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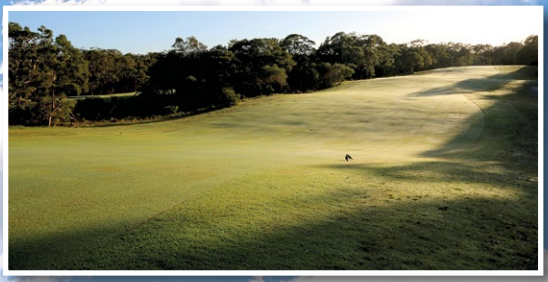

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COVER

Newcastle Golf Club: Newcastle Golf Club plays host to the 2015 Toro AGCSA Golf Championship in June. Pictured is the par three 7th. **Photo:** Brett Robinson.

CONFERENCE GUIDE

RESEARCH

Also in this edition…

Contributors to Australian Turfgrass Management Journal Volume 17.3 (May-June 2015)

Brendan Allen (NZGCSA); Gausul Azam (University of Western Australia); Jeremy Cutajar (VGCSA); Peter Frewin (AGCSA); Dr Jack Fry (Kansas State University, USA); Ryosuke Fujinuma (University of Queensland); Matt Goodbun (Newcastle GC); Neil Graham (GCSAWA); Graeme Grant (Ocean Dunes); John Halter (City GC, Toowoomba); Chris Hartwiger (USGA); Martyn Hedley (STA Qld); Danny Hull (STA ACT); Allison Jenkins (AGCSA); Don Loch (University of Queensland); Peter Lonergan (AGCSA); Neal Menzies (University of Queensland); Brett Merrell (Ras Al Hamra, Oman); Adam Moeller (USGA); John Neylan (Turfgrass Consulting and Research); Pieter Poot (University of Western Australia); Kellie Rose (STANZ) Simone Staples (AGCSA); Richard Stephens (Turf Australia); Peter Todd (STA VIC); Bruce Williams; Jenny Zadro (STA Australia).

Fresh perspective

Another Australian Turfgrass Conference is almost upon us and after the start to 2015 I'm sure all those superintendents and turf managers heading to the Hunter Valley will have some fairly sizable stories to share, particularly those from along the eastern seaboard. Having seen first-hand the devastating impact of the April 2015 storms on the Hunter region, I know for a fact that Newcastle Golf Club superintendent Matthew Goodbun and his colleagues around the area will have a few beauties to impart (you can read more about these storms in our lead article on Newcastle, starting page 6!)

There is nothing more cathartic than being able to share your trials and tribulations with colleagues and friends, especially when you have experienced great adversity as turf managers so often do. Whether its Mother Nature laying waste to your facility or the manner in which a committee or board has treated you, there is nothing better than confiding in colleagues, friends or family who you can rely upon to have your back, something which I have certainly been grateful for during some troubled times recently.

The annual conference has always been a highlight for the industry and for attendees it is a time to gain some fresh perspective on things and re-engage the grey matter. For some it can spark a renaissance while for others it can simply reinforce a belief or practice that, despite what others may think, they know is the right course of action to take. For those of you making the effort to head to Crowne Plaza Hunter Valley, I hope you head back to your facilities with plenty of new ideas to implement, not only for the betterment of your turf surfaces but for the personal and professional development of you and your staff also.

The conference promises to be a great event, not just for the spectacular location and venue but also for the breadth of content within the education sessions. Three key international presenters will headline the bill, each bringing with them decades of experience in vastly different but vital management areas, and complement the pool of local experts that has also been brought together. After his thought-provoking sessions on managing club politics last year, David Bancroft-Turner is back again, while Dr Jack Fry from Kansas State University is set to bring his many years of agronomic expertise to Australia for the first time. Joining him is fellow American and former GCSAA president Bruce Williams who, as well as having plenty of experience from his years as a superintendent, is also an expert when it comes to career progression. Both Fry and Williams have penned articles for this edition as lead-ins to their respective presentations, so if you are attending the conference make sure you take a few minutes during smoko to have a read.

Elsewhere in this edition we take a look at the second course being developed on the remote yet spectacular King Island – Ocean Dunes. The baby of well respected former Kingston Heath Golf Club course superintendent turned course designer Graeme Grant, Ocean Dunes is set to rival its neighbour Cape Wickham which featured in the last edition of ATM. In his article Grant looks back at the origins of the Ocean Dunes project, one which has been very much a personal journey that has seen a long held dream become a reality.

Like Wickham, the land upon which Ocean Dunes resides is simply breathtaking and many pundits are already claiming that it has the best four opening holes in Australian golf – having seen the photos they may just be right on the money! As Grant writes, whether that is the case will be borne out in the months and years to come, but what is for sure is that in Ocean Dunes and Cape Wickham King Island will quickly become one of the most talked about destinations in world golf. Can't wait to get myself down there! Enjoy the read...

Brett Robinson, Editor

PETER FREWIN, GENERAL MANAGER, AGCSA

All set for a fantastic week in the Hunter Valley

As you can probably imagine the past months have been quiet hectic in the AGCSA office as preparations are finalised for the 31st Australian Turfgrass Conference and Trade Exhibition. The lead up to the annual conference is always very busy but this year it seems to have gone to another level.

In previous years this edition of Australian Turfgrass Management would traditionally contain the full conference programme and a list of trade exhibitors presented in the centre of the centre of the journal. In a change from the norm, this year you will find a smaller feature on the conference in ATM with the bulk of the information being transferred to the AGCSA conference app. If you have not downloaded the app from your Apple or Android store please do so as it will be an invaluable tool for those attending the conference.

For those not making the trip to the Hunter Valley it is still a worthwhile addition to your collection of apps as it will provide a great resource for the entire year. The app will also house many of the conference session handouts and proceedings. Our trade partners have also taken the opportunity to upload brochures and other useful resources which will be available for the life of the app.

The impressive GCSAA conference facility at its Lawrence headquarters

STATESIDE

For those that read this column you would be aware that I recently attended the Golf Industry Show in San Antonio, Texas and then had an extended holiday in the US with my lovely wife Katrina. During our travels we were fortunate to see a great deal of the country – 7432 kilometres of it to be exact – as we embarked on a classic cross country road trip.

Our drive took us from West Palm Beach in Florida to Las Vegas via New Orleans, Memphis, Nashville, St Louis, Kansas City, Denver, The Rockies, Monument Valley and the Grand Canyon. For those that have not travelled in the US it is a country of extremes. There is significant opportunity, wealth and prosperity for many people, while conversely there is also significant hardship and once experienced firsthand it is certainly an eye-opener.

The trip had a great many highlights but I would like to share two of them. During my visit to West Palm Beach in Florida I was fortunate to catch up with a great friend Mark Reid who is director of golf and grounds maintenance at The Breakers. Mark was a staff member at Barwon Heads Golf Club many years ago when he was given the opportunity to participate in The Ohio Program.

Looking back, what was amazing is the opportunity that adventure would give him. He has been based in the US for about 20 years now, is married with three great kids and while still having a slight Aussie accent he measures things in pounds

Peter Frewin, "Old Tom" and Rhett Evans (GCSAA CEO) outside the GCSAA headquarters

and feet which was a little disappointing! Not only is Mark in charge of two great golf courses he is also responsible for the landscape of one the finest hotel complexes that I have ever seen.

During the stay Mark arranged a dinner where I had the chance to meet a great group of local superintendents, many of them Australian who also took the opportunity to participate in The Ohio Program. While The Ohio Program may not be for everyone it is certainly one way to gain some valuable work experience and see the world; just wish it had been available in my day!

The second highlight was the opportunity to spend a couple of days at the GCSAA headquarters. The trip to GCSAA, which is based in Lawrence, Kansas (almost the geographic centre of the US), was another eye-opener. The size and professionalism of the organisation was hard to take in at first with staff numbers of around 90 working from a three story office complex with all the trimmings – museum, library, conference facility etc...

The opportunity to sit and chat with the education and professional development staff was invaluable and it is hoped that some of their expertise can be used here in the future. The GCSAA is happy to share information and it is hoped that this information sharing and collaboration will be expanded in the coming years.

During our stay we were welcomed into the home of Rhett and Colleen Evans. Rhett is GCSAA chief executive and they were the perfect hosts. After spending such a large amount of time in hotels it was nice to base ourselves there for a few days and enjoy family life.

I hope all ATM readers get the opportunity to enjoy the quieter time that winter provides and if you are making the trip to the Hunter Valley I look forward to catching up. Please feel free to contact me at any time if you have an issue or suggestion; any feedback is greatly appreciated.

Natural Newcastle

Newcastle Golf Club is routed across some spectacular rolling sand dunes and no more is this evident than on the 6th hole pictured here which is a member favourite

Newcastle Golf Club flies under the radar when it comes to talk of some of Australia's best layouts, but visiting the course quickly changes that perception. ATM editor Brett Robinson catches up with course superintendent Matthew Goodbun to look at his maintenance operations, the recent devastating storms to hit the course and the club's upcoming hosting of the 2015 Toro AGCSA Golf Championship.

Matthew Goodbun knew his course was in trouble when a trampoline overtook him, cart-wheeling down the road while on the way to work on the morning of 21 April 2015. Having negotiated a slalom course of downed power lines and tree debris, turning into the driveway of Newcastle Golf Club his worst fears were soon realised. Jumping out of the work ute to open the gates, the roar of the wind which greeted Goodbun was only surpassed by the ethereal sound of large trees crashing over in the distance, canopies exploding and limbs splintering.

Twenty-four hours earlier a deep low pressure system had developed off the NSW central coast and descended on the Hunter region with a vengeance. While the forecast was for plenty of rain and wind, the actual conditions which hit would take Goodbun, and most in Newcastle for that matter, by surprise. Cyclonic winds of up to 150kph were enough to lay waste to the heavily tree-lined golf course, leaving Goodbun again scratching his head in awe of the ferocity that Mother Nature can unleash.

Newcastle Golf Club has been home to Matthew Goodbun for his entire turf management career. He took over the reins as superintendent from Guy Thomas in 2005

Fast forward a week and sitting in the Newcastle clubhouse Goodbun reflects on the previous week's events. Outside the conditions couldn't be more perfect for golf – the sun is shining brightly and the course at a cursory glance looks in perfect nick. The only things giving away the fact that one of the most devastating storms has recently hit is that the course is deserted, still closed, and the drone of chainsaws can be heard a few fairways away.

While the Pasha Bulker storms of June 2007, which saw the 40,000 gross tonnage coal carrier run around on nearby Nobbys Beach, brought more rain, the April 2015 storms caused significantly more damage to the golf course landscape. Just 308mm fell this time (compared to 600mm in 2007) but it was the relentless winds, akin to a Category 2 cyclone, which cut a destructive swathe through the course. More than 400 trees ranging from large angophoras and black butts to saplings were uprooted or snapped in half, while a further 1000 trees sustained significant damage.

No sooner had the storms passed than Goodbun's crew, together with a dedicated group of

PHOTOS: BRETT ROBINSON

member volunteers, methodically worked their way around the course cleaning up. It was a dangerous and painstaking task with so many tree limbs down or hanging precariously but by the following Wednesday Newcastle's eager members were back playing their much loved course. While the worst of the debris had been cleared away, the work was by far from over with the prospect of at least another couple of months' worth of clean-up still ahead.

"It's definitely the worst damage I have seen here," says Goodbun, who has spent his entire turf management career at Newcastle Golf Club, taking over the superintendent reins from Guy Thomas in 2005. "It was devastating. Driving to work you knew it was going to be bad and I don't think I've ever been overtaken by a trampoline before!

"On the Monday night we had a fair bit of wind and rain, but I didn't think it would be that bad. We managed to get most of the course cut and presented for the Tuesday ladies competition and I came in early Tuesday to do a few last minute things before they hit off. When I got to the course and opened up the front gates you could hear limbs snapping and large trees falling over – it was really bizarre. So I called the boys and told them not to bother coming in and bunkered down.

"The sound the wind made was unbelievable. It just roared up the 6th fairway straight off the ocean and on holes like that where it's exposed the trees were flattened. Those which didn't fall over had their top halves completely snapped off. We lost about 80 per cent of our tea-trees which were simply ripped out, which, while probably to the liking of a lot of the members, is a shame because there's a reason why they are there.

"We had a great crew of volunteers, some of whom were qualified chainsaw operators, who did about 80 per cent of the clean-up work around the course. That enabled us to get on with maintaining the course and catching up on some of our spraying and cultural programmes which had to be put on hold because of the weather. We got the course back open in a week, but there is still a huge amount of debris left in the bush which will take months to get to."

The fantastic undulations of the par five 10th fairway which is routed across two major dune lines

Following the storms of mid-April, a temporary water feature appeared on the 9th which lasted for a number of weeks

NATURE'S FINEST

Those who have played Newcastle will appreciate just how important the landscape areas are to the course and why the storms would have left a lasting mark. They frame the course dramatically and complement the wonderful undulating dunes which Newcastle is renowned for.

Golf has been played on the present Fern Bay site since 1915 after Fred Popplewell Senior routed nine holes on remote dune land. In the 1930s, when a vehicular ferry service made the course more accessible from Newcastle, Eric Apperly was commissioned to design an 18-hole course. He incorporated seven of the original nine holes into his new layout with the current 1st, 2nd, 10th (original 3rd), 13th (original 5th), 14th (original 6th), 17th and 18th all part of the 1915 layout. Aside from some minor tinkering with bunkers over the years, the course which presents today is essentially as Apperly had built it.

Being outside the state capital, Newcastle Golf Club has enjoyed relative anonymity over the years. But the more you play/walk/drive around the course the more it grows on you and you come to appreciate why it is perennially ranked inside the top 20 courses in Australia (Golf Australia magazine had it 17th in 2014 and Australian Golf Digest 20th).

Former professional turned golf course architect Michael Clayton perhaps best summarised Newcastle's appeal in an article he penned for Golf Architecture magazine a few years ago. In it he wrote: "Newcastle is a course that is difficult to compartmentalise because there are so many holes that are unique, simply due to the land over which they are played over – though it is well nigh impossible to identify a single poor hole. It does have a number of design quirks that would be disapproved of by the 'box tickers', but the golf is fun, in many places it's humorous and you will see shots here that you will find nowhere else in golf."

He finished by saying: "Newcastle and its like-minded reciprocal clubs such as Paraparaumu Beach, are important golf courses in Australia and New Zealand because they are accessible and are neither difficult to play nor expensive to join. They all demonstrate wonderful cerebral architecture and fun golf that is guaranteed to fascinate sporting golfers long after the flashy, style over substance, expensive newer 'resorts' have lost their appeal. Golf will suffer if places like Newcastle ever struggle to remain viable as it is these unpretentious courses that provide the vital combination of fascination, affordability and accessibility."

Indeed, the stretch of holes from 5-7 rates among the best in Australia. The 5th requires a blind tee shot over the dunes before plunging down towards the green complex. The 6th, a favourite hole of the members, heads back up with a massive dune encroaching from the left and a green atop a natural saddle. The 7th is a tricky medium length par three played through a cutting with the green guarded by two deep bunkers. One of the most unique holes, however, is the 10th. A rollercoaster par five, it climbs and plunges across two major dune lines with two blind shots required, one off the tee and another for the approach into the green. To use Clayton's words again "...it's fun, it's quirky and it's confounding."

"We are very lucky with what we have," says Goodbun. "It is definitely unique and has so much character. It's quite deceiving and when you drive through the gates you don't quite realise what is out there. Although it's hard to believe, we've never had a bulldozer do anything to the course – what is out there was once covered in sand or native vegetation.

"I don't know what you would compare it to. It has some similarities with the Melbourne sandbelt courses, but overall it's just unique. It's always a pleasure to come back home after you've been away and appreciate what a great layout it is."

While the course has practically been untouched for years, that could be about to change. The club is looking to proceed with a course master plan, overseen by Bob Harrison, with the most significant works earmarked for the par four 18th. That green will be brought forward to return the hole to its original length, with the green complex to be heavily bunkered as per the original design.

The 10th green is also a contender for a makeover with the master plan calling for a return

It took staff and a group of hard working volunteers over a week to get the course cleaned up and back in play following the April storms

to its origins. The original green was just 320m² with grass swales instead of bunkers compared to the current 620m² green which is guarded by three bunkers.

The main focus of the master plan, however, will be the bunkers. As Goodbun notes all you need to make a bunker at Newcastle is a sod cutter and as a result not one bunker on the course has been constructed professionally. The master plan aims to redress this as well as return some bunkers back to their original locations to enhance the strategic element of select holes.

CHALLENGES AND CHANGES

For all its uniqueness, Newcastle presents quite a challenging prospect for a course superintendent and behind the scenes there have been a number of recent changes which are helping to assist Goodbun, his assistant Daniel Wilkinson and their modest crew of nine provide the best playing conditions possible for the 900-odd members.

The biggest challenges Goodbun faces lie at the core of any course – its soils and its water. Although fortunate enough to reside on its own aquifer, the water is high in chlorides and bicarbonates. Similarly, the old native dune sand with its naturally rounded particle shape means compaction and retaining nutrients in the profile is difficult. Nematodes, sting in particular, also have to be monitored religiously and Goodbun recalls one instance about eight years

ago when the microscopic menaces significantly impacted his greens (one count recorded levels of 3200!). To remedy the sands, for the past eight years at renovation time Goodbun has been incorporating a heavier (90/10) angular Vermont sand, while a Chemsearch dosing system helps treat the water.

From a turf perspective, a war on Queensland blue couch and buffalo grass is ongoing. The fairways were originally sprigged from Queensland blue couch and Goodbun is continuing with a suppressing/removal programme that started under former superintendent Guy Thomas and promoting the hardier and more disease-tolerant native couch. Similarly, about 20 years ago the club decided to plant buffalo grass around a number of green complexes to try and retain bunker lips and approaches purely for aesthetics. Not surprisingly that experiment didn't work and Goodbun has been slowly removing it when time and money allows.

Newcastle's greens, which are kept between 3mm and 3.2mm year round, are mix of 1019/1020

More than 400 trees, including 80 per cent of the course's stands of tea-tree, were decimated by the April storm

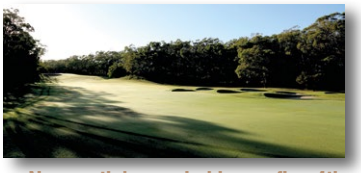
Newcastle's greens are a mix of *Poa annua* and 1019/1020 bentgrass. Over time the hardier *Poa* has naturally dominated the sward and become the preferred species. Pictured is the 10th green

bentgrass and *Poa annua*, with the latter slowly but surely taking over the sward. Goodbun doesn't mind that at all and in fact he has been *Poa's* biggest proponent and has actively promoted its spread through ongoing cultural practices. As Goodbun states the *Poa* just works so much better at Newcastle, is hardier and can tolerate the site-specific problems relating to the sands and water.

Due to these issues and to a lesser extent the slow shift across from bentgrass to *Poa*, Goodbun relies upon a very intensive cultural programme to ensure his greens are at their best year round. He undertakes a major renovation in late September/early October comprising of a 5/8 hollow tine and incorporating as much of the new sand as possible along with the usual amendments.

As soon as renovations are complete he switches to a fortnightly programme that alternates between multi-tining greens one week and verticutting, star-slitting, grooming or dusting the next. That continues up until before Christmas when gives the greens a large deep solid tine to help break up the profile, before easing off over the busy summer period. The fortnightly programme or aeration and dusting then starts to ramp up again in autumn before being eased back to every 3-4 weeks during winter.

Also assisting Goodbun in producing some fine surfaces are two of the more significant changes in recent times – a new irrigation system and fleet of machinery. Prior to the complete irrigation upgrade in 2011, Newcastle relied on an ageing MicroMaster satellite system and Rain Bird brass kickers. Notching up nearly 30 years, it had leaks everywhere, PVC pipe ranging from Class 2 to Class 12 with a million joints holding everything together.



Newcastle's reachable par five 4th

Newcastle Golf Club will host the 2015 Toro AGCSA Golf Championships on 21 June

Well past its use-by date, the club commissioned Aqueduct Consultancy to come up with a new system that would work in with its master plan and desire to return the course to its original design intent. As a result, a key part of the design was ensuring minimal watering of the rough, with part circle sprinklers installed along the edges of fairways and full circles up the middle.

Rain Bird's IC controller decoder system was installed which gives Goodbun the luxury of being able to turn on any of the 880 Rain Bird sprinklers or perform a valve check from his phone anywhere in the world. Sensors were also installed in selected greens – one green which is pure *Poa*, one which is 50/50 bent/*Poa* and one which is 75 per cent bent/25 per cent *Poa* – so Goodbun can keep a close eye on their moisture levels.

"We have much greater control over where and how much water we now use and as a result we have reduced the amount of water we put out," comments Goodbun on the new irrigation system. "By being able to better manage the output of the water and reducing the amount we actually put on the greens, we have reduced the amount of sodium build up in the profile and we don't have as much black layering or algae which has been a real positive."

Along with a new irrigation system, the most recent change has seen the club switch to Toro after many years using John Deere equipment, with Goodbun saying the presentation of the surfaces has certainly benefitted as a result.

WARM WELCOME

Although the April storms are very much fresh in the memory and the clean-up ongoing, Goodbun is also mindful that in a few weeks' time he will be entertaining his peers when a field of 100 superintendents and turf managers from around Australia line up for the 2015 Toro AGCSA Golf Championship. While it's a prospect he is relishing, at the same time he is also a little bit nervous.

"They're all good blokes and I'm open to any feedback they may have about the course and the playing surfaces," laughs Goodbun. "Seriously, though, we can't wait to have them here. It's a little bit out of the norm for the conference to come to a golf course like ours, but I think those who haven't played it before will be pleasantly surprised.

"We will be playing it off the championship tees. The greens won't be silly quick just in case we get a westerly blow in, so as long as you keep it straight off the tee and lay up in some areas instead of attacking the green, you will shoot well. It's a hard course; every hole is different and there are a lot of false fronts on greens which can be difficult to read.

"Every time we have a major event here the weather seems to intervene, so I'm praying for some nice weather. I don't care if it's freezing cold on the day, as long as the weather plays ball in the weeks leading up so that we can get the surfaces right, I'll be a happy man."

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Ocean Dunes lies just five minutes from the main King Island township of Currie. Currently 11 holes are finished (pictured is the 2nd green) with a full opening hopeful in time for the summer and autumn 2016 golfing season

Dunes dream

Graeme Grant needs little introduction to ATM readers and over a near 50-year career in turf and golf course management he has seen and done pretty much everything. The past nine years however have seen him vigorously pursue a dream which has ultimately resulted in one of the most talked about golf course developments in world golf at the moment – Ocean Dunes on King Island.

The Ocean Dunes story began 50 years ago when a young boy began thinking about ways to redesign the course he grew up playing on – the Long Island Country Club in Melbourne's southeast – and wondered why the greens failed every summer and paspalum was so prominent in the fairways instead of couchgrass.

Once he was able to convince his parents that working on a golf course was not all about being able to play more golf, a job with Claude Crockford at Royal Melbourne Golf Club ensued. There could not have been a better person to guide, educate and encourage this youngster in the ways of turf maintenance and golf course design and construction.

Now it seems that in the blink of an eye a career spanning just under those 50 years has passed and an opportunity to design, build and maintain my own course (at least in part) is about to come to fruition.

A LONG SEARCH

Ocean Dunes may never have happened but for a series of coincidences. A golfing trip to Barnbougle Dunes in 2006 planted the seed for a remote destination 'play and stay' golf links if the right land could be found.

Soon after this trip a phone call came out of the blue from a real estate agent suggesting a look at some land in South Gippsland which he thought suitable for golf. He was right about the land but the price was wrong! This began an extensive five year search dealing with approximately 14 different landowners trying to secure coastal South Gippsland land at a reasonable price – optimistic to say the least.

And then, four years ago a golfing friend pointed out a land advertisement on King Island – not quite where it was envisaged that this idea would be realised. I sat on it for five months and then decided to get on a plane and investigate this far off, possibly suitable land.

After a 50 minute flight from Moorabbin airport we landed on King Island. Not two kilometres from the airport and we were on the main road to the north weaving our way beside links land that seemed to be never ending – an extensive strip of coastal dunes just made for golf!

That day we were shown four beef cattle coastal properties (where the famous King Island steaks are produced) each about 15 per cent of the cost of the South Gippsland land. I was convinced that day that this was the place to build a golf course that had the potential to be world class.

After taking a little time to consider all the implications, we made an offer for one of those sites conditional upon a due diligence period to examine all the relative issues to do with planning such as the local council's view on golf course development, water availability, power, flora and fauna and cultural heritage etc.

To our surprise another bidder was competing with us and we were unsuccessful. Even more surprisingly this buyer was a golf course construction company – two golf companies trying to buy the same property on a remote island in the middle of Bass Strait! After coming so close this time I was fearful that this was a dream never to be realised. However I'd come too close to let it go.

Following some pretty basic research regarding the potential for two golf courses on the island, I came to the conclusion that with a second one it might make more of a destination. So now contact was made with the local estate agent requesting that he find a suitable property. Within two weeks he had one that he felt was worth another flight over.

This time it was the real thing, at least in my mind – in between the main town of Currie and the airport and only five minutes' drive from each, 3-phase power available right down to the coast, spring water available in a small dam, 2km of coastal frontage, bold imposing sand dunes with fairways already laid out among them and a 'wee burn' that will wander menacingly beside what is now the 16th hole while also providing water for the turf. A view from the potential clubhouse over the course and rugged Southern Ocean was the icing on the cake.

FROM DREAM TO REALITY

Now that a site had been found it was time to find a group of like-minded people who fancied owning a golf course and a 'play and stay' golf business. Just to go back a step, some 11 or 12 years earlier while working at Sydney's Castle Hill Country Club with Bernie McMahon (of McMahons) he remarked that "It would be good to get a piece of land one day and build a course of our own".

Coincidence would have it that we met up again when he came to Kew Golf Club a few days after my return from King island to price some proposed redesign works at the Melbourne club. Before long we were on a plane to have a look at the site and he was in the minute he saw it. Even his brother Rob couldn't talk him out of it once he returned!

The search was then on for investors to join us. Eventually two more golfing enthusiasts came on board, both friends and members of Melbourne

The beautiful topography of the Ocean Dunes site hits you in the face as soon as you step onto the 1st tee. The opening hole is a 500m dogleg par 5 that plunges towards the coastline, the green visible from the tee

Ocean Dunes' 4th hole is a spectacular 130m par three with a stunning carry across a rocky ocean inlet

sandbelt clubs. We decided not to seek more investment at that stage and between the four of us we secured all the planning permits and bought the land. Then after some low key marketing we had a few more committed but it was still just a dream.

We had the land, the course layout was done, the council was on our side but there still had to be something more substantial to sell. So with confidence in each other, Bernie and I decided to make a start on the construction with a guarantee to our fellow directors that it was entirely at our own risk. It was our view that a real golf course or at least holes in the making would provide for better marketing opportunities and confirm our commitment to the project.

For my wife and me it meant leaving home in Melbourne, buying a house and setting up on King Island so that the design and construction could be given my full attention. This was almost two years ago and we still have another seven months of construction and grow-in to undertake.

The importance of working in a hands-on way to develop design ideas and creatively shape the ground, in my view, cannot be overstated. Working with the shapers and operating machines enables the designer to take full advantage of each site, so it was always going to be that we would relocate.

NATURE'S BEST

As I've already mentioned, Ocean Dunes is to be a 'play and stay' golf project and if it is to be successful the course had to be designed and constructed as cost-effectively as possible. In order to achieve this, the land had to have the feel of a golf course even before we started.

The natural contours had to be retained with little or no alteration and we were confident the seaside links could do this. However, not every inch of the site could be turned into golf holes without substantial earthworks. The coast is rocky but had to be utilised fully to capitalise on its spectacular aspect.

As I pen this article we have almost finished the six holes adjacent to the coast and have been able to move sand from the inland dunes to replace the rock so that the reshaping blends seamlessly in with the surrounds. We are encouraged by the critiques to date, some saying that we may have the best four starting holes in this country; a nice sentiment which will only be borne out by the number of golfers wanting to come and play and return.

Most of the inland holes have been laid out by nature with undulations and features requiring little modification to produce unique golf holes with character and individuality. Even the strategy within them has been suggested by the lie of the land as has the size and shape of the putting surfaces.

An important factor in the design has been to ensure the finished course and its features fit the scale of the dunes. The greens are quite large as a result of this thinking. Every links course has its own special or unique character, generally as a result of the size and shape of the dunes it is built among. We are no different and I have been at pains to shape any reworking of the land to flow as if it was always there.

The golf strategy may not be apparent upon first playing the course, but a player who gives the holes more than a cursory glance will soon work it out. Of course wind is a factor on the coast which

Two greens, including the 3rd pictured here, had to be completely reseeded after bentgrass seedlings failed to cope with the island's notorious salt winds

necessitates wide fairways and forward tees that allow the holes to remain playable under most conditions.

DEMANDING DUNES

When I look at the finished holes and see the thriving turf I could be forgiven for forgetting (especially at my age!) the difficulties we encountered during their construction. However, the wettest winter for 80 years in 2013 followed by the windiest spring locals can remember leaves an indelible impression.

Aside from the difficulties of construction, turf establishment and maintenance in a coastal environment brings with it a whole new set of problems. Forty eight years managing golf course turf couldn't prepare me for what can happen on the edge of the Southern Ocean! To say that it has been a steep learning curve hardly goes close!

As an example, we have had to completely redo two greens after the seedlings failed to cope with the salt winds. In the first instance the bentgrass I chose was not suitable and secondly, just after the seedlings emerged, a week of strong cold winds and nasty weather in July wiped out another green.

I am constantly reminded of some advice the late John Spencer gave me over a beer many, many years ago when he said, "The man that never made a mistake never made anything!" It can, even now, help me to accept the blunders! Each one of these failures became lessons for the future.

After the failure of the initial chosen bentgrass variety, a mix of stoloniferous bentgrass – 50 per cent Mariner and 50 per cent Mackenzie – was decided upon. Pictured is the 6th green

The first was that the selection of salt tolerant bentgrass had to take precedence over every other bentgrass feature. The second was the need to continually (every two hours) water new seedlings while extreme on-shore winds are blowing. By taking heed of these lessons we eventually developed two greens in spectacular locations.

Even though there is a trend towards fine fescue for greens on new coastal links, we felt that bentgrass was a better option and could be prepared in a firm fast fashion consistent with the links tradition. A somewhat selfish motive as it is my preference to putt on bentgrass rather than fescue!

After the initial failure already mentioned, a mix of stoloniferous bentgrass was decided upon – 50 per cent Mariner (as the name suggests very highly salt tolerant) and 50 per cent Mackenzie for its fine leaf texture and fairly high salt tolerance.

Selecting a mowing height to suit the contours of the greens is very important in a links environment. Without some boldness in the greens they would

Above right: Flanked on either side by large sand dunes, the 345m par 4 7th has been framed by nature. Ocean Dunes' fairways are a salt-tolerant fine fescue mix

Above: The superb 180m par three 8th is an entirely natural hole played over a deep valley

appear out of place on these links so to ensure the wind has no undue impact on the roll of the ball they will be cut a little higher than on an inland course.

Fairways and tees were always going to be fine fescue. We toyed with the idea of Santa Ana couchgrass but soon discarded it. Even though we are only 250km south of Melbourne and never get frosts, the temperatures are too cool for couch to develop into a resilient hardy turf. We chose a salt-tolerant fescue mix and to date it is doing extremely well and where the turf has developed it provides an excellent surface in no way inferior to couch. In part we believe this is due to the retention of the natural topsoil which is free draining and full of nutrition.

Our aim is to develop a dense sward that provides the 'springy' surface that the UK links golfers refer to. Extra fertiliser in the early stages and mowing at 15mm-20mm for at least 12 months seems to be achieving this. The turf must be tight but I want to see the ball retained on all but the most severe slopes to encourage a variety of shot making skills to score well. We will probably be between 12mm-15mm once play begins.

DREAM DESTINATION

The results to date at Ocean Dunes are due to a small but dedicated team of people – three of us for the initial 6-8 months of the job. It has been said before in various ways by other golf course designers but I will reiterate it here. The implementation of the designer's ideas is in the hands of the shapers and good ones make the course architect's life easy. Encouraging them to use their skill and imagination is critical to the successful development of any golf course.

Over the years McMahons have built a quality crew and the people working on our course are as good as they come. Jared Liddy and Andrew Combe have been the lynchpins putting the course together. These two men not only operate machines skilfully but do any labouring jobs as required such as irrigation installation, drainage and greenkeeping work.

As we developed more of the course a dedicated irrigation installation expert, Brenton Kaye (Bruno), joined us midway through last year. He decided to move his family over to the Island from Perth and loves the relaxed lifestyle – when he's not at work! When Bernie can afford to release Joe Scheffer from his dozer work in NSW and Queensland he slots in with the others and is producing some wonderfully natural looking shapes that fit seamlessly into the existing landscape.

We now have the equivalent of 11 holes constructed (holes 1-9 and 18 are fully playable) and plan to be open for play by the end of 2015. Given the time spent to date this may seem ambitious but we will be putting at least double the resources into the last few holes so that we can finish in November and be ready to capitalise on the summer and autumn 2016 golfing season.

I see that our golf course will be a part of a destination that includes the other two courses – Cape Wickham (as featured in ATM Volume 17.2) and the King Island Golf Club which is a wonderful nine-hole links very close to the town of Currie. Other aspects of the island, such as the fishing (we have a great sweep fishing spot beside our 4th tee), surfing, horse riding, shipwreck tours and, of course, the local food – crays, beef, cheese etc – will compliment what we are doing and hopefully we will all benefit.

What the future holds for me is undecided but I will probably find it impossible to leave the turf maintenance and refining work to others – at least in the short-term. Living in a country environment beside golfing linksland with wildlife all around (wallabies, sea eagles, peacocks, pheasants, seals, etc.) is pretty special, even when the wind blows.

McMahons shaper Jared Liddy works his magic on the 10th tee which when completed will be a 210m par three with an ocean carry

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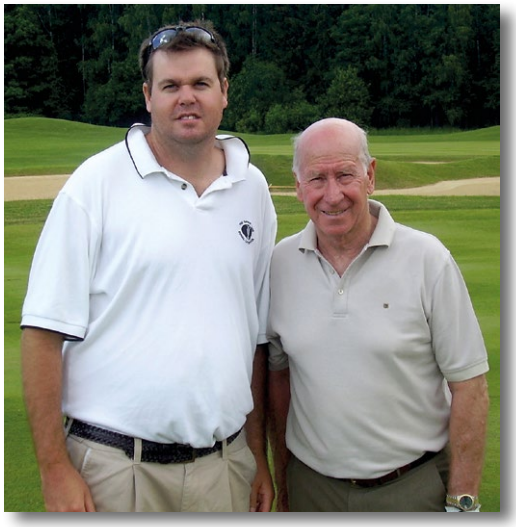
Off the radar in Oman

Since the early 2000s superintendent Brett Merrell has based himself overseas and for the past four years has called the oil-rich Middle East sultanate of Oman home. There he has played a significant role in transforming what was a sand greens complex into a Graham Marsh-designed golfing oasis – Ras al Hamra.



Working overseas for the past 15 years has afforded Brett Merrell (left) with many wonderful career opportunities and the chance to meet sporting royalty. Here he is pictured with English football great Sir Bobby Charlton while consulting at the 2007 Russian Senior Open

A love of the great outdoors really got me into working in the turf industry. I was always a sporty type of person growing up, whether it was playing cricket, rugby or tennis, but it was a chance run-in with a lecturer at Bundamba TAFE that would ultimately get me into golf.

Before that I was working at my old school preparing cricket wickets in the summer and rugby pitches in the winter. However, a conversation after class one day led to our lecturer Mark Kidd informing me that my local course, Ipswich Golf Club, was looking to hire two apprentices.

Over the next three years I learnt all about greenkeeping. Upon completion of my apprenticeship, the new Greg Norman-designed Brookwater was getting built just down the road and I knew then it was something I had to be involved in. After being given a job by David Lunardelli, the next 18 months of construction was a real eye-opener. Having never done any construction work during my time at Ipswich, to learn a different aspect within the turf industry was really interesting.

This is where I fell in love with golf course construction. The things I learnt during my time at Brookwater have helped me now ply my trade the world over. I really like maintenance but nothing compares to the feeling you get when you transform a raw site into a golfing oasis. It's something that is truly special and gives you a real sense of job satisfaction.

THE BUG BITES

Working with great guys like Marcus Hartup and Steve Harris at Brookwater and hearing their stories of working in the USA proved a big factor in me eventually taking the plunge and heading overseas. Upon completion of Brookwater, together with some encouragement from my parents, I headed off to be an intern on The Ohio Program.

While in the US I worked at Muirfield Village and the 2002 Memorial Tournament and 2003 Heritage Classic at Harbor Town Golf Links. These were two great tournaments and really amazing and completely different courses. Working on both courses was a great learning curve not just because of the tournament experience I gained but also because of the different turf varieties.

Muirfield Village was the first time I worked with cool-season grasses which would help me a few years later when I consulted on a project in Russia and it was also invaluable when I was employed at Royal Dublin Golf Club in Ireland. Muirfield

superintendent Mike McBride and his crew taught me so much about preparation of cool-season turf for daily and tournament play. Likewise, Harbor Town had a big influence on my career also and apart from preparing for the tournament it was the first time I had been at a course which oversowed its surfaces heading into winter.

My time working and travelling the US would be the catalyst for spending the next 15 years abroad. The travel bug had well and truly bit me and looking back now I have spent about half of that time in the Middle East, including Kuwait, United Arab Emirates and for the past four years Oman.

Before coming to the Middle East I spent five years in Europe and 18 months in Fiji. While in Europe I met my wife who is from Dublin and we made Dublin our home. While there I worked in Paris completing an Arnold Palmer course and I also helped prepare Pestovo Golf and Yacht Club for the first Russian Senior Open.

Working for a local golf contractor in Dublin, we did renovation works around the country and during one summer I was fortunate enough to work at one of the oldest golf courses in Ireland – Royal Dublin.

While working in Europe it really opened up my eyes about the turf industry and golf in general.

Over an 18 month period Oman's Ras al Hamra 'brown' golf course was transformed into a fully-grassed course under the auspices of Graham Marsh Golf Design and ex-pat Australian superintendent Brett Merrell. The old brown course, which had oil greens, was built some 45 years ago and pictured inset is how it looked in the 1980s

The new-look Ras al Hamra course is wall-to-wall Platinum TE paspalum due to its ability to handle Oman's weather extremes and high salinity soils

The passion the Europeans have for the game is unbelievable. In the summer they play from sun up to sun down. It doesn't get dark in the summer until about 10.30pm and without fail they will still be on the course right up until that time – truly amazing.

Working in Europe also taught me a lot about growing and maintaining cool-season grasses. Being from Queensland all we learnt was warm-season grasses, so to go and spend five years in Europe was a really good experience for me.

WARMER CLIMES

Having had enough of Dublin's cold wet winters, my wife and I decided on a lifestyle change and headed for the heat of the Middle East. I was offered the job as project manager for the contractor at the new Tiger Woods Golf Club Dubai. The fact that my good friend Mark Ecott was employed with the same company and on the same job made the move easier.

Over the next three years I learnt a hell of a lot about golf course construction and the challenges we faced during that job I don't think I will ever experience again. Dealing with extreme heat close to 50°C in summer, sand storms blowing the course away, not to mention having to import of over 15,000 trees from different parts of the world, was hugely challenging. Then there were the weekly dynamite explosions and ongoing water issues, not just the salt content of the water but the fact that our supply line was 45km long!

Merrell maintains Ras al Hamra with a crew of 16 that comprises mostly of Filipinos and Indians as well as three Omani foremen

The biggest issue, however, was staff and at one stage of the project we had over 400 people on site. One thing I have learnt in the golf industry is the importance of having good staff. In the Middle East they see it as the opposite. They very rarely have qualified staff as labour is cheap and they usually throw numbers at the job which I have learnt over the years isn't the right solution.

With most of the staff from India, Pakistan, Nepal and Bangladesh and only the foremen speaking English, it was a daily battle to get duties appointed and the boys out on site starting their work. It was a big challenge but Mark and I had a great time working with them and also the Tiger Woods Design team.

Leaving the big city of Dubai we moved to the next country along the Arabian Gulf. The Sultanate of Oman is steeped in history and culture. It is home to Muttrah Souk, one of the oldest in the world, The Royal Opera House and the grand Sultan Qaboos Mosque. It also has fantastic beaches, wadis and mountains. It boasts abundant wildlife, including the elusive Arabian leopard, and with many varieties of dolphins and whales it is a diver's paradise.

Oman would be way off the radar for most Australians. We initially settled in the southernmost city of Salalah (the home of frankincense) where I spent 14 months completing a nice project for the tourist department of Oman. The project was right on the beach and the beaches in Salalah are up there with the very best, similar to those in Queensland. When not working we spent most of our time diving, fishing and camping on the beach with friends.

Half way through that job an opportunity came to join Petroleum Development Oman (PDO). PDO is a joint venture between the Oman Government and Royal Dutch Shell in producing oil and gas for the country. PDO has been in existence for over 50 years and part of their community is a place called Ras al Hamra which is located just outside of Muscat, Oman's capital city.

At that time PDO was undertaking a major new development within the existing Ras al Hamra community, including the construction of 1500 new houses, a 750 student school, hospital and recreation facility. A key part of the project also included the transformation of the Ras al Hamra 'brown' golf course, which had oil greens (something that was quite common in the Middle East), into a fully grassed, Graham Marsh Golf Design (GMGD) golf course.

The Ras Al Hamra brown course has been in existence for 45 years and for the past 43 years it has hosted the Muscat Open amateur event which brings golfers together from all across the Middle East. This year was the first time the event has been played on turf and suffice to say it was very well received by all who played and watched.

FROM BROWN TO GREEN

GMGD was chosen by PDO to master plan and design the new-look golf course and with just 27 hectares to work with they had their work cut out to get an 18-hole course to fit within such a restricted space. The final design they came up with was amazing and fitted the site perfectly.

Essentially they scrapped the idea of 18 holes and came up with a 9-hole facility that we could also play as 18. It is a desert style course nestled along the Gulf of Oman and coastal hill sides. Clever placement of multiple tees with large double greens as well as alternative locations has created a par 71 layout which can vary in length from 5400 to 6400 yards over 18 holes. It is also the first golf course in Oman to be completely floodlit! Many trees were preserved from the Ras al Hamra redevelopment project and were replanted alongside native plants to enhance the 14 hectares of golf landscape.

On the course we have 15 greens and 13 tee complexes. To put things into perspective our 1st and 10th share the same tees and fairway but you play to a 1450m^2 double green, the right side being the 1st and the left side being the 10th. Another is our 7th/16th, a par three that has one single green and one flag – from the 7th tee complex it plays 159 yards, but from the 16th tee complex it plays 210 yards. So the layout is quite unique, but the feedback from our members is that it is very challenging and you need good course management to score well.

Due to extreme heat in the summer and very little golf during the day, the floodlights come in handy so that golfers can hone their skills during the evening when it is cooler (our opening hours will eventually be 7am-11pm).

The golf course is semi-private and mostly for PDO members and guests. We currently have about 180 members and with over 3000 workers within PDO we expect that number to rise over the coming months and years. Having worked in a lot of the Gulf Cooperation Council states I have to say the local Omani people play more golf than their Arab neighbours and of our 180 members around 35 per cent of them are Omani which is great to see.

The turfgrass decided on for the new course was Platinum TE paspalum supplied by John Holmes at Atlas Turf. We chose the TE due to its ability to handle our weather extremes and high amounts of salinity in the soil and water, as well as its low nutritional requirements and excellent disease tolerance.

Working in Oman and maintaining turf is hard as they have no chemicals for turf, with all the chemicals we use based on agriculture. Oman is great for growing crops like tomatoes and onions so learning to use chemicals used for these and balancing the amounts for turfgrass is a huge challenge. With few chemicals for turf combined with the banning of growth regulators like Primo and Armor Tech, my biggest challenge daily is to try and

With few chemicals available for turf, Merrell's biggest challenge daily is keeping greens at a constant speed. Pictured are the 6th and 15th greens

Because of the small site on which Ras al Hamra is situated, the course has 15 greens and 13 tee complexes

keep the greens at a constant speed. The biggest criticism I get is that the greens are slower at night than during the day!

Construction of the new course lasted 18 months and like any new golf course we faced many challenges along the way. Water was our biggest problem. We use treated sewage water (TSE) for the course, however, the supply was inconsistent and there were times when it was cut off without notice. As a result, half way through construction I received approval to install another line of fresh water to our tank, so that if we had a problem with the TSE I could switch to fresh. The paspalum thrived on the clean water and we had it grown in after 12-14 weeks.

Aside from a small fresh water feature lake on the 7th we have no irrigation lakes on the course. Our water storage simply comprises of a 3000m^3 tank which is enough for one day's back up. Our watering programme for the 14 hectares of turf is about 1800m^3 a day in the summer while in the winter we water every second day.

Our irrigation system is wall-to-wall Rain Bird with Rain Bird pump station. The reason we chose Rain Bird was that they have an agent in Muscat, which is always good to have them so close in case of any breakdowns. Knowing that you have a local agent is a big factor when you look at buying specialised golf equipment in the Middle East.

The new-look course had its official opening on 17 April 2015 which was well received by all the members and stakeholders. I have a staff of 16 which are made up of nine greenkeepers from the Philippines, five labourers who are all from India and two local Omani foremen.

Ras al Hamra is unique in that it is the only golf course in Oman to be fully floodlit meaning it can remain open until 11pm

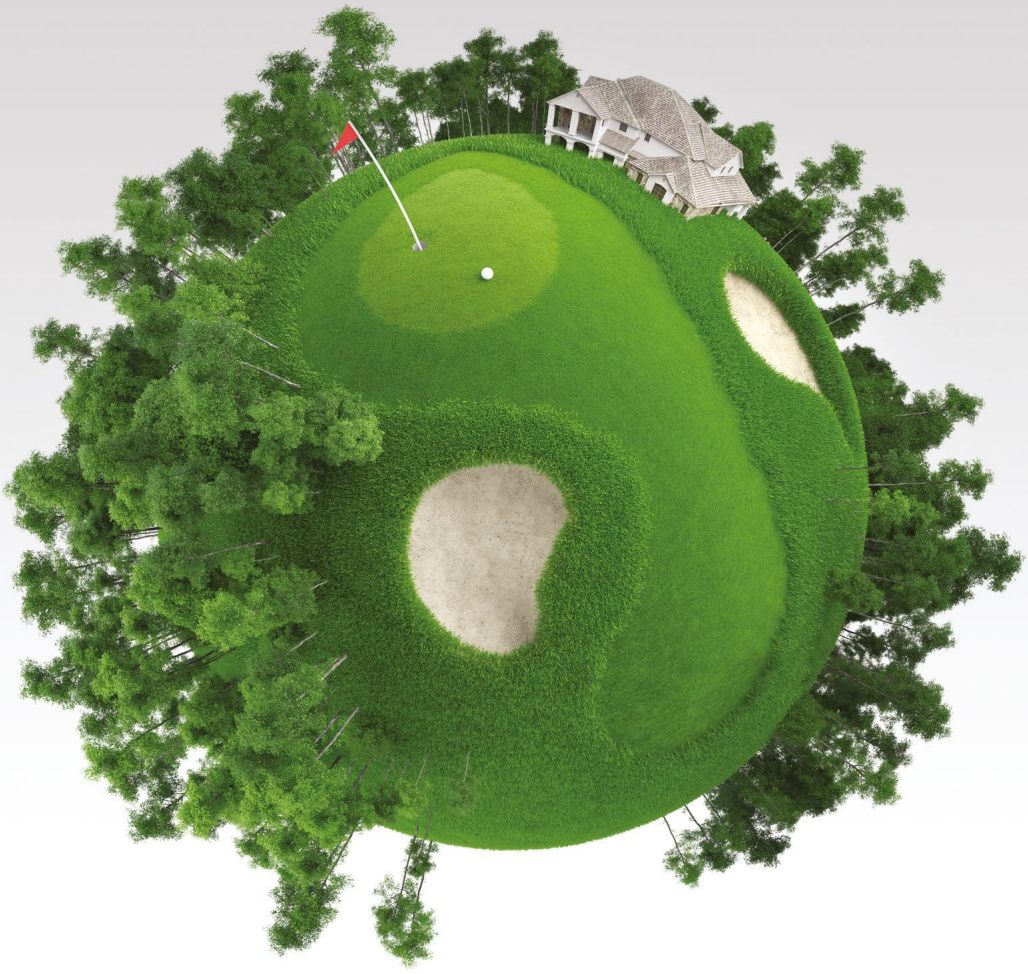
Our fleet is all Jacobsen and we have three GP400 greens mowers. We triplex all our greens and approaches due to the size of them. Our 1st/10th hole is 1450m^2 and the 2nd is 1150m^2 so to walk mow all of these is a massive job. The new GP400 heads are just like walk mowers and the quality of cut is perfect.

We are currently cutting greens at 2.25mm and go to 2mm for tournaments. In the winter months I will take them to about 2.5mm-2.75mm. We currently mow our approaches with the GP400s at 6mm. We have one LF550 fairway unit and have that cutting at 12mm. We walk mow our tees at 6mm with Greens King 522s, while the rough is cut at 30mm with one AR-3. We also have two Groom Master bunker rakes but all our bunkers are raked daily and I use these mostly for the out of play landscape areas. We have six Cushman Hauler 1200 utilities for the staff to get around the course and one 1200-litre DS spray unit. This does all our turf and when I spray the fairways and rough I usually get about 3ha to the tank.

We are on a weekly spraying programme for greens and monthly for all other turf. This is all foliar and once a month I put out a granular everywhere except greens. Once a month I pencil tine the greens to help alleviate compaction. The green sand used here was 75 per cent silicon sand and 25 per cent dune sand and when tested it came close to the USGA specification although a little high in fines. When you work in places like Oman you have to use what you have got and if it is close to the specs you go with it. Knowing this and knowing I would have to do regular aerifying I have purchased a Toro ProCore 648.

Oman, like its neighbour the United Arab Emirates, sees tourism as its future and outside of the UAE Oman will be the next biggest golf country per courses in the Middle East. In Muscat we have three other golf courses and two in the development stage.

Oman is actively promoting golf and the nearby Almouj Golf course, which has Australian ex-pat superintendent Steve Johnson at the helm, will host the National Bank of Oman Golf Classic, the final leg of the European Challenge Tour which is now called the 'Road to Oman'. This course is designed by Greg Norman, so to have two Australian golf legends stamping their mark and designing two great courses is pretty special for a small country like Oman.



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Despite the desire of golf course operators to satisfy their customers, they must understand that there are a variety of agronomic factors in play during the winter months that will require limiting course access

Weathering winter

Applying the principles of turf science to common winter scenarios that arise on golf courses allows decision makers to implement preventative measures, assess risk and make informed decisions that provide an appropriate balance between the needs of the turf and the expectations of golfers.

Golfers are always anxious to get onto the course and thus cannot help but be disappointed when they hear the words frost delay, frozen greens or cart path only. Unfortunately, golfers who enjoy playing all year inevitably will encounter periods where limiting access to the golf course is necessary.

Despite the desire of golf course operators to satisfy their customers and succeed in the golf business, decision makers at golf facilities must understand that there are a variety of agronomic factors in play during the winter months that may require limiting access to the golf course.

At the crux of winter issues are questions that every golf course decision maker must answer. How will turf that is slowly growing or not growing at all respond to play on a particular day? Will traffic from golfers result in short- or long-term harm to the turf that could affect course conditions in the spring and summer? Is the cost of repairing some damage less than the loss of revenue that occurs when access to the course is limited?

This article describes the environmental conditions and characteristics of cool-season and warm-season turf that make them vulnerable to winter injury. The most common issues regarding winter play are identified, and guidance is provided, to aid in the decision-making process.

CHANGING GROWTH PATTERNS

No golf course is exempt from making decisions about winter play, because the growth pattern of all turfgrasses changes as day length shortens and temperatures get cooler. However, the complexity of the decisions varies widely from region to region and often from winter to winter.

When temperatures fall below the ranges considered optimal for turfgrass growth, there is a change in the response of turfgrasses to stresses from golf and course maintenance activities. Therefore, turf managers must adapt to a variety of scenarios that affect short- and long-term turfgrass health as weather patterns become colder.

Understanding seasonal climate trends, and the growth patterns of cool- and warm-season grasses, is a prerequisite to making sound decisions regarding winter play. Both cool-season and warm-season grasses are distributed widely across the country. The optimum temperature range for cool-season turfgrass growth is between 15-24°C while warm-season turfgrasses have an optimum temperature range between 27-35°C (Beard, 1973). Plant growth slows when temperatures fall below these respective ranges and, ultimately, all grasses can be severely damaged by temperatures below freezing.

SUBOPTIMAL TEMPERATURES

Almost every golf course experiences periods where the temperature falls below the optimum ranges for turfgrass growth. When temperatures no longer support optimum growth, turfgrasses will recover from stress at a reduced rate. Therefore, golf traffic during periods of reduced turfgrass growth can result in increased amounts of worn turf. Additionally, warm-season grasses experience chilling stress as temperatures fall below 15°C. The chilling stress disrupts the photosynthetic cycle and causes the leaves of warm-season turf species to turn brown. The brown, dormant warm-season grasses have no recuperative ability.

Additionally, there are a few soil-related considerations that can affect golf as temperatures fall into the suboptimal ranges for turfgrass growth. As temperatures decrease, the rate of evapotranspiration decreases as well. In many climatic zones, precipitation can exceed evapotranspiration during the winter, and it is not unusual for soils to become undesirably wet for golf.

While this may not have a significant impact on turf health, it does have implications when traffic is applied to wet turf. Wet soils are more easily

Foot traffic on frost-covered greens can be lethal to turf

compacted than dry soils and turfgrasses will not reach their potential when grown on compacted soils. In dry climatic zones, lower temperatures accompanied by seasonal winds can promote excessive drying and the accumulation of salts in the upper rootzone. High concentrations of salts can be harmful to turf and further slows recuperation.

FREEZING TEMPERATURES

As turfgrasses are exposed to temperatures below freezing at night and above freezing during the day, plant and root growth slows, or eventually stops, and turf managers must adapt accordingly.

The first concern during periods of freezing temperatures is an even further-reduced recuperative rate of turfgrasses – especially turfgrasses that continue to receive traffic. During periods of freezing temperatures, the leaves and roots of cool-season grasses may still be slowly growing even though all growth has stopped for warm-season grasses. The cumulative stress and damage caused by traffic during periods of freezing temperatures will mount for both cool- and warm-season grasses.

As temperatures fall further below freezing, or freezing temperatures persist for longer durations, additional situations arise that can affect turf and soil health. The term winter injury is used to describe the damage that occurs (either naturally or as a result of traffic) under the wide variety of conditions that exist during winter.

Winter injury can include damage from frost, desiccation, low-temperature kill, ice, crown hydration and traffic on wet, frosted, frozen or thawing soils. Warm-season and cool-season turfgrasses have different thresholds for damage as do different grass species within these categories.

STRESS FACTORS

While suboptimal, freezing temperature is one stress that can affect all turfgrasses, when one or more additional stress factors occur concurrently, winter injury may be exacerbated. Understanding the additional stress factors that affect turfgrass performance throughout the winter can help turf managers make proactive decisions that promote turf survival before the winter and helps course decision makers manage winter play during the cooler months.

Shade is an often-overlooked stress factor. During the winter, the sun angle reaches the lowest point of the horizon and as a result the amount of shade on golf courses increases. Obviously, this is a particularly serious issue on heavily wooded courses. In parts of the country that are below the temperature range for optimal turf growth, shade further reduces recuperative ability even though temperatures may remain warm enough to support some growth. Furthermore, shade keeps soils colder and further limits turfgrass growth. In cases of direct low-temperature kill or crown hydration, it is

Golf is an outdoor game played on growing turfgrass plants. Inevitably, there will be times of the year when what is good for golfers might not be good for golf course turf

Cart traffic on wet, heavy soils can cause severe tire rutting and soil compaction. Completely restricting carts or limiting them to paths only is the best way to prevent this type of damage

common for the damage to be more prevalent and more severe in shaded areas.

Excessively wet soils are another stress factor that compounds the effects of low temperatures. Wet soils are prone to compaction that destroys soil structure. Turfgrasses grown on compacted soils have shallower, less-developed root systems that compromise the long-term health of the plants. Not only will turf underperform in compacted areas during the growing season, but these plants will be more at risk for both cumulative injury from traffic and acute injury from low temperatures.

Finally, traffic is one of the most important stress factors to consider. In one aspect, traffic is highly desirable because it means people are playing golf and enjoying the game. Unfortunately, traffic can cause cumulative injury to the turf over time. Concentrated vehicle traffic is the most damaging.

MAKING DECISIONS ABOUT WINTER PLAY

Making decisions about managing winter play on the golf course can be challenging. However, knowledge of how the previously reviewed factors affect turfgrass performance during winter can be applied to a variety of common scenarios. In each of the following scenarios the risk for winter injury is assessed and science-based preventative measures are provided.

The importance of having a good drainage network is never more highlighted than during the winter months

PUTTING GREENS

Scenario 1: Play on slow-growing or non-growing greens.

The Problem: Golf is frequently played during times of the year when temperatures are below optimal ranges for turfgrass growth and the recuperative ability of turf is reduced. Under these circumstances, traffic from play can create uneven playing surfaces and thin turf that favours the invasion of undesirable grasses or weeds. Often the wear patterns from traffic are worse, or more pronounced, in shaded areas. On creeping bentgrass putting greens, wear and shade favour the invasion of *Poa annua*.

Risk Assessment: Any turf damage associated with playing on slow-growing turf is cumulative, not immediate. It may or may not be easy or fast to repair the damage during the next growing season. Increasing *Poa annua* populations in creeping bentgrass putting greens is a good example.

Preventative Measures: Risk can be reduced to some extent by growing and maintaining a healthy stand of turf before the onset of cooler temperatures. Cultural and maintenance practices that are helpful in promoting healthy turf that will better withstand traffic in cool weather include:

- Appropriate annual aeration and topdressing programmes;
- Adequate fertilisation;
- Higher mowing heights;
- Proactive shade management; and
- Maximise available cupping area.

Best Course of Action: Allow play and focus on the preventative measures described above. On creeping bentgrass putting greens, begin to limit play as average temperatures decrease in the fall. On couchgrass greens, raise the cutting height before the turf enters dormancy to provide additional protection for the crown of the plant.

Scenario 2: Play on frosted greens.

The Problem: Frost-covered turf on putting greens is susceptible to immediate damage from traffic. Ice crystals on and inside the plant can puncture cell walls and cell organs. When foot traffic occurs on heavily frosted turfgrass surfaces, entire plants can be killed leaving a foot-shaped patch of dead turf.

Risk Assessment: Damage to the turf will occur immediately and the symptoms of the damage become obvious as the turf grows. Healing may not occur until the next growing season begins.

Preventative Measures: In most climatic zones, frost is a common occurrence. The best preventative measure to minimise frost delays is to reduce morning shade on greens. Sometimes a light syringe cycle is used to dissipate the frost. However, careful judgment must be used or the irrigation

water can freeze, further extending the frost delay and potentially making the greens and surrounds wetter than desired. Couchgrass managers may apply wetting agents to prevent early season frosts.

Best Course of Action: The time-honoured tradition of not playing on frosted greens is recommended and has produced good results over time. In the big picture, the disruption to golf is small, yet it prevents injury to the turf. The advent of various social media outlets has improved the speed at which golfers can be informed about frost delays. Rapid and clear communication should reduce the inconvenience and make frost delays less frustrating.

TEES, FAIRWAYS AND ROUGH

These playing areas comprise most of the turf on the golf course. They are diverse in many ways including soil type, drainage patterns, aspect in relation to the sun, amount of shade, cart path position and more. The scenario below is common to many golf courses, but because of the diversity of the playing areas, golf course decision makers must use careful discernment.

Scenario: Play on slow-growing or non-growing turf.

The Problem: This issue is particularly difficult on golf courses in areas with warm-season grasses and where year-round play occurs. Turf becomes thin or matted down under golf cart traffic. The quality of the ball lie diminishes, particularly for the high handicap player. Also, the definition between the fairway and rough becomes difficult to distinguish. By spring, golfers often complain that 'there is no grass on the fairways'. Conditions will not improve until new growth emerges from the ground in the spring.

On cool-season courses, golf cart traffic on these areas prior to the onset of the winter can weaken turf and compact the soil, particularly if the areas are wet. Compaction increases the potential for winter diseases, *Poa annua* invasion or expansion, and lower-quality turf in the spring. In cases of very high traffic in combination with other stresses, the turf can be killed and worn down to the soil.

Risk Assessment: Golf courses with moderate-to-heavy play during autumn, winter and spring will often experience one or more of the problems mentioned above. The risk to the turf is cumulative over time with one exception. Traffic on wet or saturated soils will immediately create ruts in the turf.

Preventative Measures: There are numerous steps that can be taken during the growing season and into early autumn to minimise, delay or prevent traffic-related problems from expressing themselves.

- ***Increase the height of cut in autumn.*** A higher height of cut will result in greater protection of the crown of the turfgrass plant.
- ***Later autumn nitrogen fertilisation on couchgrass.*** Research at Virginia Tech has

Shade is an often-overlooked stress factor and keeps soils colder and further limits turfgrass growth

shown that extending nitrogen applications into autumn may keep couchgrass green longer, promote better recovery and earlier green-up in the spring (Reasor et al., 2012). It does not necessarily improve wear tolerance immediately, but it will keep leaf tissue green longer and will help with course definition. Also, later nitrogen fertilisation can delay the onset of the loss of leaves under traffic.

- ***Growth regulator applications in autumn.*** Research at the University of Tennessee showed that the use of the plant growth regulator trinexepac ethyl changed the architecture of the couchgrass canopy and improved wear tolerance (Haselbauer, 2010). Observations in the field have shown that when late growth regulator applications are used in conjunction with the other two practices listed above, the result is a much denser canopy. This helps produce an excellent lie and turf that is better able to tolerate traffic.
- ***Shade management.*** Increasing sunlight levels always improves the growth and vigour of the turf. Reducing shade in high-traffic areas will produce stronger turf that is more wear tolerant as it heads into a period of suboptimal temperatures.
- ***Core aeration.*** This practice relieves soil compaction and improves soil structure, creating a better medium to grow a deeper, stronger root system that enhances the stress tolerance of the turf.
- ***Topdressing.*** This practice has been used extensively to provide firmer, more playable conditions during late autumn, winter and spring when rainfall frequently exceeds evapotranspiration. Although topdressing does not replace the importance of having a good drainage network, it does make golf courses more playable during wetter times of the year.
- ***Traffic management.*** Proactively manage high-traffic zones during the growing season so that the turf in these areas is not weakened as growth slows.
- ***Manage tee marker locations.*** Rotate tee markers on a regular basis to disperse wear from foot traffic and divots. Reducing the number of tee markers (e.g.: only one to two sets of markers per hole) and using forward or back areas on teeing grounds may be necessary to prevent concentrated wear, especially on tees where irons are used. Adjust teeing ground entry and exit points as needed to help spread wear from players gathering before they tee off. Pay particular attention to the tees on the first and tenth holes.
- ***Cart path expansion.*** If winter play is popular and the cart path system is limited, expanding the cart paths provides more options for keeping traffic off the turf when conditions warrant.
- ***Perennial ryegrass overseeding.*** This practice is used in some parts of the country as a way to provide winter colour and improve the golfing surface in the spring. Unfortunately, the cost, disruption to playing quality from irrigation during establishment, and the risk of a bad transition in late spring do not make this a viable preventative measure in all but a small number of situations.

Best Course of Action: Implement as many of the above preventative measures as possible to create the healthiest, most stress-resistant turf. When turf is growing slowly, dispersing or spreading out golf cart traffic is of the utmost importance in order to minimise turf injury and avoid reduced playing quality in the spring. Keep carts on paths when conditions are wet enough to cause tire tracks or ruts.

CONCLUSION

Golf is an outdoor game played on growing turfgrass plants. Inevitably, there will be times of the year when what is good for golfers might not be good for golf course turf. Most often, this conflict occurs in late autumn, winter or early spring when weather conditions vary widely.

Armed with a comprehensive understanding of turf performance, sound risk assessment and the implementation of preventative maintenance practices, golf course operators can offer more golf during the winter with less risk of injury.

ACKNOWLEDGEMENTS AND REFERENCES

Authors Chris Hartwiger and Adam Moeller not only have years of experience playing golf in the winter, but they are consulting agronomists with the USGA and have assisted many courses with these issues. This article has been reprinted with permission from the USGA Green Section Record Vol. 53 (1), January 9, 2015. A full list of references for this article can be obtained from the AGCSA.

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Pakenham on track

ATM columnist John Neylan looks back at the extensive project to build the new Pakenham Racetrack which, following its first race meet in March, was dubbed by champion jockey Damien Oliver as one of the best tracks in the country.

The first race meeting on 26 March 2015 at the new $72 million Pakenham Racetrack complex, the first thoroughbred racecourse built in Victoria in almost 40 years, was the culmination of several years of in-depth planning and construction. To watch the first day of racing go without a hitch was reassuring that the track was ready for racing. No matter how often you look at the turf, examine the roots and conduct trials, the proof of concept could only come with the completion of its inaugural eight-race programme.

The project came about after the Pakenham Racing Club sold its old 24.3 hectare racecourse site and relocated to a 246ha rural property near Tynong to develop a new equine precinct. The plan is to eventually develop a world class racing and training facility. The fully completed facility will include turf, synthetic and sand tracks and a 60ha residential development for trainer dwellings and stabling.

The grass track was some five years in the planning and construction so as to achieve a surface that was well drained and capable of handling an intensive racing programme. As with all racetracks, the balance of achieving a well-drained profile that has good stability is a challenge. Sand has to be the growing medium so as to achieve the drainage capability, however, the downside is that most sands have poor natural stability.

Consequently, a stabilising agent has to be incorporated to increase soil strength and resistance to displacement. The grass track was designed by Evergreen Turf and utilised StaLok™ fibres as the stabilising agent. StaLok™ fibres are made of fibrillated polypropylene and forms a three dimensional structure in the sand. The fibres were incorporated using a purpose built piece of equipment that meters out the fibres at a precise rate and then incorporates them into the required depth (150mm). The track is a perched water table construction consisting of closely spaced subsoil drains, a gravel drainage blanket and the reinforced sand rootzone.

The first challenge was to determine the combination of sand, reinforcement fibres and other additives that would provide the greatest stability. Several tests for stability were undertaken by GroundScience P/L which determined the preferred sand, rate of fibres and the rate of cocofibre. The cocofibre was needed to improve the water holding capacity and it was determined from the testing regime that it also contributed to the stability.

Once the preferred sand and gravel were selected, a quality control programme was initiated so as to ensure that the materials were consistent. Rocla was the sand supplier and the quality control programme involved testing the raw sand and then, when the stockpile was approved, cocofibre was incorporated. The blended material was then tested for capillary porosity, aeration porosity, drainage rate and loss on ignition (test for organic matter). As with the sand and cocofibre, the gravel also went through a rigorous testing regime. There were over 85 sand and gravel tests undertaken throughout the project.

Above: The new Pakenham racetrack was some five years in the planning and construction so as to achieve a surface that was well drained and capable of handling an intensive racing programme

Right: The track is a perched water table construction consisting of closely spaced subsoil drains, a gravel drainage blanket and a reinforced sand rootzone

Earthworks for the project were undertaken by McMahons and once the subgrade was prepared Evergreen took over the works and was responsible for the installation of the drains, the gravel drainage layer, the sand and fibres incorporation and turfing with washed kikuyu turf. 'Village Green' kikuyu was selected for grassing the track and was sourced from Lilydale Turf in East Gippsland and Dad & Dave's Turf from the Hawkesbury (NSW).

Construction of the track started in March/April 2013 with the first turf laid in April 2014 and the last in November 2014. Once the turf took root, routine inspections were undertaken to determine root depth, density and health while a vigorous thatch control programme was also initiated.

The challenge with any project involving the use of solid turf is dealing with the thatch and organic matter that is invariably associated with mature turf. Understanding that the presence of the thatch layer would impede root development and potentially form a shear point, the track was regularly hollow cored and topdressed to dilute and break through the layer of organic matter.

Due to time pressures, it was necessary to lay turf during the winter even though this was considered to be agronomically undesirable. Tynong is not the warmest place mid-winter, however, the kikuyu developed a very good root system through the coldest part of the year despite the agronomist's concerns.

The grass track was designed by Evergreen Turf and utilised StaLok™ fibres as a stabilising agent. Village Green kikuyu was selected for grassing the track

Root health and density were a priority during the grow-in and particular attention was given to irrigation and the fertility programme. Once the roots were sufficiently developed it was possible to allow the profile to dry down periodically so as to stimulate deep root growth. The nutrition programme paid particular attention to avoiding excessive nitrogen applications so as not to stimulate excessive top growth over the growth of roots.

In addition to the regular measuring and assessing of root development, the rootzone is routinely measured for soil moisture content using both a FieldScout™ TDR probe and several permanently installed soil moisture sensors. The measuring of soil moisture has been invaluable in

Root health and density were a priority during the grow-in and particular attention was given to irrigation and the fertility programme

understanding the moisture dynamics of the profile, deficiencies in the irrigation regime (it is an open and windy site) and the relationship with surface performance. The racing penetrometer and the TurfTrax Going Stick™ are also used to assess the racing characteristics of the surface.

Any large scale project such as this is subject to various studies, particularly when it is associated with a greenfield site such as Tynong. The site was subject to a flora and fauna audit where it was discovered that there was a small population of the endangered growling grass frog. This meant that the Pakenham Racing Club had to build a new home for these rare amphibians.

The growling grass frog is a ground-dweller that grows up to 10cm long and is bright green and bronze with a 'warty' back. growling grass frogs like to live among reeds, sedges and rushes growing in and along slow moving streams, ponds, lagoons, swamps, lakes and farm dams. The Pakenham Racing Club has included the building of a 14ha wetlands habitat for them.

A $1million Living Victoria Fund Round Two grant has been approved to help Pakenham Racecourse develop a stormwater harvesting system which includes the wetlands system and stormwater harvesting system. The system will provide more than 40 million litres of water storage, with stormwater and runoff to be harvested from the site, treated and stored for re-use.

With any turf project the Achilles heel can often be the water supply. It is not only about having sufficient water once the turf is established but enough for the grow-in period. While the new stormwater harvesting system and wetland complex is still to become fully functional it will go a long way to 'water proofing' the racetrack into the future.

The track is completed and ready for racing and now the real challenges begin. Managing the wear and finding the time to renovate will be the main tasks to ensure that the quality and durability of the track is maintained. Despite these challenges, the feedback from the opening race meet certainly gave all those involved in the project a great boost with champion jockey Damien Oliver espousing that it was one of the best tracks in the country.

As a follow up to John Neylan's research project on the influence of sand type on surface hardness, a trial was commenced in April 2014 to examine the effects of a turf cover on the hardness characteristics of two different sand types

SAND TYPES AND THE INFLUENCE OF TURF

As a follow up to the research project on the influence of sand type on surface hardness **(see ATM Volume 16.5 – 'Hard and fast', p40-44)**, a trial was commenced in April 2014 to examine the effects of a turf cover on the hardness characteristics of two different sand types. The primary aims of this project were to;

- Examine the influence of the vegetation cover on surface hardness; and
- Whether the sand type continues to have an influence on surface hardness once there is a mature turf cover.

It is important to note that this trial is examining the effects of soil type and grass cover and for obvious reasons is limited in the management techniques that can be imposed.

Based on the trial work detailed in ATM 16.5, two sands were selected that represented a medium washed sand and a fine sand. Both sands are commercially available. Based on the previous work, sands FS1 and MS2 were selected and the characteristics are summarised in Table 1.

TABLE 1: SAND CHARACTERISTICS

Sieve size (mm)	% Particles retained*	
	FS1	MS2
<0.053	2.8	0.5
Fineness modulus	0.94	0.97
Cu = D60/D10	2.35	2.2
Description**	WG/F	WG/F
Infiltration rate (mm/hr)	256 (217 – 266)	1041 (963 – 1147)

*Sand gradings done by wet sieve analysis **WG = well graded, F = fine

The trial has three treatments – no grass (bare soil), grass only and grass with regular sand dustings. The pots were established with creeping bentgrass (*Agrostis stolonifera* var. Tyee) in April 2014 and maintained at a cutting height of about 4mm. The dusting treatment is applied every two weeks at a rate of 0.05-0.1m^3/100m^2. At this time there have been 17 dustings with the equivalent of 1.6m^3/100m^2 of sand applied.

The pots are tested monthly for hardness using the Clegg Impact Soil Tester with the 0.5kg weight and the flat head. Prior to testing, the profiles are wetted up to saturation and allowed to drain for 24 hours. On several occasions dry down studies were undertaken where the turf was dried down to the point of wilt with hardness and moisture content being measured over this period.

When the surface hardness is measured the moisture content is measured using the FieldScout™ soil moisture probe. The data has been analysed using a Two-Factor Anova which allows the variables

of grass type and sand type to be assessed independently as well as their interactions.

RESULTS

The effects of the grass cover are most apparent and the older the turf cover the greater the effect it has on surface hardness. In the first few months both bentgrass treatments were significantly softer than the bare sand (Table 2 and Figure 1). However, there was no difference between the bentgrass treatments and this was a reflection of the maturity of the turf, the amount of thatch and also there had only been a few dusting applications.

At about seven months after the trial started there has regularly been a significant difference between the dusting and non-dusting treatments with the dusting treatment providing a firmer surface. Over the 11 months of the trial there has been a gradual separation between the bare surface, bentgrass-no dust and the bentgrass–dust. The bare sand being the firmest, the bentgrass-no dust the softest and the bentgrass-dust in the middle.

On several occasions there has been a significant difference in the hardness between the sands with the MS being firmer than FS. This has been somewhat surprising, however, it is likely to be due to the relatively high moisture content where the MS sand is at its firmest when it is at a higher moisture content. The FS being higher in the <0.053mm fraction tends to be softer at the higher moisture content.

This result also highlights the fact that for a dramatic difference in hardness to be achieved the sand needs to be very fine – possibly too fine and

TABLE 2: SURFACE HARDNESS

Grass	2/1/15	20/02/15	21/02/15	22/02/15 11:30am	22/02/15 4:45pm	17/03/15	16/4/15
Nil	157[a]	136.6[a]	162.6[a]	185[a]	186[a]	172[a]	166[a]
Grass only	111[b]	91.8[b]	112.1[b]	121[b]	123[b]	115[b]	119[b]
Grass/dust	124[b]	110.1[c]	127.6[c]	149[c]	141[c]	147[c]	146[c]
LSD (P<0.05)	**13**	**11**	**12**	**12**	**11**	**17**	**13**
Sand							
FS	126	111	129	148	144	142	144
MS	135	114	139	156	155	147	144
LSD(P<0.05)	**NS**	**NS**	**SIG**	**NS**	**SIG**	**NS**	**NS**
Interaction (P<0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

TABLE 3: SOIL MOISTURE CONTENT

Grass	9/7/14	17/8/14	17/9/14	2/1/15	20/2/15	17/3/15	16/4/15
Nil	9.6[a]	10.4[a]	9.6[a]	10.0[a]	7.4[a]	5.7[a]	9.5[a]
Grass only	9.5[a]	20.2[b]	11.3[a]	15.9[b]	19.7[b]	16.2[b]	21[b]
Grass/dust	9.9[a]	22.1[b]	11.3[a]	15.0[b]	14.3[c]	10.6[c]	14.2[c]
LSD (P<0.05)	**NS**	**8.3**	**NS**	**1.9**	**2.1**	**1.6**	**1.3**
Sand							
FS	10.2	17.9	11.4	14.2	14.3	10.5	16
MS	9.1	17.2	10.1	13.1	13.3	10.8	13.8
LSD (P<0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**SIG**
Interaction (P<0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

Figure 1: Surface hardness

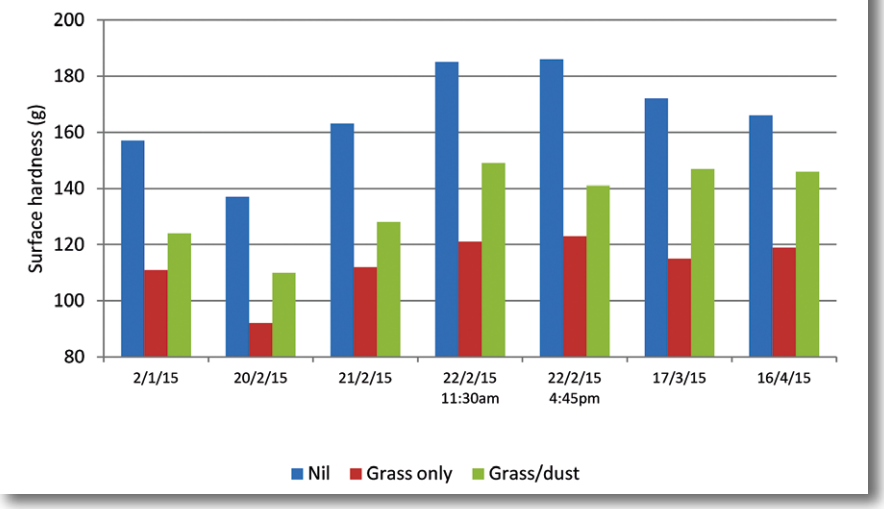
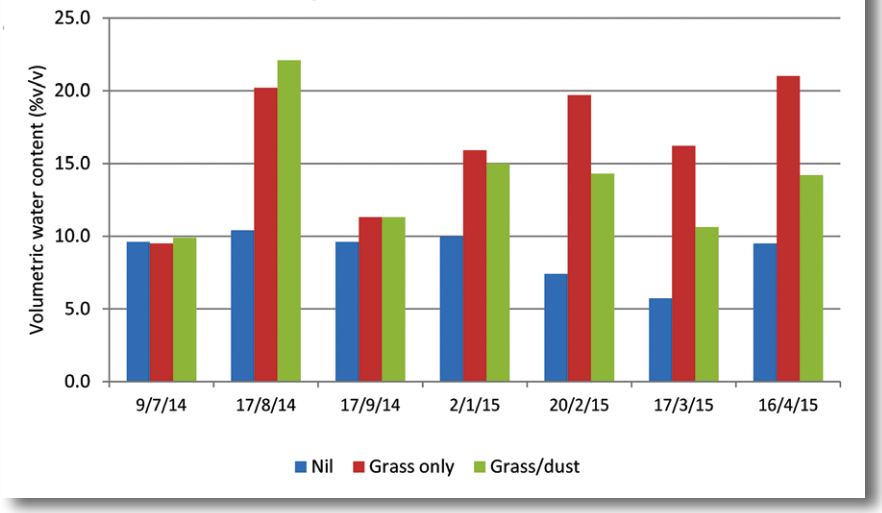


Figure 2: Soil moisture content



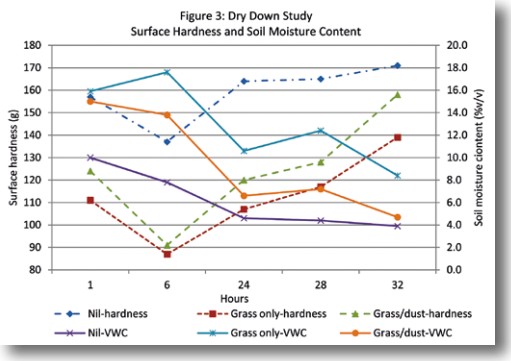


Figure 3. Dry down study – surface hardness and soil moisture content

very dry. In the analysis of the data there have been no significant interactions which mean that none of the variables have an effect on the other variable.

On several occasions there has been a significant difference in the volumetric water content, particularly as the turf has matured and the effects of the dusting becomes more apparent (Table 3 and Figure 2). Initially there was no significant difference between the treatments. As the turf matured, the bare sand had a significantly lower volumetric water content compared to the bentgrass alone with no difference between the bentgrass and the bentgrass-dust treatment.

Over the past four months the bentgrass plus dusting has been significantly drier than the bentgrass alone. On some occasions there has been a significant difference between the sand types with the MS having the lowest volumetric water.

Dry down studies were undertaken to determine the optimum moisture content at which maximum hardness was achieved. As the soils dried down there was an increase in hardness for all treatments (Figure 3). The change in firmness has a strong and reasonably predictable relationship, however, this relationship is specific to each treatment. The sands dry at the greatest rate, the bentgrass-no dust the slowest and the dusting treatment is midway between the other two treatments.

While the trial does not incorporate the management techniques normally employed on golf greens it does confirm our field observations that the turf cover quickly has an influence on surface firmness. The sand type as such does not necessarily influence the hardness of the surface but it is more about the control of thatch, soil moisture and the rate of drying. The grass cover has a major overriding influence on the dynamics of moisture and hardness with regular sand dustings critical in mitigating the effect of vegetation accumulation. Between now and the Australian Turfgrass Conference the trial will be completed including measuring infiltration rate and organic matter content.

ACKNOWLEDGEMENTS

This is a self-funded research project and I have been reliant on the in-kind support of Andrew Peart (AGCSA) for the use of the Clegg Hammer and Grant Greenway (ETP) for the use of the TDR moisture probe.

31st Australian Turfgrass Conference and Trade Exhibition

Crowne Plaza, Hunter Valley

21-26 June 2015

Conference Guide

WELCOME TO CROWNE PLAZA HUNTER VALLEY

On behalf of my fellow AGCSA Directors I would like to welcome you to the 31st Australian Turfgrass Conference and Trade Exhibition in the beautiful Hunter Valley region of Australia. The Crowne Plaza Hunter Valley Resort is our home for the next week and I sincerely thank you for making the effort to attend.

A diverse group of presenters have been secured offering a wide range of topics from *Poa annua* management to personnel management and a very timely reminder of men's health, in particular skin cancer. The range is so broad that there literally is 'something for everyone'.

This year we see the continuation of the very popular Monday workshops which are presented with thanks to Jacobsen. **David Bancroft –Turner** returns after wowing everyone last year on the Gold Coast with his presentations and continues along the same vein this year with his topics;

- **Political Intelligence** – How to survive, thrive and manage the politics at your club;
- **Changing behaviour** – The Feedback Tool guaranteed to get people to do things differently; and
- **Change management** – How to get people to do what you want.

David rated as one of the best presenters ever in the feedback survey after last year and shouldn't be missed.

Dr Jack Fry from Kansas State University is the other Jacobsen workshop presenter and he will be covering 'Stress management strategies for maintaining quality turf'. Given the summer we have just experienced in Australia you may well pick up some turf tips going forward from this well-respected presenter.

A few new innovations this year particularly in the trade exhibition will see our major sponsors able to conduct focus group meetings during the show, while breakfast will also be served on the exhibition floor on both mornings. All floor space in the exhibition has been booked out and we thank our trade partners for their support. The Friday golf will be a Big Hole Scramble event to give attendees a taste of this new style of golf if they haven't already experienced it on their home course.

The AGCSA Golf Championship, sponsored by Toro, will be held at Newcastle Golf Club where we will be hosted by superintendent **Matthew Goodbun**. The course is very highly rated and rightly so and its seemingly remote location means that a lot of people are yet to play it. Although "smashed" in Matt's own words during the April storms, I am sure we will be provided with a stern test of golf on the undulating layout.

The usual social events are also scheduled and the week promises to provide everything you could want in a conference. I have said this before, but if you can glean three new ideas to take back to your course to improve your operation then your attendance will have been worth it. Please enjoy the week and if you have any concerns please do not hesitate to contact me personally.

PETER LONERGAN
PRESIDENT, AGCSA

31ST AUSTRALIAN TURFGRASS CONFERENCE AND TRADE EXHIBITION

Host venue for the week, Crowne Plaza Hunter Valley

After the success of the 2013 event staged at Novotel Twin Waters on the Sunshine Coast, 2015 sees the Australian Turfgrass Conference and Trade Exhibition return to a resort location. The beautiful Crowne Plaza Hunter Valley, located in the heart of one of Australia's premier wine producing regions, will play host to this year's event, the first time the conference has ventured to this part of NSW.

Crowne Plaza Hunter Valley offers state-of-the-art conference and exhibition facilities, premier accommodation, an on-site golf course to facilitate with turf management training and great leisure facilities. Over the past 12 months Crowne Plaza has considerably expanded its facilities and in late January opened its new $4 million conference and events centre, the largest NSW convention centre north of Sydney. This new facility can cater for up to 1000 delegates with a combined 2012m^2 of pre-function, meeting and exhibition space.

The week in the Hunter Valley will begin for some when the 2015 Toro AGCSA Golf Championships is contested at Newcastle Golf Club (host superintendent **Matthew Goodbun**) on Sunday 21 June. That is followed on the Monday by the return for the third successive year of the popular Jacobsen sponsored Monday workshops.

As in past years the workshops cover both agronomic and management subjects and the AGCSA is delighted to welcome back the highly

popular **David Bancroft-Turner** who will conduct the latter. Bancroft-Turner returns by demand to repeat his 'sold out' sessions from the 2014 Gold Coast conference which received widespread acclaim by delegates. His 'Political Intelligence - How to survive, thrive and manage the politics at your club' workshop was rated as the best presentation in the AGCSA's post conference survey and for those who attended it has assisted them greatly to better handle clubhouse politics.

On the agronomic side of the ledger, the AGCSA is excited to present **Dr Jack Fry** from Kansas State University who will conduct a concurrent workshop titled 'Stress management strategies for maintaining quality turf'.

Also making the journey Down Under is former GCSAA president **Bruce Williams** who will join with the likes of well known local industry figures **Daryl Sellar** and **Andy Hugill** for two workshops which will look at career progression. The first 'Taking the Next Step' session will deal with making the move from superintendent to a general manager role, while the second part will look at how assistant superintendents can transition to superintendent.

Continuing the theme of men's health issues, the opening Plenary session on Tuesday will be particularly personal for a number of turf industry professionals. This year's two-hour session will deal with skin cancer and delegates will hear from colleague **Mal Caddies** (Suncorp Stadium) and **Scott Harris** (formerly superintendent Gold Creek CC, now Nuturf) who have had their own personal battles with this silent killer. Complementing their stories will be that of **Jo Crotty**, founder of Danger Sun Overhead, a mother of four who lost her 43-year-old husband to skin cancer and is now a passionate advocate for skin cancer prevention and awareness. This is a not-to-be-missed session.

Elsewhere, MCG arenas operations manager **Tony Gordon** will look back on his varied career which has taken him from his native Iowa in the US all the way to Melbourne and one of the world's most iconic sporting venues. Gordon will also team up with ANZ Stadium head curator **Graeme Logan** to look at their respective ground redevelopment projects undertaken in late 2014. AGCSA Distinguished Service Award winning agronomist **John Neylan** and leading researcher **Dr Percy Wong** will also bring their technical expertise to the conference, while the Thursday forum titled '*Poa annua* – Love, leave or loathe' will continue the long-running debate on wintergrass management.

CONFERENCE APP

If you are heading to the Hunter Valley then one thing you must do beforehand is download the Australian Turfgrass Conference app. Available on both Apple and Android devices, the conference app contains every bit of information delegates need to make the most of this year's event.

This year's app contains a 'Quick Bar' which remains visible (in red) at the top of the screen from anywhere within the app and lets you navigate to common areas such as the conference programme and speakers, trade show exhibitors and the My Schedule section. Also, when there is new data available the Refresh button will change colour.

The best way to see what the app has to offer is to download it and play around with it, but here are a few features to look out for:

- **My Schedule:** This is where your personalised schedule is viewed. When you bookmark any session it will automatically appear in your schedule. You can also add custom items with the + button on the right of the navigation bar and you can also view your Friends' schedules.
- **The Message Centre:** Swiping from the left from anywhere within the app opens up the Message Centre which lets you keep in touch with fellow delegates, manage your profile and stay on top of conference alerts.
- **Exhibitors:** The exhibitor list lets you easily browse exhibiting companies by their name and category (e.g.: seed company, chemical company, machinery). You can add exhibitors to your bookmarks by tapping the star icon next to an exhibitor. The app also contains a floor plan of the exhibition space.
- **Programme:** The programme list lets delegates easily browse the conference programme by day and streams . You can search for a session and you can add them to My Schedule by tapping the star icon on the session. Tap the notepad icon within each session to take down notes on your phone.
- **Speakers:** The speakers list lets you easily browse who will be presenting at this year's conference. You can view bios, profile photos and descriptions of their sessions and view which sessions they are presenting in.
- **Contacts:** The contacts list is populated by delegates who have chosen to make their profile public. To make your profile public, open the Message Centre by swiping from the left, tap your profile on the top and turn on the Publish My Profile option.

The 2015 AGCSA conference app contains a number of new features


David Bancroft-Turner


Dr Jack Fry


Mal Caddies


John Neylan


Tony Gordon


Graeme Logan

WHO WILL TOP THE CLASS IN 2015?

The life of a turf management apprentice can be a thankless one at times, but as this year's field of AGCSA and STA Graduate of the Year Award finalists demonstrate, with a little bit of hard work and commitment, not to mention a fair helping of skill and nous, the wonderful opportunities that the industry can afford are there for the taking.

The future of the Australian turf management industry lies in the young blood coming through its ranks and each year the AGCSA and STA give two lucky turf management apprentices a kick start to their careers. As has been the tradition of both awards, this year's recipients will receive a trip of a lifetime courtesy of award sponsors Toro Australia. The AGCSA winner will attend the Winter School of Turf Management at the University of Massachusetts and visit the 2015 Golf Industry Show, while the STA winner will attend the Toro Sports Field and Grounds Forum in the US.

The AGCSA, together with STA Australia, congratulate the following finalists for winning their state awards and making it through to the national finals:

2015 AGCSA GRADUATE OF THE YEAR AWARD

GCSAWA

Rohan Janeway
Mandurah GC

Rohan Janeway is a qualified greenkeeper and has been employed at Mandurah Country Club south of Perth since 2011. On completion of his traineeship in September 2014, Janeway was quickly promoted to leading hand, taking on core responsibilities and ownership of much of the course operations. Janeway is specialising in the irrigation and water management aspects of the course, leading to the club being awarded Bronze status in the Water Wise recognition programme as well as running the club's newly integrated recycled water programme.

Janeway finds a good work/life balance with his strong mechanical aptitude driving his passions for four wheel driving and the turf management industry. He also received the Sports Turf Management Apprentice of the Year and at the WA Golf Industry Awards in March collected the GCSAWA Graduate of the Year Award which qualified him for the national final.

NSWGCSA

Shaun Bowden
Elanora Country Club

Bowden is a hard working, enthusiastic country boy who loves to have a laugh. Having lived in Sydney since he was 15 years old, Bowden began at Elanora Country Club in Sydney's north in 2010 as a morning summer causal under the leadership of superintendent Daniel Cook. Within six months he was made a full-time groundsman and soon found that he had developed a real passion for the turfgrass industry.

At that point Bowden decided to undertake studies at Ryde TAFE to become a qualified greenkeeper. In 2014, before finishing his Certificate III studies, he was promoted to the position of foreman, responsible for a staff of 25. Bowden intends to continue his TAFE studies in the coming year and one day hopes to be a course superintendent but also experience work abroad in Asia, Europe or the USA.

SAGCSA

Jacob Burridge
Kooyonga Golf Club

Burridge is 21 years of age and hails from Adelaide where he attended St Michaels College. Growing up with a love of sport, in particular cricket, AFL and golf, Burridge has worked at the Kooyonga Golf Club for the past four years under the guidance of course superintendent Steven Newell. Most recently Burridge started studying a Diploma in Sports Turf Management through correspondence in Geelong, Victoria.

Burridge was recently elevated to the role of 3IC at Kooyonga which rates as his biggest achievement in the four years he has been working in the turf industry. While completing his Diploma studies is a priority for Burridge at present, his future aspirations include progressing into more senior roles as an assistant superintendent and one day becoming a superintendent of a championship golf course.

VGCSA

Andrew Watson
Eastern Golf Club

Watson is currently a turf manager at the Eastern Golf Club at their newly constructed site at Yering. Watson completed his apprenticeship at Churchill Park Golf Club while studying at Holmesglen TAFE and during that time he received the 2nd and 3rd Year Outstanding Apprentice Awards as well as the VGCSA Turf Apprentice Award. Even though he was a relative late starter in the industry, the 26-year-old has a passion for sports and horticulture. When not on the turf, Watson is a proud father of a baby girl, an Essendon supporter and a Moonee Valley member.

OTHER AGCSA FINALISTS

GCSAQ: Graeme Eaton (Lismore Workers GC)
TGCSA: Jason Whelan (Barnbougle Dunes)

2015 STA AUSTRALIA SPORTS TURF GRADUATE OF THE YEAR AWARD

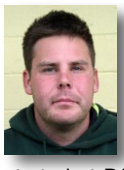
STA NSW

Matthew Clark
Tweed Shire Council

Clark has played a strong role in the sports field team at Tweed Shire Council, working closely with the co-ordinator and often taking leadership roles in organising programmes, renovations and major projects. Clark is passionate about the preparation of council's cricket wickets.

In addition to Certificate III in Sports Turf Management, Clark has achieved Certificate III Horticulture, Parks and Gardens at Wollongbar TAFE. He is keen to turn his knowledge into mentoring apprentices in the future and hopes to one day work overseas to expand his knowledge in the turf industry.

STA SA



Jake Herrmann
D&D Curators

Herrmann's working career started in the building industry working on various projects for two years until he started at D&D Curators where he now enjoys the satisfaction of preparing bowling greens and cricket wickets for local Adelaide clubs. He completed his Certificate III at Urrbrae TAFE.

The technical side of turf preparation is something that Herrmann has enjoyed learning about while at D&D Curators as well as the importance of maintaining machinery to keep it in good condition. He enjoys the challenges that every different site brings and continuing to learn.

STA TAS

Grant Woolley
City of Launceston, Aurora Stadium/ Inveresk Precinct

Woolley's career in turf management started when working as a casual at Aurora Stadium/Inveresk Precinct which was then made into a full-time position. During this time Woolley undertook Certificate III in Sports Turf Management at TAS TAFE.

Woolley experiences a diverse range of turf management practices from maintenance to renovation and construction of sporting fields and preparation for AFL, A-League football and First Class cricket. He is committed to continuing his studies to enhance his career within the industry.

STA VIC

Jonathon Perez
Melbourne & Olympic Parks Trust

Perez started his turf management career at The Sands Golf Club, Torquay as an adult apprentice before moving to Melbourne & Olympic Parks Trust to join the sports turf team. Studying at The Gordon TAFE, Geelong, Perez is involved in all facets of sports field preparation from local level to international events.

Perez has worked up to the status of match day grounds manager, supervising staff to prepare AAMI Park for domestic rugby and soccer fixtures. He also has an interest in fitness and has achieved a Certificate III in Sport and Recreation and Certificate IV in Fitness as well as coaching a local soccer team and working with athletes for strength and conditioning.

STA WA

Matthew Lane
Scotch College

Lane's interest in turf management started with a part-time position at Marri Park Golf Club. From this position a career was formed after working at the Western Australian Cricket Association (WACA) during The Ashes Test series and cricket season and eventually being offered an apprenticeship working at the WACA and Murdoch facilities.

Lane's achievements at work and at Murdoch Challenger TAFE have led him to a position as head wicket curator at Scotch College. He plans to obtain his Certificate IV in Sports Turf Management and in the future hopes to gain more experience at venues interstate and overseas.

PAST AGCSA AND STA GRADUATE OF THE YEAR WINNERS

Year	AGCSA	STA
2014	Ethan Bell (Wangaratta GC, Vic)	Luke Cooney (Hale School, WA)
2013	Luke Jorgensen (Federal GC, ACT)	Andrew Spicer (Wyong Shire, NSW)
2012	Dave Canterbury (Kiama GC, NSW)	Rory Bairnsfather-Scott (WACA, WA)
2011	Dan Oswin (Novotel Forest Resort, Vic)	Rebecca Dynon (Racing Victoria)
2010	Adam Shields (Casino Golf Club, NSW)	

GOLF

SUNDAY

2pm - 4pm
Conference registration open

10.30am - 4.30pm
Toro AGCSA Golf Championships - Newcastle Golf Club

4.30pm - 5.30pm - Pre-dinner drinks and canapes

5.30pm - 8pm - Toro Golf Dinner

MONDAY

AGCSA Jacobsen Workshops
10am - 3pm (lunch @ 12.30pm)

Dr Jack Fry
Stress management strategies for maintaining quality turf

David Bancroft-Turner
Political Intelligence - How to survive, thrive and manage the politics at your club

AGCSA TRADE CHALLENGE GOLF
11.30am - 4.30pm
Hunter Valley Golf & Country Club (Crowne Plaza)

PARTNERS MORNING TEA
10am - Hunter Valley Winery T.B.C

6.30pm - 10.30pm - SYNGENTA PRESIDENT'S DINNER

TUESDAY

Plenary - Semillon Ballroom

8.30am - 10.30am
Men's Health - Danger Sun Overhead - Forum on the prevention, awareness and early detection of skin cancers. Includes talks by industry survivors Mal Caddies and Scott Harris

10.30am - 11.00am - Morning Tea

11am - 11.40am
Dr Jack Fry - Turfgrass's niche in a green society

11.40am - 12.20pm
Laura Williams - Ecology and control of *Poa annua* on Macquarie Island

12.20pm - 1pm
Tony Gordon - My Career

1pm - 2pm - Lunch

2pm - 2.40pm
Michael Bradbery - Experiences from Deere Run

2.40pm - 3.20pm
Albie Leggett - NSW insect monitoring project

3.20pm - 4pm
Nadeem Zreikat and Gareth Hammond - Keeping up with technology

4pm - 6pm - TRADE SHOW OPENING

WEDNESDAY

7am - 9am
Breakfast in Trade Exhibition

7.45am
AGCSA AGM - *Semillon 3*

Semillon 3
9am - 10.30am
If you build it they will come - Forum - A look at the boom in golf course constructions in and around Tasmania

10.30am - 11am - Morning Tea

11am - 1pm
Short and Sweet - Short game practice facilities and courses. Includes design, planning and construction

1pm - 2pm - Lunch and Trade Show

2pm - 3.30pm
Disease Discussion
John Neylan - Managing bentgrass during long periods of humidity
Percy Wong - New diseases and their implications to the Australian Turf Industry

3.30pm - 5.00pm - Trade Show

THURSDAY

7.30am - 9am
Breakfast in Trade Exhibition

Semillon 3
9am - 9.50am
Dr Jack Fry - When golf course maintenance and the Rules of Golf collide

9.50am - 10.30am
John Neylan - Trialling sands for firmer greens

10.30 - 11.00am - Morning Tea

11am - 1pm
Poa Annua - Love, Leave or Loathe
Forum session where we will hear from those who embrace their Poa, those who live with it and manage it and those who have banished it altogether

1pm - 2.30pm - Lunch and Trade Show

2.30pm - 4pm
Dr Jack Fry - Managing irrigation to maximise plant health

6pm - 8pm EVERRIS FAREWELL BASH

FRIDAY

Big Hole Golf Scramble
8am - 1.30pm
Join us at Cypress Lakes for an 18-hole 'Big Hole' golf scramble and lunch

WORKSHOPS

WEDNESDAY

Verdelho Room

9am - 10.30am
Taking the Next Step (Part 1: Superintendents)
Workshop designed for those looking to step off the course and into the club house

11am - 1pm
David Bancroft Turner
Changing behaviour – The feedback tool guaranteed to get people to do things differently

2pm - 4pm
David Bancroft Turner
Change management – How to get people to do what you want

N.B. All session times correct at time of publication. Timetable subject to change

SPORTSFIELD

SUNDAY

2pm - 4pm
Conference registration open

10.30am - 4.30pm
Toro AGCSA Golf Championships - Newcastle Golf Club

4.30pm - 5.30pm - Pre-dinner drinks and canapes

5.30pm - 8.00pm - Toro Golf Dinner

MONDAY

AGCSA Jacobsen Workshops
10am - 3pm (lunch @ 12.30pm)

Dr Jack Fry
Stress management strategies for maintaining quality turf

David Bancroft-Turner
Political Intelligence - How to survive, thrive and manage the politics at your club

AGCSA TRADE CHALLENGE GOLF
11.30am - 4.30pm
Hunter Valley Golf & Country Club (Crowne Plaza)

6.30pm - 10.30pm - SYNGENTA PRESIDENT'S DINNER

WORKSHOPS

THURSDAY

Verdelho Room

8.30am - 11am
David Bancroft Turner
Changing behaviour – The feedback tool guaranteed to get people to do things differently

11am - 1pm
David Bancroft Turner
Change management – How to get people to do what you want

Chardonnay Room

11am - 12.30pm
Taking the Next Step (Part 2: Assistant Superintendents)
Workshop designed to enhance personal and professional skills to help when looking to move into a Superintendents position

TUESDAY

Plenary - Semillon Ballroom

8.30am - 10.30am
Men's Health - Danger Sun Overhead - Forum on the prevention, awareness and early detection of skin cancers. Includes talks by industry survivors Mal Caddies and Scott Harris

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2.40pm - 3.20pm
Albie Leggett - NSW insect monitoring project

3.20pm - 4pm
Nadeem Zreikat and Gareth Hammond - Keeping up with technology

4pm - 6pm - TRADE SHOW OPENING

WEDNESDAY

7am - 9am
Breakfast in Trade Exhibition

Semillon 1
9am - 10.30am
Reconstructing and resurfacing forum - A look at the work done at major stadiums in readiness for major events. Includes MCG, ANZ Stadium and Hunter Stadium

10.30am - 11am - Morning Tea

11am - 11.40am
Michael Smith - STA/Toro Sportsfield Mentoring Programme

11.40am - 12.20pm
John Neylan - Managing sportsfields during throughout varying summer conditions

12.20am - 1.00pm
Dr Jack Fry - Sportsfield maintenance mythbusters

1pm - 2pm - Lunch and Trade Show

2pm - 3pm - Practical demonstrations, including line marking, field painting and removal and weed identification

3.30pm - 5pm - Trade Show

THURSDAY

7.30am - 9am
Breakfast in Trade Exhibition

Semillon 1
9am - 9.30am
Greame Logan - Preparing turf in preperation for protection flooring

9.30am - 10am
Flooring materials for turf protection during non-sporting events

10am - 10.30am
Paul Paton - Disease - Why, when, what, a holistic approach

10.30am - 11am - Morning Tea

11am - 11.40pm
Drop-in wickets

11.40am - 12.20pm
Sean Cary - Cricket Australia - Relationship building with curators

12.20pm - 1pm
Wicket Forum and expert Q&A

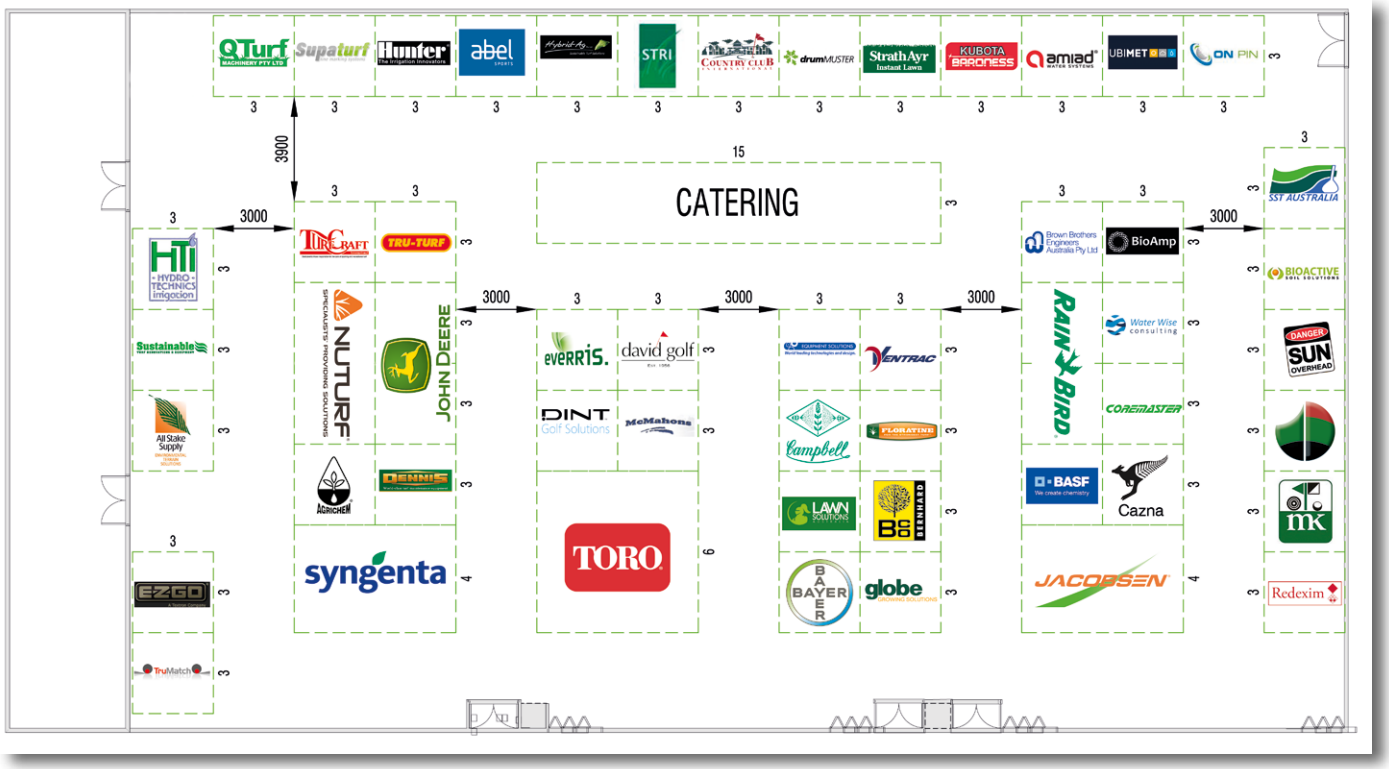
1pm - 2.30pm - Lunch, Trade Show

2.30pm - 4pm
Dr Jack Fry - Managing irrigation to maximise plant health

6pm - 8pm EVERRIS FAREWELL BASH

FRIDAY

Big Hole Golf Scramble
8am - 1.30pm
Join us at Cypress Lakes for an 18-hole 'Big Hole' golf scramble and lunch



31st Australian Turfgrass Trade Exhibition Floorplan

STAND	COMPANY
1	TruMatch
2	E-Z-Go
3	All Stake Supply
4	Sustainable Turf Renovations
5	Hydro Technics Irrigation
7	QTurf Machinery Pty Ltd
8	Supaturf (Aust) Pty Ltd
9	Hunter Industries
10	Abel Sports
11	**Hybrid-Ag**
12	STRI Ltd
13	Country Club International
14	drumMuster & ChemClear
15	StrathAyr Instant Lawn/Legen Couch Grass
16	**Kubota Tractors Australia**
17	Amiad Water Systems
18	**Ubimet Pty Ltd**
19	On-Pin
20	SST Australia
21	Bioactive Soil Solutions Pty Ltd
22	Danger Sun Overhead
23	AGCSA
24	Maxwell & Kemp Pty Ltd
25	Redexim
26	TurfCraft International
27	Tru Turf Pty Ltd
28	Everris Australia
29	David Golf & Engineering Pty Ltd

STAND	COMPANY
30	Equipment Solutions Pty Ltd
31	Ventrac Australia Pty Ltd
32	Brown Brothers Engineers Australia
33	NCH Australia (BioAmp)
34/42	Nuturf Australia Pty Ltd
35/43	John Deere Ltd
36	Dint Golf Solutions
37	McMahons
38	Colin Campbell (Chemicals) Pty Ltd
39	Floratine Asia Pacific
40/46	**Rain Bird Australia**
41	Waterwise Consulting
44	Lawn Solutions Australia
45	Bernhard and Company Ltd
47	Coremaster
48	Agrichem
49	Dennis and Sisis
50	**Bayer Environmental Science**
51	Globe Growing Solutions
52	BASF Australia Ltd
53	Cazna Australia Pty Ltd
54	**Toro Australia**
55	Jacobsen, A Textron Company
56	**Syngenta Australia Pty Ltd**

Coloured listing denotes 31st Australian Turfgrass Conference major sponsor. Floorplan correct at the time of publication.

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Roots are a hidden but critical part of the golf course. Superintendents who actively monitor roots will have a better grasp of the condition of their facility

Root of happiness

As a lead-in to his presentations at the upcoming 31st Australian Turfgrass Conference, Kansas State University turf expert Dr Jack Fry looks at the importance of a thriving turfgrass root system and some of the key fundamentals of maintenance a superintendent should keep in mind that are critical for summer putting green performance.

The best golf course superintendents are well apprised of all matters of importance at their facility. Surprises don't fit well with their persona. For that reason, it should be somewhat disconcerting to all superintendents that turfgrass performance on the golf course is largely dependent upon part of the plant's morphology that is out of site and, usually, out of mind – roots.

Creeping bentgrass and annual bluegrass, like other perennial grasses, have very fine, fibrous root systems (Beard, 2001). The optimum temperature for their root growth is 10-18°C. Relative to other cool-season grasses, the midsummer rooting depth of creeping bentgrass and *Poa annua* is poor.

In the late 1990s I cooperated with a colleague, Dr Bingru Huang, and graduate students to better understand root growth of creeping bentgrass on putting greens under heat stress. In the Midwestern USA, it is not uncommon for midsummer daytime high temperatures to exceed 35°C and night-time temperatures may not drop below 25°C. Likewise, soil surface temperatures during midday can exceed 35°C as well.

In a series of experiments done in a growth chamber, the temperature of the rootzone was controlled independently from that of the air. This allowed the rootzone to be maintained at an optimum temperature (20°C), while the shoots were exposed to high air temperatures (35°C) for a prolonged period of time. We also evaluated all combinations of temperatures, such as;

- High rootzone and high air temperatures;
- High rootzone, but cool air temperatures; and
- Cool rootzone and cool air temperatures.

From this research, it was demonstrated that maintaining a cool soil rootzone in the presence of high air temperatures resulted in good creeping bentgrass quality (Xu and Huang, 2001). Conversely, elevating the temperature of the rootzone, even when air temperatures remained cool, resulted in turf decline.

In addition, through this and other projects, we've found that when summer physiological decline occurs, roots typically decline first, followed by shoots and then turf quality. Follow-up research at Rutgers University showed that creeping bentgrass root growth, relative to a rootzone at 20°C, begins to decline at temperatures as low as 23°C (Pote et al., 2006). It is not surprising then that most of the fundamental cultural practices superintendents employ on the golf courses are devised to stimulate root growth, directly or indirectly.

These fundamentals are critical for Australian golf course superintendents managing creeping bentgrass and annual bluegrass putting greens during summer. Cultural practices used throughout the growing season, including when the plant is growing most efficiently, are going to determine whether the turf survives through extended periods of summer stress. In other words, how you manage the greens in April and October influences their performance in December and January.

There are several key fundamentals of maintenance the superintendent should keep in mind that are critical for summer putting green performance.

GOOD DRAINAGE

It goes without saying that good drainage is critical. A porous soil profile that drains well is essential to root health. If you're managing turf on something other than a sand-based green built using sound construction practices, you may have a profile that retains too much water. Higher soil water content results in less soil oxygen, and roots need oxygen to respire and grow.

Furthermore, a rootzone with more water in it also retains heat more than one that drains well. As such, poorer drainage not only reduces oxygen but also may result in sustained high temperatures during summer months, which can quickly lead to root decline and eventually loss of turf quality (Huang et al., 1998). Core aeration, followed by sand topdressing, can be used to encourage water infiltration, but subsurface drainage is important to get water out of the rootzone.

CARBOHYDRATES

Carbohydrates are 'money in the bank'. Research has shown that surplus carbohydrates (sugars) produced during autumn and spring and stored in the plant may determine whether roots can be maintained through midsummer conditions. This is because cool-season grasses are often inefficient at photosynthesis (sugar production) during high summer temperatures, but respiration (use of sugars) continues at a relatively high rate and can deplete the plant's supply (Huang et al, 2000).

At ultra-low mowing heights on greens, this can result in 'starvation' which leads to root loss and is analogous to trying to withdraw more money from your bank account than it contains – not a good idea! Stored carbohydrates can make up for the plant's inefficiency in fixing carbon during this time of year.

MOWING AND ROLLING

Mow higher and utilise rolling. Mowing higher on putting greens is always better for the plant. By raising the mowing height 0.5mm to 1mm you'll see increased root development and better turf quality (Huang et al., 2000).

Replacing daily mowing with periodic rolling, which allows maintenance of green speed, results in greater leaf area and more photosynthates that the plant can use to develop roots. Rolling is particularly effective on sand-based greens that are not susceptible to soil compaction. By increasing leaf area with less frequent mowing, you're contributing to the plant's mechanism for producing carbohydrates.

LIGHT

Light is critical. Shade reduces the plant's ability to photosynthesise and total carbohydrates produced. Consequently, shaded turf has restricted rooting and is more susceptible to heat stress, traffic and some biotic pests. In addition, it's slower to recover.

Golf course superintendents commonly face resistance when the topic of thinning or removing trees comes up. Light measurement tools and excellent communication skills can help golfers and other decision makers at the course 'see the light' for the benefit of the turf.

AIR MOVEMENT

Good air movement reduces stress. Transpiration is the process whereby the plant loses water through stomata as vapour. For transpiration to occur, a water potential gradient is necessary between absorption at the root, through the plant and to the atmosphere. On humid, still days, or when vegetation surrounds the green, there is little gradient in water vapour between the stomata and the atmosphere. As such, transpiration is limited and the plant can't cool itself (Fry and Huang, 1999). Lack of transpiration results in more heat stress and, potentially, more turf decline.

IRRIGATION MANAGEMENT

Good water management encourages rooting. Superintendents have a tendency to over-water greens. Amount and frequency of irrigation should depend on weather conditions, soil type and rooting depth. You should wet soil to the depth of the root system with each irrigation. Then, allow soil to dry nearly to the point where drought symptoms first appear; this approach has led to increased rooting of creeping bentgrass and other turfgrasses (Jordan et al., 2003).

Of course, if roots have deteriorated to a depth of 2cm or so in midsummer, the turf may need two or more irrigations per day according to these guidelines. Thus, if you water your greens on a set schedule, applying the same amount of water every day without considering environmental conditions or rooting depth, you should re-evaluate

A strong healthy root system is critical for summer putting green performance

PHOTO COURTESY OF DR DEREK SETTLE

Summer quality decline of creeping bentgrass and annual bluegrass on putting greens is not unusual. Visual symptoms of physiological decline usually come after loss has begun

your programme. Hand-held soil water sensors are very valuable tools for determining how well water is distributed and to assist in hand-watering of greens.

FERTILISING

Balanced fertilisation helps plant performance. The creeping bentgrass or *Poa annua* plant that has all essential nutrients available to it in adequate quantities will have a more extensive root system and be better prepared for heat stress.

Nitrogen is the staple in the programme, so you should apply it at levels that maintain adequate density and growth. Low annual nitrogen strategies for the sake of green speed are not conducive to good plant health and summer heat tolerance. Likewise, excessively high nitrogen levels produce a succulent plant with shallow roots that is less resistant to high temperatures. You should assess other soil chemical factors such as pH, phosphorus and potassium with regular soil tests. Potassium, in particular, may help increase heat tolerance.

OBSERVE

There are, obviously, other cultural practices that can impact root development. You may notice that I left items off the list such as application of biostimulants or ultra-violet radiation blockers. No doubt some superintendents believe in the benefits some of these products may provide. However, I consider them secondary to essential fundamentals that have the greatest impact on rooting.

So what can a superintendent do to be better in touch with the condition of turfgrass roots on the golf course? Sampling roots on putting greens at least weekly and evaluating them visually is a good place to start. Use profile samplers that provide a cross-section view of the rootzone to a depth of about 6 inches. Don't just look for presence of roots, but also their colour. Healthy roots are white, whereas unhealthy or dead roots are brown. Superintendents who monitor roots will have a better grasp of the condition of their facility; they're a hidden, but critical part of the golf course.

Sampling roots on putting greens at least weekly and evaluating them visually is a good place to start. Use profile samplers that provide a cross-section view of the rootzone to a depth of about 6 inches

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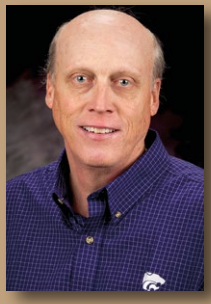
INTRODUCING.... DR JACK FRY (KANSAS STATE UNIVERSITY)



Dr Jack Fry (pictured) is a Professor in the Department of Horticulture, Forestry and Recreation Resources Kansas State University. He received a B.S. from Kansas State University, M.S. at the University of Maryland, and Ph.D. at Colorado State University. Dr. Fry was on the faculty at Louisiana State University from 1987 to 1991 teaching and conducting research in turfgrass science. In 1991, he returned to K-State. There, he teaches courses in turfgrass culture and golf course and sports turf operations, and conducts research on turfgrass environmental stresses, establishment, and pest control.

In 2004, Dr Fry co-authored the textbook Applied Turfgrass Science and Physiology. He has served industry associations in numerous capacities, including as the 2004 chair of division C-5 (Turfgrass Science) of the Crop Science Society of America. He has taught for seminars for the GCSAA since 1998. In 2011 he received the Fred V. Grau Turfgrass Science Award from the Crop Science Society of America (CSAA) and in 2012 was named a Fellow of CSSA.

Dr Fry will give a total of five presentations at the 31st Australian Turfgrass Conference, including the day-long Jacobsen-sponsored workshop on the Monday. That workshop will deal with stress management strategies for maintaining quality turf.

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At the 31st Australian Turfgrass Conference delegates will hear from former GCSAA president Bruce Williams. A US industry veteran of over 40 years, Williams is an expert on career development and progression and here he provides a lead-in to his Hunter Valley presentations which will focus on what assistant superintendents and superintendents need to make the next move up the career ladder.

Climbing the career ladder

It was in 1936 that my father, Bob Williams, graduated from the University of Massachusetts and the Stockbridge School of Agriculture in the US. His specialisation was in turfgrass management, a field that had been previously passed on by word of mouth from one greenkeeper to another.

A lot has changed over the last eight decades both with golf course conditioning and overall club management. We are fortunate today to have a variety of educational curriculums offered to advance your career in golf course and club management.

In 1973 I had a college degree and ventured out into the real world of employment in the industry. I was fortunate to work for D. Frank Dobie at Sharon Golf Club. Frank had worked for my father at Bob O'Link Golf Club in the Chicago area. After a few short years as a superintendent in Ohio Frank moved on to build the Sharon Golf Club and became its first and only general manager. The lessons I learned from Frank set the tone for my own career and also the many seminars I have taught, over the years, to work with others on development of career paths.

Wanting to be a golf course superintendent I knew I needed to learn all about grass. I did have prior experience working on golf courses and figured if you could grow grass you could be a good golf course superintendent. How little did I realise that grass growing is a cornerstone of your education but not the only skill needed to be successful.

My first week on the job at Sharon Golf Club, Frank informed me that I would be working both inside and outside. Not understanding the value of that I asked the question "Why would I need to learn about the business and food and beverage side of the business?" Frank responded and told me that I should "not limit myself to merely growing grass". It became clear that there was so much more to our business than the green side of the industry.

Each and every day I worked in the morning out on the golf course. By 11am it was time to get cleaned up and work the lunch crowd by serving drinks and food. I consider that training something that helped me to understand the members of the club and also about customer service.

Not long after working at Sharon Golf Club I enrolled in the Turfgrass Management Program at Michigan State University. I now could match my degree in English with the scientific basis to become a superintendent. On a visit to my parent's home I saw a magazine on the coffee table that was entitled 'Psychology Today'. I asked my dad why he had

that magazine and he dryly explained that if you are going to be successful you have to understand how people think, both the people that work for you and the people you work for.

On my first internship I worked at Glen View Club for Bruce Sering. Bruce had also worked for my dad and was an excellent mentor for me. Bruce had so many more responsibilities than a golf course superintendent in that he managed the many buildings, clay tennis courts, skating rinks, curling house, etc. He made sure I was immersed into those things so I would have a better foundation to develop my career.

CAREER DEVELOPMENT

Just as the industry changed from the 1930s up until the 1970s, it has changed exponentially in terms of how we develop our careers. People still need a combination of formal education and work experience to advance.

I fully realise that many in our industry are totally satisfied doing their job as a golf course superintendent. But as the times change we have seen things happen like a consolidation of the three key positions on the golf course. What formerly might have been the 'Key 3', with a golf course superintendent, golf professional and club manager, has seen trends toward combining several of those positions. As that happens it begs the question "Are you prepared to move up the career ladder?"

Let's start with the logical progression of our industry. Typically that is moving from a golf course worker to someone who has career aspirations. A career is so much more than a job and it is something that evolves over time with learning new skills and taking on greater responsibility. Rarely is that done without formal education these days. Even early on it should be a part of the plan for you to create opportunities for your own success.

The first step in the business is to work on a golf course. One will soon find out if 4:30am wake-ups are your thing and if you really like working outside in the many weather conditions you will have throughout the year. In the old days a lot of physical labour was required in the early years and that has lessened with mechanisation, but a few blisters never hurt anyone in the early stage of this career.

During those early years of training try to learn as many skills as you can. Remember that later you will be teaching those skills to your employees. Variety is important and it would be prudent to ask your potential employer what all you can learn in a year or during the time of your employment. If for some reason you do not get the variety you need then make it your goal to watch, listen and learn from others. One does not have to apply a fertiliser or plant protectant to know what goes down at what rate and what target pest might be involved.

Once your career is underway, choose your path wisely. All too often people choose where they

Obtaining a posting at an elite level club doesn't happen by chance. Superintendents make their own luck through hard work and a proven track record

Opposite: Mentors are such a critical component in career development. Choose your mentors wisely and you will reap the rewards later along the career path

Immersing yourself in as many golf course activities, whether day-to-day maintenance or construction projects etc..., provides a better foundation to develop your career

work by items like proximity to home, wages paid and job title. While those are important factors it would be much better to look at things like upward mobility, quality and value of mentorship, pedigree, broad climate immersion, etc. For those trainees I mentored they always come back and tell me how important of a lesson that was for them. Since I had 164 young men and women train under me I would say it was part of a lesson I was taught and that I passed on from my mentors.

It may take longer today to become an assistant superintendent than it did in the 1970s. I became a superintendent at the age of 25 and see many people today landing that first big job when they are well into their 30s. It is all about supply and demand.

All the hard work you have put in will change dramatically when you are an assistant. The best advice is you will be working labour and thinking management at most facilities. The assistant today does much of what the greenkeeper did in years past. Ultimately a good assistant superintendent will learn and know all the nuances of proper golf course conditioning. People with a vision for the future will carry out their jobs well but will also learn how to lead and manage their team. This is something that is rarely taught in the classroom and something that is best learned from mentors. Choose your mentors/bosses wisely.

After years of preparation the opportunity to get that first golf course superintendent job will come along.

- Are you ready to say yes?
- Have you prepared your skill set properly?
- Do you know what skills are requested/required by the employer?
- Have you had the proper training for producing a cover letter and resumè?
- How do you set yourself apart from the other candidates?

Once you get the superintendent job remember that it is just another rung on that career ladder. Make a list of the things you will need to do and learn to move up to other jobs with greater responsibility and compensation. Any time I hear that 'Superintendent X was lucky to get that job' I think back when my father taught me that "the harder you work the luckier you will get".

Develop a plan for your career. Establish where you are and where you want to be. That plan should have all of the following:

- Timeline;
- Skills required;
- Education needed; and
- Certifications along the way.

As you rise through the ranks of a superintendent, take on more responsibility. You may take on tasks and learn skills such as:

- Construction work;
- Golf course remodelling;
- Facility management;
- Development of long range plans;
- Strategic planning;
- Food and beverage responsibility; and
- Tournament management.

Items like these will prepare you for the ultimate move up the career ladder to be the superintendent at a top club or even a general manager candidate. In summary, your career doesn't happen by chance – you make your own luck! We are all in charge of the decisions that provide the opportunities to succeed!

Below and below right: A career in greenkeeping is so much more than a job and it is something that evolves over time. During your early years of training try and learn as many skills as you can and as you rise through the ranks take on more responsibility

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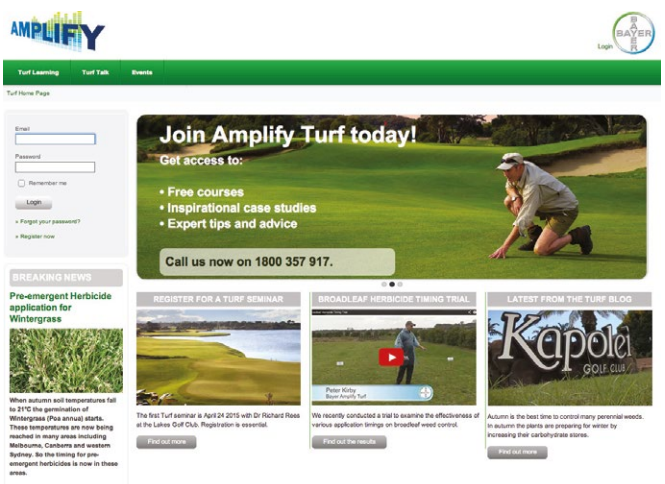

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Results from the first year of the UWA's research project show that under both high and low irrigation regimes most soil amendments were successful in increasing soil water content. However, in high irrigation plots, this increase did not result in significant effects on turf growth or colour

Water savings with soil amendments

In Volume 16.3 University of Western Australia researchers Gausul Azam and Pieter Poot outlined their Horticulture Innovation Australia-funded project on amending soils for reducing demand for irrigation by turfgrass. Here they report results from the first year of the project

Horticulture Innovation Australia

Many Australian cities are predicted to face water shortages due to increased temperatures, declines in rainfall and an increased demand for water as a result of the expansion of our cities. Western Australia's capital city Perth might experience a substantial water deficit as early as 2020.

More than 10 per cent of Perth's annual water use is associated with irrigating community parks and gardens. In addition, a substantial fraction of household water is used for watering home gardens, including turfgrass. Water restrictions have been introduced to both scheme water and bore water in response to increasing water demands and declining rainfall. Thus, turfgrass managers and home owners are facing the ongoing challenge of maintaining turfgrass with less water.

As there is increasing evidence that public and private green spaces are important for maintaining physical as well as mental health, developing approaches for maintaining turfgrass under limited irrigation is essential. Maintaining turfgrass under limited water supply is challenging, especially in sandy soils (such as on Western Australia's coastal plain), which have a relatively low water retention capacity and a tendency to become water repellent.

Turfgrass grown on sandy soils is dependent on frequent summer irrigation. Amending sandy soils with materials containing smaller particle size (e.g. clays) or which have a porous structure (e.g. zeolite) that stores water internally, has been shown to increase the water holding capacity of these soils. These materials are also likely to slow the movement of irrigation water beyond the rootzone, increasing soil water available for turfgrass and hence decreasing the demand for irrigation.

The aims of the current project were to obtain independent evidence of the efficacy of a range of soil amendments in decreasing the irrigation requirements of turfgrass and to identify the mechanisms responsible for the variation in efficacy.

EXPERIMENTAL APPROACH

The research has been conducted at the University of Western Australia's (UWA) Turf Research Facility at Shenton Park which has sandy soils typical for the Perth metropolitan area. The experimental area was divided into eight blocks each containing 12 plots (3.5m x 2.5m) representing the 12 amendment treatments (i.e.: 96 plots all together).

The eight blocks were divided into two irrigation treatments:

- High irrigation (four blocks received 65 per cent ET replacement and were watered three times per week;
- Low irrigation (remaining four blocks received 43 per cent ET replacement and were watered twice per week.

Thus there were four replicate plots for each amendment treatment/irrigation combination. The 12 amendment treatments included five inorganic, one organic amendment (compost), five inorganic-compost blends and an unamended control. Below is a list of the amendment treatments included in the experiment with the values in parentheses

representing the percentage at which amendments have been incorporated in the top 10cm of the soil (weight fresh product/weight soil).

- Bentonite (5%)
- Compost (10%)
- Kaolinite (Ca and silt amended; 10%)
- Ready Grit™ (10%)
- Spongelite (5%)
- Zeolite (5%)
- Bentonite (5%) + Compost (10%)
- Kaolinite (10%) + Compost (10%)
- Ready Grit™ (10%) + Compost (10%)
- Spongelite (5%) + Compost (10%)
- Zeolite (5%) + Compost (10%)
- Control (no amendments added)

Soft-leaf buffalograss (Palmetto) was planted in late October 2013 and given three months to establish before commencing irrigation treatments.

MEASUREMENTS

Following the start of irrigation treatments, soil water content was measured twice a day at different depths (10cm intervals to 160cm) using a capacitance probe (Diviner 2000) for either three or four days following an irrigation as dependent on the irrigation treatment.

Turfgrass growth was measured weekly by mowing the turfgrass (20mm height) using a cylinder mower and weighing the clippings. Turfgrass colour was measured on a weekly basis using a chromameter (CR-400 series), while surface temperatures were determined with infrared thermography on cloud free days.

RESULTS

Soil water content: As expected, amendments generally increased soil volumetric water content in the top 10cm when compared to untreated control plots, with the strongest increases generally observed in the combined compost-inorganic treatments as well as in the individual bentonite and kaolinite treatment.

At the end of the first watering cycle (i.e.: day three for the high irrigation treatment, day four for the low irrigation treatment) the soil volumetric water contents dropped to as little as 2.5 per cent for the control and Ready Grit™ treatments, whereas the water contents for the bentonite, kaolinite and compost treatments remained above 5 per cent (see Figure 1).

However, in the second week the soil water content of all amendment treatments at low irrigation decreased to values below 5 per cent which was associated with severe browning. Interestingly, the lowest soil water contents reached in some of the amendment treated plots (~5 per cent), were similar to the lowest values of control plots at high irrigation, but unlike these control plots were not able to maintain colour. This is likely related to the higher fraction of water in the amended plots that is not available to plants.

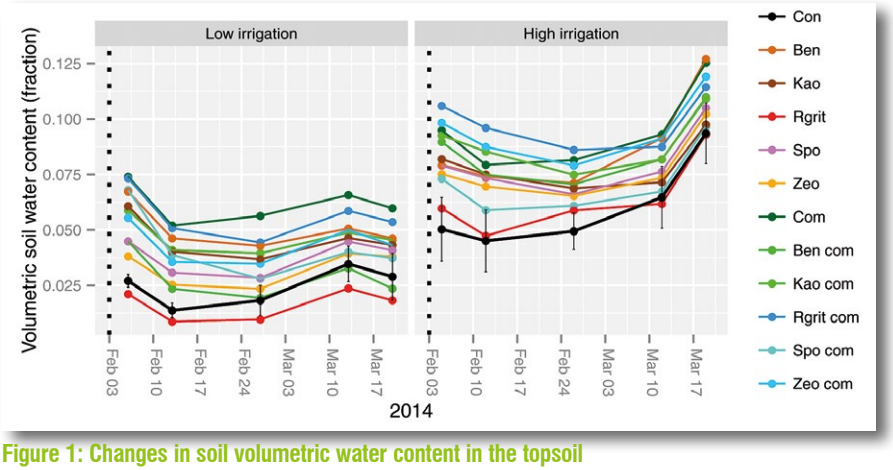
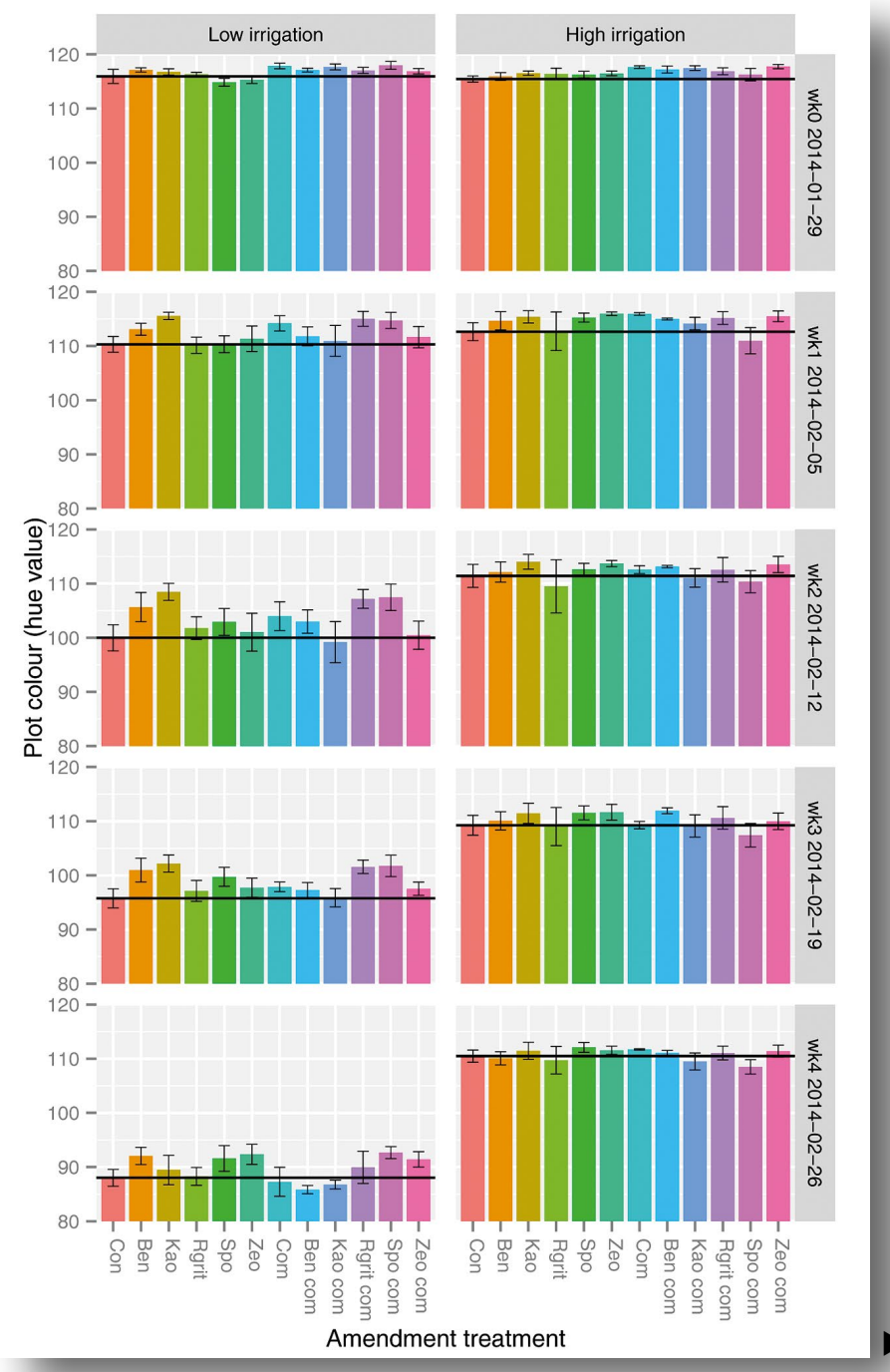
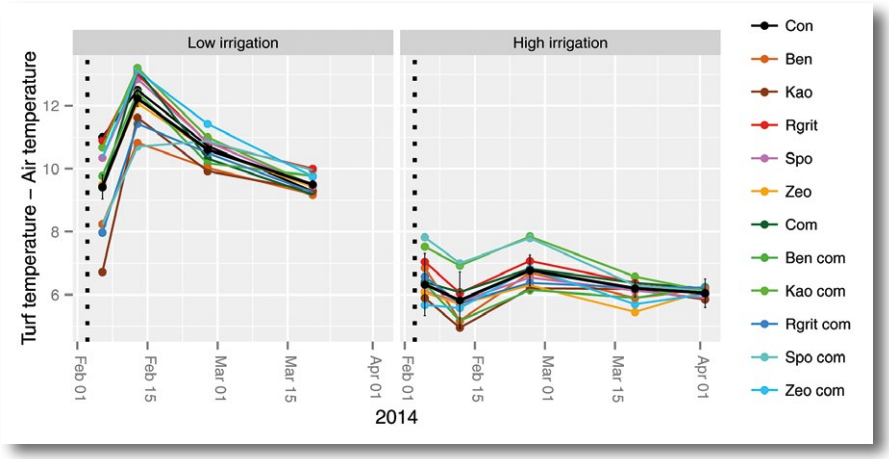


Figure 1: Changes in soil volumetric water content in the topsoil

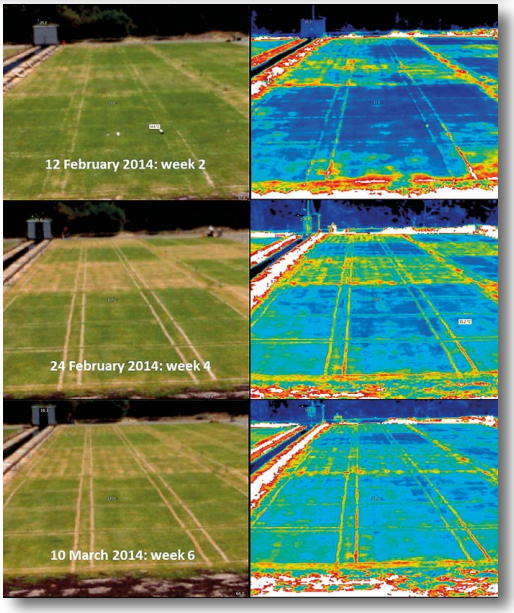
Figure 2: Changes in turf colour as dependent on level of irrigation and amendment treatment in the week before (week 0) and four weeks after start of the irrigation treatments. The black horizontal line represents the average colour for control plots





Top Figure 3: Changes in the difference between turf surface temperature and ambient air temperature (°C), at the end of an irrigation cycle (i.e. day four for the low irrigation and day three for the high irrigation treatment), as dependent on level of irrigation and amendment treatment

Right: Conventional and corresponding infrared pictures as taken from the FLUKE infrared camera during the first six weeks of the first summer of the soil amendment project



Turf colour: Before the onset of irrigation treatments, plots with added compost tended to be slightly greener than the others, which was likely due to their higher nutrient content. Thereafter, the difference between the colour of plots including and excluding compost slowly disappeared especially after irrigation treatments were started.

A substantial difference between turfgrass colour of the high and low irrigation treatments developed within 10 days after onset of irrigation treatments and the difference reached a maximum after four weeks (see Figure 2, previous page). The high irrigation plots remained green throughout the summer and there were no clear differences between the different amendments.

In contrast, the low irrigation plots invariably developed desiccated brown patches, with several amendment treatments, especially kaolinite, bentonite, compost + Ready Grit™ and compost + spongelite, able to slightly delay browning (Figure 2). As indicated before, this temporary delay in browning was associated with considerably higher soil volumetric water contents during the first week of the experiment in these amended plots.

Turf surface temperature: The results from the infrared analysis (Figure 3) were closely aligned with the results of soil water content and colour measurements. In general, high irrigation plots remained cooler than low irrigation plots. In high irrigation plots, no clear differences were found between the soil amendments.

In contrast, in low irrigation treatments, during the first few weeks, turf temperatures of control plots were ~10°C above ambient whereas those of amendments that delayed browning remained within 6.5-8.5°C from ambient, indicative of a better water supply. Thereafter, with the development of brown patches, differences between treatments disappeared.

Clipping biomass: Clipping dry biomass decreased in the first two weeks of the experiment in both irrigation treatments, most likely as a result of the harsh summer conditions. In week three, the low irrigation plots showed a large spike in clippings biomass and a reduced leaf tissue water content, both reflecting their browning off and the loss of dead plant material. Thereafter, turf growth continued to slow down as the irrigation season progressed.

Apart from the short period of browning during the heat of summer, plots with added compost grew generally slightly faster and remained greener than others, likely reflecting their higher soil and plant tissue nutrient concentrations.

PRELIMINARY CONCLUSIONS

The results of the first summer show that most of the amendments, under both irrigation regimes, were successful in increasing soil water content. However, in high irrigation plots, this increase in top soil water content did not result in significant effects on turf growth or colour. In plots receiving 33 per cent less irrigation, some of the amendment treatments were able to slightly delay browning as a result of their higher soil water content, but eventually also succumbed.

The consistent browning in all low irrigation plots may be due to the relatively short establishment period (three months) prior to reducing the irrigation and indicates that 43 per cent replacement of ET is not adequate for sustaining soft-leaf buffalograss at this stage of maturity when administered only twice a week in a warm Mediterranean climate. Indeed, the temperature data strongly suggested that especially on day four after irrigation turfgrass suffered the most.

On the basis of these first summer results we adjusted the irrigation treatments to 50 and 75 per cent ET replacement during the current irrigation season, on which we will report in future editions.

ACKNOWLEDGEMENTS

This project has been funded by Horticulture Innovation Australia (project TU13000) using the turf industry levy, with co-investment from the Water Corporation, a consortium of local government authorities, amendment product suppliers, TGAWA, STA, WA,, the WA Land Authority and funds from the Federal Government.

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Aceria couch mite. Products trialled only against this eriophyid species risk doing half the job of couch mite control

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Couch mite... which mite?

After many years delving into one of the most interesting yet destructive of turfgrass pests, Dr Don Loch provides a definitive update on local research which clearly demonstrates there is more than one species of couch mite that Australian turfgrass managers need to be aware of.

Horticulture Innovation Australia

Australian research into couch mite over the past five years has gone a long way towards unravelling what is clearly a complex area with major implications both for turf producers and for turf managers.

Funding from Horticulture Australia Limited (now Horticulture Innovation Australia) has been instrumental in facilitating this ground-breaking work, starting with an Australia-wide survey of phytophagous (plant feeding) mites on warm-season turfgrasses in 2010/11 (TU10002). The limited time and the large number of samples (117) processed in this survey meant that the mites recovered were only identified provisionally at genus level.

A new Horticulture Innovation Australia project (TU13021), with matching financial support from Racing Queensland and the Australian Racing Managers Association, has now enabled us to undertake the task of identifying the mites groups of interest down to species.

Through our research over the past five years, we now have an extensive database on the distribution of mites on different turfgrasses in Australia. Sampling continued after our 2010/11 survey and with continuing collection since then we now have data on a further 200 samples. These also include kikuyu grass (*Pennisetum clandestinum*) and zoysia grasses (*Zoysia* spp.). In this paper, however, we will only be dealing with the couch grass mite complex.

COUCH MITE SPECIES

For green couch (*Cynodon dactylon* and its hybrids with *C. transvaalensis*), the number of samples with phytophagous mites in our initial survey was almost evenly divided between *Dolichotetranychus* (Tenuipalpidae) and *Aceria* (Eriophyidae) species. A similar trend (possibly weighted slightly in favour of *Dolichotetranychus*) has continued in our subsequent sampling, with the complication of mixed tenuipalpid-eriophyid populations found at eight sites.

Our survey also found a second eriophyid mite, an *Abacarus* species, in one sample of green couch from Perth. A recent search of Australian reference collections has located two more samples of what appears to be the same *Abacarus* species in green couch, one from Sydney and the other from Townsville. It is not yet possible to determine the impact and significance of this hitherto unknown and unsuspected eriophyid species which appears to be distributed Australia-wide although not frequently collected or identified.

SYMPTOMS

The visual symptoms (i.e.: the distorted growths, or galls) caused by infestations of the two main couch mites are subtly different, but relatively easy to distinguish with experience. Over the past two years, for example, my assessments based on field symptoms have proven almost 100 per cent correct when these samples have subsequently been assessed by acarologists.

Witch's brooms (rosetted growths at stolon nodes) and poor stolon root development are typical of *Aceria* infestations, which are often concentrated more along edges rather than being spread across an area. At the same time, individual growths within

an Aceria witch's broom become shortened with leaves greatly reduced in length, thickened and flattened laterally to give a 'pinetree' effect.

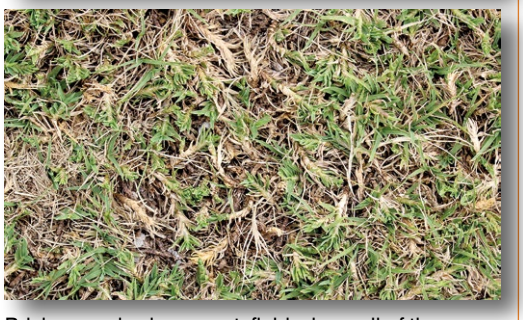
The *Dolichotetranychus* species, on the other hand, produces a characteristic thinning and weakening of the stand, usually concentrated in patches, but frequently spread across an infested area. There is markedly less proliferation of distorted growths at stolon nodes (i.e.: no strong witch's brooming).

These pinetree-like growths are slightly more thickened and rounded with even shorter leaves than for *Aceria. Dolichotetranychus* can also be found persisting in some quite old, half-dead, elongated pinetree-like growths (up to 8cm or more long), though not as prevalent as in younger growths. In the case of mixed *Aceria-Dolichotetranychus* populations, the external symptoms tend to follow the dominant species.

IMPACT OF COUCH MITE INFESTATIONS

Mites distort the new growths on green couch and reduce the rate of growth. In three replicated pot experiments with a *Dolichotetranychus*-infested treatment, I measured reductions in dry matter production of 75, 70 and 50 per cent through mite infestation.

Anecdotally, the *Dolichotetranychus* couch mite can be more damaging than the eriophyid *Aceria* mite, as shown in the photograph (right) of a



Aceria symptoms (left) and *Dolichotetranychus* symptoms (below)

Brisbane suburban sportsfield where all of the green cover was wiped out.

Additionally, stolon, root and rhizome development are weaker on mite-affected turf, with the result that production turf fails to knit and bind together properly leading to longer production cycles and breakage of rolls at harvest, with losses of up to 30 per cent. Affected turf is also more easily water-stressed due to its poor root development.

Managers of established turf facilities face two major issues in the event of a mite outbreak:

Total devastation of a green couch sportsfield caused by *Dolichotetranychus*

Dolichotetranychus – the forgotten couch mite

- The reduced use that is possible as a result of the much poorer wear resistance and the extremely slow recovery from wear of the mite-affected turf; and
- The poor quality and uneven nature of the turf surface through distortion and thinning.

Indirectly, costly mistakes can be made where a mite infestation is not recognised. During our survey, some parks managers were investing in ineffective water crystals to overcome the perceived drought susceptibility of their turf, while overlooking the mite damage actually causing this.

HISTORY AND ORIGIN OF COUCH MITES IN AUSTRALIA

Records of the two common couch mite species date back more than 70 years. The tenuipalpid *Dolichotetranychus australianus* was described from samples collected in 1943 from an infested green couch bowls green in Queensland. Conventional wisdom seemed to be that *Dolichotetranychus* mites were confined to Queensland until our survey proved otherwise. Although described from an Australian collection, it appears more likely that *D. australianus* originated elsewhere, probably in Africa where widely separated infestations on bermudagrass were recorded much earlier from Egypt to South Africa.

Dolichotetranychus causes pinetree-like growths that are slightly more thickened and rounded with even shorter leaves than *Aceria*

Witch's brooming symptoms on green couch caused by an *Aceria* species were first reported in 1934 in Western Australia, with the next recorded occurrence (as *Aceria cynodoniensis*) coming from NSW in 1967. Most eriophyid mites are highly host-specific, so the apparently exclusive association of the eriophyid couch mite with *Cynodon dactylon* and its hybrids is not unexpected.

Recent suggestions in American literature that A. *cynodoniensis* is probably native to Australia, but without any supporting evidence, therefore do not fit well with the presumed centre of origin for *C. dactylon* being located in the Middle East and its widespread distribution throughout Africa, nor with the fact that most (if not all) *Cynodon* genotypes in Australia are derived from imported material post-1788. Earlier US acarologists in the 1960s believed that *Aceria cynodoniensis* is native to Africa; and until there is definitive proof to the contrary, this remains the most likely scenario.

RESISTANCE TO COUCH MITES

In our experience, there are no green couch cultivars or genotypes that could be confidently described as completely resistant to couch mite. Rather, there seems to be differences among cultivars in terms of their susceptibility to, and the level of damage from, mites.

Even more intriguing, some varieties and even lines of breeding appear to be more prone to infestations by one or other of the two couch mite species. Common sense would dictate that the more susceptible varieties be phased out commercially.

Over the past five decades, numerous trials have been conducted across a range of *Cynodon* varieties in the US aimed at determining their relative resistance to *A. cynodoniensis* by assessing the spread of mites between pots in the glasshouse. The results, however, have been inconsistent from year to year and from trial to trial.

The results of my own attempts to establish mites in mite-free pots by "seeding" with infested material or facilitating spread through close proximity with infested pots are best described as unreliable. Until we have a better understanding of the underlying factors that encourage couch mites to spread and establish new colonies, information from such trials must always be tempered with caution.

CONTROL OF COUCH MITES

The mites (Class: Acari) are a large and diverse group, second only to the insects in number of species. Not surprisingly, chemical control cannot be approached as a case of one size fits all – an effective miticide on one group may not work at all with another group of mites. Anecdotally, *Dolichotetranychus* couch mites are the more difficult to control and we have examples of infestations that have persisted for more than 10 years in spite of all control measures tried.

There are currently seven products (based on four active ingredients) registered for 'couch mite' control, only three of which actually specify that this refers to the eriophyid *Aceria cynodoniensis*. In preliminary screening trials on *Dolichotetranychus*

in green couch and tarsonemid mites in kikuyu in another HAL-funded project (TU10004), two of the currently registered actives proved ineffective on both mites, as was an oil-based product promoted as an 'organic' solution.

Our recommendation is that all future registrations for couch mite control should cover both mite groups and that identification of the target mite in each experiment be confirmed by a specialist acarologist.

MYTHS AND MISCONCEPTIONS

Some of the naïve, ignorant and just plain stupid comments that can emanate from self-appointed experts looking to sell product never cease to amaze and amuse us. A good example of the level of misinformation possible is the furphy that mites in turf have come from casuarinas or other trees nearby.

The eriophyid couch mite occurs exclusively on green couch. And while the host range of the *Dolichotetranychus* couch mite has not been definitively determined – it has been found on at least one other turfgrass (though possibly migratory rather than being settled) – it is most closely associated with green couch. So any mites that might be found in nearby trees will be some of the many thousands of other phytophagous mite species, each with different host ranges that do not include green couch or any other turf grasses.

DISSEMINATION OF INFORMATION

A detailed final report on our initial survey has been available from HAL/HIA for the past four years. A wall chart describing both couch mite species was distributed to Turf Producers Australia members and handed out free at the 2012 Australian Turfgrass Conference where I also gave a detailed presentation and written paper on our work.

Additionally, Peter McMaugh and I have made presentations on mites to other national and regional conferences and groups – anyone willing to show interest. Peter's presentation on our work at the International Horticulture Congress in Brisbane last year and our accompanying paper have received very favourable comment internationally.

In our 2011 report, we highlighted the poor level of information available on turf mites through commercial websites – selective and Amero-centric at best, misleading at worst. Yet virtually nothing has changed since then. Is anyone out there in commercial-land actually listening and reading? Are our so-called commercial researchers keeping up with the literature and new developments in their own backyard, which is fundamental to good science?

My message to the commercial turf industry about couch mite in Australia can be summed up in a well-known quote from Shakespeare's Hamlet – "There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy."

Typical *Aceria* witch's brooming (top) and *Dolichotetranychus* gall (bottom)

City Golf Club Toowoomba, QLD

Successfully hosting the Queensland PGA Championship for the past six years, City Golf Club in Toowoomba has garnered a reputation as being one of regional Australia's finest golf courses. Superintendent John Halter gives ATM a behind-the-scenes look at his maintenance operations.

Above: Looking from the 18th tee down towards the clubhouse at City Golf Club in Toowoomba

Superintendent: John Halter (58).
Nickname: Lots, if the course isn't up to scratch!
Family: Married to Jude for 35 years, three adult children – Daniel, Brenton and Chloe.
Years as a superintendent: Seven.
Association involvement: AGCSA (seven years) and GCSAQ (10-plus years).
Turf management career: Started work at the City Golf Club in 1994 as an 'A' grade mechanic and then appointed 2IC in 1998. Enrolled myself into TAFE College, gained my greenkeeping Certificate and in 2002 I was assigned the position of assistant superintendent before taking on the position of superintendent in 2008.
Qualifications: Certificate IV Horticulture, Diploma of Business (Human Resources), Diploma of Business (Frontline Management) and a Diploma in Horticulture (in progress).

Where in Australia is City Golf Club? The City Golf Club is situated in Toowoomba which is located on the edge of the Great Dividing Range, 130km west of Brisbane. As well as having four distinct seasons, it offers the best of urban and regional environments.

Tell us a bit about your background and how you came to be a superintendent there. I initially started work with the Toowoomba Regional Council as an apprentice mechanic and when I qualified studied for another year to become an 'A' grade mechanic. I became 2IC of the workshop before moving to Buckley's Earthmoving to head up their workshop.

It was at this time that I decided to look at my employment options as I knew I didn't want to work with heavy machinery for the rest of my life – it was time for a change. I worked for a short time at Fox Civil Construction before the mechanic's position was advertised at The City Golf Club. I applied, was successful and have never looked back, becoming superintendent in 2008. I just love the place. I truly enjoy going to work every day – my office surroundings are second to none.

Give us an overview of City GC and some of its unique characteristics? The City Golf Club is an 18-hole golf course and is the host of the Coca Cola Queensland PGA Championship. Located within five minutes from the city centre and within walking distance from many of the great sites that Toowoomba has to offer, the City Golf Club is one of the largest and most innovative clubhouses in Australia.

From humble beginnings in 1926 City Golf Club has stood strong in supporting the Toowoomba community. Through eight decades of depressions, wars, floods and droughts City Golf Club has proudly given back to the community it is a part of. In 2013 alone, City Golf Club supported 77 local community services and charities, ensuring our community maintained access to vital services that lacked funding.

What are some of the unique features about City GC from a turf management perspective? Is it an easy/hard facility to manage? I don't think we are

unique, but I guess growing bentgrass in a summer climate might be. Growing a cool-season and a warm-season grass in hot climate is different and has its moments. I guess we only have two types of grass to maintain – bentgrass greens and kikuyu fairways, tees, surrounds and most of the course.

Possibly the hardest part about bentgrass greens in the summer with the heat and humidity, is surviving – it certainly keeps you on your toes. Kikuyu goes off in the winter a bit due to the frosts and it thins out, but come spring and with some warmer weather the turf will bounce back after a solid tine, fertilise, gyp-wet and rain.

I wouldn't say it is a hard course to manage. We have our course committee who at times come in and give their time to trim trees etc and want to help out, which is good to a degree. But, they do have a bit of difficulty in following directions. I have great staff that are just as passionate as I am.

Take us through your turf management operations there. What, if any, changes have you brought about in terms of managing the course during your time as superintendent? During the growing season our fairways, tees and surrounds are cut twice weekly even after applying Primo or the equivalent. The cooler weather tends to slow things down a bit and the mowing cuts back to once a week and when the frosts hit, when required. Greens are mowed every day, except Sunday or when pennants or amateur classics are being played. Roughs are mown weekly in the growing season and depending on the growth as required.

Poa annua has been a problem like in most places, so during winter we have a programme in place which we have carried out for the last six years to help contain and suppress the plant's growth and then, during summer, apply Primo and Nominee.

What are some of the major challenges facing City GC both from a turf and club management perspective? No I don't think the challenges are any more unique from one club to another. Our main concern is making the course more playable in the wet weather. Golfers tend to drive to wherever their ball lands and especially on the bottom part of our course the water does not drain that well. Over the years the club has been putting in cart paths and that is on-going.

The bunkers are also a problem as they are old and need to be overhauled. We are looking at new bunker linings and what effect they have with the wet weather, so in all, the club realises that we need to make the course more playable during the wet season and have less damage to the turf areas.

Outline any major course improvement works recently completed and/or highlight any ongoing or future works? The new 7th hole was well received in 2014 and next year the 1st will also be altered and a new green built to make it a more picturesque and challenging hole with a water carry to the green. In addition, new tees will be constructed on some of the holes to give the course a bit more length. Our new driving range on the water retention basin will also be in use for the players participating in the 2016 PGA. All other areas of the course will be continually improved as part of the long-term course development plan.

The weather and climate is always a great leveller for a course superintendent. How has Mother Nature treated City GC in recent times? The City Golf Club was the first golfing victim of the 2011 southeast Queensland floods. We had no warning at all of impending trouble as the raging torrent cut right through the centre of town. Being 700 metres above sea level you just don't expect such extraordinary water flows in a place like this!

I recall seeing the flow pick up and carry a car through our creek and smack into two of our pedestrian bridges. This trapped car, together with the surging waters, eventually destroyed the bridge which then took out another one further downstream. The irrigation system was also damaged as were numerous paths and bunkers, but the club was lucky compared to those in Brisbane.

Thanks to a Dad's Army of volunteers who helped with the massive clean-up operation, remarkably members were back golfing on a full 18-hole course within a couple of weeks and by late February the layout had recovered sufficiently to enable the 2011 Queensland PGA Championship to proceed as planned.

The one product I couldn't manage my course without is... All products used on a golf course are important for different reasons, but if I had to pick the more important ones I'd choose Primo Maxx and Compel wetting agent tablets.

How important are the relationships you have with other course supers/trade reps? This is very important. During the 2011 floods in Toowoomba, I

The City Golf Club crew from left John Halter (superintendent), Aaron Hopkins, Daniel Andrews, Nigel Weldon, David Welch, Evan White, Ian Highfields, Shane Chalmers (assistant superintendent) and James Woodside (absent is Greg Hartley)

For the past six years City Golf Club has successfully hosted the Coca Cola Queensland PGA Championship and will continue to entertain the tournament for the next two years at least

received numerous phone calls from other supers who offered assistance or who rang me to offer their support or to even ask how I was going. This was greatly appreciated and there are many I now contact when I realise they are facing adverse weather conditions in their regions.

Support to each other in this industry is valued as it is hard for many to understand what it takes to bring a golf course back to optimum condition after suffering from adverse major climate events. Trade reps are also important as they keep you up to date with the latest chemicals to be released and also it is good to get their opinion as well.

What are some of the more unusual requests you have had as a regional superintendent? We once had a run-away steer on the golf course – it was an interesting morning at work trying to capture a bull that had run away from the saleyards four kilometres away.

We had police and stockmen on the course trying to capture the bull, but it kept moving away from them so they tried catching it in golf buggies. If you could imagine these guys in buggies hanging out the sides and standing on the back in pursuit, it reminded me of a scene out of Keystone Cops. Unfortunately for the bull, it wasn't a very happy ending.

What have you got in your shed? Toro 6700D fairway mower, 2 x Toro3250D greens mowers, 2 x 3100D surrounds mowers (one being a Sidewinder), 4300D Toro rotary mower, Toro 5040 bunker rake, John Deere 1200A bunker rake, 2 x John Deere 2500A greens mowers (now tees mowers), John Deere 2653A surrounds mower, John Deere 1145 72" Lastec out front mower, 1445 John Deere 72" out front mower, John Deere Gator, Kubota 3680 72" out front mower, Jacobsen 500A series walk behind mower, Toro HDX-D utility/turf sprayer, Toro Multi-Pro sprayer, Hino Dutro truck, Fiat New Holland

AT A GLANCE – CITY GOLF CLUB, TOOWOOMBA

Course specs: Total area 34ha, 5805m. Fifteen hectares of kikuyu fairways and tees, 0.8ha of bentgrass greens.

Members: 1034.

Annual rounds: 50,000+

Major tournaments: Queensland PGA Championship and various Amateur Classics (2-3 a year). Others include the National Left Handers' Championship, Defence Force Championship, Queensland and National Secondary School Championships and Queensland Primary School Sport Championship.

Course budget: $900,000. This covers salary, wages and course/machinery maintenance. Coming under budget is always a plus!

Staff structure: John Halter (superintendent), Shane Chalmers (assistant superintendent), Evan White (mechanic), Nigel Weldon and James Woodside (apprentice greenkeepers), Dave Welch, Ian Highfields and Dan Andrews (ground staff), Aaron Hopkins (gardener) and Greg Hartley (casual).

Climate/rainfall: Toowoomba has a subtropical highland climate with warm summers and mild to cold winters. It enjoys four distinct seasons, sometimes in one day. Daily maximum temperatures in Toowoomba average 28°C in summer and 17°C in winter. Our highest temperature ever recorded in Toowoomba was 39.5°C, while the lowest was −4.4°C. Winter temperatures can often go below freezing. In a situation unique among Queensland cities, snow has been reported on the higher parts of the city on rare occasions.

Average annual rainfall is 723 millimetres. Rainfall in the eastern suburbs along the Great Dividing Range nudges 1000mm per year. The majority of Toowoomba's rain falls from November to March, with January and February being the peak wet months. Like most of south-east Queensland, severe thunderstorms can be a threat and Toowoomba may occasionally be affected by ex-tropical cyclones.

Soil types: There are a couple of different soil types through the course. We have a rich red volcanic type soil running through half the course and the other, what we call black soil, has a high percentage of clay in it on the lower part of the course. Some of the greens are still push ups, but we are changing them over to USGA standard as part of the ongoing course development plan.

Water sources and irrigation system: City Golf Club is irrigated by two bores (no effluent water is used). We are allocated 160 megalitres per year from the Department of Natural Resources and our average water use is around 115-120ML per year. The irrigation system is controlled by the Toro Site Pro Central Control System. Sprinklers used on the fairways are Rain Bird 700B's and 750B's. Tees are irrigated by PGP's and series 5000 Rain Bird sprinklers. Greens have 700B and 750B Rain Birds installed.

Cutting heights/regimes: Fairways at the City Golf Club are cut at 13mm twice a week during summer, and 17mm. Tees, collars and aprons are cut at 10mm. Greens are cut six days a week year round – 3mm during summer and 3.5mm in winter. Rough areas are cut at 63mm.

Renovations: Greens were previously renovated twice yearly, but that has now been changed to once every three years. In between major renovations, greens are groomed, aerated, topdressed, fertilised, amendments added on a monthly basis during the growing season and as required during winter. I have found that there is no difference in growth or compaction. In fact, the greens have not looked better according to members.

Major disease pressures and how you combat them: Probably our main disease is helmo in the fairways, tees and surrounds. We normally go out and apply Mancozeb to the turf and spray with a phosphite foliar liquid. This seems a have a good result without a huge cost. The greens have improved with disease since we changed to our monthly programme.

skid steer loader, John Deere 3120 tractor, MF35 Massey Ferguson tractor, SR54 soil reliever, Dakota spreader, 2 x quad bikes plus various other small plant and utes.

What's your favourite piece of machinery and why? For versatility and the amount of use we get out of it in construction and general maintenance, it has to be the skid steer loader. We have a lot of attachments for it and it saves us a lot of time and money not having to hire equipment in. Our next major purchase will be a cylinder grinder. We already have one, but it is getting a bit old and while still performing well the newer ones are so much more precise. The club had one on loan for the PGA and the difference it made to the condition of the course was remarkable.

Do you think regional/country superintendents have a better work-life balance? No, there is always the same pressure with the weather conditions. Work-life balance relies on the weather and this is no different no matter where the golf course is situated. Hot days means we are on-call with bent greens – drinks can only start after 5pm!

Favourite spot on your course? The 17th green as it overlooks the CBD. Our 18th tee overlooks the clubhouse and is always beautiful as the sun is setting.

The view from the 17th tee looking up toward the green and from the green (below) which affords a tremendous view over the Toowoomba CBD

Most of City Golf Club's kikuyu fairways are fairly tight with little room for error. Pictured is the 7th

Best advice you have received about being a course superintendent/greenkeeper and who gave it to you. I have been given plenty of good advice, but our former greens director (Phil Anderson) once said as we were out on the course, "John, you are the superintendent. This is your course now. Don't worry about anyone else and believe in yourself and it will happen."

Most pleasing/rewarding moment during your time as City GC superintendent? There have been many moments, but knowing that we were going to host the Queensland PGA for the first time was a huge privilege and honour. It certainly made me think well ahead of the tournament and I will forever appreciate the trust and confidence that the club had in the staff and myself to produce a course worthy of such an event.

What does it mean for City GC to be able to host an event like the PGA? This year the tournament was won by Kiwi Ryan Fox and PGA officials announced during the presentation ceremony that the championship will return to the club until at least 2017. Club officials and organisers met to review the tournament's performance with the week-long event gaining the thumbs up as preparations begin for next year's event.

We are more than happy with the outcome of this year's tournament which attracted a top field – the best we've had yet. The gallery sizes were up and financially we came out with a better bottom line. If we can continue building on that next year, we will be more than happy.

How do you prepare the course for the event? Basically, I like to try and keep the course in the same condition all year round. So when it comes to a major tournament like the PGA the staff only have to put a few finishing touches to the course, instead of starting from scratch and putting in hours of overtime to achieve the same result. Presentation of the course is a high priority for me at all times.

What are some of the challenges you have faced over the years with the tournament? It's always the weather! I think in the six PGA championships we have held it has rained for five of them and the other was a drought. The most prominent was, of course, the 2011 floods and the year after we had the Australia Day floods which had a lot of high winds and a lot of tree damage. We had to close the course as it was too dangerous for golfers to play. These conditions always seem to be around the PGA. I do have to thank the many volunteers who have given up their time to assist in the clean-up of the course. One year, the gods may be with us and we may get a surprise – fingers crossed!

Favourite tournament moment to date? There have been many. I think it still has to be our first PGA, standing near the 18th green when the final putt rolled in and the winner was announced, knowing that we can do this and six years on still improving with each event.

Right: City Golf Club's 14th

Below: This tranquil little creek turned into a raging torrent during the 2011 south east Queensland floods

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METEOR HERBICIDE HITS AUSTRALIAN TURF MARKET

Group K herbicide Meteor has recently been released by Nuturf, the first Metolachlor base herbicide to hit the Australian turf market

Nuturf Australia has launched Meteor herbicide, the first Metolachlor base herbicide to hit the Australian turf market.

Meteor is a pre-emergent herbicide containing 960g/L of Metolachlor. It is registered for the control of wintergrass (*Poa annua*), summergrass (*Digitaria sanguinalis*) and crowsfoot grass (*Eleusine indica*) in a range of warm-season turfgrasses including couchgrass, kikuyu, zoysia, Queensland blue couch and buffalo. Meteor provides pre-emergent control of weeds for up to three months and it has two key points that set it apart from other conventional pre-emergent herbicides.

"Meteor possesses a different mode of action to the other common pre-emergent herbicides which are largely Group D herbicides," says recently appointed Nuturf business manager Peter Schumacher. "Meteor is a Group K herbicide which means that turf managers will be able to construct a year-long programme for the pre-emergent control of annual weeds without running into resistance issues. Basically, this is a solution to a decades old problem faced by turf managers in Australia".

Schumacher adds that as a short to medium residual pre-emergent herbicide, Meteor is ideal to use in conjunction with the longer-lasting Group D chemistries such as Dimension EW to strengthen weed management programmes.

"Due to the mode of action, Meteor is almost exclusively shoot-absorbed, and therefore has a greatly reduced impact on turf root development compared to Group D chemistries," says Schumacher. "This makes Meteor a great solution for turf establishment situations where conventional pre-emergents will root-prune resulting in slower turf establishment. Due to this reduced root activity, Meteor is ideally suited for use in warm-season turf production where rapid root development has a direct influence on turf yield."

NUTURF GOES SILVER

In addition to the launch of its new herbicide, Nuturf also recently announced that it had signed on as a Silver Partner of the Australian Golf Course Superintendents Association, joining the likes of fellow turf industry companies Bayer, John Deere and Rain Bird.

Schumacher says the new partnership marries up two organisations with like-minded ideals: "Nuturf has a long history of providing solutions through analysis, science and knowledge, things that also go to the heart of the AGCSA with their education and professional development programmes," says Schumacher.

"To be in partnership with an industry association that shares the values and ethos of our Nuturf business will see some fantastic outcomes for the turf industry well into the future. We are delighted with this partnership and Nuturf looks forward to continually innovating, with new products and service offerings for our customers in the turf industry."

AGCSA general manager Peter Frewin added that the AGCSA was delighted to have Nuturf on board as a partner: "Nuturf is a major player in the turf industry in Australia so to have them partner us on some projects is wonderful, in particular capturing the conference webcasts. Nuturf is helping the AGCSA to capture and disseminate the conference webcasts at the upcoming 31st Australian Turfgrass Conference at Crowne Plaza Hunter Valley. These webcasts are a great resource for the industry and for Nuturf to come on board will ensure this continues. We look forward to the partnership between us growing in the years to come."

For further information about Nuturf's Group K herbicide Meteor, contact your local Nuturf Territory Manager or phone 1800 631 008.

JACOBSEN GETS HEAVY DUTY WITH TRUCKSTER XD

The new Jacobsen Truckster XD boasts a 1610kg standard payload capacity

AGCSA Gold Partner Jacobsen unveiled its new Truckster XD heavy-duty utility vehicle at the Golf Industry Show in San Antonio, Texas late February with the first vehicles outside the USA to be available by the final quarter of 2015. Serving as a replacement for the venerable Cushman Turf-Truckster, Jacobsen believes that the all-new Truckster XD will set a new standard for capacity, power, strength and comfort.

The Truckster XD boasts a 1610 kilogram standard payload capacity, supported by the toughest bed in the industry, with steel up to 75 per cent thicker than comparable boxes and 20 per cent more volume. Two power units are available – a diesel version with 24.8hp and 71.5Nm of torque and a petrol model providing 32.5hp and 70Nm of torque. Operator comfort has also been a focus for Jacobsen with the Truckster XD providing an operator area that is 25 per cent bigger than rival utilities. A full range of accessories and attachments will also be available with kits enabling the retrofitting of existing and competitor equipment.

"When we started this project, the first thing we did was ask hundreds of superintendents, greenkeepers and sports turf managers what they

wanted from a heavy-duty utility vehicle," says Ransomes Jacobsen director of global product management Richard Comely. "The feedback was unanimous; they told us they wanted a truck with more capacity, power and comfort and based on the extensive field testing and feedback we've received over the past year, we've delivered exactly that.

"We have two main goals with this new vehicle – to make turf managers' jobs easier and to satisfy their unmet needs. When you look at what is currently available on the market today, there's nothing as tough, powerful or comfortable as the Jacobsen Truckster XD. As a result, we believe it will serve as a game changer in the heavy duty utility vehicle category."

In other news, Jacobsen has appointed JT Turf P/L as its main distributor in New South Wales. JT Turf is a newly set up distribution company owned and operated by John and Lyndal Woodham who are also the distributors for Jacobsen in New Zealand and the South Pacific (including the Fiji Islands). Their distribution company was awarded the Asia Pacific Jacobsen Distributor of the Year for 2014 as well as Asia Pacific Jacobsen Service Provider of the Year in 2013.

Commenting on the new business managing director John Woodham said: "I am very excited with Jacobsen's vision for Australia and humbled that we were asked to become the distributor for NSW. I strongly believe that the team we have assembled at JT Turf will enable us to provide a level of service and support that ensures our new customers will enjoy the legendary Jacobsen quality of cut!"

Mike Foskett, Jacobsen's regional sales manager for Australasia adds: "Jacobsen has continued with the strategy of enhancing the distribution channels in Australia to ensure that our customers have the sales and support experience that they expect when purchasing our products. John Woodham is a proven and successful distributor who has focused on after-sales support and service to ensure that the Jacobsen experience is positive and beneficial." **To find out more about Jacobsen's Truckster XD visit www.ransomesjacobsen.com or contact your local Jacobsen distributor.**

STEER 750 RECEIVES APVMA REGISTRATION

Turf Culture has recently gained APVMA registration for 'Steer 750 Herbicide', which contains 750g/kg quinclorac. Steer 750 Herbicide is registered for the post-emergence control of summer grass and white clover and the suppression of kikuyu in turf as specified in the Directions for Use. Visit www.turfculture.com.au to download the product label.

Steer 750 herbicide has received APVMA registration

HAUL LIKE A PRO

The new Cushman Hauler Pro features a 72-volt AC electric drivetrain

The fully electric Cushman Hauler Pro golf utility vehicle is now available in Australia through Augusta Golf Cars P/L. The new Hauler Pro features a 72-volt AC electric drivetrain, upgraded from more traditional 48-volt systems, that offers up to 50 fully-loaded miles of range between charges. The patented AC Drive technology also ensures that the Hauler Pro maintains consistent power and performance from the first pre-dawn chores to the last light of dusk, without the noisy drone of a petrol engine.

The AC Drive technology is up to 25 per cent more energy-efficient than DC technology, and also provides for unique features such as regenerative

The Ventrac dual wheel model can handle slopes of 30 degrees without issue

braking that recharges the batteries whenever the vehicle's brakes are applied and also speed control to maintain constant speeds up and down steep slopes.

The Hauler Pro is equipped with a standard on-board charger, which provides the convenience of charging the vehicle at any outlet within a property and eliminates the need for a separate bulky charger. An optional 12V outlet is also available. An optional limited-slip differential provides for greatly improved traction on wet or loose turf, while helping to protect fairways from damage due to wheel slippage.

The Hauler Pro features a maximum load capacity of 455kg and comes standard with a 0.27m^3 cargo bed. A 0.42m^3 cargo bed is available as a factory-installed option for facilities that require more cargo space.

For more information on the Cushman Hauler Pro visit www.ezgo.com.au.

VENTRAC LANDS IN AUSTRALIA

Ventrac Australia is establishing a new dealer network selling to and servicing the Ventrac articulated tractor and its implements. This multi-tooled machine is manufactured in Orville, Ohio and has taken the USA by storm.

Owned by the Steiner family, Ventrac comes from an agricultural background. The Ventrac, with the dual wheel option, can legally handle 30 degree slopes easily making it a safer option on undulating terrain. The Ventrac has over 30 attachments which enable operators to grind stumps, dig trenches, prepare soil, mow and much more.

Chris Stig, formerly of Proturf Machinery, says he is very excited to be part of the Ventrac team and bringing this unique machine to the Australian industry. "This machine can do and can go where no other product can," says Stig. "It offers solutions to any golf course or turf facility. The product is very well built and will give any owner many years of hard work and the feedback from those who have seen the Ventrac in action has been excellent."

To find out more about the Ventrac and its many uses, visit www.ventracaus.com.au or email chris@ventracaus.com.au

2015 SPORTING AMENITIES GUIDE TO WORKPLACE SAFETY

For amenities managers and groundskeepers throughout Australia, Pro-Visual Publishing has released the 2015 edition of the Sporting Amenities Guide to Workplace Safety.

The guide provides information and advice on current safety issues within the industry, aiming to help curators, superintendents, greenkeepers, landscape contractors and turf managers establish and nurture a safe working environment.

One of the topics featured on this year's guide involves establishing an Integrated Pest Management programme for controlling pests. Furthermore, there are several alternative options to monitor insects, including using effective flushing agents such as irritating solutions and dishwashing liquid, as well as placing traps to detect movement.

The guide has been distributed free of charge and each chart is practical and informative, providing a quick reference point for management and staff.

For further information, or to obtain additional copies of the chart, please call (02) 8272 2611, or email marketing@provisual.com.au.

The 2015 Sporting Amenities Guide to Workplace Safety wallchart

INDUSTRY APPOINTMENTS AND ANNOUNCEMENTS

SIMPLOT WELCOMES WELDON

Simplot has appointed **Paul Weldon** (pictured) as territory manager specialising in the turf farm market in Queensland. Weldon brings extensive experience in the turf market working with many types of turf from buffalo, kikuyu and hybrid couchgrass etc. Weldon also has a wealth of knowledge in turf nutrition and pesticide programming with over 20 years' experience in the industry. He can be contacted on 0438 326 321 or email paul.weldon@simplot.com.au.

DICKS APPOINTED OASIS TERRITORY MANAGER

Oasis Turf has appointed **Darren Dicks** to its team of territory managers in Victoria. Dicks' role will be to liaise with clients in the golf, bowls, racing and sportsgrounds sectors and provide technical support to them.

Dicks began his career in turf at Royal Melbourne Golf Club where he worked for nine years, including three as assistant. He then took over as superintendent at Kooringal Golf Club in Melbourne's west for four years before joining McMahon's as divisional manager of golf course maintenance and golf renovations/reconstruction. During his five years with McMahons Dicks completed a Diploma of Sports Turf Management and Diploma of Management. Dicks can be contacted on 0407 278 933 or email darren@oasisturf.com.au.

SIMMONDS SHIFTS TO TORO

After six years with Queensland Turf Irrigation Services **Sheldon Simmonds** (pictured) has joined the Toro Irrigation team in the Sunshine state. Based out of Banyo, Simmonds can be contacted on 0418 830 602 or sheldon.simmonds@toro.com.

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GCSAWA

Hartfield Country Club superintendent Nick Kinley (left), club president Tony Sutton (middle) and Globe's Jeff Lane with the Globe Environmental Award

GCSAWA Superintendent of the Year Simon Bourne (Cottesloe Golf Club, right) with MacIntosh & Sons representative Mike Healy

GCSAWA Graduate of the Year Rohan Janeway with Toro's Geoff Stephens

The Western Australia Golf Industry Gala Dinner was held at the Crown Casino on Friday 6 March to recognise individuals and facilities that have excelled over the last 12 months. The evening gave the GCSAWA a chance to honour its members for their tireless work.

McIntosh & Son Superintendent of the Year went the way Cottesloe Golf Club's **Simon Bourne**. Simon started his employment at Cottesloe in 1996 and his intimate knowledge of the course has provided the foundations to lead his team and deliver results which places Cottesloe up there as one of WA's premier golf courses. In 2014, Simon project managed the completion of major works on holes 12, 13 and 14 and also delivered an exceptional venue for the WA Open Championship last October.

The Globe Environmental Award was won by Hartfield Country Club superintendent **Nick Kinley**. Hartfield Country Club has made significant improvements in its surrounding course environment with a long-term commitment towards land management and sustainability.

As part of a plant identification plan and revegetation project, over 30,000 native plants have been planted strategically throughout the course. Understory species have been planted in many areas to create habitat and increase the local bandicoot population. Plant surveys have also been undertaken to identify any rare and endangered species on the course.

In addition to this, the club has also installed a new washdown bay, chemical storage facility and fuel storage area to upgrade aging infrastructure. Hartfield has also invested in solar panels to assist in the reduction of carbon emissions and further enhance its commitment to the environment.

Toro Apprentice of the Year was bestowed upon **Rohan Janeway** from Mandurah Country Club. Rohan has been with Mandurah for the full length of his apprenticeship. He is an extremely hard-working and passionate greenkeeper who prides himself on diligent course presentation and attention to detail.

Rohan has sound mechanical knowledge and assists in mechanical works. He also has a good understanding of reticulation and proved a strong aid to achieving the Bronze Award in the Water Wise Program.

Other course awards were:

- **Metropolitan Golf Course of the Year:** Gosnells Golf Club (superintendent **Phil Moylan**);
- **Regional Golf Course of the Year:** Katanning Country Club;
- **PGA Pro-Am of the Year:** Karratha Golf Club;
- **PGA Tournament of the Year:** Bunbury Golf Club (superintendent **Des Russell**).

EVENTS

Wednesday 15 April saw the start to the Super Series and the new format of running these days on some afternoons and including a 'walk 'n' talk' session by the host superintendent. The day was held at Sun City Country Club with **Brad Anderson** using his local knowledge to take out the day with 18 points. It was a poor turn out with many superintendents still busy with renovations or construction on their courses. The committee will look at this in the future.

By the time this edition of ATM is out, the Management Challenge would have been held at Royal Fremantle Golf Club (superintendent **Jason Kelly**). This event has been held for over 25 years and is recognised as the GCSAWA's major event of the year. It was introduced to encourage and foster good relations between club officials and managers.

A *Poa* Forum will be held at Lake Karrinyup on 28 May to discuss growth regulators and seedhead suppressants followed by a general discussion.

Elsewhere, **Glenn Cross** (Mt Lawley Golf Club) and **Adam Strachan** (Secret Harbour) are putting a lot of work into organising the Margaret River conference which will be held from Sunday 16 to Wednesday 19 August. This state conference has always been a success and continues to be supported by the AGCSA and will include keynote presentations from brothers **Justin and Nathan Bradbury**, superintendents at Bonnie Doon and Eastlakes golf clubs respectively in Sydney.

The Water Wise programme continues with Royal Fremantle Golf Club the most recent course to gain accreditation. **Darren Wilson** (Wembley Golf Complex) continues to put work into encouraging golf clubs to enter the programme to show the efficient use of water within our industry. The GCSAWA will also be running irrigation workshops and spray training throughout the winter months.

NEIL GRAHAM
PRESIDENT, GCSAWA

STA ACT REGION

While we were spoilt in the early part of summer with good regular rainfall, the latter part and into early autumn has been very dry. We had 20mm for the period beginning of February to the end of the first week of March in the form of two falls of 8mm and 12mm. We have since had around 90mm for the remainder of April and temperatures have plummeted more recently with icy winds and an early taste of winter. Sometimes it's hard to decide which is worse – hot and dry or wet and cold, but that's Canberra's weather for you.

Our Annual Sports Turf Association Golf Day was held on Monday 11 May. Federal Golf Club (host superintendent **Mark Thomson**) hosted the four-man Ambrose event for the first time with a $10,000 hole-in-one prize up for grabs. Costing a mere $25 it was a fantastic day with a BBQ and drinks keeping the punters happy. We were also hoping to have a tour of Royal Canberra Golf Club the following morning with **Andrew Boyle** showing off the reconstruction work to date on the front nine.

Our annual Turf Seminar is fast approaching on Wednesday 29 July at Tuggeranong Town Sports Centre. Once again we have a great list of speakers lined up to talk on a variety of turf related topics including drone technology and an update of the reconstruction work at Royal Canberra. Some local sporting identities will be speaking regarding their own expectations for the quality of turf surfaces, while **Adrian Black** will be speaking about managing Melbourne's AAMI Park.

As has been the custom from the past few years, we will conduct our AGM at the conclusion of the seminar. It appears that some of our current committee members will step down at this year's AGM. We will be asking for anyone interested to nominate for the committee and assist in the organisation of our few events that we hold each year. New ideas are always welcome and it matters very little what level of turf management you are at; everyone is welcome to join and contribute to the local turf industry.

DANNY HULL
COMMITTEE, STA ACT REGION

STA QLD

Our first event for 2015, an education day, was held at the Queensland Sport and Athletics Centre (QSAC) in March and was attended by around 50 members. Grounds manager **Peter Cronin** gave us a warm welcome and told us a history of the venue including some of the more unusual and amusing things that have happened on the site over the years.

Our first speaker for the day was **Jo Crotty** from 'Danger Sun Overhead'. After losing her husband, and the father of their small children, to melanoma, Jo took to educating people on the danger we expose ourselves to working outside. It was a great but confronting presentation and one that I know made us all pay attention and hopefully follow up with a skin check and some more sun protection at work.

Next up was **Damon Joseph** from Character Builders. His was a very entertaining motivational presentation with the theme being "where do you want to be in five years?" Not lacking motivation himself, being the owner of several small businesses, you got the feeling he had his whole future mapped out.

Following lunch there were small presentations from **Chris Lambrides** (UQ) and **John Hagan** (BNIT), on the opportunities for further turf studies and qualifications. **Colin Hoey** from Drummuster and a small demonstration on Silvan spray nozzles from **Barry Moore** (KC Turf Equipment) finished off the day's presentations. A tour of Peter's fields, which were in great condition, his equipment shed and that last minute networking completed another great STA day.

In April there were three STA Qld sponsored awards presented at the annual Queensland Grade Cricket awards at The Gabba. Congratulations to **John McFarlane** of Redlands for taking out the STA Queensland Cricket Groundsman of the Year and First Grade Wicket of the Year awards. Congratulations also to **Rick Shenton** of Premier Greenkeeping for taking out the Most Improved Grounds Award for the Gold Coast District Cricket Club. On the subject of cricket, our upcoming field day is our annual cricket wicket day at the Alan Border Fields in May combined this year with the AGM.

MARTYN HEDLEY
VICE-PRESIDENT, STA QLD

ON THE MOVE

CRAIG BEVAN: From joint assistant superintendent Bayview Golf Club, NSW to assistant superintendent Camden Golf Club, NSW.

DAVE CANTERBURY: From assistant superintendent The Cut, WA to superintendent Kwinana Golf Club, WA.

KATE GEORGE: From horticulturalist Woodlands Golf Club, Vic to horticulturalist Commonwealth Golf Club, Vic.

JAKE GIBBS: From superintendent Wollongong Golf Club, NSW to assistant superintendent Bonnie Doon Golf Club, NSW.

NZGCSA

Winter came early for The Hills Golf Club near Queenstown in mid-April

With the winter slow down upon most of us, it is always interesting to reflect on the previous season and the variety of challenges it has thrown up. In New Zealand we have had significant droughts in some areas, record rainfall in others, snow-fall in summer and it seems as time goes on that there is far less predictability in the weather.

We watch with sympathy the massive storm events in recent times in New South Wales and Queensland with phenomenal rainfall and damage to golf courses (although admittedly perhaps the sympathy levels weren't quite so high immediately following the Cricket World Cup Cricket final!). This can be a tough industry to be in, so taking the time to head to conferences and catch up with those who share the same challenges is really important.

The New Zealand Fine Turf Seminar (NZFTS) is being held in central Wellington from 14-17 June. The successful format of education, social events and accommodation all being in the one venue in order to increase the camaraderie is happening again. Speakers include **Dr Jack Fry** (Kansas State University) and **Bruce Williams** (Director for California Alliance for Golf and USGA Greens Section committee member).

There will be some great presentations and the Australian contingent will be warmly welcomed as always. With the flow back and forth across the Tasman for conferences the prospect of a combined event has appeal.

The Future Turf Managers Initiative (FTMI), which is supported by Jacobsen, will be held for the second time. It will follow on from the NZFTS in Wellington with participants being involved in two days of intensive education around personality types, conflict resolution and people management. Jacobsen supports the FTMI around the world and it is a great opportunity to mentor future industry leaders.

Toro recently held its Toro Turf Masters event at Millbrook in Queenstown. With the area in magnificent autumn colour, fresh snow on the mountains and a couple of blue sky afternoons for the golf at Millbrook and Jack's Point, it was very successful. I think the trip was revealing for many of the 45 or so Australian superintendents involved, with some surprise at just how good some of the NZ courses are.

Conversations around grass varieties, density, *Poa annua* levels, maintenance regimes and maintenance equipment make these types of events quite unique – for most of the population grass is a strange thing to be so passionate about!

BRENDAN ALLEN
PRESIDENT, NZGCSA

ON THE MOVE

BEN GEESON: Departed Brookwater Golf & Country Club, Qld in December after more than 14 years, including the last four as superintendent. Now a property manager for a Brisbane-based company.

MICK KELLY: Appointed superintendent Middle Ridge Golf Club, Toowoomba, Qld.

LANCE KNOX: From 3IC/retic supervisor Hartfield Country Club, WA to assistant superintendent Margaret River Golf Club, WA.

JOSH LEWIS: Appointed superintendent Sawtell Golf Club, NSW in March replacing Chris Neville.

ANDREW MAGGS: From qualified greenkeeper Commercial Club, Albury, NSW to superintendent Maryborough Golf & Bowls Club, Vic.

ROD WAITE: After 23 years finished up as course superintendent at Easts Leisure & Golf Club, Maitland, NSW in the last week of February 2015.

KYLE WILSON: Has added the title of director of golf to addition to his role as course manager at Moonah Links, Vic.

STANZ

The New Zealand sports turf industry has always enjoyed a high profile being a regular feature in the media, but 2015 is going to be one of those years when we are truly on show.

NZ Cricket is in high praise of our groundsmen for the outstanding turf they produced for the 2015 Cricket World Cup, with the ICC very happy with the standard of practice and game day pitches produced. A major contribution to what was a very successful sporting event; needless to say I won't mention the final outcome.

Now we get to showcase our profession to a few more billion people with the FIFA U20 World Cup about to kick off. From what I can gather most preparations have gone smoothly due to extensive planning and forethought and football pitches are ready to go around the country.

The sporting codes always enjoy a spike in players following major sporting events such as these and hopefully as a spin off from all this exposure we will also experience increased interest in our industry and maybe even some new recruits.

KELLIE ROSE
CHAIR, STANZ

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VGCSA

Diploma scholarship winners Mark Harkness (left) and Ben Hartley

VGCSA Superintendent Recognition Award recipient Trevor U'ren

Guest speaker and former Collingwood AFL player Craig 'Ned' Kelly recalls his infamous on-field pinching exploits

The VGCSA recently held its 88th AGM at Huntingdale Golf Club hosted by **Michael Freeman**. The hospitality of Huntingdale and Michael was exceptional and this was the major reason that the day was so successful and enjoyable for all in attendance.

The election of office bearers for the next 12 months resulted in only one new addition to the committee, with **Tom Smith** (Waterford Valley Golf) taking on the role of general committee member due to the vacancy created as a result of Mark Jennings resigning from this role as superintendent at Box Hill Golf Club and VGCSA treasurer. The full committee for the next 12 months is:

- **President:** Jeremy Cutajar (Ringwood & Dorset GCs)
- **Vice-president:** Mat Poultney (Greenacres GC)
- **Secretary:** Barry Proctor (Cranbourne GC)
- **Treasurer:** Steve Burchett (Portarlington GC)
- **Committee:** Shane Greenhill (Sorrento GC), Michael Freeman (Huntingdale GC), Steve Hewitt (Thirteenth Beach Golf Links) and Tom Smith (Waterford Valley GC)

Guest speaker for the evening was former Collingwood premiership player and now successful player manager **Craig 'Ned' Kelly**. Ned proved to be a very popular guest and was very generous with his time.

Long-serving Devil Bend Golf Club course superintendent **Trevor U'ren** received the VGCSA's Superintendent Recognition Award. A former committee member and driver behind the VGCSA's OH&S induction DVD a few years ago, U'ren received the award in front of his peers during the AGM and was joined by Nuturf territory manager **Chris Newman** who was bestowed the VGCSA Trade Recognition Award.

Also recognised were three up and coming turf managers – **Andrew Watson, Mark Harkness** and **Ben Hartley**. Watson, now at Eastern Golf Club but formerly of Churchill Park Golf Club, was bestowed the VGCSA Graduate of the Year Award. Watson will now go on to contest the final of the AGCSA Graduate of the Year Award which will be handed out at the 31st Australian Turfgrass Conference in the Hunter Valley.

Harkness (Victoria Golf Club) and Hartley (Thirteenth Beach Golf Links) were named as dual winners of the VGCSA Diploma Scholarship. The VGCSA committee could not pick a clear winner due to the presentation standards, dedication and self-funded curriculum courses undertaken by both finalists. Both Harkness and Hartley will receive equal funds which will go towards their Diploma of Sports Turf Management fees for this year.

On the course, Numurkah Golf Club superintendent **Mathew Campbell** collected the coveted Powell Trophy from **Chris Angwin** (Burnley Golf Course), while Corowa Golf Club superintendent **Darren Harvey** took home the Toro Cup from **Colin Foster** (Barwon Valley GC). **Mick Grant** won the Trade Shield. Nearest the pins went to **Mark Findlay** (Midlands GC), **Mat Poultney** (Green Acres GC) and **Brendan Brown**, while Campbell smashed the longest drive.

Upcoming VCGSA meetings include the always popular assistants, 3IC and groundsmen meeting to be held at Latrobe Golf Club on Monday 15 June and the country meet at Yarrawonga Golf Club from Monday 3 to Wednesday 5 of August.

Finally, I would like to thank all the committee, members and trade that have supported the VGCSA over the last 12 months. A special thank you to outgoing committee member Mark Jennings for all his hard work and dedication he has displayed over a number of years as treasurer, and also a very big thank you to our administrator **Lesley Mitchell**.

JEREMY CUTAJAR
PRESIDENT, VGCSA

STA VIC

Well what a day! A thunderstorm tried to stop us by destroying a nearby substation. Despite having no power we soldiered on and with the help of the Frankston boys, a generator was quickly delivered. We hope the early start did not cause anyone to miss anything, but with the storm continuing we got underway early just in case some other unforseen calamity happened.

The content of the presentations was of an incredibly high standard and kept everyone's attention all morning. It was fantastic to hear so many questions for the presenters. I personally would like to take the opportunity to thank all of our presenters and especially our sponsor for the day Grassports Australia as well as Cricket Victoria – and don't forget the catering from Ambience.

Chris Cay presented a great informative session and covered everything you need to maintain your wicket. **John Neylan** is well underway with the STA (Vic)-funded *Poa annua* control trials. There were some very interesting questions and comments at the end of John's presentation and we all look forward to the next instalment.

Chris Harris from Cricket Victoria provided a very informative insight into the workings and administration that goes on behind the scenes. When he then teamed up with **Mick Lewis** I think we would all agree there were some stories from well behind the scenes that had us laughing.

Don't forget on 22 July 2015 STA Vic will be hosting its Sports Field Seminar at AAMI Park. Tickets will go on sale in May so book early to ensure a seat as there will be no door sales on the day. Keep the green side up and growing through the winter and pray for good weather to come at wicket renovation time.

PETER TODD
PRESIDENT, STA VIC

SENATOR COLBECK TO OPEN 2015 TURF AUSTRALIA CONFERENCE

The 2015 Turf Australia Conference and Field Day will be held at the Novotel Twin Waters Resort, Queensland Sunshine Coast, from August 26-28. The theme for this year's event is 'Fun in the Sun!' and Turf Australia has negotiated reduced accommodation rates at the picturesque Twin Waters Resort. So why not take the opportunity to bring the family and stay longer!

The programme is packed with relevant national and international information for turf farms, including Richard Colbeck (Federal Senator and Parliamentary Secretary to the Minister for Agriculture) and Dr Kevin Kenworthy (associate professor, University of Florida). Well known comedian David Smiedt will be the Master of Ceremonies. In addition, there will be presentations on how to include 'fun' in the marketing of turf and managing staff.

The annual field day will be held at GoTurf in Beerburrum and will include the latest Firefly Turf Harvester in action and an extensive on-farm workshop programme on soil management, irrigation and more. The full conference and field day programme will be finalised soon so keep an eye out on the Turf Australia website www.turfaustralia.com.au

The 2015 Turf Australia Field Day will feature the latest turf harvesting machinery

TURF LEVY

Turf Australia has initiated a project to increase the level of compliance in regards to the registration of turf growing businesses with the Department of Agriculture (DoA) – Levies, ensuring the correct amount of levy is being paid by all turf growers and encouraging timely levy payments.

The turf levy rate of $0.015 per square metre has been in place since 2006/07 and is collected from turf businesses who harvest and sell more than two hectares of turf per year. Eighty per cent of the levy collected is directed towards research and development (R&D) activities while the remaining 20 per cent is dedicated to marketing initiatives. The R&D levy is matched dollar for dollar by the Federal Government, while the marketing levy is not.

On average, the turf R&D levy has provided $450,000 per year, which after being matched dollar for dollar by the Federal Government results in $900,000 per year. The marketing levy gives approximately $110,000 per year. In addition, for more than a decade the turf industry has received significant 'Voluntary Contribution' (VC) funding from Horticulture Australia, which enables industry funds to be matched dollar for dollar by the Federal Government for approved R&D activity.

While the levy income collected has been significantly lower than what was predicted prior to the levy being struck, significant benefits to industry have already been realised through the 280 projects that have already been funded by Horticulture Australia covering marketing, research, development and extension.

The levy collection processes for the turf industry, unfortunately, involves a high level of administration and the costs associated with this are subtracted from the levy collected. The good news is there are ways, such as lodging returns online and paying via EFT, that minimise these costs.

While turf production businesses selling less than 2ha of turf per year are not required to pay the levy, sales records are required to be kept and must be provided to DoA – Levies upon request. Failure to do so can result in legal action. In addition, Turf Australia and the state turf associations are required to inform DoA – Levies of turf businesses that may be harvesting and producing over 2ha of turf per year and are not listed as being a levy payer. If you are growing turf for sale and not paying the levy, expect to be contacted soon.

For more information, contact either Richard Stephens, Business & Industry Development Manager with TA, email bidm@turfaustralia.com.au or Keith Tolmie, Regional Manager – NSW, DoA – Levies, email keith.tolmie@daff.gov.au

HUMIC PRODUCTS – POTENTIAL OR PRESUMPTION FOR AGRICULTURE

By Kim Billingham, NSW Department of Primary Industries, Sydney, 2012.
106 pp. Price: $12.

Over the past 20 years, the use of humic acid, humates (the salts of humic acids) and fulvic acid as biostimulants has become a popular fad with turf managers both in Australia and worldwide. This is the result of strong sales promotion of such products as enhancers of nutrient efficiency and plant growth, but with little credible technical information to support such claims, particularly for warm-season grasses.

Kim Billingham, from the New South Wales Department of Primary Industries, has reviewed the available information about the nature and function of these products, and plant responses under field and glasshouse conditions. Billingham's book and her science-based analysis of the various commercial claims about such products are timely, indeed overdue. While her assessment of the practical value of humic products is pitched in the context of their wider agricultural use, Billingham's findings are equally relevant to turf and ornamental use.

Following a four-page Executive Summary, the central 64 pages of the book are divided into six sections:

- Introduction;
- A brief history of humus;
- Humic substances;
- Humic products;
- The claims of humic products; and
- Conclusion and recommendations.

This is rounded out by three Appendices, selected references and an extensive glossary of terms.

Soil organic matter is universally recognised as an important and a valuable component of a good healthy soil. However, this has not always been the case in production agriculture and horticulture, hence Billingham starts by briefly tracing the development over time of our present understanding of the role of soil organic matter under its old name, 'humus'.

She then outlines our current knowledge of humic substances, the natural organic compounds that make up the bulk of the organic matter found in soils (equivalent to 50-80 per cent of soil organic carbon content). The molecules that comprise humic substances are so incredibly complex that, even with modern chemical techniques, their chemical structures are still only partially known. In situ, the chemical activity of humic substances is high and, more importantly, they resist microbial degradation, which enables them to play a wide range of beneficial roles in building soil physical, chemical and biological characteristics.

Billingham has done an excellent job of explaining in simple terms the complex roles of soil organic matter in soil physical, chemical and biological processes, such that this can be easily understood without the need for specialised training in soil science.

Humic products, on the other hand, do not occur naturally in soils and are made from brown coals, peats, composts and other organic matter. As such, they have been produced by artificial chemical processes rather than undergoing the complex biological transformations that produce the natural humic substances found in soils.

So while it is possible to recover similar fractions called humic acid, fulvic acid, etc, from artificial humic products, the actual compounds that comprise these basic fractions may not exist naturally in soils and may not even be relevant to natural soil processes. Again, the chemistry within each humic product marketed is incredibly complex and details relating to the individual molecules remain largely unknown.

The inability to control the inherent variation caused by even slight differences in raw material makes quality control difficult, if not impossible, for manufacturers aiming to produce a consistent product with consistent properties and actions; and since there are no industry-wide standards, similarly described products from different manufacturers can vary considerably.

Clearly, such basic considerations have not deterred those with a commercial product to sell and a good story to tell. In a recent web search, Billingham found 28 Australian companies promoting more than 200 humic products. There was also no shortage of claims relating to product efficacy, which she summarised as a series of dot points just under a page in length. By and large, these claims are not backed by scientifically sound evidence, but simply mirror the known properties of the natural humic substances found in soils.

Billingham addresses two key questions about the various humic products on the market:

- Can the product work, based on our current scientific understanding of soil-plant relationships?; and
- Does the product work under field conditions, based on independent scientific trial evidence?

In the course of this, she evaluates the myriad of claims used to promote the use of humic products in general: that they increase plant growth and yield, improve soil structure and water holding capacity, and increase nutrient availability. In relation to each of the issues identified, Billingham methodically looks at the background and sets out clearly what is being claimed by commercial products. She then analyses the validity or otherwise of these claims based on the available scientific evidence before concluding whether there is some potential value – albeit unproven as yet – or simply presumption in relation to each claim.

Billingham's overall conclusion is that "Humic products show some potential..., especially in terms of phosphorus and micronutrient availability, and soil remediation. However, no recommendations on their use can be made until extensive field trials are conducted and the humic products are compared with other soil amendments with accompanying cost-benefit analyses."

In *Humic Products*, Kim Billingham provides an excellent coverage of the topic: comprehensive, well written and logically presented, yet concise and easy to read for a general audience. While primarily directed at general agricultural use, her findings are equally valid for turf use, and should also be compulsory reading for anyone who produces or manages turf.

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