia for hand watering, popular with the golf and bowling fraternity.

Precision: Solid metal professional precision fixed spray pattern hose nozzles give millions of soft uniform droplets and provide rapid yet surprisingly gentle water application.

Pellet Pro: Wetting agent application gun accepts cartridges or granules and provides gentle ultra-soft spray while applying.

Big Gulp: Versatile water removal hand suction pumps, ideal for de-watering sprinkler heads and valve boxes.

Mirage: Sports turf sprinklers, radius up to 49 metres (largest radius pop-up sprinkler in the world) for watering sports areas from the side lines. Models available with synthetic turf top in green or tan, and some models with 100mm natural turf sod cup.

Velvetene - Stand 25

TFWA02, commonly known as Velvetene, is an Australian variety of paspalum vaginatum which exhibits significant salt tolerance and grows in a wide variety of soil types and pH levels. The plant has very dense, laterally growing stolons with close internode spacing and deep aggressive rhizomes which gives it good drought tolerance and a high re-generation rate after harvesting or renovations.

Thought to originate in South Africa it is related to the 'halophyte' type plants that has naturally evolved in poorly drained soils and will grow in salty beach sands or calcareous soils. Irrigation water to establish Velvetene from stolons should not exceed 11,000ppm, whereas established turf will have no visible effect at 15,000ppm. The use of variable quality water resources on specific soil types may require various changes in management strategies to deal with highly saline situations.

Recommended mowing height for Velvetene is 8-15mm, but with intensive grooming at 3mm it will become a very fine and dense putting surface. Without mowing Velvetene will grow to 75-100mm with seed heads slightly higher. If not intensively managed, there is no requirement for fertiliser, however it responds quickly to fertiliser when used resulting in excessive growth at high rates.

Wiedenmann GmbH (QTurf Machinery) - Stand 29

Consistency and reliability are values that count for more then words. Therefore in Germany, it is nothing extraordinary to formulate a corporate philosophy using just three words – 'only the best'. Founded in 1964, Wiedenmann GmbH has grown into a market leader within Europe in the maintenance of turf and golf greens. Wiedenmann has achieved this outstanding position by offering innovative machinery.

In conjunction with the Australian and New Zealand distributor, QTurf Machinery Pty Ltd, Wiedenmann is continuing its innovation with the introduction of the Terra Spike GXi. The new generation of Terra Spike I series aerators revolutionise turf maintenance by setting new standards in speed, productivity and quality.

The operator's wellbeing is also being looked after with the unique damping systems, VibraStop and Powerpack. A twin drive concept can be configured to match various transmission ratios. Don't waste valuable time with adjustments that can be made simply and easily by turning a crank. The GXi is very low maintenance with only four grease points. Loosen and aerate your turf at an unprecedented working depth and speed.

JRM AUTHORIZED DISTRIBUTORS

AUSTRALIA - VICTORIA
Applied Agronomics - Jim Brennan
(0421) 418 595
jim@appliedagronomics.com.au

AUSTRALIA - QUEENSLAND
Redwood International - Ian Leonard
PO Box 985 Maleny, QLD 4552
07 54 999 031 Fax
0419 757 863 Mobile

AUSTRALIA - NEW SOUTH WALES
Turf Technology Systems - Mark Wiggins
P.O. Box 8272
Werrington County NSW 2747
1800 250 258

NEW ZEALAND
C. Brent Baber Turf Equipment Co.
P.O. Box 72-728 Papakura 2110
New Zealand
64 09 294 6040

MALAYSIA
NUAIM CORPORATION (M) SDN BHD
No 14 Jalan P10/19, Section 10,
Selaman Industrial Park,
43650 Bandar Baru Bangi, Selangor, Malaysia
+603-89211596

THAILAND
Raun Interprise - Thorbjorn Raun
135/75 Patak Villa.Rawai
Phuket 83130
66 76 281 203

THE PULSE

Australian superintendents have experienced some pretty challenging times of late, in particular with water restrictions and the ever increasing issues of environmental management and OH&S. But how are their colleagues who ply their trade overseas faring? In this instalment of The Pulse we ask five ex-pat Australians what are some of the major issues they currently face in their everyday operations.

RANALD MCNEILL
Qatar

There are a number of issues I deal with at Doha Golf Course on a daily basis. Getting trained and qualified employees, training inexperienced staff, a constant water supply, resources and materials are but a few. Qatar is rapidly growing; the infrastructure is insufficient and is unable to support the current expansion of the population and the massive amount of construction work. In a country that imports everything, demand outstrips supply of resources, therefore inflation is out of control and import and product costs are skyrocketing.

The most pressing issue at this time of the year (summer – with temperatures up to 50ºC) is water management and availability. All water in this region is produced through desalination and controlled by the government. Our average requirement per day for a year is about 4,500m^3. In summer we require about 6,500m^3 but, due the insufficient infrastructure, to cope with the demand, we simply cannot get adequate water to irrigate. It certainly advances our ryegrass transition in the rough!

We communicate constantly with the relevant authorities about the lack of incoming water to our holding lakes and hope for some sympathy and an increase in the supply. Water is only pumped to the course for 14 hours per day. The government has taken this measure to have some control over the "locals" usage. Qatari's do not have to pay for their water or electricity and would leave hoses running all day. In contrast, the expatriate population pays handsomely and watches their consumption.

When schools break-up in June, the majority of the population leaves to holiday and escape the heat and humidity that arrives July through September. Only when the demand drops, can we expect an increase in supply. Until then it is a "bukra inshallah" (tomorrow god willing) situation.

STEVE MARSDEN
New Zealand

Superintendents that head overseas to work do so for many reasons. It can be an extremely rewarding experience, but is the grass always greener? Moving across the Tasman was a relatively easy one; there is no language barrier, strict religious boundaries or civil unrest. The biggest adjustment was sharing my office space with a farmer and his sheep for two years. Operating from a 60-year-old wool shed where regular shearing and crutching was carried out has been a unique experience for this city slicker.

The project here at Kinloch is a new golf course situated less than a kilometre from Lake Taupo in the central North Island. The course is built on volcanic pumice soils. Pumice is a very light, free-draining medium that is highly erodable, and during heavy rain the soils scour out heavily and the pumice floats away.

Lake Taupo is one of the largest fresh water Lakes in the southern hemisphere. It is topped up by snow melt from nearby mountains, fresh water from trout-filled rivers and streams and local rainfall. Nutrient loading on the lake from years of farming has reduced the water quality. One of our management challenges is also to minimise our fertiliser inputs while maintaining healthy playing surfaces. Careful consideration is given when selecting fertiliser products (a mix of organic, synthetic coated and products containing nitrogen inhibitors are used).

Water supply for golf course irrigation comes from a bore situated 100m down into the volcanic profile. Fresh clean drinkable water is used, there are caps on water drawn over a 12 month period, but it is not limited to specific windows of use, so it can be drawn throughout the year. By no means is water squandered, all sprinklers are valve in head and are wired individually to allow for specific run times according to their location.

GARY CHATFIELD
Thailand

Depending on location, one of the main issues superintendents face in Asia is the availability of irrigation water. Normally with new courses the architect incorporates lakes as part of the strategy and also for use as irrigation storage.

In the tropics with the weather being so hot, one of the big issues with staff is the wearing of protective equipment when applying chemicals. Because of the heat staff won't wear much protection and their ignorance causes concern. Many staff wear thongs as normal footwear! Attitudes towards the job are also different as many people see it as just a way of earning money, not making a career out of it. The tender loving care that many Australian superintendents and groundstaff have for their course is not that evident in Asia. As there are no formal turf education courses in Asia, it is up to the superintendent to train staff.

A lot of courses that were built during the boom have now become neglected due to decreasing budgets. Weeds have taken over the tees, fairways and rough and encroachment of fairway grass into the greens is a big problem, especially Tifway into Tifdwarf.

One of the other problems appearing now is the utilising of paspalum in clean water situations. If paspalum becomes contaminated with couch or zoysia then these two grasses will overgrow the paspalum in time unless a lot of herbicides are used. In tropical parts of Asia paspalum is susceptible to fungus and insect attack so many chemicals are required. People are only planting paspalum due to its colour and not due to high salt content soil or water.

Due to virtually perfect growing conditions, thatch and mat levels need to be continually kept under control. Normally there is some type of renovation work going on each week and some courses close Mondays for maintenance so work can be done properly and quickly.

MICK KELLY
Kuwait

I have been overseas for a long time but always keep up with news from home. I really feel for superintendents in Australia who are going through such severe drought. But no matter where you are, there are always certain issues when it comes to maintaining golf courses.

My main source of frustration here at the Sahara Golf Club is the lack of turf related products in Kuwait. With 10 per cent of the world's oil reserves and 25mm of rainfall a year, agriculture and its associated industries don't rank high in importance, so anything I need has to be imported which adds cost, time and requires careful advance planning. Add to that there is only one registered fungicide in Kuwait suitable for turf maintenance (to register others would take two years of red tape torture). I also have to reassure the course owner that the budget I require is realistic!

My major concern, however, is also water, but for completely different reasons. I use TSE water to irrigate the course but my biggest problem is not quantity but getting it to the course (I have been told 600,000m^3 of TSE is pumped into the ocean each day!). Last summer a ministry pump station supplied water to the course, while during winter I used an alternative source. As temperatures started to increase in March this year, I sent my irrigation supervisor to open the ministry valve, but there was no water! After many calls and visits to the relevant ministries, nobody could explain why we weren't able to receive the TSE water. Eventually they agreed that we could install our own pump from the main source and operate it ourselves. Fortunately we were able to avert a full scale disaster.

In Kuwait from March to November there is no rain, meaning irrigation water is critical. It's without doubt the thing I lose most sleep over, apart from my dipping footy tipping form.

ANDREW CLACY
Singapore

I have been in Asia now for 12 years which included a one year stint in Mt. Gambier in 2005/06. Working in Asia is substantially different from South Australia, for example here at the Singapore Island Country Club I look after 81 holes and have over 120 staff on the maintenance crew. Some staff members have been here for 40 years with most having been on site for 20. As such the staff are very well drilled and very reliable as equipment operators.

There are no OH&S regulations to worry about and the staff are generally not unionised. The staff are well looked after though, and will usually get two months bonus pay per year with an annual increment which is linked to the overall performance of the club.

Environmental management varies from country to country in Asia. Here in Singapore it is a highly sensitive issue as the golf courses I manage border two fresh water reservoirs which are a primary source of potable water for the nation. Chemicals and fertilisers applied to the golf course are heavily scrutinised by the government authority that manages the reservoirs.

The use of the water is unlimited, however, the need for irrigation water is substantially lower than required in Australia due to the amount of rainfall. We will have up to and sometimes more than 1m of rainfall per month with no distinct wet or dry season.

The biggest problem I face as a turf manager is lack of sunlight hours. The length of day does not vary greatly being so close to the equator, rather the problem is the amount of cloud cover. Mornings are clear, however cloud builds up and will develop into a storm in the afternoon. In Macau it was not so much cloud cover but the amount of airborne pollution generated in southern China that blocked out the sunlight!

WITH ANDREW PEART

pH affects a number of aspects of a soil including nutrient availability and balances, the activity of specific microbial populations, and overall turfgrass vigour and persistence

Getting the pHacts right

Soil pH levels can have a dramatic impact on how well turf performs, or doesn't. In this instalment of Tech Talk Andrew Peart looks at this important chemical component and some of the strategies to manage acid and alkaline soils alike.

The measure of hydrogen ion concentration in the soil solution, or pH, is defined as the negative logarithm of that concentration ($pH = -\log[H^+]$). This measure is used to determine whether a soil is acid or alkaline.

When water ionizes from H_2O to H^+ and OH^-, both H^+ and OH^- ions are in equal concentrations of 0.0000001 moles per litre $[H^+]=[OH^-] = 1 \times 10^{-7}$ moles/litre or more commonly expressed as pH = 7.

When the hydrogen concentration is greater, such as 0.0001 moles per liter, the pH is 4; when it is smaller, such as 0.00000001, the pH is 8. When pH changes from one unit to another, the change in the hydrogen ion concentration is ten-fold. So a pH of 5 is 10 times more acid than a pH of 6 and 100 times more acid than a pH of 7.

The pH of a soil is one of the most important aspects in terms of soil chemistry and it can dramatically influence the performance of a turfgrass species being grown. pH affects the following aspects:

- Nutrient availability and balances;
- The potential for Al and Mn toxicities;
- Activity of specific microbial populations;
- The quantity of lime or sulphur to alter pH;
- Turfgrass vigour and persistence.

The availability of nutrients for plant uptake, as affected by soil pH, can be seen in Figure 1. As pH becomes increasingly acid (<7) nutrients most likely to be deficient are N, P, K, Mg and S, while with increasing alkalinity (>7) Fe, Mn, P and B may become deficient.

Carrow, Waddington & Rieke (2001) state the reasons for reduced availability of the following nutrients in acid soils are as follows;

Ca, Mg, K: Fewer basic ions are present, replaced by Al^{3+} and H^+ on the CE sites.

N: Bacteria populations involved in nitrification decline so NH^{4+} accumulates but nitrate level is low.

P: Phosphate ions form insoluble chemical compounds with Fe, Mn, and Al

S: SO_4^{2-} may bind with Al and/or Fe oxides

Mo: Forms insoluble compounds

Carrow et. al. (2001) state the reasons for reduced availability of the following nutrients in alkaline soils are as follows;

Fe, Mn, Cu and Zn: Form less soluble hydroxide and oxide forms.

P: Relative insoluble forms with Ca at pH 8-8.5.

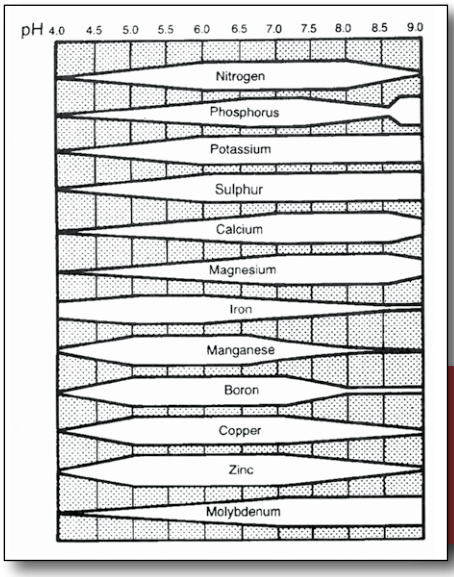


Figure 1. The availability to plants of nutrient elements varies with pH in this manner in mineral soils. The wider the bar the greater the availability. Source: Handrek & Black (2002)

ACID SOILS AND THEIR IMPACT ON THE SOIL-PLANT RELATIONSHIP

Carrow et. al (2001) state that acid soils can evolve through several processes that include;

- The result of leaching of base cations in humid, high rainfall climates;
- By the action of acidic nitrogen sources, especially ammonium sulphate and ammonium phosphate;
- Over-application of sulphur;
- Acid rain or acidic irrigation water;
- Waterlogged soils rich in organic matter and dissolved sulphate that form sediments high in reduced sulphides, which form acid sulphate soils when drained.

TOXICITIES

At low pH (generally <4.8) certain nutrients, namely aluminium and manganese, become much more soluble and can be sufficiently high in the soil solution to cause direct plant root toxicity.

The toxicity is normally associated with a complex, known as acid soil complex, that includes other plant nutrient deficiencies (Ca, Mg, K,) and high soil strength that inhibits rooting.

Different turfgrass species and varieties within a species can vary in their susceptibility to this complex.

AFFECT ON MICRO-ORGANISMS

Total fungi populations will usually remain constant independent of pH, however individual species will change. Total bacteria and actinomycete populations however steadily decline at pH <5.5 (Carrow et. al, 2001).

Bacteria, namely *Nitrosomonas spp*. and *Nitrobacter spp*. that are responsible for converting organic bound N into the organic forms, NH_4^+ and NO_3^- have significantly reduced populations.

Other micro-organism activities affected by low pH are:

- Phosphorus mineralisation from phosphorus held in organic matter;
- *Thiobacillus spp*. that transform reduced forms of S into an oxidised form (sulphate) can be reduced;
- Bacteria and actinomycetes responsible for the breakdown of the more resilient forms of organic matter decline and thatch can accumulate; and
- Some fungal pathogen presence may be higher in low pH soils with limited research suggesting *Rhizoctonia* and *Fusarium spp*. falling into this category.

MANAGEMENT OF ACID SOILS

The most common way to rectify acid soils is through the application of lime, generally applied in the form of agricultural limestone, calcium carbonate ($CaCO_3$).

There are alternative liming materials that can also be used to alter soil pH, but the sources containing magnesium are generally more expensive and the hydroxide and oxide forms can cause burning of the turfgrass if applied at too high a rate. The alternatives include:

- Dolomite ($CaCO_3$ + $MgCO_3$) - 0.92 equivalent of $CaCO_3$
- Magnesium carbonate ($MgCO_3$) - 0.84 equivalent of $CaCO_3$
- Calcium hydroxide (builder's lime – $Ca(OH)_2$) - 0.74 equivalent of $CaCO_3$
- Calcium oxide (burnt lime - CaO) - 0.56 equivalent of $CaCO_3$

If it was stated that 20kg per 100m^2 of calcium carbonate was required to alter the pH to 6.5 then it would require only 0.92 x 20kg per 100m^2 of dolomite due its greater neutralising value.

The table below, is a general guide to the amount of $CaCO_3$ needed to raise the pH in the top 10cm of a soil profile. The figures stated are in grams per square metre.

Soil Texture	pH 4.5-5.5	pH 5.5-6.5
Sand, loamy sand	85	110
Sandy loam	130	195
Loam	195	240
Silty loam	280	320
Clay loam	320	410
Organic soil	680	790

Source: Handreck & Black (2002)

There are two important factors in a liming agent. First, the calcium and or magnesium that will displace the hydrogen from the exchange sites and second the carbonate, hydroxide or oxide that will combine with the displaced hydrogen ion to neutralise its acidifying effect. In the case of carbonate it forms carbonic acid that is not stable in soils and quickly forms carbon dioxide and water.

The following illustrates the chemical reaction when calcium carbonate is added to a soil:

$2H^+$-Clay colloid + $CaCO_3$ (limestone) → Ca_2^+-Clay colloid + H_2CO_3 (carbonic acid)

Then:

H_2CO_3 → H_2O + CO_2

ALKALINE SOILS AND THEIR IMPACT ON THE SOIL-PLANT RELATIONSHIP

Carrow et. al (2001) state that alkaline soils can evolve through several processes that include;

- Base cation accumulation due to lack of leaching;
- Soil formation from calcium carbonate parent material;
- Caliche conditions from the precipitation of calcium and magnesium carbonates, usually from irrigation water high in carbonates or bicarbonates.

Alkaline soils do not pose as many problems as do excessively acid soils. Nutritional stresses are less common, toxicities are extremely rare and there is far less impact on microbial populations. Some nutritional deficiencies may occur but these are normally limited to the micro-nutrients as mentioned earlier.

MANAGEMENT OF ALKALINE SOILS

Excessive acidic conditions provide clear agronomic reasons to alter pH but in alkaline soils it is less clear because:

- Nutritional problems are rare;
- If nutritional problems are present, it may be more economical to adjust fertiliser practices;
- The presence of free $CaCO_3$ may make it impractical, unless this is due to caliche deposits.

Caliche deposits are generally formed close to the surface and are formed by calcium and or magnesium carbonates precipitated from the soil solution usually as a result of irrigation water high in these carbonates. These caliche deposits can reduce water infiltration and percolation and pH reduction should be considered in this situation.

Calcareous soils contain sufficient $CaCO_3$ ▶

SOIL TEXTURE			
Measured pH	Sand to loamy sand	Loam	Clay
	lb S per 1000sq.ft. (50lb/1000sq.ft. = 2440 kgS/ha)		
8.5	30-50	50-60	60-70
8	15-25	25-35	35-50
7.5	10-15	15-20	20-25
7	2-5	3-6	5-10

Source: Carrow et.al. (2001)

and or $MgCO_3$ to visibly effervesce when treated with 0.1M HCl (Carrow et.al, 2001). The presence of free $CaCO_3$ can have a dramatic effect on trying to reduce the pH of a soil and a permanent reduction cannot occur until all free $CaCO_3$ has been dissolved.

The addition of sulphur is generally recommended for the reduction of soil pH. In soil the sulphur is converted by the presence of Thiobacillus bacteria to sulphuric acid, which then disassociates into hydrogen ions and sulphate ions. It is the addition of the hydrogen ions into the soil solution and then on to the exchange sites that lowers the soil pH.

The following illustrates the chemical reaction when elemental sulphur is added to a soil;

$$2S + 3O_2 + 2H_2O \xrightarrow{\text{Thiobacillus}} 2H_2SO_4 \rightarrow 4H^+ + 2SO_4^{2-}$$

$$Ca^{2+}\text{-Clay colloid} + 4H^+ + 2SO_4^{2-} \rightarrow 2H^+\text{-Clay colloid} + 2CaSO_4$$

The table above provides approximate quantities of elemental S (99 per cent pure) over 1000sq.ft. to lower the pH to 6.5 in the top 15cm of soil, given there is no free calcium carbonate present.

APPLICATION GUIDELINES

For golf greens it is recommended to apply 24-48 kg S per ha at three to four week intervals but not over the summer months on bentgrass. Total annual S should be 488kg S per ha or less. Lower rates are recommended for higher sand content greens with no $CaCO_3$ present.

The main factor that limits the amount of sulphur is the potential for excessive acidity developing in the surface 25mm where the turfgrass crown is located.

Several weeks are required for the transformation of elemental S into H_2SO_4 (sulphuric acid) and this is dependent on environmental factors influencing the Thiobacillus bacteria.

Lastly, elemental sulphur should be immediately watered in after application to remove residues from the foliage which may lead to leaf burn.

Direct injection of sulphuric acid through the irrigation system can also be effective to dissolve or prevent caliche deposits as well as reduce soil pH.

REFERENCES

Carrow R.N, Waddington D.V & Rieke P.E, 2001: *Turfgrass Soil Fertility and Chemical Problems: Assessment and Management. John Wiley & Sons, Inc.*

Handreck K & Black N, 2002: *Growing Media for Ornamental Plants and Turf. UNSW Press 3rd Edition.*

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BY BRETT MORRIS

Kikuyu used as erosion control and stabilisation on roadside embankments in the Bega Valley, NSW

Breeding kikuyu for the future

In late 2004, a major research project was established between the University of Sydney's Plant Breeding Institute and Penngrass Research. The initial outcomes of the research were to examine the variation existing within naturalised stands of kikuyu grass and begin investigation into breeding new varieties of kikuyu for industry use. Brett Morris outlines the project.

Kikuyu grass *(Pennisetum clandestinum)* was first introduced into Australia in 1918. Its ability to quickly adapt and naturalise to varying local environments saw it widely planted throughout Australia in the 1920s and 1930s as it offered farmers a durable, aggressive and nutritive grass which outgrew problem weeds in pastures.

Reports from farmers were overwhelmingly positive and due to its popularity, kikuyu today represents the base pasture species for over 80 per cent of all dairy farms in NSW alone.

While the agricultural sector embraced the new grass, named after the Kikuyu tribe in Kenya, its spread extended beyond the farm setting. Throughout the 1940s and 1950s, the NSW Department of Agriculture was recommending kikuyu to the Commonwealth's Department of Civil Aviation as a preferred cover for use on airstrips, as *Paspalum spp*. was creating an uneven landing surface.

Kikuyu was also used extensively as an erosion control measure on river banks throughout the 1950 and 1960s, followed by use on newly constructed roadside embankments. Farmers in the Bega Valley have noted how kikuyu was not present until major road construction was undertaken throughout the 1970s.

Its invasive nature and preference for fertile soils has seen kikuyu colonise many turfgrass playing surfaces, such as golf courses, but not without its critics or flaws.

Apart from its drought tolerance and ability to photosynthesise at lower temperatures than most C_4 grasses, meaning longer growth into winter, its high thatching tendency is a cause of concern for turfgrass managers which translates to uneven bounce around greens, a cause of frustration for many golfers.

Kikuyu growing in a tidal swampland, high salt environment at low tide

An example of the observed phenotypic differences in the Plant Breeding Institute's kikuyu grass germplasm collection

Also, kikuyu is susceptible to the oomycete fungus *Verrucalvus flavofaciens* commonly known as 'Kikuyu Yellows'. Kikuyu Yellows occurs in Australia only through late spring to early autumn, normally after periods of rainfall.

Infected plants exhibit a yellowing of the leaf which gives way to death, creating bare patches within the kikuyu stand which then may host infestation of other weed species. Little is still known about this oomycete, and there are no fungicides at present available on the market for its control.

There are currently four registered varieties of kikuyu grass. 'Whittet', registered in 1970, is the most common form available due to its high seeding tendencies and is commercially grown for seed at Quirindi, NSW. 'Breakwell' is a natural selection from northern NSW registered in 1971.

'Crofts' is a natural selection with a preference for cooler weather collected at Camden and registered in 1983, while 'Noonan', derived from open pollinated 'Whittet' and 'Breakwell', has been found to be resistant of Kikuyu Yellows over a 10-year period by Dr. Percy Wong and was registered in 1983. Due though to its inconsistent seeding performance, little to no 'Noonan' is grown in Australia today, with no 'Breakwell' or 'Crofts' grown at all commercially.

Worldwide, there is a wide range of suspected and confirmed kikuyu varieties, some of which have been logged and registered, including 25 selections in the United States where it is also classed in several states as a noxious weed.

Apart from efforts to produce a seeding strain in Australia during the 1940s and 1950s, very little to no work has been carried out in traditional breeding programmes in an effort to produce fine-leaf turf varieties, with most effort focused on producing higher digestibility types for pasture usage.

Part of the lack of breeding programmes can be attributed to the plasticity of kikuyu and the ability of the 'common' type kikuyu to perform as well as, or better than, the cultivars on the market at present.

It is expected, however, that with the wide range of locales in which kikuyu has been planted, a large amount of natural variation should exist within the naturalised populations as they adapt to their individual environmental conditions and surrounds.

Environments are not just restricted to temperature and rainfall, but also importantly include the biotic and abiotic stresses which are imposed on the plant species growing within them.

INITIAL COLLECTIONS

An initial 75 selections were collected from the kikuyu turf farm of Geoff Hatton in Cobbitty, NSW, from a field that was left uncut and unwatered throughout autumn and winter of 2004. The germplasm collection was expanded following a collection trip throughout NSW over the following months. Populations were observed growing in a wide range of varying environments.

Collections were made from further high salt environments, shade, traffic, low nutrient, drought-affected areas and sand dunes to name several. As expected, a wide range of morphological differences were observed such as dwarf forms. As a preliminary step before hybridisation work started, all forms were returned to a standardised growing environment where individual characteristics were observed to ensure they weren't a plastic response to their environment. ▶

BREEDING

Following collection and confirmation of genotypic differences, hybridisation started using three Kikuyu Yellows-resistant cultivars which were growing at the Plant Breeders Institute as pollen parents. Kikuyu flowers best around spring, so fresh pollen was collected on a daily basis before transferal to the receptive stigmas.

From over 1000 targeted hand crosses, 350 hybrid seeds were produced from male sterile female parents. Each stigma was then individually bagged to prevent the chance arrival of outside pollen contaminating the hand crossed stigma. Seed in kikuyu takes four to five weeks to develop.

Following an after-ripening period, the hybrid seeds were sown on individual gel slopes in a controlled micro-climate to observe germination patterns. Kikuyu germination, under favourable conditions, is rapid with the emergence of the radicle usually evident after three days followed by the primary shoot one day later. After transfer to pots, the hybrid lines are then screened and scored for a range of attributes, from general heterosis to internode length, leaf width and so on.

Unlike the *Cynodon* genus which is mainly composed of species with a low, creeping growth habit (eg. *C. dactylon, C. transvaalensis*), kikuyu is the only species within the *Pennisetum* genus which exhibits this behaviour. Other *Pennisetum* species such as Pearl Millet (*P. glaucum*) and Swamp Foxtail (*P. alopecuroides*), have a tall clumping habit, thus hybridisation amongst the genus is not practicable.

Further, kikuyu exists only as a tetraploid (2n=36) so while traditional hybridisation techniques may not result in hybrids which fall along the classical Mendelian inheritance, it is useful in the transfer of desirable dominant genes from elite germplasm.

From the original F_1 lines, the plants were clonally propagated to multiply and increase stock and to also observe any changes in flowering patterns. Kikuyu exists both as fully fertile and male sterile forms. Male sterile kikuyu can be identified by the absence of filaments and stamens protruding above the canopy, with only a feathery stigma being produced.

Up until the early 1930s, stigmas only were supposed to have been observed on kikuyu in Australia, leading researchers to suggest that the original introduction from Africa into Australia was male sterile. The fully fertile type exhibits long slender filaments measuring up to 40mm on which stamens are projected above the canopy. This ensures an individual stamen is able, upon dehiscence, to release approximately 2500 pollen grains within its immediate area, dependent on wind strength.

In early 2007, elite lines of the F_1 hybrids were selected for further analysis. A total of 14 lines were planted in 25m^2 field plots to assess their turf performance. Some of these lines will now be sent around Australia towards the end of 2007 for field assessment at the turf farms of the members who comprise Penngrass Research. The 14 lines, which are also grown against 'Whittet' and a common form to assess differences, are also currently being screened for their resistance to Kikuyu Yellows.

A number of promising selections have been discovered exhibiting features suitable for golf course fairways and teeing grounds (bottom left) right through to aggressive forms suitable for pasture production and even race track surfaces (top right)

VARIATION

While the breeding programme was being undertaken, a number of other studies were being carried out in relation to the variation experienced within kikuyu. Original selections from Queensland, NSW, Victoria, Tasmania, South Australia and the ACT were established in replicated plots to assess ecotypic differences.

A total of 16 selections representing a wide range of environmental differences within the States started as a 2-inch plug and were allowed to grow out. Measurements including runner length, foliage height, internode width and length, stolon width, leaf width and coverage, were undertaken on a weekly basis over the course of 16 weeks. It is not until kikuyu is allowed to grow out naturally that genotypic variations can be fully expressed and observed.

A number of promising selections have been discovered exhibiting features suitable for golf course fairways and teeing grounds right through to aggressive forms suitable for pasture production and even race track surfaces.

As Stebbins (1950) writes, "The variation seen between the individuals of any population is based on three factors: environmental modification, genetic recombination, and mutation." Natural variation among couchgrass has resulted in many leading forms utilised today including mutations such as Tifdwarf, Wintergreen and Greenlees Park.

Genetic recombination will occur through hybridisation, or if a new stand of kikuyu is introduced into an area of an existing population. This has been quite common with kikuyu across NSW during the transfer of grazing cattle from block to block, or between properties with the grass commonly found germinating in dung.

The seed for kikuyu grass is held tightly within the base of the floret near the ground surface, under the foliage, and is not released if simple management programmes such as cutting are undertaken. Renovation techniques, or any form of disturbance, will

result in the seed bank being disturbed and the seed released into the growing environment.

In his Masters thesis, Parker (1999) found that a 10-year-old stand of kikuyu which had been mown but not renovated contained between 25,000-27,000 seeds per square metre to a depth of 3cm. Thus, simple renovation techniques such as scarifying, or re-turfing areas with kikuyu from an outside source, continually aids in the process of gene flow once the seed bank is disturbed, allowing the seed to be released, germinate, mature and flower.

DNA ANALYSIS

To examine the differences within the natural selections of kikuyu within the germplasm collection, a DNA analysis was undertaken. As with a lot of the current study into kikuyu, very little prior work had been carried out and the DNA analysis was no exception.

As such, we chose a method known as RAPD analysis (Random Amplified Polymorphic DNA). It does not require any prior sequence information resulting in it being a method of choice for investigations of genetic variability and estimations of genetic relatedness between plant species. RAPD fingerprinting has been successfully utilised to distinguish genetic diversity among a range of turfgrasses including perennial ryegrass, buffalograss, Kentucky bluegrass and couchgrass.

The DNA analysis (currently in publication) showed that there are three main groupings of kikuyu grass existing in Australia, and is also the first study of its kind worldwide using the RAPD process on kikuyu.

In the study carried out, cultivars 'Noonan' and 'Breakwell' were the closest related at 82.4 per cent, with the least similar being cultivar 'Whittet' and one of our potential pasture selections at 29.2 per cent. The high levels of polymorphism detected by RAPD marking shows that it is an effective method for identifying significant genetic variation. The analysis also provided insights into the spread of kikuyu around Australia when coupled with importation documents.

OTHER STUDIES

While the major studies have been listed, a number of other studies have been undertaken throughout the term of research. These have included cytology, pollen behaviour and storage, pathology, seed germination, importation and spread.

Future work will continue on resistance to Kikuyu Yellows, targeted mutagensis and tolerance of a wide range of environmental stresses. Utilising the dominant attributes of this agriculturally important species will hopefully result in improved turf forms in years to come which will require little input from the manager.

ACKNOWLEDGEMENTS

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REFERENCES

Parker, S. 1999. *'Pre-Emergent Control of Pennisetum clandestinum in Cynodon dactylon cultivars'. Masters Thesis University of Sydney..*

Stebbins, G.L. 1950. *'Variation and Evolution in Plants'. Columbia University Press. New York.*

New Mexico State University researchers found that the efficacy of wetting agents varied over depth and was most pronounced at depths of 2.5cm or less

Water repellency in sandy rootzones treated with wetting agents

US researchers have conducted a two-year project to examine the effect 10 different wetting agents have on sand-based rootzone hydrophobicity and putting green turf appearance.

Water repellency, or hydrophobicity, is a widely reported phenomenon in agricultural and turfgrass soils (7). Severe hydrophobicity can reduce water percolation and infiltration to such an extent that even extremely long periods of irrigation are unsuccessful in wetting the soil.

The soil properties associated with water repellency have major consequences on soil water retention, plant growth, and ultimately turfgrass appearance. Inhibited turf growth, increased run-off, uneven wetting patterns, preferential flow, and accelerated leaching of applied fertilisers and chemicals are all a result of hydrophobic soil conditions (17).

Soil repellency can be attributed to hydrophobic compounds present either in the soil as interstitial matter or on soil mineral or aggregate surfaces (9, 10, 26). The hydrophobic organic compounds are released from roots (6, 8), fungal or microbial by-products (13, 24), or can be produced directly by decomposing organic matter (20).

Localised dry spot (LDS), a major problem in turf areas, is a condition characterised by irregular areas of stressed turf and results from hydrophobic conditions present in turfgrass rootzones. The sandy nature of turfgrass rootzones like golf greens and tees further promotes the occurrence of LDS, as susceptibility to water repellency development is particularly pronounced in coarse textured soils (9).

LDS causes turfgrass quality deterioration and increased irrigation water use as turfgrass managers react to drought-stressed turf by increasing irrigation volume and application frequency.

Surfactants, wetting agents, or (soil) penetrants are terms used to describe surface-active materials that lower interfacial tension between a hydrophilic and a hydrophobic phase. Surfactants can aid in combating LDS by re-wetting the rootzone through increased moisture retention (2, 19, 21), which results in improved turf vigour and quality (4, 23).

The application of surfactants, particularly non-ionic block copolymer surfactants, has been the traditional tool to manage the LDS phenomenon in soils (17). Approximately 80 per cent of all golf course superintendents in the United States use wetting agents as part of regular maintenance programmes (12, 14).

Numerous products are currently used by turf managers throughout the US, despite the lack of research results from multi-year studies on the efficacy of surfactants to mitigate water repellency and LDS.

Results from studies that examined efficacy of soil surfactants have been inconsistent. Whereas some studies suggested wetting agents reduced both LDS and water repellency (4), others found that surfactants decreased repellency but not localised dry spots (3). Karnok and Tucker (15, 16) also showed a decrease in water repellency after wetting agents were applied but did not test for localised dry spots. Bigelow et al. (1) and Park (23) reported a decrease in localised dry spots after the application of wetting agents, but no reduction in soil water repellency.

All the aforementioned studies were conducted on golf greens with a sandy rootzone in a wide range of climatic conditions. Both Carey and Gunn (3) and Bigelow et al. (1) suspected wet and cool weather conditions were confounding factors influencing the outcome of the study. Furthermore, all of these studies were carried out as single-year experiments.

We conducted a two-year study at New

Mexico State University to investigate the effects of wetting agents on soil hydrophobicity and colour and quality of turf grown in a sandy rootzone in an arid climate. The objective of the research was to determine if repeated applications of soil surfactants could prevent soil water repellency and improve turfgrass quality.

The study was part of a nation-wide trial funded by the United States Golf Association and Golf Course Superintendents Association of America in which similar studies were conducted concurrently at several other universities across the country (25).

Localised dry spot causes turfgrass quality deterioration and increased irrigation water use as turfgrass managers react to drought-stressed turf by increasing irrigation volume and application frequency

PROJECT SITE AND MAINTENANCE

The study was conducted during the summer months of 2003 and 2004 at New Mexico State University's golf course in Las Cruces. Ten wetting agents commonly used in turfgrass management were applied to 1m×3m plots on a practice putting green. Each treatment was replicated four times.

The green was built in 1992 according to California specifications with a 300mm deep straight sand rootzone layer. The rootzone consisted of 96.3 per cent sand (6.9 per cent very coarse, 21.7 per cent coarse, 44.6 per cent medium, 17.6 per cent fine, and 5.5 per cent very fine), 1.4 per cent silt, and 1.25 per cent clay and had less than 1 per cent organic matter accumulation when averaged over the 30cm depth.

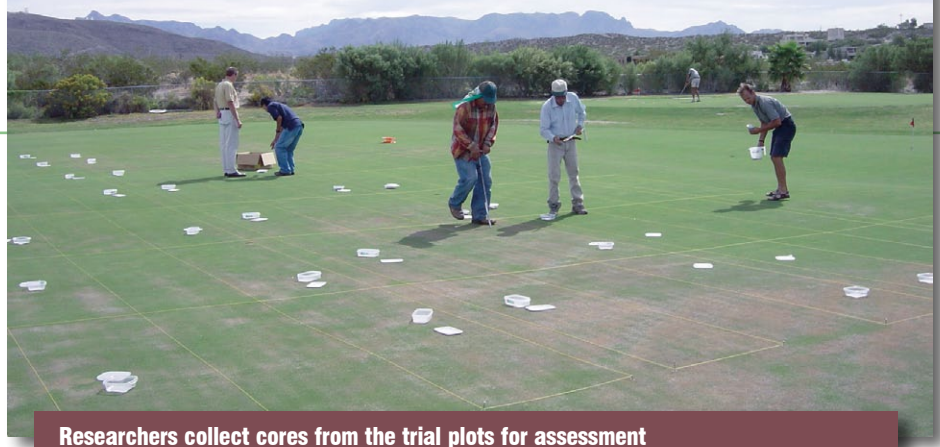
Turf cover on the green consisted of creeping bentgrass (Penncross) which was mowed daily at a height of 2.8mm. During both years the green was fertilised with N at 30.5g/m^2, P_2O_5 at 13g/m^2, and K_2O at 49.9g/m^2 and was irrigated every other day at 80 per cent potential evapotranspiration (pET).

WETTING AGENTS TESTED AND STUDIED EFFECTS

The wetting agents – Aqueduct, Brilliance, Cascade Plus, HydroWet, LescoFlo, Naiad, Primer Select, Respond 2, Surfside 37 and Tri-Cure – were applied according to label directions (Table 1). Untreated (control) plots received only water. All treatments were watered-in by hand immediately after application with the exception of Aqueduct, which was watered-in the following morning before mowing.

First treatments in 2003 and 2004 were applied on 27 June and 17 May respectively. Accumulated pET for 27 June to 21 August 2003 was 540mm and 510mm for 17 May to 11 July, 2004. No precipitation occurred during these periods.

Turfgrass colour and quality ratings were taken every two weeks at seven, 21, 35, 49, and 63 days after the first treatment (DAT). Colour ratings were taken on a scale from 1 to 9 with 1 = brown, 5 = medium green and 9 = dark green. Turfgrass quality was also assessed visually every two weeks on a 1 to 9 ▶



Researchers collect cores from the trial plots for assessment

scale where 1 = dead turf and 9 = dark green, uniform turf.

The water droplet penetration test (WDP) was used to measure rootzone hydrophobicity. Four cores, 6cm long and 2cm in diameter, were taken from each plot, air-dried for two weeks and tested for water repellency. The WDP was performed by placing a 36-microlitre droplet of deionized water on the cores at depths of 0.5, 1.5, 2.5, 3.5, 4.5, and 5.5cm (measured from the turf canopy of the core downwards), and recording the time in seconds for the droplet to infiltrate the surface. Any water droplet remaining after 600 seconds was recorded as 600 seconds.

Rootzone hydrophobicity was determined prior to the first treatment application, referred to as zero days after first treatment (0 DAT) and at 14, 28, and 56 DAT (days after the first application) of the wetting agent in both years of the study.

TURFGRASS COLOUR AND QUALITY

Analysis of turfgrass colour and quality revealed wetting agent by year interactions but no significant three-way interaction between wetting agent, year, and DAT. Therefore, treatment means for quality and colour were pooled over DAT and are presented separately for each year (Table 2).

In 2003, plots treated with Brilliance, Cascade Plus, HydroWet, LescoFlo, and Primer Select rated higher for turfgrass quality than the untreated plot. Aqueduct, HydroWet, LescoFlo, Primer Select and Tri-Cure rated higher for turfgrass colour than the untreated plots in 2003 (Table 2). Naiad-treated plots ranked lower than the untreated plots in 2003 for quality and colour. These findings agree with those of Frank and Bryan (11), who also reported lower quality ratings on Naiad-treated plots when compared to other treatments.

With the exception of Naiad, all treated plots had ratings of greater than 6 (the minimum acceptable colour and quality). Therefore, these wetting agents appeared to have no negative impact on greens when applied at label rate.

In 2004, none of the treated plots differed in colour and quality from the untreated plots and turfgrass colour and quality increased from 2003 to 2004. Heavy rains in March of 2004 totaling 84mm compared to the 30-year average of 5mm (22) are most likely the cause of reduced rootzone hydrophobicity and subsequent increase in turfgrass colour and quality compared to 2003.

REPELLENCY AFFECTED BY WETTING AGENT TREATMENTS AT DIFFERENT DEPTHS

There was no interaction between wetting agent, depth, and DAT, or between wetting agent, year of treatment, and depth. Therefore water droplet penetration time were pooled over DAT and year and presented as treatment means for each depth (Fig. 1).

Contrary to other studies (3) in which repellency declined progressively with rootzone depth, plots in this study had a tendency for greater water repellency at a depth of 1.5cm than at more shallow depths. Only in untreated plots and plots treated with Respond 2 was water droplet penetration time greater at a depth of 0.5cm than at 1.5cm (Fig. 1).

At a soil depth of 0.5cm all products with the exception of Naiad and Respond 2 exhibited lower water droplet penetration time than in the untreated plots. At a depth of 1.5cm, Aqueduct, Brilliance, and LescoFlo reduced water repellency, while Naiad-treated plots showed greater water droplet penetration time compared to the untreated plots.

At 2.5cm rootzone depths, Aqueduct and LescoFlo-treated plots exhibited less repellency compared to the untreated plots, while Naiad-treated plots showed greater droplet penetration time when compared to the untreated plots.

At a depth of 3.5cm, repellency in Naiad-treated plots did not differ from the untreated plots, but was greater than all other wetting agents included in the study. None of the tested wetting agents had an impact on water repellency at depths of 4.5 and 5.5cm.

Plots treated with Aqueduct and LescoFlo consistently showed lower water repellency at rootzone depths of 0.5, 1.5, and 2.5cm compared to the untreated plots. For all other wetting agents, watering every other day at 80 per cent pET without additional rainfall may not be adequate to move the surfactants through the profile to greater depths.

Naiad-treated plots had greatest water droplet penetration time at depths of 0.5, 1.5, 2.5 and 3.5cm. Most wetting agents included in this study reduced water repellency at 0.5cm depths. However, only Aqueduct and LescoFlo percolated to greater depths and reduced hydrophobicity.

Table 1. Application rates (liters), spray volumes (liters per 1000 m²) and application frequency (DAT) for products included in the study.

Wetting Agent	Application rate (litre)	Spray volume (l/1000 m²)	Application frequency (DAT)
Aqueduct	0.24	40.7	0, 7, 28, and 56
Brilliance	0.24	81.5	0 and 10
Cascade Plus	0.24	81.5	0 and 10
HydroWet	0.24	407.5	0 and 14
	0.06	203.7	28, 42, and 56
LescoFlo	0.24	407.5	0, 14, 28, 42, and 56
Naiad	0.24	407.5	0 and 14
	0.17	407.5	42
Primer Select	0.17	81.5	0, 28, and 56
Respond 2	0.30	326.0	0 and 56
Surfside 37	0.94	407.5	0
	0.12	407.5	14, 28, 42, and 56
Tri-Cure	0.17	81.5	0, 28, and 56

EFFICACY OF WETTING AGENTS OVER TIME

Statistical analyses revealed a significant interaction between wetting agents, DAT, and year, but no four-way interaction between wetting agent, DAT, depth and year. Therefore, water droplet penetration times were pooled over sampling depths and presented separately for DAT and year (Fig. 2).

At the beginning of the study in 2003 (0 DAT), soil water repellency in Naiad and Primer Select-treated plots was greater compared to all other plots.

After 14 days, Brilliance-treated plots showed lower water droplet penetration time compared to the untreated plots.

Rootzones in both Naiad and Respond 2-treated plots exhibited greater water repellency than in untreated plots (Fig. 2). Twenty-eight DAT, Aqueduct, HydroWet, LescoFlo, Primer Select and Tri-Cure reduced repellency compared to the untreated and Naiad-treated plots exhibited again greater repellency than the untreated plots (Fig. 2).

Despite similar weather conditions during the research periods in 2003 and 2004, overall water repellency in the rootzone at 0, 14, and 28 DAT was lower in 2004 (Fig. 3) than in 2003 (Fig. 2).

Relatively high soil moisture during spring of 2004 caused by an unusual wet March may have prevented the onset of more severe rootzone hydrophobicity in early to mid-summer, particularly in the untreated plots. With the exception of Naiad and Primer Select, all tested wetting agents reduced repellency in plots compared to the untreated plots 14 DAT in 2004 (Fig. 2).

Table 2. Visual turfgrass quality and colour ratings for 2003 and 2004. Data were pooled over 5 sampling dates in each year. Ratings were taken on a scale from 1 to 9 with 1 = worst, 9 = best and 6 = minimum acceptable colour/quality.

	Turfgrass quality		Turfgrass colour	
Wetting Agent	**2003**	**2004**	**2003**	**2004**
Aqueduct	6.4 bcBx	7.7 A	6.4 bcdB	7.7 A
Brilliance	6.8 ab	7.6	6.8 abcdB	7.7 A
Cascade Plus	6.6 abB	7.4 A	6.6 abcdB	7.4 A
Control	6.2 cB	7.9 A	6.2 dB	7.9 A
HydroWet	7.1 ab	7.6	7.1 abc	7.6
LescoFlo	7.3 a	7.8	7.3 a	7.9
Naiad	5.2 dB	7.3 A	5.2 eB	7.4 A
Primer Select	7.3 a	7.9	7.3 a	7.8
Respond 2	6.3 cB	7.6 A	6.3 cdB	7.8 A
Surfside 37	6.4 bcB	7.8 A	6.4 bcdB	7.8 A
Tri-Cure	7.2 abc	7.8	7.2 abB	7.9 A

x Values followed by the same letter are not significantly different from one another (Fisher's protected LSD, a = 0.05). Lower case letters denote differences between wetting agents (in columns). Upper case letters denote differences between years for each wetting agent (in rows).

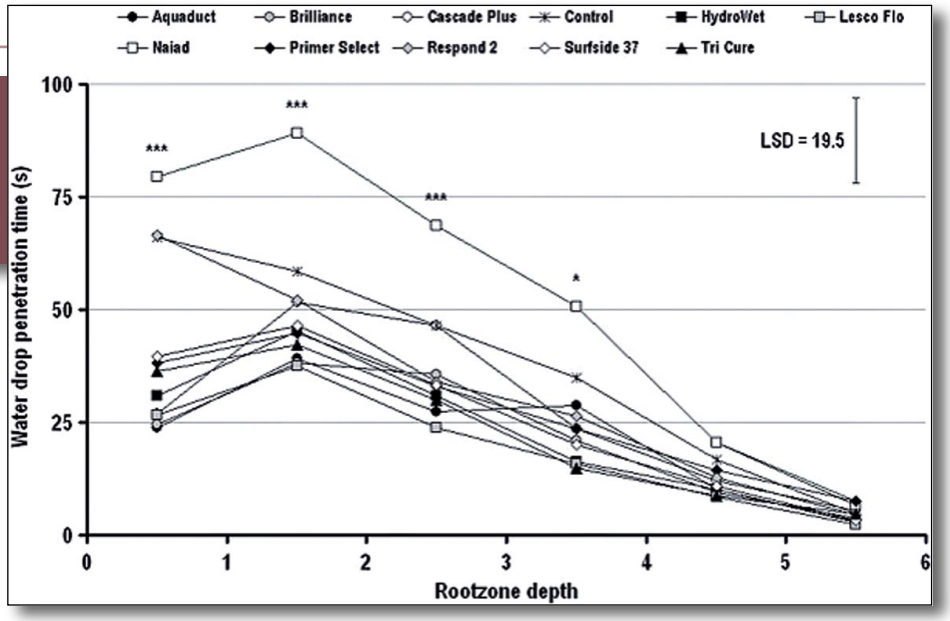


Figure 1. Water repellency expressed as water droplet penetration time (s) in rootzone depths of 0.5, 1.5, 2.5, 3.5, 4.5, and 5.5cm for wetting agents treatments.

CONCLUSION

Most wetting agents included in this two-year study alleviated hydrophobicity in a sandy turfgrass rootzone at depths of 0.5cm and 1.5cm. Also, water repellency in the rootzone had a direct impact on turfgrass quality. Plots with highest rootzone hydrophobicity exhibited lower stand quality.

Despite similar weather conditions during the course of the two-year study, results for hydrophobicity, turfgrass quality, and colour differed from one year to the next. Unusually wet weather conditions before the start of the second-year study prevented the development of more severe hydrophobic rootzone conditions and may explain the differences observed from one year to the next.

This study underscores the value of longer-term trials by demonstrating that results can vary substantially from year to year, depending on weather conditions. Multiple-year studies which consider annual variations in weather conditions may be more useful in assessing the overall performance of individual wetting agents.

ACKNOWLEDGMENTS

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ATM thanks USGATERO and the authors for allowing publication of this research (USGATERO 6(6) 1-9). A full list of references can be obtained by contacting the AGCSA on (03) 9548 8600.

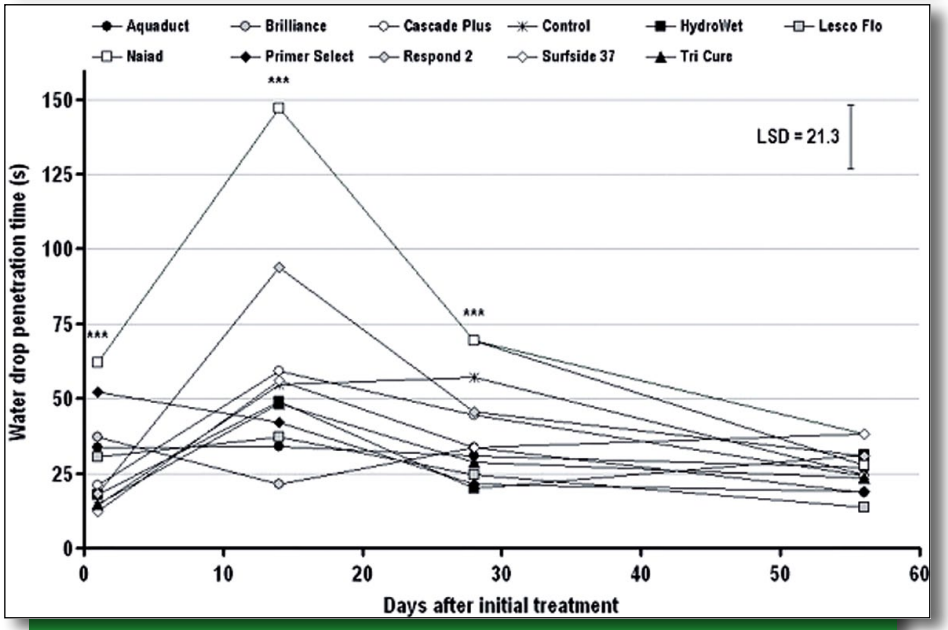

Figure 2. Water repellency expressed as water droplet penetration time (s) at 0, 14, 28, and 56 days after the first treatment in 2003. Data are pooled over all sampling depths.

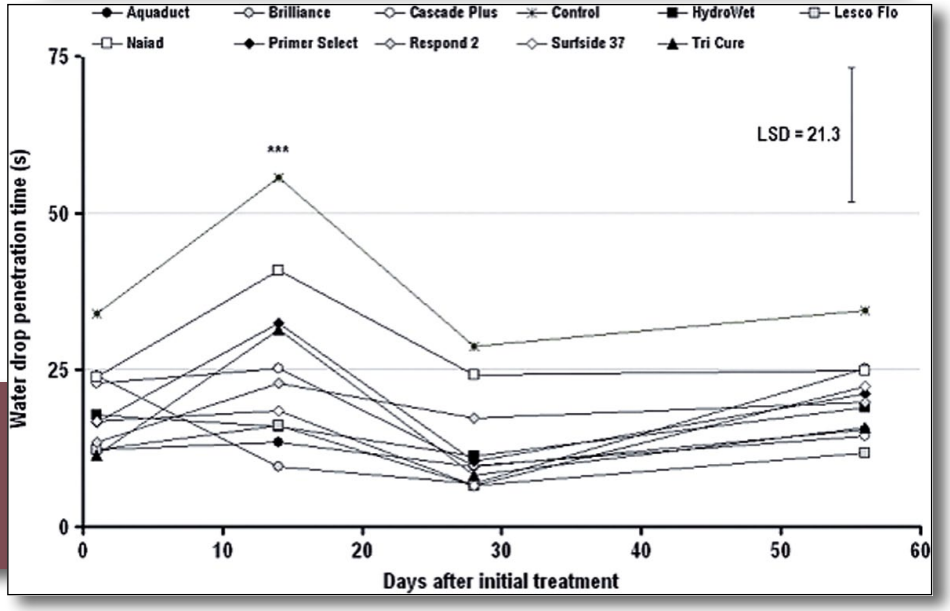

Figure 3. Water repellency expressed as water droplet penetration time (s) at 0, 14, 28, and 56 days after the first treatment in 2004. Data are pooled over all sampling depths.

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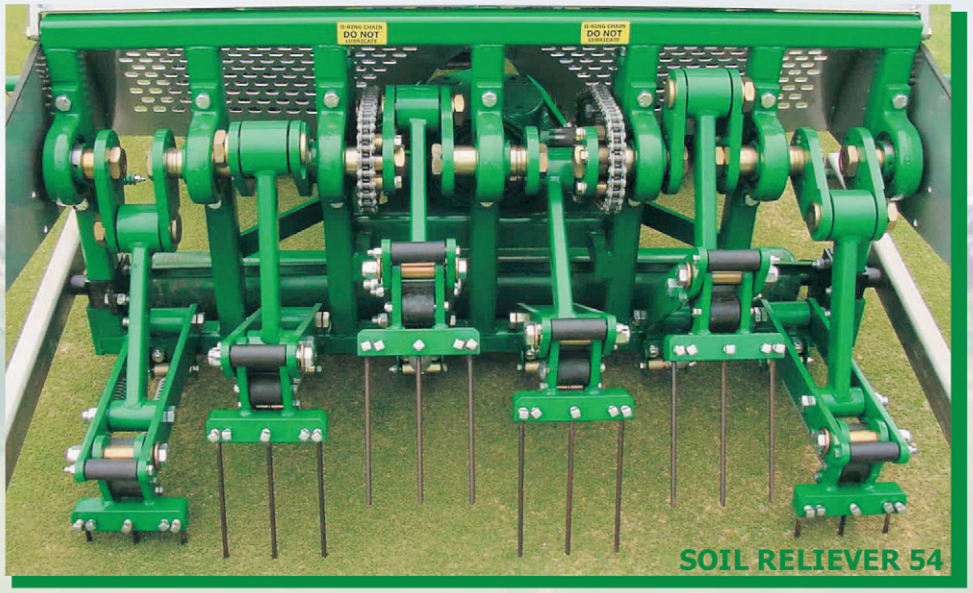

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CHANGE OF GUARD FOR STATE ASSOCIATIONS

Two of Australia's state superintendent associations have welcomed new presidents in recent months and another two are set to follow suit.

Victoria elected a new president at its AGM in May while South Australia was expected to officially appoint a new president at its AGM in mid-June. The Queensland association could also have a new face at the top with current president Rod Cook (The Grand Golf Club) looking at stepping aside at the AGM in August, while after four years as president and a total of nine years on the GCSAWA committee, Gosnells Golf Club superintendent Brad Sofield is set to hand over the baton in Western Australia.

At the VGCSA AGM at The National Golf Club, Huntingdale Golf Club superintendent Michael Freeman was voted in after fellow sandbelt superintendent Mark Prosser (Commonwealth Golf Club) stepped down after two years as president. Freeman's vice-president role under Prosser has been filled by Freeway Golf Club superintendent Glen Davie who formerly held the position of treasurer.

VGCSA president Michael Freeman

Across in South Australia, the SAGCSA has been reeling following the departure of president Peter Harfield as well as vice-president Daryl Sellar.

Sellar took over as acting president following Harfield's sudden resignation from Blackwood Golf Club in April, but due to his recent appointment as the AGCSA's new HR and best practice manager, scaled down his involvement with Glenelg Golf Club and is no longer full-time superintendent.

SAGCSA president Andy Blacker

That change of role, which now sees Sellar in more of a consultancy role with Glenelg, meant he had to step down from the SAGCSA committee which paved the way for Thaxted Park Golf Club superintendent Andy Blacker to take over as president of the SAGCSA.

YARRA SUPERINTENDENTS GO WITH THE FLOW

Superintendents of Melbourne's so-called Yarra-belt golf courses received some welcome news in April when Melbourne Water agreed to delay the implementation of harsher ban environmental flow trigger levels.

In March 2007, Melbourne Water announced a proposed increase in the ban environmental flow trigger for the Yarra River from 150ML/day to 220ML/day, measured at Yarra Glen and effective from 1 July, 2007.

The consequences of such a change would have brought into question the future viability of a number of golf courses along the Yarra River including The Heritage, Heidelberg, Yarra Bend, Kew, Greenacres, La Trobe, Yarra Valley, Rosanna, Freeway and Ivanhoe Public.

The resultant effect if the proposal had been implemented this past summer would have seen the diverters (golf courses) denied water for 85 of the possible 90 days, with obvious dire consequences.

Seeking feedback to the proposal, Melbourne Water asked for expressions of interest from the diverters and along with others Kew Golf Club (superintendent Adam Robertson) submitted a range of alternatives while at the same time advising Melbourne Water that the 220ML ban trigger level could irreparably damage those clubs in question.

A meeting was held between the golf clubs and Melbourne Water at Rosanna Golf Club on 12 April with the water authority accepting a number of the recommendations submitted by the clubs. Among the recommendations adopted were:

- The new ban trigger level for summer flow rates will be 200ML per day, instead of 220ML per day, and 350ML per day for winter flows. The previous 150ML level had no scientific basis.
- Implementation of the new trigger level will be no earlier than 1 July, 2008. It may be delayed even further, and not be introduced until urban restrictions are back to Level 1 (currently Level 3a).
- Flow rates, for determining the trigger level, will be measured at Chandler Highway, rather than upstream at Yarra Glen. Summer flows of 200ML per day are still required at Chandler Highway. (This allows golf clubs the very significant benefit of urban stormwater flows being included in flow rates).
- Daily flow rates will be used from 1 July, 2007 instead of rolling averages. Saturdays and Sundays are still to be automated on the Melbourne Water website.
- Proposals for harvesting of stormwater will be considered favourably and can be outside of current diverters' licences. Maybe available all year round. Criteria are still to be defined during storm events, which will be subject to separate metering and licensing.
- Environmental filling may be available for billabongs etc, but not if then used for irrigation. Special application will be required.
- Linking of urban town water and Yarra flow regimes will not occur. Separate requirements have been defined for each regime and will continue to operate independently. This was raised in the context of a ban on pumping from the Yarra but Level 3A restrictions on town water which enabled some courses to water greens etc with town water despite on bans from the Yarra.

QLD APPRENTICE FOILS POKIES HEIST

Gold Coast Burleigh Golf Club apprentice greenkeeper Jason McClear could be in line for a pay rise after unwittingly foiling a robbery at the club in April.

McClear, who has been at the Queensland club for the past three years under AGCSA president and superintendent Jeff Gambin, was leaving the maintenance facility late one evening after finishing some night spraying when he noticed movement in the bushes as he was heading out the driveway.

Getting out of his car, McClear discovered two balaclava-clad persons crouched in the bushes, who upon seeing McClear immediately took off. Quickly heading to the clubhouse, McClear discovered that the club's night manager had just been held up by two robbers armed with a crowbar and that they had managed to get away with around $2000 in poker machine takings.

The following morning McClear returned to work and decided to check the location where he had disturbed the robbers. Much to his amazement he found a number of poker machine hoppers which the robbers had inadvertently left behind in their haste to get away after McClear had sprung them.

Jason McClear

It was estimated that the robbers left almost half of their heist which McClear was able to return to his grateful employer.

QUEENSLAND TOPS 2IC CHALLENGE

Queensland has upset defending champions Victoria to take out the second annual David Golf 2IC Challenge. The event, which brings together assistant superintendents for a State of Origin interstate final, was held at Thirteenth Beach Golf Club in mid-May with the northerners taking out the title for the first time.

The Queensland team, which comprised of Ben Baumann (The Glades), Kelvin Nicholson (Pacific Harbour), Kirk Heald (Victoria Park) and Stuart Robinson (Caboolture) finished tied with the Victorians on 113 stableford points, but a countback handed the title to the visitors. The home state was represented by Heath Crawford (Freeway), Adam Lamb (Metropolitan), Tony Gordon (St Andrews Beach and Steve Varty (Berwick-Montuna).

The NSW team of Scott Fogg (Gold Creek), Wayne Smith (Toukley), Matthew Robinson (Leura) and Gary Urquhart (Gold Creek) brought up the rear with 104 points.

Nicholson capped off the day by winning the individual prize after posting 40 points.

REUNION REKINDLES OLD FRIENDSHIPS

Sydney's Pennant Hills Golf Club was the setting for a unique reunion in May with 62 of the club's former and current groundstaff converging for a day of reminiscing and recollecting.

The reunion was the brainchild of Stuart Bow, who served as assistant superintendent at the club from 1985-1994, and Greg Ford who is now manager of NSW-based company PJC Sportsturf.

Organised by Bow, current day Pennant Hills superintendent Richard Kirkby and NSWGCSA committee member Scott Riley, the reunion included nine holes of golf followed by a BBQ dinner in the Pennant Hills clubhouse.

Pennant Hills was home to influential superintendent Vince Church who from 1951 to his retirement in 1977 set a benchmark for the greenkeeping profession in Australia. Unfortunately just a couple of months before the reunion, Church passed away at the age of 91. Church's unique character and innovative methods were remembered in speeches given by former Pennant Hills apprentices Martyn Black (superintendent, Castle Hill Country Club) and John Odell (superintendent, Royal Sydney Golf Club), while Bow and Bruce Carruthers also reminisced about the times when they worked at the club.

Former Pennant Hills employees Loch Ledford, Jack Jones and Martyn Black

Kirkby, who has been superintendent at the course for the past 13 years, also shed some light on what current day operations are like at the exclusive northern Sydney course and outlined the innovative project underway to install a sewer mining plant on the course (see page 70).

Special guest for the evening was retired course architect Al Howard who had a lot of involvement with the club in its early years, while former apprentice Laurie Cochrane travelled from New Zealand for the occasion.

The day also included a tour of the Pennant Hills 'Cottage' which over the years has housed a number of the club's more prominent groundstaff including Church, Black, Loch Ledford, Bob Batho, Mark Warwick (superintendent Muirfield Golf Club) and current day assistant superintendent Paul Gumbleton.

CONSTRUCTION STARTS ON PENNANT HILLS PLANT

Construction of the groundbreaking sewer mining plant at Pennant Hills Golf Club in Sydney's northern suburbs is underway with an expected commissioning date of early November.

While most work to date has involved the design and pre-fabrication of tanks and the plant offsite, an area of bushland on the right hand side of the 10th fairway was cleared in mid-June with construction due to start shortly after.

"Things are progressing very well and we are at the 100 metre mark of the 110 metre hurdles," says Pennant Hills general manager Stewart Fenton.

Earlier this year Pennant Hills signed a contract with Water Technology Australia to supply and commission a water reclamation plant using Zenon membranes. The quality of water produced will be equivalent to Queensland Class A standards and is the highest quality water available short of drinkable quality.

Zenon is recognised as a world leader in membrane technology. The membranes are comparable to thousands of pieces of spaghetti with millions of pores that the water flows down through to initiate a separation process.

"Zenon currently have 11 of the top 12 largest water recycling plants in the world so we are confident that we will be able to produce a consistent top quality product for use on the golf course," says Fenton.

"The plant will be able to produce approximately 650kl of water per day (limited only by the flow we have available to us through the sewer system) and will be capable of shutting down to about 15 per cent of its capacity during times when water is not needed.

"We will have 2.44ML of water stored in large onsite storage tanks for emergency back up use. We will also be connecting our bores, which are too saline for use now, to the plant as an additional water source should the need arise."

The major obstacles to date have been the range of regulatory hurdles the club has had to jump through as the first club in Australia to go down this path. This has included EIS and DA processes with council, permits required with the Department of Natural Resources, negotiating a sewer mining agreement and Sewer Discharge Agreement with Sydney Water and satisfaction of Department of Energy, Utilities and Sustainability (DEUS) guidelines relating to recycle water usage.

"The good news for those following is that much of the work has been done and most of the regulatory authorities now have pro forma policy documents as a result of our negotiations along the process," says Fenton.

"The water is perfectly safe for intermittent human contact and the plant and water will meet all of the specific objectives the club set out to achieve. That is, no odour, top quality water, no noise generation that will impact on golfers and a plant that visually fits in with the natural bushland environment evident at the club.

"Our members are very excited about the solution to our long-term water needs. We continue to get much interest from other golf clubs and other sporting organisations alike. We recently presented a case study at the OzWater conference in Sydney to several hundred delegates and presented at a Sydney Water conference in June."

Expected commissioning date of the plant is set down for 1 November, 2007.

INTERNATIONAL ACCOLADES FOR ATM MAGAZINE

Australian Turfgrass Management magazine continues to demonstrate its industry-leading status after it collected four awards at the recent 2nd TOCA International Communicators Contest.

After collecting four awards for writing and design at the inaugural awards in 2006, ATM bagged a further four awards at the 2007 awards which were presented in Savannah, Georgia, USA in early May. The awards were:

PHOTOGRAPHY

First Place: "Northern Golf Club 17th" by Brett Robinson

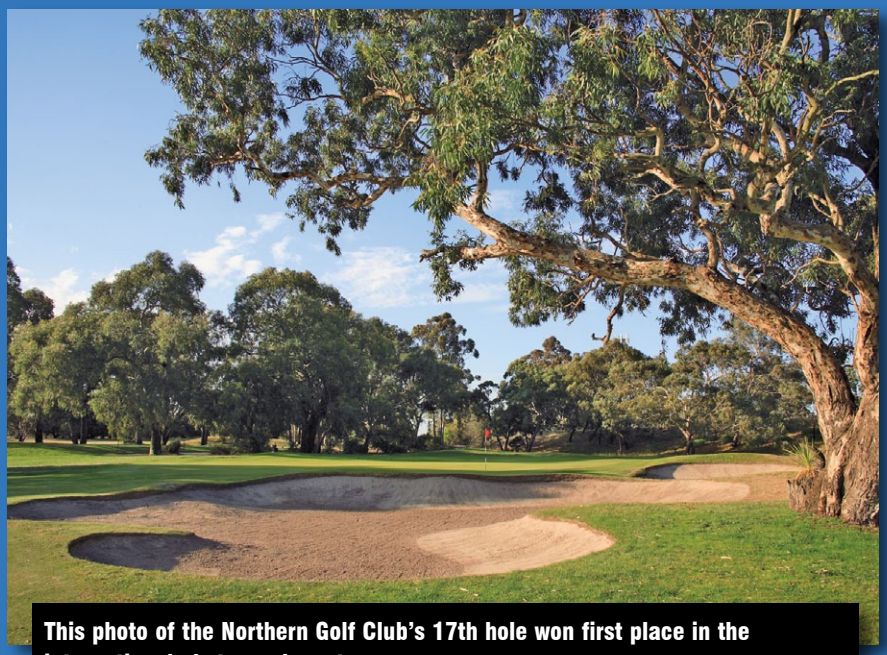
Merit: "Perfect Harmony" by Brett Robinson

DESIGN

First Place: "The Monster Bites" (ATM Vol 8.1) by Jo Corne

WRITING

Merit: "The Return to Royal Sydney" (ATM Vol 8.5) by Brett Robinson



This photo of the Northern Golf Club's 17th hole won first place in the international photography category

TOCA (Turf and Ornamental Communicators Association) is a US-based association composed of editors, writers, publishers, photographers, public relations/advertising practitioners, industry association leaders and others involved in green industry communications.

The International Communicators Contest attracted entries from horticulture industry publications from around the world including Canada, the UK and Europe. In 2006 ATM won two first place and two merit awards in both writing and design.

CHANGE OF GUARD FOR STATE ASSOCIATIONS

Two of Australia's state superintendent associations have welcomed new presidents in recent months and another two are set to follow suit.

Victoria elected a new president at its AGM in May while South Australia was expected to officially appoint a new president at its AGM in mid-June. The Queensland association could also have a new face at the top with current president Rod Cook (The Grand Golf Club) looking at stepping aside at the AGM in August, while after four years as president and a total of nine years on the GCSAWA committee, Gosnells Golf Club superintendent Brad Sofield is set to hand over the baton in Western Australia.

At the VGCSA AGM at The National Golf Club, Huntingdale Golf Club superintendent Michael Freeman was voted in after fellow sandbelt superintendent Mark Prosser (Commonwealth Golf Club) stepped down after two years as president. Freeman's vice-president role under Prosser has been filled by Freeway Golf Club superintendent Glen Davie who formerly held the position of treasurer.

VGCSA president Michael Freeman

Across in South Australia, the SAGCSA has been reeling following the departure of president Peter Harfield as well as vice-president Daryl Sellar.

Sellar took over as acting president following Harfield's sudden resignation from

SAGCSA president Andy Blacker

Blackwood Golf Club in April, but due to his recent appointment as the AGCSA's new HR and best practice manager, scaled down his involvement with Glenelg Golf Club and is no longer full-time superintendent.

That change of role, which now sees Sellar in more of a consultancy role with Glenelg, meant he had to step down from the SAGCSA committee which paved the way for Thaxted Park Golf Club superintendent Andy Blacker to take over as president of the SAGCSA.

JOHN DEERE EXPANDS ITS TURF MAINTENANCE ARSENAL

The new John Deere 2500B ride-on greens mower

John Deere has added a number of new mowing and maintenance products to its line of golf course equipment for 2007.

The 2653B trim and surrounds mower has a new traction system that provides flow equally to each wheel motor, reducing slippage and improving hill climbing, while maintaining cut quality.

The redesigned operator station provides easier access to operator controls, better access on and off the machine, and four additional inches of leg room. The one-piece hood design, with full access to the engine when open, offers convenient access for daily maintenance and makes on-board diagnosis easy.

The 2500B ride-on greens mower comes equipped with either a gas engine that meets 2008 CARB and EPA emissions standards, or a diesel engine that meets EPA Tier 2, Interim Tier 4 and Tier 4 standards. The mower features 22-inch cutting units that come with 11-blade reels, 3mm standard bedknives and a smooth or grooved front roller.

The 2500E hybrid ride-on greens mower has electric reel motors with 102 fewer potential hydraulic leak points, reduced sound levels and increased fuel efficiency. Like the 2500B it comes standard with a two-post SAE J21294 roll over protection structure with seatbelts that meet pending ISO 21299 standards.

The C-Series walk-behind greens mower line features 18-inch, 22-inch and 26-inch cutting widths and a dual-traction drive with improved rear drum and drive system that provides straighter tracking on greens. Bedknife-to-reel adjustment knobs make for easier precision adjustments and all models come equipped with a standard operator-presence system that meets ANSI B71.4-2004 requirements. They also feature an optional gear-driven Greens Tender conditioner that counter-rotates to stand up the grass prior to cutting.

The ProGator 2020A gas and 2030A diesel heavy-duty utility vehicles are also now available. Their five-speed synchromesh transmission allows operators to not only change gears on the go, but also start the vehicle in any gear.

The A Series ProGator features a manual engage 4WD system and a new auxiliary hydraulic pump configuration for more power. There are no grease points on 2WD machines, and only three grease points on 4WD machines, saving maintenance time.

John Deere has also extended its line of utility vehicles with the introduction of the Gator XUV 4x4.

"The utility vehicle market has been growing over the past few years," says John Deere divisional sales manager Kel Davison. "We've been participating in this growth with our Gator High-Performance Series (HPX) models, and the XUV is an extension of our line that provides even more benefits that buyers are looking for."

The XUV features a True 4WD system with an on-demand locking front differential that provides greater operator control. This system allows the operator to select 1, 2, 3, or 4-wheel drive operation, to optimise for turf friendliness or for rugged terrain, and everything in between.

The XUV features a new advanced suspension system that provides customers with a high-quality, comfortable ride, even when tackling rugged terrain. The suspension has also been optimised to handle everything from light or no-load operations to maximum cargo capacity (453 kilograms for the cargo box, 635 kilograms total payload capacity).

For more information about the new range of John Deere equipment, visit your local John Deere dealer, freecall 1800 800 981 in Australia or 0800 303 100 in New Zealand, or visit www.deere.com.au

The John Deere 2653B trim and surrounds mower has a new traction system that provides flow equally to each wheel motor

SIERRAFORM GT TEES OFF

New slow-release potassium fertiliser Sierraform GT has hit the market with Scotts Australia launching it across the industry with a series of golf days in May.

Sierraform provides optimum protection against stresses (i.e. cold, heat, drought and wear) and has a proven increased efficiency of turf water consumption. It helps maintain a higher bank of available K in the sand/soil profile and maintains equilibrium of magnesium and calcium uptake.

The dual effect of slow release nitrogen and slow-release potassium is that it is released throughout the effective period, whenever the grass plant needs it. Leaf analysis has shown a significant difference between Sierraform GT and fertilisers that do not contain slow-release potassium. The result is a stronger grass plant that is more resistant to cold, heat, drought and intensive wear all year round.

For more information about Sierraform GT visit www.scottsasiapacific.com

Sierraform® GT

TRIAL HOPES TO DRUM UP NEW BUSINESS

Since 1999 the drumMUSTER programme along with the advent of the ChemClear programme in 2004, has provided a solution to the problem of used chemical containers and unwanted chemicals.

In a bid to improve its support to superintendents and turf managers, drumMUSTER has seen the need to improve access to facilities for disposal of unwanted (eligible) chemical drums.

With the support of waste disposal company Chemsal, specialised skips have been manufactured and have been placed on a trial basis at locations throughout metropolitan Melbourne and Sydney, giving greater accessibility for ease of disposal.

Chemical users are increasingly required to abide by strict regulations covering occupational health and safety, control of use of chemicals and new label requirements. This means that any breaches of those regulations can have a serious impact on the turf management industry.

Correct disposal by recycling through drumMUSTER removes the threat of expensive and strict legislation which may be imminent if recycling is overlooked by turf industry managers. Disposal of unclean chemical containers in all states is illegal and this practice can potentially incur large fines or criminal convictions.

ChemClear collections are planned when a threshold quantity of chemicals have been registered with the programme. Users are asked to simply take an inventory of any unwanted chemical products, including the manufacturer's name, product name, container size and approximate quantity remaining and contact the ChemClear freecall 1800 008 182 or register online at www.chemclear.com.au

SCULLION JOINS E-PAR TEAM

Highly respected golf course superintendent Dean Scullion has joined Terry Muir at e-par.

Scullion, superintendent at the award-winning Kooindah Waters Golf Club on the Central Coast of NSW, was appointed e-par area manager for Queensland and northern NSW in May and has been charged with establishing, coordinating and supporting the company's environmental, OH&S, training and technical services.

ON TRACK WITH TORO

Mini diggers have become increasingly popular in recent times due to their ability to access small enclosed work sites and perform numerous tasks from earthworks, trenching, loading and lifting work which eliminates the need for manual labour as well as saving time and money.

While Toro has been involved in the mini digger market in the US, it is only recently that it has launched its range of diggers – the Traxmaster – onto the Australian market.

Rather than normal pneumatic tyres, Traxmaster is equipped with reinforced Kevlar bevel edged tracks and features zero radius turning for maximum access to tight worksites. Designed specially for the Traxmaster, the track's weight dispersion system exerts minimal ground pressure which is ideal when working on turf areas. As well as its light footprint, the unit also has a host of inbuilt safety features which help protect the operator in the event of a mishap.

Traxmaster is currently available in four sizes – the TX413 which is powered by a 13hp Honda petrol engine and has 150mm wide tracks, the TX 420 which has a 20hp Kohler petrol engine, and the TX425 which boasts a 25hp Kohler petrol engine. The latter two can be ordered with 150mm or 241mm wide tracks. The TX 525 25hp Kubota diesel is also available and can be ordered with 150mm or 241mm wide tracks.

The Toro Traxmaster 525 mini digger with 4-in-1 bucket

For more information contact Toro Australia on 1300 734 349 or visit www.minidigger.com.au

One of Scullion's key roles will be assisting and supporting superintendents develop, implement and manage their e-par environmental management systems and other management and training tools as part of the company's commitment to the AGCSA's Environmental Management Initiative. Scullion started his new posting on 4 June.

SCHUMACHER SCORES TOP TORO MANAGERIAL POSTING

Peter Schumacher

Elanora Golf Club superintendent Peter Schumacher has been appointed as the new national sales manager for Toro's grounds and capital equipment division.

Almost 10 years to the day after starting as superintendent at Elanora, Schumacher handed in his resignation in late May and finished up on 26 June. A former AGCSA Board member and winner of the AGCSA's Excellence in Golf Course Management Award in 2004, Schumacher started his new position in early July.

Schumacher began his career at Wollongong Golf Club before taking over as superintendent at The Grange Golf Club in NSW. After a period of four years there he was appointed superintendent at Elanora during which time he oversaw the complete reconstruction of the exclusive northern Sydney course.

"I'm looking forward to a new challenge," Schumacher told ATM. "I recently completed a business degree and after 20 years in turf management it is time to take the next step in my career. And what better place to do that than with a market leader such as Toro."

SMART APPROACH TO IMPROVING WATER QUALITY

South Australian-based company Hydrosmart has developed a unique low-cost solution to help improve the quality of irrigation water for superintendents and turf managers.

Salinity, calcium, iron, scale, algae, blue green algae and a variety of chemical problems are being overcome within Australia and Asia by Hydrosmart's new computerised water conditioner which uses a unique particle physics approach to treat water using frequencies to bring about a wide range of beneficial changes.

Particle physics research recognises the basic mineral and chemical bonding mechanism which allows for crystals to form and chemical reactions to take place.

Hydrosmart's computer system creates a series of highly specific frequencies that target and disrupt this bonding, allowing the minerals and chemicals to break down to smaller non-bonding, non-reactive particle size and keep them in solution. This provides the ability to produce high quality usable water simply and sustainably without the expense of the removal of the minerals.

The technology has been tried and tested among South Australia's viticulture industry for a number of years and after success there Hydrosmart has now shifted its focus to the broader irrigation markets and industrial and commercial water problems.

For more information about Hydrosmart's chemical-free water solutions, visit www.hydrosmart.com.au

PHILMAC RELEASES NEW PRODUCT CATALOGUE

South Australian-based pipe fittings manufacturer and distributor of water management products Philmac has launched its new product catalogue for the landscape and turf markets.

The catalogue has information on about 3500 products for the transfer, control and application of water and contains a number of new products including brass and plastic Roland impact sprinklers and the Watts Water Technologies range of back-flow prevention and dual check valves.

The catalogue comes with a CD-Rom

resource providing a technical library in a PDF format as well as a hyperlinked navigation system that provides access to pricing for customer reference.

For more information about the new Philmac catalogue call (08) 8300 9200.

WATERING DOWN THE DROUGHT

Melbourne-based South East Water can help superintendents and turf managers through these trying times of water restrictions with its tankered water service.

The service currently offers two products – groundwater sourced from a bore at Lang Lang and Class C recycled water. The Class C service is limited because it can only be used under strict controls, while South East Water can provide 99 million litres of groundwater from the Lang Lang bore each year restriction free. Groundwater is suitable for the irrigation of municipal parks and sportsgrounds, replenishment of contained wetlands and ornamental water features such as fountains and ponds and vehicle washing.

For further information regarding South East Water's tankered water service, call (03) 9552 3615.

IT CAN HAPPEN OVERNIGHT

Pesticide clean-up has been made much more simplistic with the recent launch of Orica Watercare's Landguard OP-A.

Landguard OP-A has been designed to clean up organophosphate (OP) insecticide-contaminated water in a simple-to-use treatment. Working on certain organophosphate contaminants, including those commonly used in sports turf such as chlorpyrifos, diazinon and fenamiphos, Landguard OP-A is able to reduce the toxicity of contaminated solution by over 200,000 times.

Landguard OP-A can reduce OP residue in equipment wash water to levels that can take years to occur naturally. It is simple to use, effective and requires no capital investment. Landguard provides a better environmental outcome while also minimising risk.

Developed by Orica Watercare, in conjunction with CSIRO, Landguard is proven to reduce the toxicity of contaminated solution by more than 95 per cent overnight. Landguard can be added to excess spray solution, left overnight and the treated water can be disposed the next morning. Landguard is available from leading distributors nationally.

For more information, visit www.orica-landguard.com or phone customer service on 1300 550 036.

INNOV8 TEAMS UP WITH E-PAR

Innov8 Business Solutions has announced a strategic new alliance with environmental management system provider e-par.

Innov8, a company specialising in occupational health and safety management solutions, has sought the assistance of e-par to provide a digitised version of its Safetee Pro OH&S diary system now available to e-par users online.

The Safetee Pro system is available in a new format in addition to a range of new online OH&S training courses, all available through the e-par portal www.epar.com.au.

The e-par website now provides its clients with instant access to the complete package of services required to effectively manage the numerous environmental, health, safety and training issues that golf course superintendents face every day.

For more information and order forms for Safetee Pro and all training packages, visit www.epar.com.au.

GCSAQ

Queensland has had a mild start to winter with temperatures in Brisbane being the hottest on record for this time of year. Add to that little rain and it has made for some very interesting times for clubs around the state.

The GCSAQ has been working with Queensland Golf over the last couple of months on sports turf management best practice guidelines and water efficiency guidelines. This has been a very interesting task as these documents cover all playing surfaces whether football fields, bowling greens or golf courses.

We have also had a meeting with Ken Moore from the Australian Department of Agriculture and Fisheries who has been commissioned to analyse the turf industry. He is currently travelling around the country seeking feedback from the industry.

The last GCSAQ meeting was the Globe Day at Boomerang Golf Club. This was a very informative event with a varying degree of topics. And for a laugh, what else would you do there but have a boomerang throwing and catching competition!

Elsewhere around the traps there have been a few incidents to report involving local superintendents which will no doubt bring a smile to our colleagues around the country.

One particular Sunshine Coast superintendent, who had just started his new posting, was driving around inspecting the course when he hopped out of his work vehicle but neglected to put the handbrake on. To his horror he turned around to see his new chariot accelerating down the fairway before colliding into a tree. The car was needless to say a write-off and the superintendent very red-faced.

A bit further south and another recently appointed superintendent got himself into a tight spot literally on State of Origin I night back in May. Looking forward to watching the Maroons get one up on the Blues, the superintendent in question received a phone call just before kick off informing him that a sprinkler had stuck.

After figuring out it wasn't a hoax, he went to the club but despite his efforts couldn't get the sprinkler to stop. Heading to the pump shed, the superintendent realised he had left the key at home and so, rather foolishly, decided he'd try and squeeze his way into the shed between where the mainline comes out of the shed and the shed wall.

Obviously having had a hearty meal that night, the poor superintendent became wedged unceremoniously in the narrow gap and after many minutes of twisting this way and that and sucking in his stomach, finally managed to extricate himself much to his relief.

But hats off goes to one Brisbane-based superintendent who, being a diligent sort, was at work late one Saturday afternoon. Deciding to go for one more look around the course, he informed the cleaners who were tidying his office to leave his office open when they had finished. Arriving back from his inspection he found his office had been locked up and peering through the window he could see his car keys, mobile phone, wallet and shed keys sitting on his desk.

Left with little option, the superintendent grabbed a sledgehammer and crowbar (the maintenance facility was luckily still open) to remove the office door but as he was in mid swing who should walk around the corner but one of the club's committee members! Try explaining that one!

On a more serious note, I would like to wish Kelly Hyland all the best after departing Royal Queensland Golf Club in May. Kelly notched up 25 years' service for the club and on behalf of all members I wish him the very best in his future endeavours. Kelly, we hope you are not lost entirely to the industry.

Major events coming up include the 23rd Australian Turfgrass Conference and Trade Exhibition in Cairns from 23-27 July, while the following month the GCSAQ AGM will be held at Murwillumbah Golf Club. See you in Cairns.

ROD COOK
PRESIDENT, GCSAQ.

TGAA ACT

Along with the cooler weather the region has also received some significant rainfall which has topped up many dams and helped to alleviate many problems associated with the drought.

Although recent rain along with the cooler temperatures has helped to reduce total water usage, local turf managers are facing the real threat of Level 4 restrictions. If Level 4 restrictions are imposed on the industry this will result in the significant loss of assets for many clubs and businesses.

The local water authorities/regulators and representatives from both the horticultural and turf industries are in discussion on exactly what impact this may have. It is vital that industry assist in developing strategies to combat the issue of allocation reduction.

Although it's too early to obtain stats from the recently held TGAA ACT mid-year seminar on drought stress, it seems that early feedback from attendees and sponsors has been positive. The TGAA ACT thanks all speakers, sponsors and delegates for their attendance; we hope to see you next year.

It is the general consensus within the turf and related industry that the TGAA ACT annual mid-year seminar is an event not to be missed. So as to assist and best represent the turf industry the TGAA ACT is constantly seeking new thoughts and ideas on seminar topics. If you have any suggestions please contact Gary Dawson on (02) 6207 4623.

In local news, the recently held golf day at Gold Creek Country Club in honour of the late Grant King proved to an enjoyable day for all those involved. This event has no doubt become a regular calendar event for the TGAA ACT in commemoration of the dedication and influence Grant had on the turf industry.

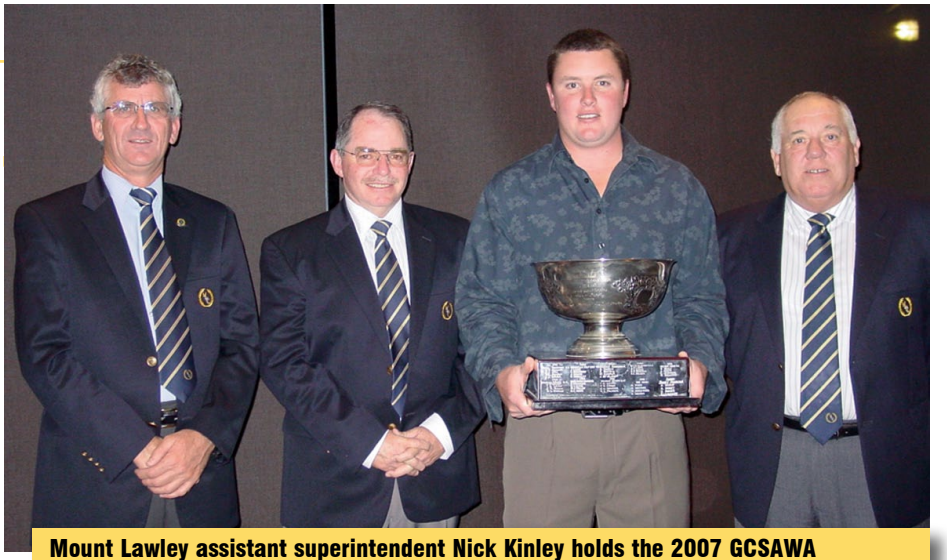
The TGAA ACT would like to take this opportunity to thank all the participants including sponsors, organisers and Gold Creek course superintendent Scott Harris and his staff in presenting a beautifully prepared course. It has been decided that the event will be held at Gold Creek annually due to the connection Grant had with the club.

On a final note, Smartrain is holding a series of chemical user and handler courses that are AQF Level 4 accredited. Due to the changes made to legislation affecting chemical users, it is essential for staff who are involved in the supervision and training of workers to practice the correct methods in transport, handling, mixing and applying chemicals in the workplace. For further details please contact Chris Houghton on (02) 6284 4533.

Till next time, agrostologists.

JUSTIN A. K. HASLAM
COMMITTEE, TGAA ACT.

GCSAWA



Mount Lawley assistant superintendent Nick Kinley holds the 2007 GCSAWA Management Challenge trophy

G'day to all around the country. Western Australia is awash with winners this edition with our association's major events on the 2007 calendar passing us by with much hype and fanfare.

For the second consecutive year, Mount Lawley Golf Club has taken the honours in what is proudly our biggest golf event. That's right, all the knockers stood up and paid attention when the dynamic Mount Lawley team took top honours at the 2007 GCSAWA Management Challenge played out at their spectacular course in May.

From the onset there was a dark cloud hanging over the host team with the late withdrawal of last year's MVP, superintendent Glenn Cross, and his subsequent replacement by assistant Nick Kinley. In the dying minutes preceding the Challenge, Glenn was forced out of the team with a mystery foot injury that saw him benched on the drinks cart alongside the GCSAWA's other golfing great, yours truly. In a tight tiresome challenge the talent within the Mount Lawley team shone brightly to edge out newcomers Maylands Golf Club.

Mount Lawley was again the focus of attention when it played host to the 2007 Turf Industry Awards in May. Congratulations go to the following award winners:

- GCSAWA Best Indentured Apprentice Award: Peter Beach (Gosnells Golf Club)
- Chipco Shield Student of the Year: Scott Davey (Bunbury Golf Club)
- Lawn Doctor Turf Lecturers Award: Isaac Kimberly (Lovegrove Turf Services)
- Murray James Perpetual Bowling Greenkeepers Association Trophy: Sam Fraser (Melville BC)

GCSAWA Best Indentured Apprentice award winner Peter Beach

Congratulations to all the award winners for their efforts during their training and I hope this recognition of their efforts assists in a successful journey through the turf industry. Special thanks to all the sponsors for this year's awards night; your kind support is once again appreciated. Thank you also to the friendly professional staff at Mount Lawley for hosting this year's event and as usual providing a first class facility and service.

On a closing note I have decided to vacate the role of GCSAWA president after four years, serving in total nine years alongside some really good fellas. To all past and present committee members who I have worked with, I thank you dearly for your friendship, guidance, humour, professionalism and most importantly your equally strong passion for building a strong cohesive professional golf association.

I wish my successor and the remaining committee the best of luck in the future and hope that they enjoy it equally as much as I have over the years.

BRAD SOFIELD
PRESIDENT, GCSAWA.

VGA

Once again a successful field day was held at Golf and Bowling Machinery's complex at Melton in April. This day has become a calendar event with greenkeepers around Victoria converging for a day of great displays, food and company.

Just up the road in Bendigo, Shane Harling's apprentice Luke Theis took out the VGA-sponsored Apprenticeship Award at the 2007 NMIT Awards night. Well done Luke. Shane has obviously taught you well.

Also up in Bendigo, greenkeeper extraordinaire Brendan Brown is moving up north to take over the assistant superintendent position at Horton Park Golf Club in Maroochydore. We wish him and his family all the best in their new venture. Bendigo's loss is Queensland's gain.

Our mini-conference was held in Corowa in May where everyone enjoyed each other's company, as well as fine dining, golf and bowling. It was great to see Duncan Knox and his family in attendance. Duncan has been an inspiration at the VGA over the years as a long-serving secretary and also a recent life-membership recipient.

Big thanks to Ray McLarty and his assistant Owen for their first-class greens and hospitality. In the bowling department the highlight on the greens was Alan (Bundy) Elliot's win over Peter Rasmussen in the singles final.

The committee of the VGA urges all members to continue planning and preparation for another difficult season this year. There seems no doubt that the Melbourne metro area will go to Stage 4, which means that by the start of summer virtually the whole state will be on that extreme level of water restrictions.

BILL HAMSHERE
COMMITTEE, VGA.

SAGCSA

The past year may well be remembered for the big dry and the challenges it has presented turf managers across the country, but here in South Australia it will also be remembered as a year that has seen the departure of three key superintendents.

The departures of Chris Klei (Grange GC), Brian Cooper (Mt Osmond GC) and Peter Harfield (Blackwood GC) have left a void within our local industry that will be felt for many years to come. While recent ATM state reports have recognised these guys on an individual basis, collectively it is important that our industry acknowledges the combined weight of their past contributions. I am sure I speak for all SAGCSA members in wishing them well for the future and I sincerely thank them for their efforts over the years.

The annual superintendents/managers conference was held on 22 and 23 May at Mount Barker Golf Course and the Hahndorf Resort. Those that attended received a sobering report from Andrew Johnson (director of strategic policy for the Department of Land, Water and Biodiversity) on the seriousness of the national water shortage and in particular the lack of recent inflows into the River Murray.

Early indicators are that unless a well above average inflow occurs this season, irrigators on the River Murray may receive zero allocation in upcoming months. With many of our Riverland courses relying on river water for irrigation, the outlook is bleak. For metro courses, Level 5 water restrictions are a distinct possibility, which equates to no outdoor water use.

Water security is a major issue for clubs in SA and it was apparent at the conference that managers and superintendents from across the state are united in their awareness of current and impending issues and their desire to be proactive as an industry in securing viable sources of water for future irrigation use.

Topics also covered at the conference were alternative water source projects (SA Water), irrigation efficiency and IMP issues (Darren Ferber, Aquatek), ASR treatment projects at The Grange and Royal Adelaide golf clubs (Don Will, RAGC), staff retention/attraction (Team Solutions Training), workplace safety and risk management issues (Safety First). Thanks go to the host club Mt Barker and local superintendent Sam Sherriff and to Daryl Sellar, Sam Morrison and Don Will who all contributed to organising the event.

A special mention must be made to Don Will who finished as manager of Royal Adelaide Golf Club in June. Don has helped foster the strong relationship between managers and superintendents in our state and has on many occasions contributed to the running of our joint conferences and meetings. This has led to a greater understanding of each other's roles through knowledge sharing and mutual respect. SAGCSA would like to acknowledge Don's outstanding service to the industry and we wish him well.

On closing it is nice to be able to report that much of South Australia received good rainfall in late April with 100mm-plus falling in a lot of centres over a four-day period. May has seen frequent shower activity. Collectively we are keeping our fingers crossed, as it appears we are heading into a typical winter pattern.

I would like to close by wishing everyone a cold, wet, miserable winter.

ANDREW BLACKER
PRESIDENT, SAGCSA.

VGCSA

On behalf of the committee and the members of the VGCSA I would like to thank Mark Prosser (Commonwealth Golf Club) who stepped down as president at our recent AGM at The National Golf Club. Mark made a massive commitment to the association as president and a committee person over the past five years.

Also stepping down from the board is Adam Robertson (Kew Golf Club). Adam has done a wonderful job with membership and education over the past four years. I wish Mark and Adam all the best for the future and I hope they don't mind the odd phone call for advice as I begin my tenure as president.

At the AGM we welcomed Jeremy Cutajar (Ringwood and Dorset golf clubs) and Colin Morrison (Flinders Golf Club) to the committee and I hope that all members can support this committee over the next year and be active in VGCSA meetings.

Following a successful AGM, we now have just two more meetings left for the year. The first is the Bayer Environmental Science turf research day at Kingston Heath Golf Club (superintendent Martin Greenwood) on Thursday, 11 October. Members are encouraged to get a group of four together from your club to play one of Australia's finest golf courses.

Kingston Heath Golf Club will play host to the VGCSA's turf research day in October

The last meeting for the year is at Huntingdale Golf Club on 8 December, an end of year Christmas get together recognising people in the industry.

Finally, congratulations and best of luck to Robert Hall from Green Acres Golf Club who was named as the VGCSA's Apprentice of the Year. Robert will go on to represent Victoria in the final of the AGCSA's Graduate of the Year Award which will be announced at the 23rd Australian Turfgrass Conference in Cairns.

MICHAEL FREEMAN
PRESIDENT, VGCSA.

TGAA VIC

Since the last edition of ATM we should have all had some rain that has eased the burden in the short term. At least it has allowed us to get some grass germinated and to close some cracks. How long it lasts is up to the gods and how well we can rotate the use of each area.

On 10 May the TGAA VIC, in association with ASBA, held its Bursars Day at Eltham College. A huge thank-you goes out to the team at Eltham College for providing such a great venue. There were 130 in attendance as well as 29 exhibits that people could wander through during the breaks.

First speaker was Trudy Ann King, an architect from Bligh Voller Nield. Trudy told us that we need to create spaces to make staff and students feel inspired. By using 'green' design and increasing light, ventilation etc you can increase a student's learning capacity and also improve attendance. Trudy really wanted everyone to look at what conditions our students were working in and how they could be improved.

The next speaker was Ben Deward who is a sustainable development consultant. Ben told us that if we follow our current water use trends then we will exceed our supplies by the year 2020. On average, Australians use 600 litres per household a day. In comparison Europe uses 150 litres and India 25 litres per day.

Some of Ben's solutions to our water problems were:

- Stormwater collection
- Treatment and reuse of grey water and black water
- Sewer mining
- Use of water efficient planting
- Capturing runoff water into tanks
- Waterless urinals
- Solar hot water systems

The next speaker was Greg Moore from the University of Melbourne, Burnley Campus. Greg spoke about the reasons for our climate change and how trees have played a big part in it. With the reduction in tree numbers due to Australia's population increase, the carbon dioxide levels have risen and caused the global warming effect.

As a result we will see warmer winters and hotter summers, fewer frosts and more days above 30 degrees, higher summer rainfall and a more tropical climate, flooding of lowland coastal areas, more easterly winds and higher energy demands. Every one degree rise in temperature causes the snowline to rise 100m.

One of Greg's solutions to overcoming the global warming problem is to plant more trees. When you plant trees they should be in isolated garden beds in preference to lawns. Wherever they are they should have a drip system extending out to at least the drip line of the tree in its advanced form. The trees should also have mulch to a depth of 75mm over the top of the drip system. Keep in mind that large trees can use up to 1000 litres a day.

Sam Thorn from consulting engineers Bibby Rusden Thomson was the next speaker. Sam told us how to save time, money and manpower by installing new processes into your buildings to reduce energy consumptions. Some of the simple systems that can be installed into your buildings are: timers that automatically turn lights off when they are not in use; automatic dimming zones that adjust according to the light required; air conditioning/heating units with thermostats can now also be fitted with timers to shut them off while not in use rather than relying on the last person to turn them off; changing to energy efficient lights and installing solar systems as another source of energy.

Our next speaker was Phil Walters from Caulfield Grammar in Wheelers Hill. They recently reconstructed their main oval including the turf wicket table. Phil talked us through the processes they carried out to move from wintergrass to a Legend couch oval. The job took 46 days to complete and Phil said they had full cover from sprigs in three-and-a-half months. Phil's talk was very detailed and I would suggest if you ever go down this path yourself to have a chat to Phil before you start.

Our guest speaker for the day was Tony Shaw, ex Collingwood captain, coach and premiership player. Tony talked about all things football including his disgust at where the game is headed at the moment. One other topic that got his goat was the Ben Cousins drug issue.

Upcoming TGAA VIC events include the ever popular Cricket Wicket Seminar on 4 July at the MCG and the OH&S/AGM in September. There is also still time to get your registration in to attend the 23rd Australian Turfgrass Conference in Cairns.

Until the next edition keep smiling through these testing months and pray for some rain.

MATT HANRAHAN
COMMITTEE, TGAA VIC.

TGCSA

After the driest summer in living memory, the north of Tasmania had over 120mm of rain in May (our normal average is 65mm). Most of us were left wondering what happened to autumn; we appeared to have missed it.

A successful field day was held on 29 May at the recently refurbished Quamby Golf Club. Having played the course before the changes I was very impressed. The North vs South Golf challenge was held in the morning, with the Toro Cup up for grabs.

After lunch Tas Turf Solutions released the Scotts Sierraform G slow release potassium fertiliser and Mark Wiggans from Tru-Turf demonstrated the Super Thatch Away head system. Steve Lewis (Royal Hobart Golf Club) then finished off a great day by speaking about the new irrigation system being installed at his club.

A reminder to all members that the TGCSA AGM and conference will be held on 21-22 August at Port Sorell. More information on the event will be released at a later date.

In other news from down here, former TGCSA president Tony Smith has left Mowbray Golf Club to take up the position of assistant superintendent at Launceston Golf Club. Tony hooks up with Launceston super Phil Hill who he served under for a number of years when Phil was superintendent at Mowbray.

Work has also recommenced on the Greg Norman course at Orford after work had ceased during the summer. Greens Beach in the north is still waiting on council approval with work starting on the Thomson-Wolveridge course once the mountain of paperwork has been sorted.

PETER MEDWIN
PRESIDENT, TGCSA.

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"The growing-in phase of a new golf course is critical and requires detailed planning, particularly when it comes to irrigation.
When the new Settlers Run Golf Course at Cranbourne was in the early stages of planning we had no hesitation in recommending a Lowara pumping system because of its better control, long term reliability and ease of maintenance.
The Settlers Run pump installation incorporates 4 variable speed Hydrovars which are uniquely linked to Toro Irrigations' Sitepro software which delivers to the Superintendent precise information on the performance of the total pumping system, which is absolutely critical to the grow-in phase.
Combine that with Brown Brothers' exemplary after sales service and Settlers Run couldn't be in better hands."

Brendan Graham, A&M Watering

How the Hydrovar reduces energy consumption.

Most applications involve the pump operating either along its full speed performance curve or the pumps performance is throttled or regulated by a valve. The Hydrovar eliminates these operating methods by regulating pump speed and hence output to match the system demand. This saves wasted energy traditionally lost in these conventional pump systems. Energy savings of up to 70% can be realized. (figure 1)

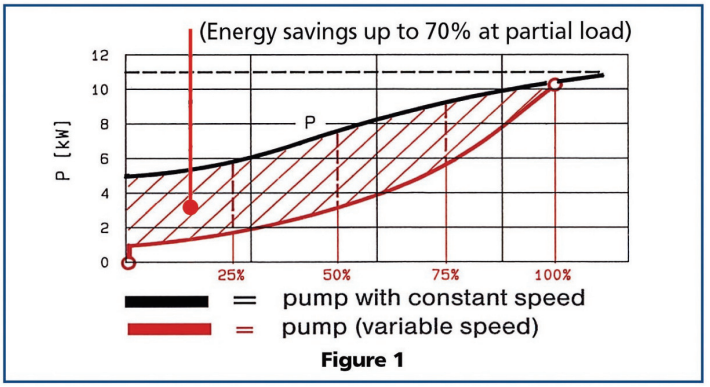

Figure 1

What is Hydrovar?

Hydrovar has gained a reputation as THE pump mounted microprocessor pumping system controller. But it does much more than just change motor speed.

It actually manages the performance of the pump to match a wide range of system conditions and requirements.

Hydrovar is fully programmable on site as it incorporates the microprocessor and the variable drive in one compact and unique package

How Hydrovar reduces maintenance cost.

Hydrovar software is designed specifically for centrifugal pump operation, control and protection. Hydrovar can thus be setup to protect the pump from operating under various unfavourable conditions eg. cavitation, operating against closed head, low NPSHa or operation past a pumps maximum flow rate. Hydrovar will automatically shut down and alarm if adverse conditions occur.

Hydrovar provides the Golf Course Superintendent with the flexibility of watering required with substantial savings on installation, power usage and maintenance. For details about the experience of some of Australia and New Zealands most prestigious Golf Clubs who have installed Hydrovar pumping systems, contact the Lowara distributors nearest you.

What is Flowlink?

TORO

To assist green-keepers and Superintendents in the golf course, turf and irrigation markets, Lowara and TORO Irrigation teamed up together to develop a link between the Toro Sitepro software and Hydrovar.

The link operates with up to 4 Hydrovar pump systems and monitor running / fault conditions and measures pressure and flow of the pump system.

All these parameters are displayed on the central irrigation control computer

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