WINNER OF 4 AWARDS AT THE 1ST TOCA INTERNATIONAL COMMUNICATORS CONTEST

AUSTRALIAN Turfgrass MANAGEMENT

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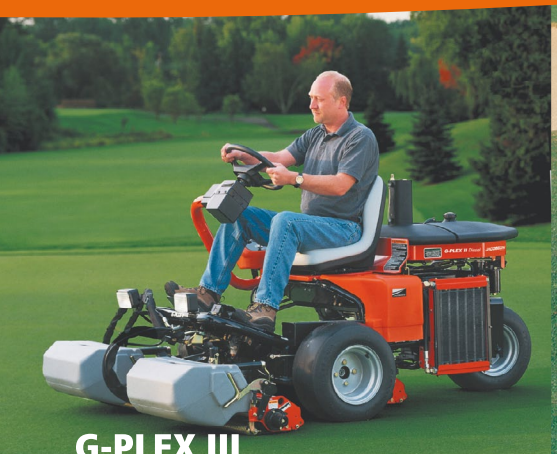

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Stephen Clifford 0409 513 207
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Australian Turfgrass Management
Published by:
Australian Golf Course Superintendents Association
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Production:
Editor:
Brett Robinson Ph:(03) 9548 8600
brett@agcsa.com.au

Art Direction & Design:
Jo Corne Ph: (03) 9548 8600
jo@agcsa.com.au

Advertising:
Scott Petersen Ph:(03) 9548 8600
scott@agcsa.com.au

AGCSA

President: Jeff Gambin
Directors: Martyn Black
Jon Penberthy
Allan Devlin

Chief Executive Officer:
Steven Potts Ph: (03) 9548 8600
steven@agcsa.com.au

Events Manager:
Jeff Johnson Ph: (03) 9548 8600
jeff@agcsa.com.au

Membership Services & Administration Coordinator:
Paula Dolan Ph: (03) 9548 8600
info@agcsa.com.au

Accounts/Subscriptions:
AGCSA
Suite 1, Monash Corporate Centre
752 Blackburn Road
Clayton North, 3168 Vic
Ph: (03) 9548 8600
Fax: (03) 9548 8622
Email: info@agcsa.com.au
Website: www.agcsa.com.au

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22nd Australian Turfgrass Conference

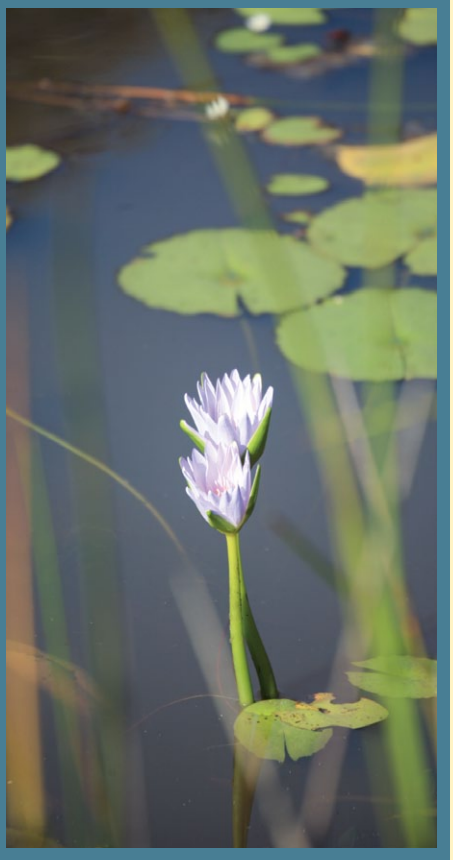
Golf course superintendents and turf managers from acround the country migrated north to the warm climes of Brisbane in July for the AGCSA's annual 22nd Australian Turfgrass Conference.

Design: Jo Corne

FEATURES

OPINION

RESEARCH



design and management actions have on local threatened species diversity. As he writes here, the results show the positive role golf courses do have in local ecosystems.

COMPARING WATER USAGE BY C_3 AND C_4 TURFGRASSES 42

With water being one of the turf industry's hottest topics at present, Phillip Ford from NMIT presents the findings of his research into comparing water use by C_3 and C_4 turfgrasses during summer. The aim of the trial work was to quantify daily ET rates and Crop Factor values for a range of commonly used turfgrasses during a Melbourne summer.

In Every Edition

family matters

Forgive me readers, but this editorial is rather self-indulgent and for that I make no apology. As I type this it is 11.53pm on a Wednesday night and the heavy rain outside (yes, precipitation in Melbourne, in winter – quite amazing really) is doing its best to drown out the cries of my newborn baby boy. The little fella, not surprisingly, is winning the battle hands-down.

Yes, on 28 July at 4.12pm my life was transformed. My beautiful wife Katherine gave birth to Kristian Nicholas, our first child. A 3.82kg bundle of joy, the little champ is progressing well (particularly his lungs!) and to all those within the industry who have passed on their congratulations and well wishes, I most humbly thank you.

It seems I'm not the only one in the industry currently going through a major transition with the arrival of a wee bub. Former Torquay Golf Club superintendent Shane Brogan and his wife Helen are now proud parents to baby girl Eva, Commonwealth Golf Club foreman Steve Bolt recently became a proud dad to Oliver, while over in the West I have it on good authority that the Austen and Dennis families have also chalked up new additions to their households.

As any new father out there will know, the sudden change the arrival of a baby brings is quite remarkable. Your whole outlook on life alters and you begin to focus on the things that really matter. If being a proud pop has taught me anything in the few weeks since Kristian's arrival (besides how to change a nappy with one hand and how to survive on two hours' sleep each night), life is all about perspectives.

The lot of a superintendent these days is by no means straightforward with issues of environmental management, workplace safety, water sustainability, pay rates and job security all adding to the complexity of the profession, and as one superintendent commented to me earlier this year, "When does it get any easier?" Goodness knows, and with what will no doubt be another hectic spring and trying summer on the horizon there is little likelihood that it will get any easier.

But at the end of the day no matter how testing matters become, it's important to step back, take stock and think about what really matters. I know what I'm saying isn't a grand revelation, but it pays to remind ourselves every now and then that work isn't everything and that, in my instance anyway, family matters now more than anything.

But back to this volume of Australian Turfgrass Management magazine, which, incidentally marks my third anniversary as editor. Volume 8.4 certainly has an international feel about it, kicking off with a tale from unrivalled storyteller, NSW superintendent and AGCSA Board member Martyn Black about his recent trip to India. As Black quipped as he handed me his tome, "People won't learn much from it, but at least they'll have a good laugh." Turn to page six and I'm sure you'll agree.

Elsewhere in this edition, up and coming South Australian greenkeeper Luke Partridge tells of his experiences working at the famous Oakmont Country Club during his Ohio University internship, while we also have exclusive pictures of the destruction wreaked upon St Michael's Golf Club following the collapse of the New South Wales Golf Club dam in early July.

Enjoy the read. I'm off to get some precious shut-eye.

Brett Robinson
Editor

PS: Can anyone tell me where I can buy ear plugs at 12.46am?

Contributors to Australian Turfgrass Management Volume 8.4

Manoon Aunpoklang (Innotech)
Norm Ashlin (Collier Park GC)
Martyn Black (Castle Hill CC)
Michael Bradbery (NSWGCSA)
Gary Chatfield (Global Turf)
Rod Cook (The Grand GC)
Peter Donkers (Long Reef)
Phil Ford (NMIT)
Martin Greenwood (Kingston Heath)
Matt Hanrahan (Geelong Grammar)
Peter Harfield (Blackwood GC)
Justin Haslam (TGAA ACT)
Jean-Marc Hero (Griffith Uni)
Simon Hodgkison (Griffith)
John Neylan (AGCSATech)
Luke Partridge (Kinloch Resort)
Andrew Peart (AGCSATech)
Scott Petersen (AGCSA)
Steven Potts (AGCSA)
Mark Prosser (VGCSA)
Peter Ruscoe (TGAA WA)
Daryl Sellar (Glenelg GC)
Brad Sofield (Gosnells GC)
Jan Warnken (Griffith Uni)

foreword thinking

AGCSA CHIEF EXECUTIVE, STEVEN POTTS

With the 2006 Australian Turfgrass Conference behind us, I would like to thank all delegates, speakers and exhibitors for a truly memorable week. Over 600 delegates attended the education component while nearly 1500 were involved with or visited the two-day trade exhibition.

The feedback from the Brisbane event has been truly remarkable and I would additionally like to thank everyone who has taken the time to write or call the office with their thoughts. We look forward to regrouping for the 23rd Australian Turfgrass Conference in Cairns from the 22-27 July, 2007.

I would also like to thank our sponsors for their continued support with a record 90 companies being part of the trade exhibition. A full report from the 2006 Australian Turfgrass Conference is included on pages 20-24. I would like to congratulate our 2006 AGCSA Award winners and golf champions:

- **AGCSA Distinguished Service Award (sponsored by Scotts Australia)**: Norm Ashlin (Collier Park Golf Club, Western Australia)
- **Excellence in Golf Course Management (sponsored by John Deere)**: Daryl Sellar (Glenelg Golf Club, South Australia)
- **Claude Crockford Environmental Award (sponsored by Syngenta)**: Peter Donkers (Long Reef Golf Club, NSW)
- **AGCSA Graduate of the Year (sponsored by Toro)**: Sean Kinsley (Yamba Golf Club)
- **AGCSA Golf Championships – Stroke (sponsored by Toro)**: Steve Jacobsen (Carnarvon Golf Club, NSW)
- **AGCSA Golf Championships – Stableford (sponsored by Toro)**: Ryan Fury (Eastlake Golf Club, NSW)
- **AGCSA Golf Championships – Teams (sponsored by Toro)**: NSW
- **AGCSA Corporate Cup**: Brian Bird (Anembo)

The 2006 AGCSA Annual General Meeting was held in Brisbane on Wednesday, 19 July and was attended by approximately 80 members. The meeting reappointed Jeff Gambin as president and Jon Penberthy as board director for a period of two years. The 2006 AGCSA Board is now made up of the following members:

President: Jeff Gambin (Gold Coast Burleigh Golf Club, QLD)

Directors: Jon Penberthy (Tewantin-Noosa Golf Club, QLD); Martyn Black (Castle Hill Country Club, NSW); Allan Devlin (Secret Harbour Golf Club, WA).

The 2006 Education Forum was held on Friday, 21 July following the conference and included a report on the progress made this year by the committee, the launch of the Delivery and Assessment Guide for Certificate II, discussion on the draft Delivery and Assessment Guide for Diploma and presentations from the Irrigation Association of Australia and the APVMA.

All golf clubs should now have received a letter from Golf Australia regarding the environmental initiative. The letter states that the vision of the environmental initiative is to provide all Australian golf clubs with a robust "low-cost, high-return environmental management system and support service" that is user-friendly, cost efficient and effective.

The initiative will provide a strategic asset for all golf clubs that will save time, money, improve resource management and enable golf clubs, directors and officers to meet their corporate and legislative requirements. I encourage all superintendents to support the initiative.

The Australian Open at Royal Sydney Golf Club is scheduled for 13-19 November 2006 and once again the AGCSA will be looking for volunteers as part of the Course Quality Officials programme. A flyer will be sent out shortly providing details on how to register as a volunteer.

Finally, I would like to congratulate AGCSA editor Brett Robinson and his beautiful wife Katherine on the arrival of their first child Kristian Nicholas on 28 July, 2006.

Enjoy the magazine.

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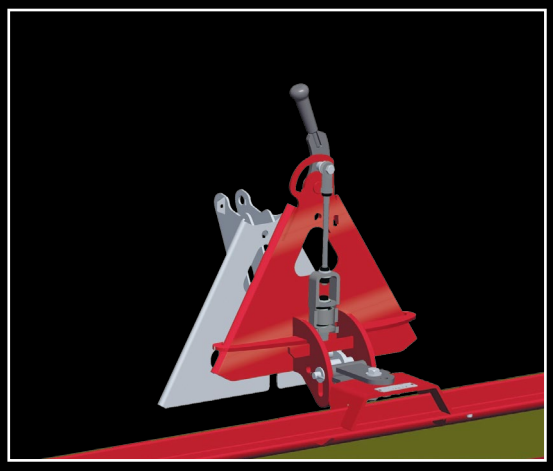

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BY MARTYN BLACK

Incredible

Over the past couple of years the AGCSA has been forging contacts with the fledgling Golf Course Superintendents and Managers Association of India, which was formed in 2003. Earlier this year AGCSA Board member and Castle Hill Country Club superintendent Martyn Black was guest of honour at their inaugural conference in Delhi. Here, in true pioneering fashion, is an account of his sub-continent sojourn.

Colonel K.D. Bagga

Some three years ago I was contacted by a person calling himself Colonel K.D. Bagga, a golf course architect from India. The accent was so strong I at first thought it was that old scallywag Tony Fogarty from Catalina Country Club who often rings me under some alias. However, the person on the other end was genuine and was keen to meet me in person and discuss Australia helping form a golf course superintendent association in India.

Colonel K.D. Bagga came to Australia to visit his son who was working in Sydney at the time, and upon telling his son that his dream of forming an Indian association had hit a snag (apparently due to a lack of interest from American contacts), his son suggested he try the nearest golf course to see if anyone could help. Moore Park Golf Course superintendent Mal Durkin suggested the Colonel contact either myself, Gary Dempsey (New South Wales Golf Club) or David Scaife (Bonnie Doon Golf Club). The Colonel, being a smart bloke, contacted all three of us.

You would find it difficult not to be impressed by Colonel K.D. Bagga. A man now in his seventies, he is India's leading golf course architect and has worked for several years with well-known American Ronald Fream. The passion and commitment shown by this gentleman is infectious and I along with others were keen to help.

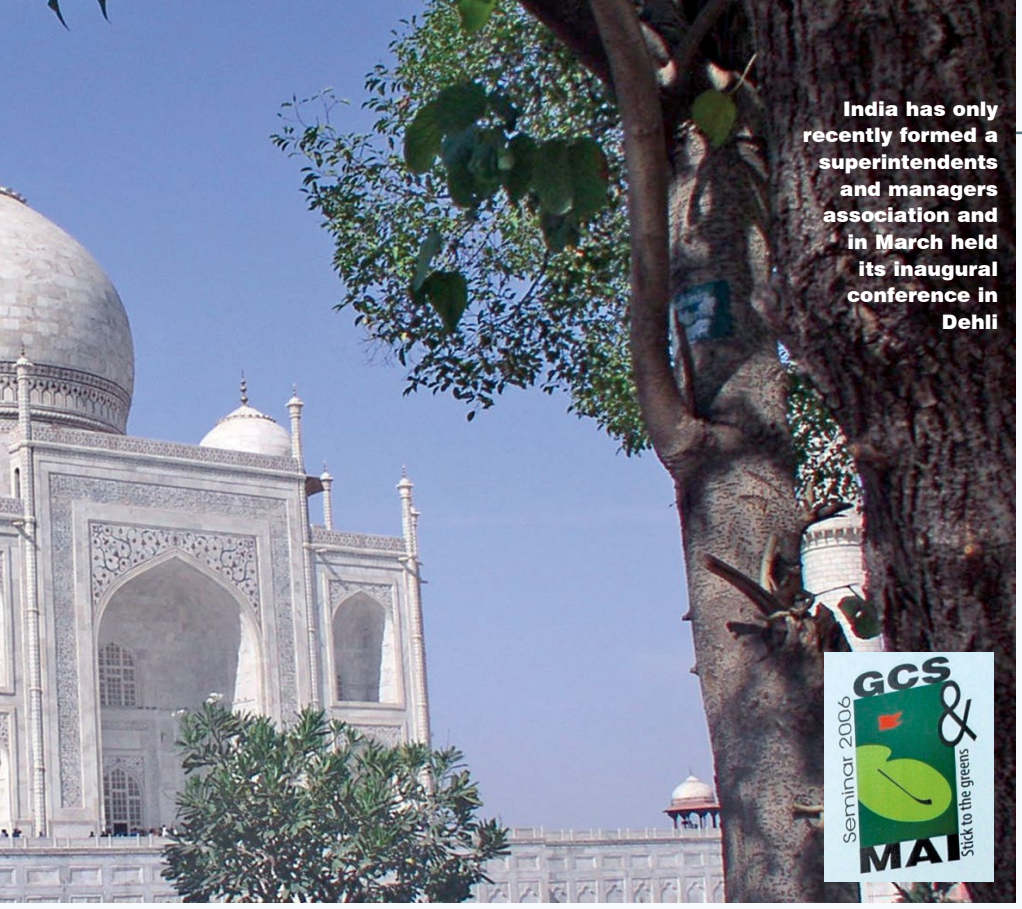
There are approximately 250 golf courses in India and being a large country like ours they cover the full gambit of varying climate conditions. The Colonel has built about 10 courses in India and is very much one of the 'father figures' of golf in the country.

So after three years of struggle and strife the Colonel's dream was realised and they now have an association which incorporates general managers and superintendents – the Golf Course Superintendents and Managers Association of India (GCS&MAI).

THE CHOSEN ONE

The inaugural GCS&MAI conference was held in Delhi in March and AGCSA chief executive Steven Potts, Gary Dempsey and myself were invited. Try as I might to convince Colonel Bagga that there were much more qualified people to speak than us, namely John Neylan and Andrew Peart (no offence Demo) the Colonel insisted that in the first instance we were to be the 'chosen ones'.

Steven Potts was unable to attend so it was down to Gary and I. Tragically, 24 hours before we were to fly out, Gary's brother-in-law



India has only recently formed a superintendents and managers association and in March held its inaugural conference in Dehli

India

died after a long fight with cancer and was unable to go. So I was on my "Pat Malone".

As the plane left Sydney, I knew that in 15 hours' time I would be greeted at Delhi Airport by Brigadier Bains who would take me to my 5-star motel. Beautiful!

Now! Many of us are aware that India has a population of 1.12billion people, but I didn't think they would all be at Delhi Airport to welcome me! Brigadier Bains rang me while I was waiting in Customs and said he was wearing a yellow shirt with a blue turban and he would be standing at the exit. To my dismay there were four exits and approximately 150 blokes with yellow shirts and blue turbans.

After asking four guys fitting the description with no success, I tried to ring the Brigadier. No joy! After 10 minutes Brigadier Bains rang me again and after new directions to his location I finally found him wearing a white shirt and a blue turban. I knew I was going to be in for an exciting week!

After our chauffeur located us outside the terminal, we slowly made our way through what could only be described as pandemonium. I will never complain about Sydney traffic again; you had to see it to believe it - push bikes, motorbikes, taxis, cars, trucks, wagons and those 3-wheel motor scooters with anywhere from three to 10 people hanging out of them.

When we finally got onto the main road and into slightly less bedlam, I saw a huge tourist billboard which read 'Incredible India'; never a truer word spoken as I was about to sample some incredible things over the next eight days.

Due to Gary Dempsey not being able to come with me, Colonel Bagga and his friends thought I would be lonely by myself in the 5-star motel, so they had decided I was to spend the week with Brigadier Bains and his family. This turned out to be a terrific experience and the hospitality shown to me during my stay was, dare I say it, 'incredible'.

The Brigadier, being a retired army officer, is entitled to certain privileges befitting his rank and years of service to his country. I found myself living in a two-storey house in a gated community. The British influences are very much still in vogue and each morning I was served tea and biscuits in my room before going downstairs for breakfast.

My hosts were wonderful people with a great sense of humour and they, like me, enjoyed a drop of beer and wine. Needless to say we got on great.

I must admit as an Australian male who has to fight with his own kids to get them to do the washing up or any kind of household chores, I never quite got used to having two servants, a chauffer and the occasional bodyguard. Incredible!

OUT AND ABOUT

The first two days I visited some golf courses in the New Delhi area. I was chauffeured to Delhi Golf Club by Brigadier Bains' driver where we met Colonel Bagga and a man called H.P. Parmar, a local turf consultant who gained his degree at the University of Guelph in Canada.

H.P. Parmar had just purchased a luxury 4WD, not a scratch on it, so off we went in style to see the Greg Norman-designed course at Noida, a fast developing area about a one hour drive out of Delhi.

The course manager showed us around and even though it was a Sunday afternoon there were about a dozen of his staff of 68 in attendance. I saw two young boys hand-watering fairway margins to stop any stress occurring in the 34^{o}C heat. The Tifdwarf putting surfaces were in good condition despite a recent major renovation.

The next day H.P. Parmar and I travelled to an Arnold Palmer-designed course 40 minutes north of the city. Halfway through our journey, as another herd of Brahma bulls walked lazily across in front of buses, cars, 3-wheeled scooters, dogs and beggars with no legs, I asked H.P. how this river of traffic could co-exist in so many different shapes, sizes and values, and did he feel any pressure driving such a beautiful car. H.P. answered, "It just seems to work and we all fit in, even the donkeys and horses".

At the very next intersection H.P.'s words came back to haunt him as some little bloke in a rust-bucket on wheels slammed into the back left hand corner of our vehicle and carried on up every panel until he was wedged hard up against the passengers door! Well, H.P. got out of his door (I couldn't get out of mine), walked around and looked at his once-perfect panelled beauty, then opened up with a barrage of the Indian equivalent of every four-letter word known to man.

H.P. won the verbal battle quite easily, but the little bloke with the mad eyes had another surprise for us. Despite agreeing to pull in behind some 300 yards up the road, he disappeared up a small tributary and vanished into the Delhi smog.

With that little Indian experience under my belt we soon arrived at DLF Golf and Country Club where we were met by superintendent Shekhar Bhardwaj. Kim Fuller, who will be known to some readers, was Shekhar's boss during construction of the course, which once ▶

AGCSA Board member Martyn Black addresses the GCS&MAI conference

again is a world-class facility with fine Tifdwarf greens and TifEagle fairways and tees.

Shekhar took over from Kim when he moved on, and with a groundstaff of 75, 50 of whom are dedicated to the landscape crew, the course was immaculately presented with many man-hours dedicated to pruning trees into all sorts of tortured shapes and designs (*Casuarina cunninghamiana* made to look like 20-foot tall French poodles. Incredible!).

This course was also really only for the rich and famous of which there is an abundance of both in India. During our tour of the course, which has concrete cart paths and floodlighting for nine holes of night golf, we approached the 3rd green and from 100 yards away I announced to my hosts, "That bloke looks like an Australian". H.P. was incredulous, "How can you tell?", to which I replied, "He's got his shirt hanging out and looks pretty comfortable with his place in the world". As we got closer my hosts were quite excited as they said "That is Kapil, Kapil is here"! Then I added, "Yeah, and the bloke he is playing with is Dean Jones!"

GUEST OF HONOUR

GCS&MAI conference day arrived and everything was beautifully set up with sponsors marquees and decorated registration tables in the clubhouse surrounds of one of Delhi's best municipal golf courses. This venue was a last minute decision as 48 hours beforehand there was a labour strike at the original venue, which, unbeknown to me, sent things into turmoil. Colonel Bagga is one tough, resourceful man, and while this gave him, in his words, "a bloody heart attack", he and his disciples rallied and rose above this unwanted drama.

There was much pomp and pageantry with myself and a gentleman who once represented India in the Eisenhower Cup as the special guests. We both received a huge bunch of flowers which apparently is Indian custom. I gave mine to the Brigadier's wife and picked up a couple of brownie points.

A complete set of welcoming speeches ensued starting with Colonel Bagga who seemed genuinely relieved that it had finally materialised. He was followed by the "most esteemed" guest who I later found out owned his own golf course and was indeed a very important figure in golf in India.

I was next and part of my introductory speech involved expounding the virtues of the Austalian Golf Course Superintendents' Association which must have gone down well because I believe more than 12 delegates have since taken up international membership. I presented Colonel Bagga with one of our diaries as a gift and I think he liked it as much as flowers.

The next ceremonial part of proceedings was the giving of the Indian equivalent of our Distinguished Service Award. This was presented to a terrific old bloke, 92-years-of-age who spoke not a word of English and worked at Delhi Golf Club in 1943. He wore the traditional clothing and was a real character.

So with all of that out of the way the education component started. This called for the introduction of the MC, a man called

India has about 250 golf courses and the number continues to grow

Colonel P.K. Uberoi. This bloke and I became great friends by the end of my visit and he had a terrific sense of humour. To my surprise and delight he started each session with a fairly risqué joke, which impressed me because there were two women in the audience. I felt a lot more comfortable after hearing Colonel Uberoi.

The first lecture was on water and was given by a university professor. All was going well until he was attacked without warning by a delegate sitting up the back. Apparently he didn't want to know about rainfall statistics from the 1950's; he wanted to know about now! I thought "Strewth, tough crowd!"

The professor struggled to regain his composure, and the fact that every second bloke was receiving mobile phone calls, despite big signs saying they weren't allowed, didn't help either.

The next lecture was by Professor Shah from Kashmir who spoke very well about weed management. He must have been good because he was not interrupted and was also asked some questions.

I was next and spoke about course maintenance practices in Australian conditions. I went for 40 minutes and covered fertilising, watering, mowing, renovation, bunker maintenance and tree management. I must have whetted their appetite because they wouldn't let me get out for lunch and I had to be rescued by Colonel Bagga who was frightened I would starve to death.

Lunch was an amazing array of different, colourful dishes which my hosts insisted I try a bit of each one. Some brought tears to my eyes, others stopped my heart momentarily.

The afternoon session went well with some sponsor presentations from Toro and Rain Bird and other local manufacturers of golf carts and irrigation hardware. All in all, it was a good start with 63 people form all over the country and one from Pakistan in attendance.

Day two saw numbers swell to around 100 and I was first away with a presentation on course construction techniques including bunker design. I was about to find out there is a range of views on bunker design and in particular the type of sand that should be used.

I had just shown a slide of Gary Dempsey's magnificent pot bunkers at NSWGC when I was asked a question by an elderly gentleman as to whether that design could be used on an inland course. The same bloke that attacked the professor on day one launched into a ▶

verbal tirade at this elderly gent who was not going to be bullied and gave as good as he got. After what appeared to me to be a fairly even contest for 20 seconds or so, I could see Colonel Bagga becoming very agitated so I took the initiative and banged my fist on the lectern and called loudly in my deepest voice "Order, Order, Order!" Well you could have heard a pin drop. From then on many people called me "The Judge".

A few more lectures followed including one from my adopted father, Brigadier Bains, who spoke on the value of preventative maintenance of machinery. This bloke is a brilliant man who makes turf machinery in a small factory in Delhi. From the outside it looks very ordinary, but once inside it was clean enough to do brain surgery. The Brigadier was involved with the maintenance of tanks and armoured vehicles when he was in the army. He now exports his greens mowers and gang mowers to all neighbouring countries and has just picked up a contract to export to the UK. As Colonel Bagga said to me, "He is doing a great service for India".

AN INTERNATIONAL INCIDENT

So the seminar ended with another series of closing speeches and then it was out to play the golf championship. Armed with my borrowed clubs and a young caddy called Ravi, we hit off with great fanfare as the boy from Down Under took on a wide array of locals including doctors, colonels, brigadiers, superintendents, managers and sponsors.

I was enjoying my round with the other seven people (everyone had a caddy) but when we got halfway I inadvertently caused an international incident by asking for another Kingfisher (good local beer). The license, however, didn't start until 6pm.

There was much tooing and froing in a language very foreign to me! Even Colonel Uberoi could not convince the barman that I was a special guest from another hemisphere and they should make an exception. Once I realised the trouble they were having I said don't worry about it, but my guests saw this as a major affront to their hospitality.

Colonel Uberoi then played his trump card and sent my caddy to fetch Colonel Bagga who was busy organising the presentation dinner some 50 yards away. I don't know what K.D. said to the barman, but I got my ice-cold Kingfisher within 10 seconds of the brief

During the conference, Black was on hand to help the GCS&MAI present its version of the Distinguished Service Award

conversation. Suffice to say, the Colonel is a 'big wheel'. My caddy was so impressed that his player had a beer that we got a photo taken on the 10th tee with it.

Anyway I was lucky enough to play well on the back nine and shot 74 off the stick to beat the superintendent from Forest Hill Golf and Country Club by two shots which enabled the Colonel to proudly announce to me, "Mr Martyn, you are our champion" (apparently Daryl Sellar wants to come next year).

The presentation dinner was a jacket and tie affair and once again I tried to be polite and sample all the food including a fish dish which I think is the one that finally got me.

I took home lots of trophies and made lots of friends and the barmen who were reluctant to give me a beer earlier were kept busy all night as groups of delegates kept me pinned at the bar swapping stories and inviting me to all parts of India to visit their golf course.

A VERY LONG DAY

The following day we left at 8am for the five-hour drive to Chandigarh. Unfortunately I had been up well before 'damaging the Doulton'. Yes, the dreaded 'Delhi belly' had finally got me and by the time we arrived at our motel I had left my calling card at several roadside amenities. I was in trouble!

We had a meeting organised with the Punjab Golf Association at no less than the Chandigarh Cricket Ground. Steeped in history, the first thing you see when you walk into the very ornate reception area is a life-size portrait of Don Bradman. Next to the Don is Sachin Tendulkar. The dinner was another example of hospitality gone mad. There were about 20 people but enough food for 100. Unfortunately I could only manage three grains of rice and a strawberry.

As usual Colonel Bagga came to the rescue. Before bed that night the great man gave me some old Indian medicine in the form of coconut husks which he assured me would "bind my stool". That sounded good to me and next morning I was good as gold!

We visited three golf courses, two of which the Colonel had built only a few years ago, both very good designs in challenging environments. The Colonel also designed a driving range which is one of the headquarters for the Indian PGA from which you can see the Himalayas. We drove back to Delhi in the afternoon, with Colonel Uberoi and I in the front seat swapping jokes for five hours while Colonel Bagga slept in the back; he had endured a few big days. The trip was a success with the Punjab Golf Association wanting to hold the seminar next year.

FOND FAREWELLS

My last day in India saw me entered into the World Amateur Inter-Team Challenge at Delhi Golf Club, a beautiful old golf course which gets lots of traffic. I believe Peter Thomson helped them with some design work.

Once again I had a caddy, but this bloke was the gun. His English was not great but his golf was – he had shot a 62 around this course (10 under), he was my vintage and knew the place like to back of his hand.

In an unbelievable finish to an 'incredible' week, I was lucky enough to shoot 74 off the stick again which was the second best scratch score of the day. The Colonel proudly told me, "You will now represent India." Yes, that's right, I go back to Malaysia later in the year to play for India! I think I will stand out in that foursome!

So that's it, an amazing journey with some great people in a vastly different country. I cannot thank Colonel Bagga, Colonel Uberoi and Brigadier Bains enough for their hospitality and friendship. As an AGCSA Board member, we as an association wish our Indian friends every success and hopefully we can continue to help wherever possible.

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NOTHING RUNS LIKE A DEERE™

BY LUKE C. PARTRIDGE

Author Luke Partridge

Mean greens and hallowed grounds

The Ohio Program has provided many up and coming Australian greenkeepers the chance to work at some of the United States' leading golf courses. For 21-year-old South Australian Luke Partridge it afforded him the chance to work at one of the world's most exclusive country clubs – Oakmont. Here he outlines his time at the Pennsylvania course which has a reputation for producing the fastest greens in world golf.

Flying in over the Pacific Ocean I wasn't quite sure what to expect out of The Ohio Program. I had been warned that my internship at Oakmont Country Club in Pennsylvania was not going to be a walk in the park, but perhaps nothing could have prepared me for what was to come.

Oakmont is one of the oldest, most traditional courses in America. It has a history steeped with tradition having hosted seven US Opens, five US Amateurs and three PGA Championships, and will play host to the US Open in 2007.

It is a very private and very exclusive members-only club that prides itself on its reputation as having a golf course that is in tournament condition seven days a week, setting the standards for day-to-day maintenance and conditioning at the highest level. The club also boasts the world's fastest greens from day-to-day over summer.

Oakmont is currently ranked number four in America's top golf courses and is number two in course conditioning, second only to Augusta National. The golf course is currently in the middle of the biggest renovation/ restoration in its history, with superintendent John Zimmers and renowned architect Tom Fazio using 100-year-old photos to restore the golf course back to its old charm, while at the same time lengthening, narrowing and adding to the 190-plus bunkers in preparation for the upcoming US Open.

Zimmers has an obvious passion for turfgrass management that is reflected by the quality product he presents every day. He has a wealth of knowledge and experience to share. He has worked on some of the best courses in the US including overseeing the grow-in of Sand Ridge Golf Club in Ohio. He was actually headhunted to take over the top spot at Oakmont coming into the US Open.

Zimmers has hosted numerous trainees from The Ohio Program in the past. He expects nothing short of the best from all of his interns and staff included. He pushed us to our limits working up to 90 hours a week with us for almost four months without a day off. Needless to say it was the hardest summer of my life but the things I learnt and the experience I gained was invaluable.

To intern under a superintendent who demands perfection daily, and is known as one of the best in the world, was a huge honour. The Ohio Program works with many of the best courses around the US, such as Merion, Pine Valley, Augusta, Shinnecock and many more, but you have to realise that the top clubs micro-manage their courses and to learn from this management style is really beneficial.

NEW TECHNIQUES

Upon my arrival at Oakmont in March 2005 I was thrown straight into the thick of it. We started out with drill-n-fill, a renovation practice that was entirely new to me. The concept is simple; it is a machine that drills holes 12 inches (30cm) down and fills them with sand promoting deeper root growth and superior drainage. I say superior drainage because the drill bits drill down to within inches of the sub-

Oakmont Country Club is renowned for boasting some of the slickest greens in the world and has hosted numerous US Opens in its long distinguished history. It is also home to one of the world's most recognisable bunker complexes – the Church Pews

surface drainage lines making infiltration much more efficient.

The days of drill-n-fill were long and tiring – 16 hours daily of filling the machines with 5/50 dry sand and cleaning the greens of the excess sand and clay soil left from the drilling.

Another process that was done in autumn that was similar to this was the dry-jecting of greens. The dry-ject machine injects sand into the greens via high pressure (450psi) jets of water followed by a rush of dry sand leaving virtually no mess and unnoticeable holes that healed very quickly.

Zimmmers was a huge advocate of getting as much sand into the predominately clay soils as possible, maintaining the importance of having a deep healthy root system especially considering the stress the greens were under.

Once the holes left from the aggressive drilling had healed adequately we were straight into spring aerification of the tees, greens, approaches and fairways. After the greens and approaches were aerified, sand was then hand swept into all the holes on all 18 greens and approaches, including three large putters.

Zimmers is a huge fan of hand sweeping sand as he believes it is the best way to make sure all of the holes were filled. He believes that drag mats can pinch holes shut and do not push sand down nearly as well as hand sweeping. This is attention to detail at its finest, and it works. Doing things right often means you do it by hand, the old fashioned way. Who would believe that I had to learn that in America?

After the grind of spring renovation, myself, along with a 40-man crew, settled into a general routine, one which I had never experienced before. As I mentioned earlier, the standards of day-to-day conditioning were set extremely high, which meant that the golf course was pushed to its limits everyday and was basically 'living on the edge'.

The idea of having the course in tournament condition every day meant keeping it as dry as possible but still green, improving playability and lessening the chance of disease. This meant that tee, fairway and rough heads were run for just three to four minute cycles once a night. Wilt was kept at bay during the day by a 10-man hand watering crew that scouted the course for hotspots for up to 15 hours a day. ▶

To add to the pressure, the crew was also responsible for keeping cool the truckloads of cool-season bluegrass and fine fescue sod being laid daily in hot (26^{o}C) and humid (83 per cent) conditions. The state of the art irrigation system was only used during the day in extreme circumstances so there would be times where syringing entire fairways by hand was the only option.

MEAN GREENS

Oakmont is all about green speeds. The members expect the greens to stimp no less than 12 on a normal day, weather permitting. They are not disappointed.

Daily mowing routines at the peak of the season usually started with a double cut by triplexes, double or triple cut with hand units and then double rolled. The mowers were set at .086 of an inch (2.18mm). During a tournament we would double cut and double roll each evening after play before repeating the routine the next morning.

Putting five cuts on a green in the morning was quite an experience. The first green to be cut would be number nine up by the clubhouse which was lit up by spotlights. It was an awesome sight to see six walk mowers and two triplexes bustling across the green trying to avoid each other and at the same time try to concentrate on their line of cut, which was virtually impossible to see.

A lot of the time the greens would be so dry that there would be no lubrication for the mowers and they would start to bounce. A hand waterer was then called and he would give the green a very light spray.

Because of the low mowing heights, Zimmers and his two assistants would carefully inspect all the mowers on the first cut every morning to make sure they were cutting properly. If anything looked even slightly out, the mower would be called in and a mechanic sent out with a gauge to double check the heights. This happened quite often. The highest stimp reading to be taken at Oakmont was 15 and some days the greens were unstimpable.

WHAT IS THE OHIO PROGRAM

Run by Ohio State University, the programme brings 19-28-year-old single guys and girls up for 12 to 18 months to work on some of the most exclusive golf courses in the United States. You have to be drug free with no criminal record, have a clean drivers license and most importantly a willingness to learn and ability to endure long hours of on-the-job training. Irishman Mike O'Keeffe manages the programme and brings in over 100 turf trainees a year from all over the world.

The programme has been a popular avenue for many Australian greenkeepers who have developed a strong reputation as excellent workers. A number of current superintendents have undertaken the programme including Sam Myott (The Heritage), Shane Brogan (ex-Torquay Golf Club), Ben Marshall (Club Pelican), Ben Cavanagh (Brisbane Golf Club), Darren Moore (Lakelands) and David Goldie (The Dunes), who has since become the point of contact in Australia for the programme.

For more details on The Ohio Program (www.top.osu.edu) contact Mike O'Keeffe on okeeffe.1@osu.edu or David Goldie on dngoldie@hotmail.com

The regular low mowing, rolling and weekly applications of Primo meant that the *Poa*-bent canopy grew in extra tight, not to mention the fact that the surfaces have evolved over 102 years, being the same turf that was planted in 1903. To say that the greens at Oakmont were especially unique would be an understatement.

However, with this amount of stress on the turf, disease management was essential. Automatic irrigation was never run on the greens or approaches. They were monitored carefully by hand waterers who would apply very light syringes during the day and only if the greens were footprinting. Syringing kept the greens ultra fast and alive!

The preparation of the greens at Oakmont was a unique practice that is not performed anywhere else in the world on a daily basis. I learned so much being exposed to this pressure. On top of that, chemical applications were also obviously of high importance with each application being worth around the five figure mark. The pressure was always on the applicator to perform on a weekly basis.

Through The Ohio Program Luke Partridge spent more than a year working at Oakmont and then at Sea Island Resorts in Georgia

HEADING SOUTH

In contrast to my stay at Oakmont, my next placement was at the Sea Island Resorts on the premier Seaside Course on Sea Island just off the coast of Georgia which is ranked the number one golf resort in the US and number 22 public access course. Sea Island has played host to a number of PGA events including the UBS Cup in 2003.

The two worlds of the traditional country club and the ultra modern and exclusive resort

course were like chalk and cheese. Where Oakmont made the course challenging for members by growing the rough and speeding up the greens, Seaside cut rough short and only single cut greens to make play more enjoyable for visitors and to get as many rounds as possible in a day.

What Seaside lacked in conditioning in comparison to Oakmont, it made up for in its aesthetic appeal. Seaside is situated on the edge of an island surrounded by marshland, ocean inlets and old oak trees draped in Spanish moss. It is as much a wildlife sanctuary as it is golf course. Bald eagles gracefully patrol the skies and I even saw dolphins swimming in an inlet between the No.8 tee and fairway.

I arrived at Seaside just after overseeding. Their overseeding had been hampered by 24 inches of rain received during the remnants of a hurricane. The seed had germinated causing numerous seed washouts leaving irregular patterns on mainly the *Poa* areas around the tees greens and approaches. The wet conditions also caused an outbreak of pythium.

In the lead-up to the 2007 US Open, Oakmont has undergone one of the biggest restorations in its history, with superintendent John Zimmers and renowned architect Tom Fazio using old photos to restore some of the course's old charm

The seedling like state of the *Poa* caused prolonged disease damage. Getting these areas to germinate evenly presented a challenge that was eventually overcome by numerous applications of Stardust *Poa trivialis* via rotary spreaders and with the help of some favourable weather. Numerous fungicide applications were made at a curative rate.

Seaside's bermudagrass was overseeded with perennial ryegrass on the fairways and rough at a rate of 500lbs per acre (approx. 227kg/0.4ha) and Stardust *Poa trivialis* on the ▶

greens, tees and approaches at a rate of 18lbs per 1000sq ft (8.2kgs/92m^2). These turfgrass varieties were selected because they are obviously cool-season grasses that will stand up to some heat stress in the early summer months but are not so heat-tolerant that they will not burn out during transition.

They were also selected because of the reasonable $2 per pound price. However this is still an enormous amount of money when you think of how many pounds it takes to overseed an entire course. You could gauge the course budget solely on the extensiveness of its overseeding process.

Another challenge at Seaside was adjusting to the cultural differences of training with an almost entirely Hispanic maintenance crew, something I have never experienced before. However, once you get over the language barrier you find that most of these guys are really nice, laid back, hard working and appreciative people that are willing to teach you some Spanish in return for a little English.

LASTING IMPRESSIONS

Stereotypically, American golf courses are said to be over-watered, over-fertilised and willing to sacrifice playability for aesthetic appeal. I believe this is completely untrue, at least on the courses I experienced.

A large portion of the restoration work is targeting the course's 190-plus bunkers

I believe American superintendents have an edge in that they are able to present a course perfectly in a condition that is suited to its specific situation. I was lucky enough to see both ends of the spectrum, training at both a top end private country club and one of the best resort courses in the States, giving me a taste of maintenance practices that were extremely different in every way but funnily enough ultimately striving to achieve the same goal.

Among the renovation practices used at Oakmont is 'drill-n-fill', where 12-inch (30cm) holes are drilled down to within inches of the sub-surface drainage lines to promote deeper root growth and superior drainage

Along my travels I met some great people and invaluable contacts from all over the world. I also travelled to Niagara Falls in Canada and New York City and got to see most of the east coast of America. I was also lucky enough to attend some great golf tournaments on top courses (including The Masters) and even attended the 2006 GCSAA national turf conference in Atlanta.

I think the major lesson learnt working in America under such professional conditions is the importance of communication on a golf course. It also gives you a well trained eye for detail and gives you a better understanding of the differences between the practices employed in Australia and the US.

ACKNOWLEDGEMENTS

The author would like to thank The Fellowship of Golfing Rotarians, Rob and David Motteram, Mike O'Keeffe, David Goldie, John Zimmers and Peter LeRiche from Torrens Valley TAFE for all of their help towards participating in the programme.

Luke Partridge hails from Adelaide and completed his apprenticeship at D&D Curators before moving to Mt Osmond Golf Club. While there he received a Rotary Scholarship to take part in The Ohio Program. Partridge completed his turf management studies at Torrens Valley TAFE.

Since writing this article Partridge has taken up a position in New Zealand helping construct the new Jack Nicklaus-designed Kinloch Golf Club near Taupo under superintendent Stephen Marsden.

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PHOTOS BY DARREN JONES

Tsunami strikes St Michael's

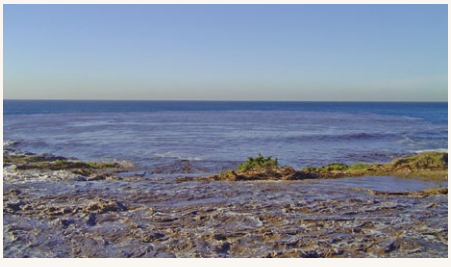
Thursday, 6 July, 2006 will go down as a day that groundstaff from St Michael's and New South Wales golf clubs won't forget in a hurry. In what they are calling the 'St Michaels Tsunami', the NSW Golf Club dam located on the boundary between the two clubs burst its banks causing between 35-40 million litres of water to cascade down across St Michael's Golf Club.

The incident happened shortly before 9am when a 13m wide by 6m high section of wall on the northern side of the NSW Golf Club dam collapsed. The resulting torrent cut a swathe through St Michael's destroying bridges, cart paths, fairways and irrigation hardware before being channelled into the St Michael's dam which broke its banks and overflowed into the nearby ocean.

"It was quite an eventful day for a Thursday," recalls St Michael's superintendent Darren Jones, winner of the AGCSA's Excellence in Golf Course Management Award in 2005. "Our members were beginning their mid-week competition which for the previous two weeks had been cancelled due to wet weather.

"Finally we had a beautiful day for golf, but the next thing I know my assistant Darren O'Conner roars up in his buggy and says, 'You've got to come and see this'. I jumped into his cart and up over the hill we went and there it was – the St Michael's tsunami."

Entering the property at the top end of the course, the torrent of water crossed a service road before spewing across the 11th fairway and into the top end of Moran's Gully that meanders its way through most of St Michael's. Water flowed through behind the 14th green to an area below the 15th before rushing down into the St Michael's dam.



Along the way the surge of water uprooted trees, tore up irrigation wire from fairways (a section of wire on the 11th fairway was ripped up and moved 50m across) and stripped rubber matting from cart paths, while three bridges on 15, 16 and 17 collapsed. In the case of the bridge on 16, the span is now 50m wider after an area of 5000m^2 was washed away.

As the drama unfolded, St Michael's staff had to rescue golfers who became marooned on sections of fairways and tees that had become small islands, while an engineer who was putting the finishing touches to a three-week repair job on two of the three bridges also had to be rescued shortly before watching all his work get washed down the drain.

Despite holding firm, the ground either side of the St Michael's dam wall eventually gave way due to the sheer volume of water, while the pumphouse also sustained significant damage. Not surprisingly, the influx of water left behind thousands of tonnes of sand and silt in the dam and as this edition of ATM was going to press St Michael's was still in the process of removing those deposits.

BY BRETT ROBINSON

The Syngenta Disease Diagnosis workshops were one of the highlights of the education sessions

Back in Brisbane

22nd Australian Turfgrass Conference

Superintendents and turf managers from around the country turned out in force for the industry's largest annual gathering in Brisbane last month. The 22nd Australian Turfgrass Conference saw a record turnout from the trade and attracted some of the industry's foremost agronomic experts. Here ATM reviews the week's events and profiles the winners of the 2006 AGCSA Awards.

A record turnout from the trade marked a highly successful 22nd Australian Turfgrass Conference which returned to Brisbane after a four year gap in mid July. With over 10,000m^2 of exhibition space, which was more than that at the 2004 Melbourne conference, more than 90 companies, including 15 new to the conference, turned out for the two-day trade exhibition.

In total over 1500 people either attended or were part of the trade exhibition, while the education sessions attracted 608 delegates. Full registrations for the golf course management stream were up from Melbourne while a healthy number of delegates also turned out for the sportsfield and turf mechanics streams.

Following on from the first regional turfgrass gathering last year in Echuca-Moama, the 2006 conference returned to the bright lights of the big city, with Brisbane playing host to the conference for the first time since 2002.

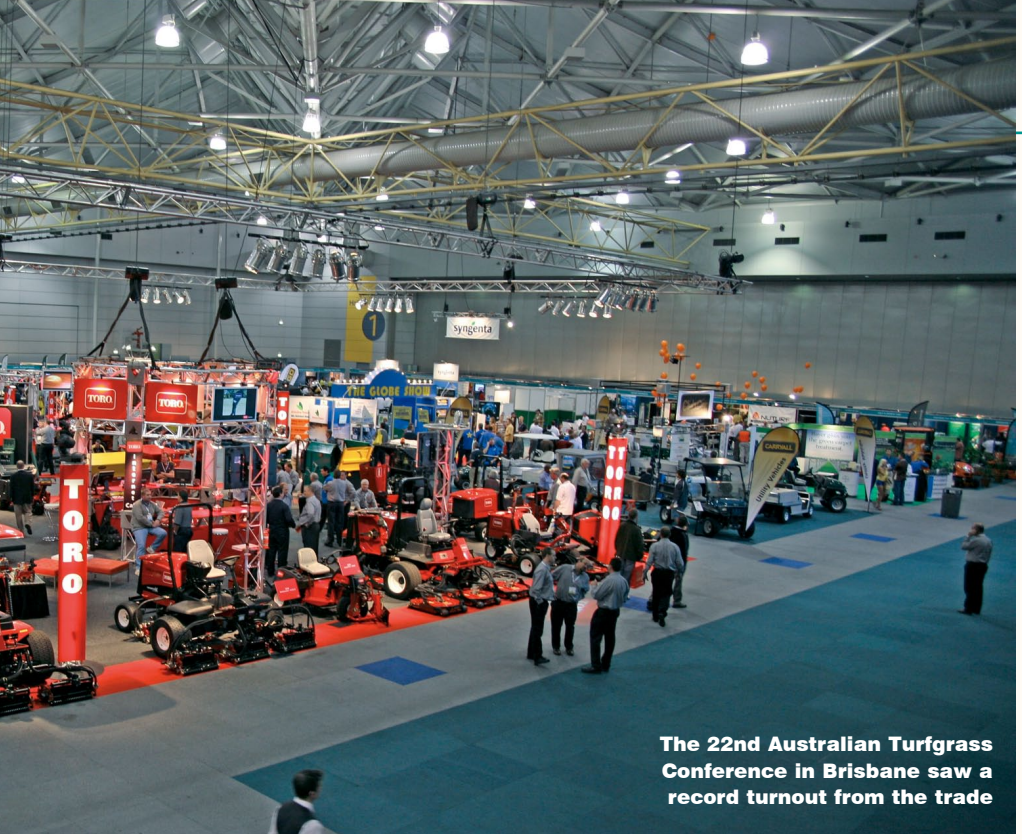
North Carolina State University weed management expert Fred Yelverton opened the conference with a seminar on future trends in weed management, before a wealth of other turf experts from Australia and around the world took centre stage for the education component of the conference. In total there were nearly 50 different seminars and workshops over the golf course, sportsfield and turf mechanics management streams.

Among the keynote speakers was a very candid Billy McMillan from BIGGA who looked at communication strategies and committees, while Dr. Milton Engelke from the Texas A&M University got technical in his seminar on rootzone organic management.

One of the most popular seminars during the week was the Syngenta Disease Diagnosis workshops which were held in both the golf and sportsfield management streams.

University of Tennessee's Alan Windham ran the workshop and took delegates through the different methods of diagnosing common turf diseases. Each workshop contained around 50 microscopes which delegates were able to use to undertake a series of exercises designed to help them understand diagnostic processes.

The turf mechanics stream also attracted a strong turnout with presentations from a number of leading companies including Toro, Jacobsen and John Deere, while Terry Muir examined some of the ways mechanics can keep their workshop up scratch from an environmental perspective.



The 22nd Australian Turfgrass Conference in Brisbane saw a record turnout from the trade

The trade exhibition again proved a highlight with a host of new companies turning out in Brisbane. Among them were Water Equipment Technology, East Coast Turf Renovations, JRM, Becker Underwood, PJC Sportsturf, Grovely TAFE, PGG Wrightson, Conquest Couch Growers, Princess Turf and Albright.

A new feature at this year's trade exhibition was a dedicated area for new product launches. One of the highlights was Toro's Great Sporting Moments product launch where sporting icons Greg Ritchie and Jack Newton helped Toro launch six new products to hit the Australian market (see Around the Trade, page 50).

JACOBSEN TURNS RED

Conference week got off to the best possible start for Carnarvon Golf Club superintendent Steve Jacobsen after he collected the 2006 AGCSA Golf Championships title at North Lakes Golf Club. Jacobsen fired a two-over par 74 to collect his first Toro Red Jacket, beating home Daryl Sellar (Glenelg Golf Club) and Michael Dennis (Royal Perth Golf Club) who both shot 77s.

Playing off a two handicap, Jacobsen posted 37 on the front and back nines and collected nearest the pin prizes on 5 and 12. This round included three birdies and five bogeys, as well as a two on the par 3 162m 5th.

Sellar, a three-time winner of the tournament playing of scratch, left his run a bit too late to finish three shots adrift of Jacobsen. Starting on the 8th, Sellar was six over after nine holes, but fired a one-under on the closing nine.

Defending champion Trevor Ridge could only manage 85, five bogies and a double bogey over the final seven closing holes putting paid to what would have been a third consecutive Red Jacket for the Sawtell Golf Club superintendent. Likewise, former champion and perennial frontrunner Martyn Black could only manage 90 around the Graham Marsh-designed layout which included an uncharacteristic three sevens and an eight on the long par 5 4th.

Victorian Mark Jennings had a round of golf he would rather forget, the Box Hill Golf Club superintendent scoring on just four holes for a grand total of eight points.

Jacobsen headed what proved to be a very fruitful day on the greens for NSW superintendents at North Lakes. Playing off a 27 handicap, Eastlake Golf Club superintendent Ryan Fury scored 38 points to win the stableford trophy, three points clear of the mercurial Merv Hayward. Shaun Probert (Ryde Parramatta) managed to post 33 points while Andrew Heskett recorded 31.

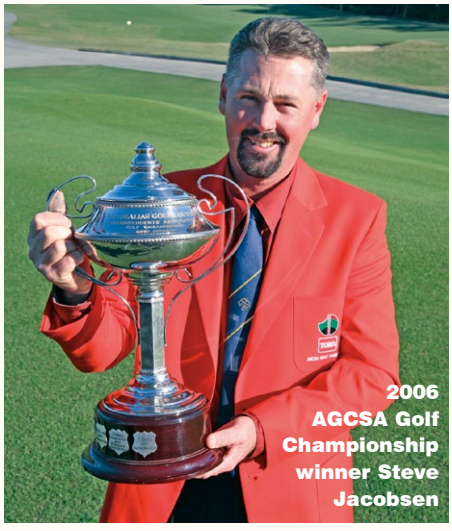
Ryan's points haul helped set up a NSW win in the teams' event for the second year in a row, finishing 11 points clear of host state Queensland. Fury was joined by fellow NSW supers Probert, Alan Horrocks (26 points) and Ridge (25 points) to give NSW a grand total of 122 points.

Cavanagh headed the Queenslanders with 34 points while Michael McMaiton and Stuart Laing posted 27s as Queensland finished second on 111 points. Steve Lewis (32 points) led the Tasmanians into third, while the Victorians could only manage 88 points.

Across at Brisbane Golf Club, Brian Bird took out the 2006 AGCSA Corporate Cup. Playing off a handicap of 10, the golf course architect came home with 37 points, 19 on the front nine and 18 on the closing nine.

Three-handicappers Paul McLean and Terry Barr both shot 76 off the stick to finish with 35

CONTINUED ON PAGE 24 ▶


2006 AGCSA Golf Championship winner Steve Jacobsen


2006 AGCSA Award winners, from left, Norm Ashlin, Peter Donkers, Daryl Sellar and Sean Kinsley

2006 AGCSA Awards Recognising Excellence

A Western Australian icon and one of South Australia's most prominent superintendents were among this year's winners at the 2006 AGCSA Awards announced during the 22nd Australian Turfgrass Conference in Brisbane. ATM profiles the latest names to be entered onto the honours board.

2006 DISTINGUISHED SERVICE AWARD PRESENTED IN PARTNERSHIP WITH SCOTTS AUSTRALIA

NORM ASHLIN

One of Western Australia's most respected superintendents Norm Ashlin joined the elite of his profession after collecting the AGCSA's Distinguished Service Award in Brisbane. The life member of the GCSAWA, who has spent nearly 40 years in the greenkeeping trade, became the tenth winner of the award which recognises an individual who has left an indelible mark on the industry.

Born in southern Tasmania, Ashlin was number nine child of 10. He left home at the tender age of 12 and went across to Western Australia at 14. His first job was in Capel (south of Bunbury) as a farm hand milking cows for the princely wage of 10 cents an hour.

Ashlin's first greenkeeping job came in 1970 at the 18-hole Capel Golf Course. Back then the sprinkler system was the bayonet type and the machinery inventory consisted of a three-gang Scott Bonner wheel-driven unit with Armstrong lift, two 20-inch Scott Bonner Super Cuts, a tractor and drawn slasher, one flymower and a rudimentary spray unit.

In 1980 Ashlin moved to Perth whereupon he undertook a greenkeeping course at night school and in 1983 was asked to become head greenkeeper at a new golf course that was planned for an old pineapple plantation. That course, Collier Park, remains Ashlin's home today and over the past two decades he has watched it transform into one of the most popular tracks in the state.

Ashlin has played a significant role in the WA turf industry with Collier Park being used as a trial site for numerous turf research projects, including the national bentgrass and couchgrass trials. Collier Park has also played an important role in developing apprentices, with TAFE students regularly completing work experience at the course during the 1980s and 1990s.

Not surprisingly, Ashlin has been privy to many of the major changes to affect the industry over the years, from new greenkeeping methods brought about by innovations in technology through to the heightened awareness of issues like environmental management and OH&S.

"When I first started golf course work in 1970, the care of oneself and the environment didn't come into the equation," says Ashlin. "Fertilisers came in 83kg bags and we were expected to lift them. Spraying was done without protective clothing and most fungicides were mercury-based. No-one worried about what type of fungus was present, because the fungicide was broad-spectrum and the mercury content just about killed everything.

"The main pesticide we used was Dieldrin and no records were kept on what was sprayed, how much and how often. No protective clothing or respirators were worn and there were certainly no washdown bays. Ammonium nitrate was stored alongside fuel drums. How different is it now? The changes to safety procedures are a good thing."

In line with these changing attitudes, Ashlin is currently in the process of improving Collier Park's washdown facilities, with the club spending upwards of $75,000.

"Environmental issues are coming more and more to our attention, not just at Collier Park but across the industry," says Ashlin. "Chemical and fertiliser residue is a big concern because stormwater from roads and other areas flows through Collier Park and the water leaving the course flows into the Canning and Swan rivers.

"We also try to recycle as much as possible instead of sending to landfill. We began by experimenting with worms, using our de-thatching to feed them. It worked and they turned out some great castings. Now we are experimenting with harvesting liquids from the same process and we hope to be able to use this as fertiliser on fairways."

AGCSA EXCELLENCE IN GOLF COURSE MANAGEMENT PRESENTED IN PARTNERSHIP WITH JOHN DEERE

DARYL SELLAR

South Australia had cause to celebrate early on in the conference after popular Glenelg Golf Club superintendent Daryl Sellar was named winner of the AGCSA Excellence in Golf Course Management Award. Sellar beat home Glenn Cross (Mt Lawley Golf Club, WA) and Mark Jennings (Box Hill Golf Club, VIC) to become the state's first winner of the award since it began back in 1990.

Over the past seven years, Sellar and his team have transformed the famous Adelaide layout, laying a strong and sustainable foundation for the club's future. Glenelg Golf Club has been located on its current site at Novar Gardens in Adelaide's western suburbs since 1927. The course has undergone numerous changes over its history, with this latest project, overseen by Sellar and previous superintendent Darren Cahill, the third major routing of the course. The redevelopment was prompted by four issues:

- Turf species – the conversion of kikuyu fairways and surrounds to Santa ana, and *Poa annua* greens to bentgrass (Dominant blend);
- Revegetation – returning sections of the course to their original character;
- Playability – through the development of a more challenging and interesting course, coupled with the conversion to more suitable turf species, the overall presentation and playability of the course was to be enhanced;
- Sustainability – early in the redevelopment programme, opportunities were identified and strategies instigated that allowed the 'new' course to be more sustainable than the old, while still achieving improved quality and playability.

The project was completed over a seven-year timeframe. The first stage of work was carried out in the summer of 1998/99, when the predominantly kikuyu fairways of holes 4, 5, and 6 were stripped and replaced with Santa ana. At the same time, the opportunity was taken to remodel the bunkering, extend the 4th green, construct a new 5th green and reconfigure the 6th hole.

The 13th was realigned with a completely new green complex and a new par 3 14th hole was created to cover the loss of the old 7th. Two large lakes were also excavated in an existing low area between the new 13th/14th holes and the adjacent 18th.

The 14th green and its surrounds were then rebuilt in the summer of 1999/2000, along with the creation of a new tee complex for the 15th and a lowering of the first part of the 18th fairway to improve visibility.

At this stage it was best if work was carried out during winter. It was decided that the Santa ana would be sodded rather than sprigged and to replace the *Poa* greens with Dominant blend (1019/1020) bentgrass.

The winter of 2004 saw the start of the final stage of the redevelopment. Works included new greens and approaches to the 12th and 15th holes and new tees to the par 4 13th and 17th. The most comprehensive work was the construction of an entirely new par 3 hole, the 16th, and the existing creek was expanded into a lake network. This final phase added 110 metres of length to the course which in total now measures a demanding 6267m, par 71.

More importantly, the course is now better equipped to meet the challenges of the future through greater sustainability. The character of the course now lends itself to reduced inputs in marginal or out-of-play areas, with greater focus on the playing surfaces. The upgrade of the irrigation system and conversion of turf species has already seen improved playing conditions with reduced inputs.

AGCSA CLAUDE CROCKFORD ENVIRONMENTAL AWARD PRESENTED IN PARTNERSHIP WITH SYNGENTA

PETER DONKERS

Located on the environmentally-sensitive Long Reef headland in the northern coastal suburbs of Sydney, Long Reef Golf Club requires precise environmental management. Fortunately, the club has the services of superintendent Peter Donkers to expertly manage these challenges and in Brisbane he was recognised for his efforts after winning the prestigious Claude Crockford Environmental Management Award.

The major project consuming Donkers' time at the moment is the construction and upgrade of the course's maintenance facility. With a price tag between $750,000-$1 million, the new facility will replace the existing one which is situated in the middle of the course making it an eyesore due to the open nature of the site. The new maintenance facility will be constructed from scratch and after a lengthy process of finding a suitable site the council recently approved the DA. The existing facility is in a very poor state with many environmental issues such as improper chemical mixing and filling facilities, fuel fill-up area and chemical and fertiliser storage.

Some of the challenges facing Donkers and the club have included the location of the new facility due to complaints from local residents. As well, the new facility must comply with the Griffith Park Plan of Management which covers the whole of the Long Reef headland.

In conjunction with the construction of the new facility, the club and the local council will divert local stormwater through the course into a new dam. The dam will be excavated from the site of the current shed and will allow all stormwater currently exiting directly to local beaches to be diverted through the course, filtered through the existing pond system and used for irrigation.

GRADUATE OF THE YEAR AWARD PRESENTED IN PARTNERSHIP WITH TORO

SEAN KINSLEY

At 35 years of age, Yamba Golf Club's Sean Kinsley can lay claim to becoming the oldest recipient of the AGCSA Graduate of the Year Award, beating a talented field of apprentices drawn from across the country.

A love for the game of golf and a desire for a career change were the driving forces behind Kinsley taking up a greenkeeping apprenticeship in his 30's. Kinsley joined Yamba Golf Club a little under three years ago after already completing the first year of an apprenticeship off his own bat.

At the time, Kinsley, a former graduate of economics, approached Yamba superintendent Andrew Smith who just so happened to be on the lookout for a new apprentice. It proved to be a perfect match and Kinsley has since established himself as an integral member of the Yamba greenkeeping crew.

Playing off a five handicap means Kinsley has a real appreciation for the game of golf and it's no surprise therefore that Smith has got Kinsley setting up the course for play each morning. Kinsley is one of three apprentices on staff at Yamba and also heads up the bunker maintenance and repair team and undertakes weed spraying around the course.

Unfortunately for Smith there is a strong possibility that he could lose his star apprentice come the end of this year. Kinsley will fly to the US in early 2007 to attend the Winter School for Turf Managers at the University of Massachusetts courtesy of Toro and while there he plans on organising an internship through The Ohio Program.

Correction: In the last edition of ATM, David Faggus from Wallacia Golf Club was named as a finalist for the NSWGCSA Graduate of the Year Award. The finalist's name should have been Brett Saggus. ATM apologises for the error.

CONTINUED FROM PAGE 21

points and tie for second, while three players – Gary Smith, Andrew Peart and defending champion Paul Brown – tied for third on 34.

Peter Boyd pulled off the longest drive on the 1st and nearest the pin prize on the 4th, while Paul Lierse (13th) and Gary Topp (7th) also collected nearest the pin prizes. Greg Marshall had the privilege of departing Brisbane Golf Club with the NAGA award after a return of just 15 points.

ON CUE

Conference week kicked off in usual fashion with the Bayer Environmental Science sponsored Welcoming Cocktail Reception at The Gabba. Over 500 delegates showed up for the opening night festivities which this year carried a theme based around classic golfing film Caddyshack. A few brave souls got into the spirit of the evening wearing their best (or worst) attire in true Rodney Dangerfield spirit.

Highlight of the evening was the Scotts Pool Competition which pitted 64 teams of two against each other in search of the turf industry's sharpest cue. The team of Scott McKay and Brent Robinson (who was a late ring-in for Tim Kennedy) triumphed after dispatching Colin Kinghan (Oatlands Golf Club) and Paul Kortholt (Rossdale Golf Club) to take out the main prize.

Scott McKay and Brent Robinson took out the Scotts Pool Competition

POST-CONFERENCE TOUR

This year's post-conference turf tour took in three venues with around 80 delegates visiting Royal Queensland Golf Club, The Gabba and Redlands Research Station.

First stop was Royal Queensland where Ashley Mead (Michael Clayton Golf Design) superintendent Kelly Hyland, assistant superintendent Marcus Price, Jason Gale and Tim Bilston (Grove) showed off the major redesign work the course is undergoing to accommodate the second Gateway Bridge.

Delegates viewed the recently completed stretch of holes 10-13 which have been rerouted and will be handed over in September. Hyland also showed off the 15th and 16th fairways which had recently been sprigged and plugged with Queensland blue couch.

Following Royal Queensland the tour stopped by Brisbane's premier sporting facility The Gabba. Unfortunately, due to all the drama surrounding Jason Akermanis at the Brisbane Lions, delegates were only allowed to spend a few minutes out in the centre of the ground after the Lions called a closed training session.

Final destination for the day was one of Australia's premier turf research facilities Redlands Research Station. Drs Don Loch and Rachel Poulter showed delegates the numerous plots which make up many of the Horticulture Australia-funded research projects the facility has on the go.

Among the projects Redlands is undertaking are warm season variety trials, management guidelines for new warm-season grasses in Australia, and optimising nitrogen fertiliser for use on turf.

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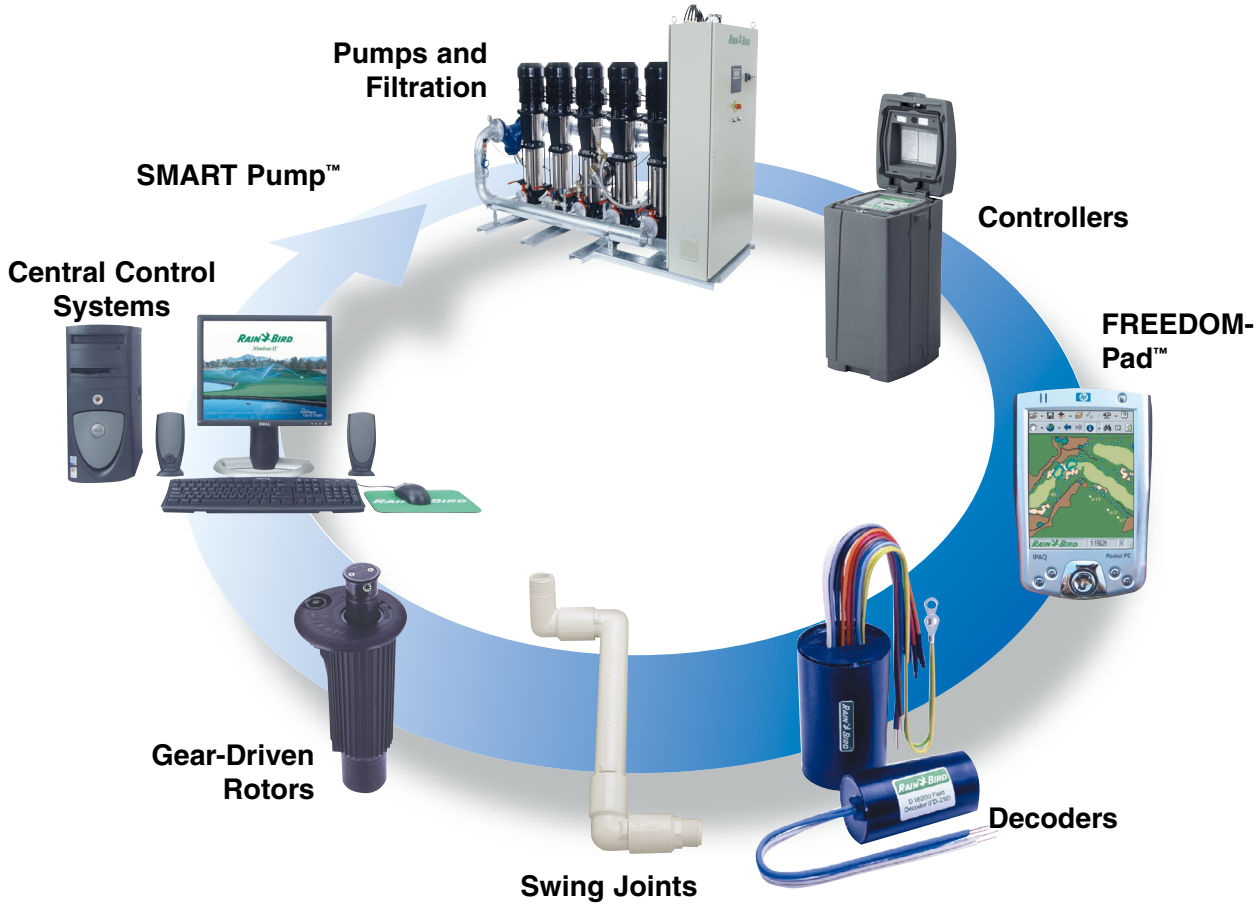

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THE PULSE

Staff rosters can be a constant source of debate, particularly in the golf course maintenance industry which is so heavily dictated by the seasons. Clubs are forever being asked to come up with ways of improving roster efficiencies and in this instalment of The Pulse, ATM's dedicated opinion section, we get superintendents' thoughts on the matter.

Most readers of ATM will be aware of the AGCSA's weekly email newsletter The Cut which goes out to over 1800 inboxes each week. In each edition of The Cut the industry is asked to comment on certain issues affecting them and back in June a golf club general manager posed a question relating to greenkeeping rosters. The topic provoked widespread response from superintendents around the country and what follows are some of those received.

The question asked was: "Golf is played from dawn to dusk seven days a week. However, staff rosters seem to be based on a traditional 6am-2.30pm, Monday to Friday roster with overtime on weekends and after hours. Do any clubs have innovative roster arrangements including weekend rosters as part of normal shifts and seasonal rosters such as afternoon rosters in summer aimed to get maximum use out of course equipment?" Here's what some superintendents had to say.

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"I have been employing staff for weekend work as part of their normal working week for a number of years now. Course quality improved as there was little drying out over the weekend. Staff are happier as there is no 'standby' afternoon watering on weekends. My staff have been at me for ages to start early so they can leave early in the summer, but there is little point in this as the afternoon is precisely the time you need staff to combat the stresses of summer. I will roster people to come in late if extremely hot days are forecasted so they can work into the afternoon and help get the greens through the hottest part of the day." Superintendent, NSW

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"Innovation in terms of rostering these days sounds really good from a manager's (whether a GM or superintendent) point of view, maximising plant and labour usage to get better efficiencies and more out of the money. Summer shift rostering is done on a limited basis at my course, due to needing at least six out of seven of us on course every morning to set up for competition. Staff only take annual leave between March and October and get paid double-time for weekends.

It is, however, increasingly difficult to just get guys to work for peanuts. To then start to play around with their hours, split shifts or expect them to, in my case, give up weekend social lives (as they do) so as they can get to work on a Saturday or Sunday morning at 4.30am for standard pay instead of our agreement of double-time is ludicrous.

People play golf for recreation and many actually can afford to play golf all week long while the majority have to work to struggle to put fuel in their car. Where does the imbalance lie? Greenkeepers are poorly paid and are expected to provide a high level service at hours which suit the golfer for no reward. You can't just take, take, take because they walk, walk, walk. Greenkeepers these days use the remaining daylight hours once they have knocked off to work a second job to supplement their income, go to training or spend quality time with the family.

I don't personally see a time where golf clubs can increase hours, split shifts or perform standard shifts over weekends in place of overtime without solving the root problem in our industry which is we are non-competitive in regards to remuneration with many other trades and industries. For many it will get all too hard for no reward. Sorry to get fired up,

but I hear so much talk about how can we get more from staff without the golfer putting their hand in their pocket. Let's get real – they're not paying enough to start with to expect anything extra." – Superintendent, WA

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"My club has only six ground staff to roster as it is. We need all of these staff to do course preparations every day. As well, we have three come in on a weekend to do course prep, overtime every second weekend. I wonder how many general managers have split shifts in their office to maximise opening hours for member contact at the front office." – Superintendent, SA.

"I work dawn to dusk 6.5 days per week with Thursday afternoons off. The course is divided in half on any given day, half free and half being worked on. Play on my bit and expect inconvenience, the other bit is free of staff." - Superintendent, QLD

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"Including myself we only have four staff, one of whom is a first year apprentice. How would we be able to have a split roster and still get the course ready for daily play? What makes it even harder is we do not get paid for overtime. This includes Saturdays. We have to take time off in lieu, however they are kind enough to pay us for Sundays (which we only do for special events such as pennant) and public holidays. However, we do find it easier for one of us to come in early when we need to do any spraying." - Superintendent, QLD

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"I utilise a split crew system with four people rostered to work 11.30am to 7.30 pm Monday-Friday. Three of these people are summer casuals who work from October through April (the main mowing season) and the other is a qualified greenkeeper who supervises them. They are primarily employed as fairway/rough mowers and the greenkeeper is an all-rounder.

My course is generally very busy in the mornings and a bit quieter in the afternoons in the peak of summer so productivity with mowing is way up as there is less disruption due to play and a better quality of cut on the dry turf. This crew can also be used for emergencies as well such as irrigation blow outs and greens syringing. The extended work time also helps security as there is virtually always an employee on the course during daylight hours and the greenkeeper will have a first aid certificate to assist golfers if required. All in all it works very well. The four are generally surfers who love the surf in the mornings and work in the afternoons...a real surf'n'turf!" Superintendent, QLD

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"The roster that has been described is definitely a traditional roster that is in place with at least 80-90 per cent of golf courses in Australia and here in NZ. Most superintendents have been brought up with this particular roster as it delivers the expectations of a club.

There are many issues that surround the use of such rosters where community and golfing expectations are adhered to. There are health and safety issues that we as managers need to focus on ensuring that the wellbeing of individuals employed by the clubs are properly managed.

The bottom line is, a community expectation is to live next to a golf course with limited noise issues, a members' perspective is to play golf with no staff disruptions, and from a staffing perspective the majority are courteous enough to stay out of the golfer's way and still deliver quality surfaces.

Our industry has taken great leaps forward in utilising management tools that decrease the amount of mowing and still maintain good surfaces, utilising the main resource (staff) to the best of its ability to ensure we are able to deliver those expectations." – Superintendent, NZ

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"In all seriousness, whether or not you can split shifts comes down to your staff size. I have five and a half staff members, so like most superintendents I would not be able to set the course up sufficiently for everyday competition. But I guess I would direct all complaints to the general manager!

When we changed over to workplace agreements, all staff receive time in lieu instead of overtime, which taxes me 12 staff hours mid-week every week. I have worked at a NSW golf course that switched to a 5.5 day week format, with what I thought were less than positive results. Staff liaison to do with job tasks dropped off, as did staff productivity and comradeship. It's very hard to change tradition with support, particularly in a small town where every other tradesman is sticking with tradition." Superintendent, NSW.
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AGCSATech Update

BY JOHN NEYLAN

The Hua Hin Golf Course development in Thailand relies on a huge amount of manual labour to undertake most of the construction work

Fresh from the 22nd Australian Turfgrass Conference, John Neylan looks at two trials AGCSATech will be involved with in the coming years and re-examines a favourite topic, the testing and quality control of rootzone soils.

POA ANNUA CONTROL TRIALS

Poa annua continues to be an ongoing scourge where bentgrass greens are being maintained. While there have been numerous trials evaluating various herbicides, very little of the research has examined a total control programme that involves the strategic application of herbicides as they are related to the life-cycle of *Poa annua*. That is, pre-emergent herbicides are applied to reduce the establishment of new seedlings, post-emergent herbicides to control established plants, growth retardants to reduce the competitiveness of *Poa annua* and seedhead inhibitors to break the reproductive cycle.

The AGCSA, with funding from Horticulture Australia Limited (HAL) has received project approval to undertake a study into the control of *Poa annua* taking this strategic approach. The trials will involve the use of the following herbicides;

- Pre-emergents: Besulide and Dithiopyr;
- Post-emergents: Endothal, Paclobutrazol and Ethofumesate;
- Growth retardants: Trinexapac-ethyl;
- Seedhead inhibitor: Ethephon; and
- New herbicides yet to be registered.

In addition to the herbicide treatments, *Poa annua* plants will be collected prior to treatment and then at the end of the three-year trial period. These plants will be propagated to determine the number and proportion of different ecotypes and what changes may occur over time, particularly as it relates to the effects of herbicide applications.

In preliminary trials, it has been demonstrated that different ecotypes vary in their tolerance to herbicides. In particular, the more perennial forms of *Poa annua* are strongly resistant to many of the herbicides used in its control.

As part of the programme to examine the change in the balance of the ecotypes, plots will be sprayed repeatedly with individual herbicides to determine what the timeframe is for these changes to occur.

At this time we are looking for two sites to undertake the trials, one in Melbourne and the other in Sydney. We require a bentgrass nursery or practice putter/chipper that has about a 20-40 per cent *Poa annua* population. It is important to note that some of the treatments may have a phytotoxic affect on the bentgrass and the trial area should not be a high profile turf area.

SEED INDUSTRY TRIALS

The Australian Seed Federation (ASF) has selected AGCSATech to undertake the next round of ANTEP trials. The trials are to be established at Mount Scopus Memorial College in Melbourne in early September with up to 30 varieties replicated three times.

These trials follow on from the previous ryegrass and tall fescue trials that have been undertaken over the past seven years. This program is an initiative of the Turf and Lawn Seed Committee of the ASF and provides an independent evaluation of the newest seed cultivars. The trials provide an excellent resource for turf managers to compare cultivars and to make selections for their particular turf requirements.

GOING THAI

AGCSATech recently had the opportunity to be part of a new golf course project in Hua Hin, Thailand which is a seaside spa resort town south of Bangkok.

The new golf course has a strong Australian influence with the course being designed by Pacific Coast Design (Phil Ryan), irrigation design by David Hanby and the project superintendent is expatriate Gavan Wilson.

Gavan was one of the first Australians to work on a project in South East Asia and has been in Thailand for over 12 years. The Aussie influence does not end there with the shapers coming over from Australian construction company Densal.

The golf course is constructed on an old pineapple plantation where the fairways, roughs and tees will be established with seashore paspalum and the greens with TifEagle hybrid couch. The project has a very tight timeframe, with the expectation that it will be open in December 2006.

Being my first experience inspecting a project in the region, I was intrigued by the dependence on manual labour used to undertake much of the work. Even on the greens the traditional method of placing the gravel and sand is by wheelbarrow and shovel. However, because of the tight timeframe the Densal boys were patiently training the locals on the use of excavators to place the sand and gravel.

During my visit I was able to meet up with Matee Suntisawasdi, a local stalwart of the Thailand Golf Course Superintendents Association and it is hoped that the AGCSA and the Thailand superintendents can develop a close relationship.

Being a fledgling association there is much that we can assist them with as they develop their own identity.

Greens construction at the new golf course development at Hua Hin

WATER MANAGEMENT

Not a day passes without some reference to water and the potential impacts that it has on turf, society and the environment. The City of Toowoomba recently had a vote on the proposal to supplement the potable water supply with highly treated effluent from the city's treatment works. While the proposition did not get up, it still raises many questions regarding where turf areas will get their water from. With the Toowoomba example there were statements made by the anti-effluent water lobby that the city will have to find other water sources!

The question needs to be asked of each and every turf facility around the country, where will your water come from in two, five, 10 or 50 years time? Is your turf facility sticking its head in the sand and hoping that it will all be good again, or are you acknowledging that things are changing?

The most important suggestion that as an association we can make is for you to develop a water management plan. Ask the key questions;

- How much water do I use?
- How much water do I actually need to sustain an acceptable turf quality?
- What is the present quality and possible future quality of the water supply?
- If the current supply is unavailable what are the alternatives?
- Where does the water come from and how sustainable is the supply?
- What does the water cost and is there a likelihood that the cost will increase?
- What changes can be made to improve water use efficiency – (e.g. different grass species, irrigation system upgrade and controller upgrade)?
- How will all of this affect turf presentation?

There is much to be asked and among the challenges is how this is all communicated to the users of the turf facility. It could mean that golf courses cannot achieve the level of presentation now currently enjoyed. It is essential to plan ahead and get the message out early.

The Hua Hin project has a strong Australian influence with expatriate project superintendent Gavan Wilson (centre)

SOIL TESTING AND QUALITY CONTROL

Regular readers of AGCSATech Update will know that I have an obsession with soils, soil selection, soil testing and quality control. However, recent experiences have again reinforced the importance of writing detailed soil specifications and undertaking a comprehensive programme of check testing during production and delivery of rootzone soils.

Many soil suppliers still do not understand the requirements of soils for turf construction projects and in particular the need for consistency of the material. We use the USGA ▶

BY JOHN NEYLAN

TABLE 1. USGA PARTICLE SIZE PARAMETERS

Particle size distribution (% retained) Fraction	Sieve (mm)	USGA Specification Recommendation		Selected Sand	Acceptable range*
Fine Gravel	>2.00	< 3	total particles	0	0
Very Coarse Sand	1.00 - 2.00		< 10	5	2.5 – 7.5
Coarse Sand	0.50 - 1.00		total particles	23	20.7 – 25.3
Medium Sand	0.25 - 0.50		> 60	52	46.8 – 57.2
Fine Sand	0.15 - 0.25	< 20		15	12.8 – 17.3
Very Fine Sand	0.05 - 0.15	< 5	total particles	4	2.8 – 5.3
Silt plus Clay	<0.05	< 5	< 10	1	0.75 – 1.25
Saturated hydraulic conductivity (mm/hr)				500	400 - 600

*Acceptable range calculated from Table 2 - USGA Confidence Intervals for Quality Control Testing

Greens Section's 'Guidelines for Establishing Quality Control Tolerances' to assist in the process of determining what a reasonable and acceptable variation is. The following information has been taken from the USGA Greens Section.

A critical component of putting green construction is the production of the rootzone material.

Whether this material is straight sand or a composite of sand and amendments, it is very important that the material remain as consistent as possible throughout the blending and installation processes. The consistency is important in terms of the performance of individual greens and also between greens.

Quality control sampling and testing is the best means of assuring the consumer that they are getting what they paid for. The quality control process is accomplished by collecting samples throughout the blending and installation steps, submitting these samples to an accredited laboratory for analysis, and comparing the results to a 'benchmark' or target sample.

The benchmark sample is not often understood. While there can be a general specification such as the USGA guidelines for the rootzone mix, this is only the starting point. Step one is to locate a sand that fits within the parameters in the specification and then the characteristics of this specific sand becomes the benchmark sample (Table 1).

When comparing quality control samples to the target sample, it is unreasonable to expect the test results to be identical. There are many factors throughout the entire chain of custody of a rootzone mixture that inevitably result in differences from one test to another in spite of the best efforts of everyone concerned.

Factors that result in differences in test results can be grouped into two categories - field variables and laboratory variables. Examples of field variables include:

- Changes in the make-up of the sand source;
- Changes in the composition of the organic matter or other amendment;
- Variability in the blending processes; and
- Variability in how quality control samples are collected.

Examples of laboratory variables are:

- Variability in carrying out the test procedures; and
- Variability that occurs due to limitations in the repeatability of the test procedures;

To keep laboratory variability to a minimum, it is critical that the same accredited laboratory be utilised throughout all phases of the project.

Through extensive statistical analysis, it has been determined that the amount of test variability within the same lab is quite small (assuming they are testing the exact same material each time).

However, sending the same sample to different laboratories greatly increases the amount of test variability that will occur. This is due to differences in test equipment and laboratory technique.

These factors should be given strong consideration when establishing variation tolerances for quality control testing. Setting tolerances that are unrealistically tight can result in the disqualification of a perfectly good rootzone mixture, significantly increased cost of the project (for both the owner and the contractors), unnecessary litigation and lengthy construction delays. Setting tolerances that are too loose could result in large changes in the make-up of the rootzone mixture, to the point that the performance of the greens could suffer.

With assistance from university and laboratory scientists, the USGA Green Section has identified the maximum amount of variation that should be tolerated for key test parameters measured during quality control testing.

The following table (Table 2) details a variability percentage for each parameter. This variability percentage is more accurately referred to as the confidence interval and is used to establish plus or minus values for each measured parameter.

For example, assume the laboratory test indicates a value for fine sand to be 10 per cent. Using the confidence interval percentage for fine sand of 1.5 per cent, the acceptable variance is 10 per cent plus or minus 1.5 per cent for an acceptable range for quality control testing of 8.5-11.5 per cent.

TABLE 2: USGA CONFIDENCE INTERVALS FOR QUALITY CONTROL TESTING

TEST PARAMETER	USGA CONFIDENCE INTERVAL
Fine Gravel	50%
Very Coarse Sand	50%
Coarse Sand	10%
Medium Sand	10%
Fine Sand	15%
Very Fine Sand	30%
Silt	25%
Clay	25%
Total Porosity	10%
Air-filled Porosity	10%
Capillary Porosity	10%
Saturated Conductivity	20%
Per cent Organic Matter of Mix	.2*

*The confidence interval for per cent organic matter is not represented as a percentage. Thus a reported value of .7 per cent organic matter could range from .5-.9 per cent.

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Cape Kidnappers ranked 27th in Golf Digest's most recent Top 100 courses in the world

Kiwi capers
From Kidnappers to Kinloch

In this instalment of Tech Talk, Andrew Peart steps out of the lab and onto the course to sample some of New Zealand's finest golf courses during his recent trip to the North Island Fine Turf Seminar, including one of the world's top 30 courses, Cape Kidnappers.

At the end of May I was fortunate to be asked to speak in New Zealand at the North Island Fine Turf Seminar which was hosted by the Central North Island Turf Managers in Tauranga.

It comprised of a golf function on Sunday afternoon before two days of presentations on the Monday and Tuesday. Leigh Yanner, golf course superintendent at Moonah Links, also attended and gave two very interesting presentations about hosting the Australian Open and grass species being utilised on the Mornington Peninsula.

As well as attending the turf seminar I was also able to experience some of New Zealand's finest golf courses in the North Island. New Zealand has the highest number of golf courses per capita in the world so it was great to be able to experience some first hand.

GULF HARBOUR COUNTRY CLUB

Prior to the start of the seminar, Yanner and I travelled up to the Whangaparaoa Peninsula north of Auckland following an invitation from course superintendent Tony Jonas.

Gulf Harbour hosted last year's New Zealand Open and will host at least the upcoming three national events. Gulf Harbour was designed by Robert Trent Jones Jr. and is a stunning golf course in terms of location and design.

The Auckland region had received somewhere in the vicinity of 500mm of rain during April and May, apparently not the average amount, and subsequently the course was very wet. Gulf Harbour, to the best of my knowledge is only one of two courses in New Zealand to have couchgrass fairways, the other being Auckland Golf Club.

The fairways at Gulf Harbour are Windsorgreen couch and were holding up very well considering the exceptionally wet conditions. Keeping the couchgrass weed free is a continual challenge especially with a limited range of herbicides for use. At this stage trifloxysulfuron (Monument) is not available in New Zealand.

The greens on the course are SR1119 and SR1120 with differing amounts of *Poa annua* in them. It is likely that the club will resurface the putting surfaces as their major technique in managing *Poa* infestation, as well as growth regulator applications.

According to Jonas, all Robert Trent Jones Jr. designed courses are uniquely branded by the construction of the 13th tee complex. All these tee complexes are rectangular in design irrespective of the other tee designs across the course. At Gulf Harbour this is evident on the long uphill par 3. The tees are bentgrass and hand mown which presents them in tremendous condition.


Cape Kidnappers rests atop cliffs on the North Island's east coast

TURF SEMINAR

The turf seminar was attended by roughly 150 delegates, predominantly from the North Island. Presentations were given not only by Yanner and myself but also David Howard and David Ormsby from the New Zealand Turf Sports Institute as well as other New Zealand identities.

New Zealand is also working its way through new chemical usage and storage legislation (The Hazardous Substances and New Organisms (HSNO) Act) which will very shortly be mandatory for golf courses. It has replaced the old Dangerous Goods Act, Explosives Act, Toxic Substances Act, Pesticides Act and sections of the Animals and Plants Act.

Leo Barber, superintendent at Paraparaumu Beach Golf Club, gave a simple but very effective way of introducing superintendents

to computers and how easily and effectively programmes such as Excel can be utilised by superintendents. Many golf clubs in New Zealand are maintained by just one or two people so keeping accurate records is vital, and more importantly, being able to quickly access them when required.

CAPE KIDNAPPERS

This is one golf course I'm sure is on the list of all aspiring golfers when heading to the North Island. Myself, Yanner and Glen Davie, superintendent at Freeway Golf Course in Melbourne, were fortunate enough to be able to play there. Once negotiating our way to the front gate, four hours from Tauranga, we were then faced with a 15-minute drive up the driveway before reaching the clubhouse.

Cape Kidnappers is truly a spectacular golf course and rated number 27 in Golf Digest's most recent Top 100 courses in the world. The course is no doubt renowned for the holes jutting out on the cliffs above the Pacific Ocean but the design of the inland holes is also exquisite. The use of the bunkering complements the naturally undulating landscape and open fairways are targets that must be hit unless you have a bag full of balls. One New Zealander suggested that a lost ball count could be as high as one and a half balls per handicap stroke. Not good news for a 12 handicapper.

Wairakei International Golf Club

Gulf Harbour Country Club will host the next three New Zealand Opens

The greens are a mixture of SR1119 and SR1120, with the tees and fairways predominantly browntop bent and fine fescue. While the greens had recently been scarified they were still presenting good firm putting surfaces.

It is no doubt a spectacular place to work but I wouldn't like an early start in winter with a stiff breeze blowing from the south east.

WAIRAKEI INTERNATIONAL

Located just out of Taupo in the centre of the North Island is this picturesque, heavily treed course. Designed by Englishman Commander John Harris, Michael Wolveridge and Peter Thomson, Wairakei became New Zealand's first internationally recognised golf course. In 1996 it was rated as the 17th best course in the world outside the USA.

Playing off the blue tees it is not a course for the short hitter. This is emphasised by the 14th hole which measures 548m including a large pine tree in the middle of the fairway that must be negotiated for the second shot.

There are a little over 100 bunkers on the course of which many faces are lined with tree ▶

fern trunks, a theme that is also continued on retaining walls around the course.

Wairakei is not the environment for couchgrass fairways with frosts a common phenomenon in winter and the northern parts of the fairways remaining so for much of the day. The perennial ryegrass fairways however where in immaculate condition and with Taupo's generally dry but cold winters provide excellent playing surfaces year round. With the striped mowing pattern on the tees and fairways the course is always very well presented.

KINLOCH

Located on the north western side of Lake Taupo, Kinloch is a Jack Nicklaus-designed course in the throes of construction. Headed up by former Lakelands superintendent Steve Marsden, this will be a stunning course, set into the side of a hill with rolling fescue pastures. The front nine shaping is almost complete with some holes already grassed.

The fairways will be fescue that is intended to blend in with the pasture grasses that are locally endemic. Due to the slow emergence though of the fescue, the fairways are being seeded with a low rate of transitional rye, to assist with surface stabilisation, with the knowledge that this will not persist.

The new Kinloch course near Taupo currently under construction

The greens will be a mixture of SR1119 and SR1120 bentgrass. Some greens have been sown but with the present low temperatures and especially cold mornings the growth has been very slow although germination has still been reasonable.

ACKNOWLEDGEMENTS

Firstly, I would like to thank the organising committee of the North Island Fine Turf Seminar for the invitation to speak at their Tauranga seminar.

Secondly, I would like to thank those people who gave up their time to show Leigh and I around their courses, including Tony Jonas (Gulf Harbour), Nigel Lloyd (Wairakei International) and Andrew Ellis (Kinloch). Lastly, Paul Delaney for the opportunity to play at Cape Kidnappers, who unfortunately was not there as he was in Australia.

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BY SIMON HODGKISON, JEAN-MARC HERO, JAN WARNKEN

Assessing the conservation value of Australian golf courses

Griffith University PhD student Simon Hodgkison recently completed a thesis assessing the conservation value of golf courses in south-east Queensland and the role that course design and management actions have on local threatened species diversity. As he writes here, the results show the positive role golf courses do have in local ecosystems.

It has often been suggested that golf courses have potential value as an urban refuge for native wildlife. Recent studies conducted in the United States (1,4,5,6,7) and Australia (2,3) have confirmed that golf courses can support high densities of regionally threatened birds, reptiles, mammals and frogs and therefore play a role in urban wildlife conservation.

However, while recent studies have confirmed that golf courses do have conservation potential, they have also revealed great variation in the extent to which that conservation potential is realised (Figure 1, page 39). Many golf courses support only common urban-adapted wildlife and therefore hold no conservation value.

The conservation opportunities offered by the golf industry are potentially very important in the context of degraded urban environments, where rates of wildlife extinction are high and opportunities to protect wildlife habitat are limited.

Given their ubiquity and capacity to retain pockets of native vegetation, golf courses present many potentially valuable opportunities for small-scale off-reserve wildlife conservation. It is therefore important to understand the cause of variation in golf course conservation value; to determine why some golf courses can provide refuge to threatened species, while others simply support a range of common urban-adapted wildlife and therefore have no conservation value.

It has generally been assumed that golf course design and management actions play a critical role in determining wildlife diversity on golf courses. In recent decades, the golf industry has taken a proactive approach to environmental management, initiating education programs that outline practical ways to enhance the habitat value of golf courses by increasing the size, connectivity and structural complexity of vegetation in rough and out-of-play areas.

These strategies have, however, been adapted from landscape ecology studies conducted at much larger spatial scales than those found on golf courses. As a result, there was never any guarantee that such small-scale on-site management actions would significantly increase the conservation value of suburban golf courses.

Biodiversity is rarely a simple reflection of local habitat size or quality and is instead often determined by regional or historical influences. Some ecologists also suggest there are spatial limits to wildlife conservation, below which efforts to increase habitat size and complexity will have little more than a cosmetic effect.

A recent study conducted in the United States (6) lent weight to this argument when it found that golf course design and management practices had little influence on local bird diversity and that instead the conservation value of golf courses was determined by environmental factors. The findings of that study are however by no means universal to golf courses in other parts of the United States (4,5) let alone other parts of the world. It is therefore important to determine the factors influencing the conservation value of golf courses in Australia.

THE STUDY

Australian golf course superintendents and architects are making enormous concessions to accommodate the needs of native wildlife in their designs and daily maintenance regimes.

While there are peripheral benefits to these activities (i.e. promoting environmental awareness, broadening the golf experience,

Above: Australian superintendents and architects are making enormous concessions to accommodate the needs of native wildlife in their designs and daily maintenance regimes

improving the industry's environmental reputation, reducing maintenance costs and creating uniquely Australian courses that could boost Australian golf tourism) it is essential to determine whether natural design and management actions can achieve their principle goal of improving the conservation value of golf courses.

A recent study conducted at Griffith University's Centre for Innovative Conservation Strategies has investigated the role that course design and management practices play in determining the vertebrate conservation value of golf courses in south-east Queensland.

During the study, birds, reptiles, mammals and frogs were surveyed on 20 suburban golf courses in Brisbane and the Gold Coast between June 2001 and March 2004. On each course, wildlife were surveyed on multiple occasions at 10 randomly selected terrestrial survey points (in rough and out-of-play areas) and at 10 randomly selected aquatic survey points (in or adjacent to on-site waterbodies).

Birds and frogs were surveyed from calls and sightings along standardised transects. Reptiles were surveyed using standardised active-search techniques (i.e. overturning rocks, logs and leaf litter). Mammals were surveyed using a combination of spotlighting transects, Elliott trapping surveys (90 trap nights/course) and opportunistic encounters recorded within standardised search periods.

PARTICIPATING COURSES

California Creek Golf Course
Gailes Golf Club
Gainsborough Greens Golf Course
Gold Coast Country Club
Gold Coast-Burleigh Golf Club
Helensvale Golf Club
Keperra Country Club
McLeod Golf Club
Oxley Golf Club
Parkwood International Golf Club
Redland Bay Golf Club
Robina Woods Golf Club
Southport Golf Club
St Lucia Golf Links
Surfers Paradise Golf Club
The Grand Golf Club
The Pacific Golf Club
Tweed Heads-Coolangatta Golf Club
Virginia Golf Club
Wynnum Golf Club

For each wildlife group, local measurements of abundance and species richness were obtained for each course (pooling survey results across sampling points and survey periods). The site abundance and species richness of threatened species (i.e. those generally incapable of persisting in suburban areas of south-east Queensland) was also determined, by omitting data collected at each site for urban-adapted and urban-tolerant species.

Environmental characteristics that might explain variations in wildlife diversity among golf courses were then measured at three separate (local, landscape and regional) scales. At each survey point, local environmental characteristics (eg. foliage height diversity, canopy cover, ground cover, tree density, native grass cover, number of hollows, number of logs, abundance of woody debris) were measured using standardised techniques.

Landscape scale environmental characteristics (eg. on-site vegetation connectivity, the area of vegetation, area of water, number of streams, number of temporary waterbodies, number of permanent ponds) were measured on each golf course from rectified aerial photographs using MapInfo Geographic Information System (GIS).

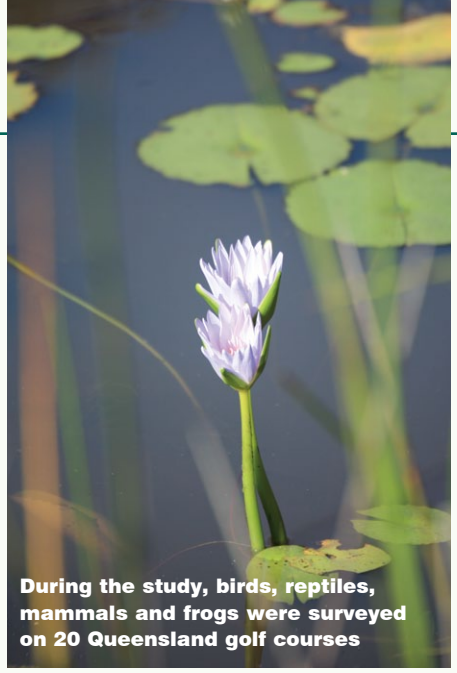
Similarly, regional environmental characteristics in the area surrounding golf courses (eg. area of vegetation, built land and the number of streams within a 1km, 2km and 5km radius of each course boundary) were measured from rectified aerial photographs and remnant vegetation databases using MapInfo GIS.

For each vertebrate group, separate multiple regressions were then used to identify the environmental characteristics that best explained among-site differences in local abundance and species richness. Regressions were first conducted separately within each (local, landscape and regional) scale and then with all scales combined to determine the scale at which environmental characteristics most significantly influence local wildlife diversity.

The study also examined how wildlife abundance and species richness changed with the size of individual habitat fragments on golf courses (by comparing wildlife diversity against local fragment size for the 200 randomly selected terrestrial survey points surveyed on all golf courses).

RESULTS AND DISCUSSION

The study confirmed that wildlife diversity on golf courses was not simply a reflection of local golf course design and management practices. Local bird, reptile, mammal and amphibian diversity on golf courses was partly influenced by regional environmental factors, increasing with the area of surrounding native vegetation and decreasing with the area of adjacent built land. Local amphibian diversity also increased with the number of streams that were connected to each course.



During the study, birds, reptiles, mammals and frogs were surveyed on 20 Queensland golf courses

Unlike the recent North American study (6) however, the conservation value of golf courses was not solely determined by environmental conditions in the surrounding landscape. The local diversity of threatened vertebrates increased significantly with the size and complexity of on-course habitats. Australian golf course architects and superintendents can therefore evidently play a significant role in determining the conservation value of suburban golf courses.

Principal among the environmental factors influencing vertebrate diversity on golf courses was the area of native vegetation retained on-site. The diversity of threatened birds, reptiles, mammals and even frogs increased with the area of eucalypt vegetation retained locally.

FRAGMENT SIZE

The size of individual fragments was also important, with the number of threatened birds, reptiles and mammals increasing with fragment size. Unfortunately, there was no distinct threshold in the relationship between fragment size and species richness that could serve as a spatial guideline to ecologically sound development. The number of threatened species continued to increase with fragment size beyond fragments larger than 60ha. The conservation value of golf courses will therefore always be further enhanced by increasing the area of native vegetation.

While some spatial guidelines can nevertheless be obtained from these results, caution is needed, since the relationship is likely to change regionally and between habitat types. In addition, the results only show the fragment sizes required to be 'utilised' by threatened species. Many species will be dependent on larger fragments to perform critical breeding and nesting activities. Nevertheless, the results show that vegetation area is a critical determinant of local threatened vertebrate diversity on golf courses.

Fragment shape was also important, and had particular influence on reptile diversity. Golf courses that retained rounded fragments had significantly higher reptile conservation value than those with predominantly narrow fragments wedged between fairways. This relationship may not be a simple response to fragment shape, but reflect the fact that narrow fragments often have structurally simplified understorey (to allow golfers to play from the rough). Course designs that maximise vegetation fragment width will have increased reptile conservation value.

HABITAT STRUCTURE AND COMPLEXITY

The study also investigated whether the spatial arrangement of habitats on golf courses is important, or if high biodiversity can be maintained simply by retaining a sufficient area of habitat. Habitat configuration and connectivity is often a major determinant of local wildlife diversity in fragmented landscapes since this determines their capacity to maintain ongoing access to critical resources (i.e. food, water, mates and shelter from predators and adverse environmental conditions).

Small-scale variations in habitat connectivity (such as those induced by variations in golf course design) may however have limited influence on wildlife diversity, particularly if animals can move freely across fairways and other playing surfaces. The study found that while connectivity isn't a prime determinant of local conservation value, it does have benefits for specific threatened wildlife including small forest birds and threatened skinks and should therefore be maximised wherever possible.

Amphibian conservation value increased with the diversity of local waterbody types. Many frog species are adapted to breed in certain waterbody types having evolved specific strategies to overcome the inherent threats (i.e. predation and desiccation) that are unique to those waterbodies.

Like many urban and agricultural land types, golf courses have a greater tendency to retain permanent ponds (for their irrigation, storm-water mitigation and aesthetic value)

than temporary and semi-permanent waterbodies. As a result, species that breed in temporary waterbodies are facing widespread declines and extinctions in urban areas, while permanent pond-breeders are in many cases increasing in abundance and distribution. By retaining a range of waterbody types, (including temporary and semi-permanent ponds), golf courses can support a greater diversity of native frog species and provide refuge to those that are threatened by urbanisation. The impact that habitat structure has on vertebrate diversity was also a central focus of the study. While many golf clubs may have a limited capacity to increase the size of on-course habitats, many will have greater freedom to increase the structural complexity of habitats in rough and out-of-play areas through altered management regimes.

While these may have design value, acting as an aesthetic contrast to the manicured look of mown fairways, tees and greens, it was important to assess the associated ecological benefits of such actions. The study found that efforts to enhance habitat complexity will significantly increase golf course conservation value. The diversity of all threatened vertebrates

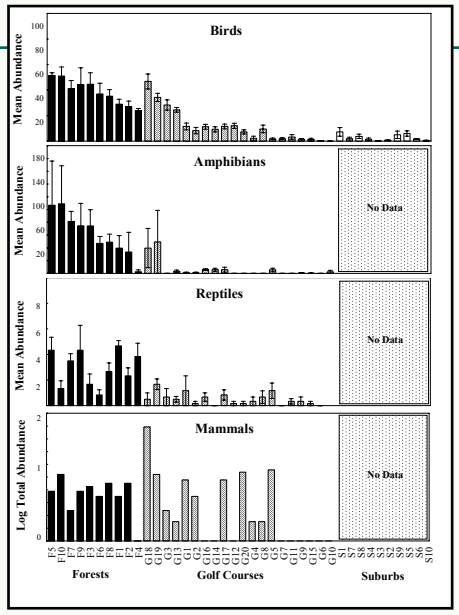


Figure 1. Variable refuge value among 20 golf courses in south-east Queensland as determined by comparing the site abundance of threatened birds, reptiles, mammals and frogs on golf courses (G1-20) with that recorded on 10 eucalypt forests (F1-10) and 10 suburban residential areas (S1-10). (No data is available for reptiles, mammals and frogs in suburban areas. Columns = means, whiskers = 95% confidence intervals).

increased with habitat complexity, with different vertebrates responding to different structural features.

The local diversity of threatened birds increased with foliage height diversity and the area of native grass cover. Threatened reptile diversity increased with the abundance of coarse woody debris and with the proportion of canopy cover. Threatened mammal diversity increased with local tree density, the area of native grass cover and the abundance of dead and hollow-bearing trees.

Threatened frog diversity increased with the complexity of aquatic (floating and emergent) and adjacent reed vegetation and was also influenced by waterbody structure. Waterbodies with steep concrete-edged banks surrounded by manicured turfgrass had significantly lower frog conservation value than those with complex bottom physiology, gently-sloping banks and adjacent reed vegetation. While different wildlife respond to different habitat structures, the ecological factors driving these responses are likely to be universal.

On golf courses with high habitat complexity, wildlife would have access to a greater diversity of food, shelter, nesting ▶

and breeding sites, increased protection from predators and adverse environmental conditions and reduced exposure to noise and other disturbances that can suppress local rates of survival, reproduction and juvenile development.

CONCLUSION

The study validates recent efforts to 'naturalise' golf course design and management practices within the Australian golf industry. While the conservation value of suburban golf courses is partly determined and therefore to some extent restricted by environmental conditions in the surrounding landscape, efforts to increase the size, connectivity and structural complexity of on-site habitats can, nevertheless, significantly increase local wildlife diversity and ensure that golf courses play a positive conservation role in urban landscapes.

Golf course architects and superintendents therefore have a unique opportunity to design and manage public open-spaces that not only provide recreational, aesthetic and economic value, but make a much-needed contribution to urban wildlife conservation.

While golf courses clearly have conservation potential and could grow to become an important recognised contributor in urban biodiversity strategies, this would require a sustained effort by all involved. More research is required to assess the reproductive value (productivity) of habitats retained on golf courses and the nature and intensity of threats faced by local wildlife. Greater collaboration is also required between research organisations, community environmental groups and the golf industry to ensure the conservation potential of the industry is realised to the greatest extent possible.

Realising the conservation value of suburban golf courses requires combined efforts at local (course management), landscape (course architects) and regional (urban planning) scales. While efforts are currently being made by golf course superintendents and architects, greater effort is required at an urban planning level to ensure that golf courses are built in areas where they will have strategic value (in the context of the surrounding urban landscape).

Conservation priorities are only one of many conflicting functional, aesthetic, engineering and economic constraints that influence golf course design and management practices. Nevertheless, golf course superintendents and architects can be reassured that where they do set aside areas of wildlife habitat, their actions can produce achievable ecological outcomes that will have real conservation benefits for regionally threatened vertebrates that are increasingly facing extinction from urban areas.

REFERENCES

A full list of references can be obtained from the AGCSA.

ACKNOWLEDGEMENTS

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BY PHILLIP FORD

Last summer, Phillip Ford conducted research into the use of water by C_3 and C_4 turfgrass. The aim of the trial work was to quantify daily evapotranspiration (ET) rates and Crop Factor values for a range of commonly used turfgrasses in a Melbourne summer. Here he presents the findings which will form part of his PhD thesis.

The trial, conducted over the summer of 2005/06, tested water use for a range of turfgrasses commonly used in Victoria. Ten turfgrass species were grown in PVC pots with a diameter of 150mm and a depth of 265mm

C_3 vs C_4 Turfgrasses

Comparison of water usage during summer

Photosynthesis is the process whereby plants use carbon dioxide from the atmosphere, water from the soil and energy from sunlight to synthesise carbohydrates. Most plant species on the planet use a photosynthetic pathway that initially forms a three-carbon molecule (hence the term C_3 photosynthesis).

But certain plant species that evolved in hot, arid climates have an adaptation to photosynthesis that performs more efficiently at higher temperatures and uses less water. The initial molecule in this mechanism has four carbons, hence the term C_4 photosynthesis.

The main C_3 turfgrasses are the *Agrostis*, *Lolium, Festuca* and *Poa* species, and the main C_4 turfgrasses are the *Cynodon, Paspalum, Pennisetum, Stenotaphrum* and *Zoysia* species.

C_4 grasses evolved in hot, arid climates and their method of photosynthesis is just one of several adaptations that give them an advantage over C_3 grasses in summer. They handle foliar heat stress better, their root systems are better suited to high soil temperatures and their survival and recovery from severe drought is better.

In a natural (ie: unirrigated) environment, C_3 grasses such as bentgrass, fescue and ryegrass would normally go into a summer dormancy in a climate like Melbourne's. They lose all colour and growth in early December and green up again four months later with autumn rainfall and cooler temperatures. The dormancy mechanism allows them to survive very well as a species.

But most of us want green grass over summer, so we install irrigation systems to keep the grass green and active. If water is plentiful and cheap we can afford to keep the C_3 grasses out of their summer dormancy, even though they're not well adapted to it and not efficient in their water use.

A Livingston atmometer mounted on a water reservoir

In our current situation, however, water is no longer plentiful and the benefit of the C_4 grasses becomes more obvious. The Victorian golf industry came to this conclusion many years ago, thanks in no small part to Peter McMaugh's input at several high profile Melbourne clubs. Since the early 1980's there has been a strong trend of converting fairway surfaces from C_3 grasses to C_4 species, mainly couch.

As well as reduced water use, couch has a quality advantage over other C_4 species in a fairway situation. The Victorian Golf Association conducted trial work in the 1990's to assess fairway species under low water input (Low Input Fairway Trial, 2000) and came to the general conclusion that couchgrass fairways, especially the varieties Santa ana, Legend and Wintergreen, offered excellent quality on little or no irrigation throughout Victoria.

While the industry has voted with its feet, there has been no objective measurement of water use and general 'irrigation requirement' of the various C_3 and C_4 species in Melbourne. Overseas work is of limited application due to the great variety of climatic factors that affect summer water use.

One important measure that characterises the water use of a species is its Crop Factor

(CF). CF values are regularly quoted, but rarely measured. The overseas literature (eg: McCarty, 2005) generally quotes CF values of 0.85 for C_3 grasses, and 0.75 for C_4 grasses.

The CF value of 0.75 for C_4 grasses seemed way too high for me, and at odds with the watering practices of many Melbourne superintendents who gave very little (or no) water to their couch fairways, and at odds with trials I had done earlier (VGA Low Input Fairways Grasses, 2000).

So what was happening? Were the Crop Factors quoted by the Americans wrong? Or were there other drought tolerance mechanisms operating with the C_4 grasses? The short answer is that the Americans were correct with their Crop Factors, and that C_4 grasses do have other drought tolerance mechanisms apart from a lower daily ET rate and Crop Factor.

The aim of this trial work was to quantify daily evapotranspiration (ET) rates and CF values for a range of commonly used turfgrasses in a Melbourne summer. The trial was conducted as part of a Masters thesis for Sydney University, under the supervision of Prof. Peter Martin. That thesis is still in progress.

TRIAL WORK

A trial was established in spring 2005 to test water use for the range of turfgrasses commonly used in Victoria. Ten turfgrass species were grown in pots, each grass replicated four times. Grasses were established in PVC pots with a diameter of 150mm and a depth of 265mm.

Once the grasses were fully established, the pots were well watered up then allowed to drain, then the drainage hole at the bottom of the pot was sealed to create a lysimeter. A lysimeter is a sealed container, where the only water lost each day is from direct evaporation from the soil surface or from water transpiration through the turfgrass foliage.

This water loss is called 'evapotranspiration' (ET). The weight of water lost (in grams per day) can be related to the surface area of the lysimeter to allow ET to be determined in millimeters per day (the same unit as rainfall).

Atmometers are a meteorological tool that estimates daily evaporative conditions, which are affected by wind, humidity, temperature and radiation. Plant ET rates can be related to atmometer-derived evaporation measurements to derive a 'Crop Factor', which is a single number that characterises the water use of a particular species.

Two ET assessments were carried out, one in early summer (23 Nov-12 Dec, 2005) and one in late summer (8-24 Feb, 2006). After the second assessment the grasses were allowed to dry out completely and suffer extreme drought for 10 days, before they were watered and assessed for drought recovery and survival over the following 20 days. The lysimeters were then tipped out and root depths measured.

RESULTS AND DISCUSSION

EARLY SUMMER

While there were some significant differences between C_3 species (eg: bentgrass used five per cent more water than red fescue) and between C_4 species (eg: paspalum used 11 per cent more water than zoysia), by far the greatest difference in water use was between the C_3 group and the C_4 group.

C_4 grasses had ET rates and Crop Factors in the range 25-30 per cent less than C_3 grasses in the early summer period. The average Crop Factor for the C_3 grasses in this period was 0.83, while for the C_4 grasses it was 0.62 (See Table 1).

TABLE 1: TOTAL AND MEAN ET FIGURES AND MEAN CROP FACTORS FOR THE COMMONLY USED TURFGRASS SPECIES IN THE 17 DAYS FROM 23 NOVEMBER-10 DECEMBER, 2005, BEFORE MOISTURE STRESS CAUSED SOME GRASSES TO DROP OUT.

TURFGRASS SPECIES	TOTAL ET (MM)	RATIO TO COUCH	MEAN ET (MM/DAY)	MEAN CROP FACTOR
Creeping Bentgrass	81.8 a	133%	4.81	0.83
Tall Fescue	80.6 a,b	131%	4.74	0.84
Perennial Ryegrass	80.2 a,b	130%	4.72	0.81
Kentucky Bluegrass	77.9 b	126%	4.58	0.79
Fine Fescue	77.6 b	126%	4.56	0.86
Paspalum vaginatum	66.0 c	107%	3.88	0.66
Buffalo	63.9 c,d	104%	3.76	0.62
Kikuyu	62.2 d,e	101%	3.66	0.61
Couch	61.7 d,e	100%	3.63	0.61
Zoysia japonica	59.5 e	96%	3.5	0.59
LSD (P = 0.05)	3.7			
Total atmom. Evap.	90.6mm	147%		

Total ET readings followed by the same letter are not statistically significantly different.

After 17 days the C_3 grasses dropped out of the trial due to moisture stress. The C_4 grasses only lasted another three days before they, too, suffered visible moisture stress. In those 20 days the C_4 grasses reached a total ET of around 80mm (data not shown), the same as the C_3 grasses in their 17 days.

In summary, the C_3 grasses performed extremely well in early summer, no doubt due to a new, vigorous and efficient root system and very little hot weather to cause stress. They lasted 17 days on their moisture reserves, and extracted those reserves very well.

The C_4 grasses used around 25-30 per cent less water than the C_3 grasses on a daily ET basis and on a daily Crop Factor basis. However, they only lasted two to three days longer (20 days vs 17 days, a time increase of 18 per cent) than the C_3 grasses before requiring irrigation.

It seems turf managers can expect better water use efficiency from their C_3 grasses in early summer, and should water accordingly. In late summer, however, the story was quite different.

TABLE 2: TOTAL ET AND MEAN CROP FACTOR VALUES FOR THE COMMONLY USED TURFGRASS SPECIES IN THE SEVEN DAYS FROM 8-14 FEB 2006, BEFORE MOISTURE STRESS CAUSED THE C_3 GRASSES TO DROP OUT.

TURFGRASS SPECIES	TOTAL ET (MM) IN FIRST 7 DAYS	RATIO TO COUCH	CROP FACTOR
Red Fescue	32.38 ab	126%	0.91 a,b
Perennial Ryegrass	30.95 ab	120%	0.87 a,b
Kentucky Bluegrass	33.80 a	131%	0.95 a
Tall Fescue	31.78 ab	123%	0.90 a,b
Dichondra	30.75b	120%	0.87 b
Buffalo	24.78 c	96%	0.70 c
Kikuyu	25.20 c	98%	0.71 c
Zoysia	27.15 c	106%	0.76 c
Hybrid Couch	25.73 c	100%	0.72 c
Paspalum	26.98 c	105%	0.76 c
Couch (soil)	27.05 c	105%	0.76 c
Atmometer	35.5	138%	
LSD (P=0.05)	2.98		0.09

ET and Crop Factor values followed by the same letter are not statistically significantly different.

LATE SUMMER

Following the December assessment the grasses were watered back to full health and vigour, and irrigated as needed to maintain health over the summer. The creeping bentgrass pots were damaged by Dollar Spot and their place in the trial was taken by *Dichondra repens*, a dicotyledenous (broadleaf) C_4 species also known as Kidney Weed. It is sometimes used as a domestic lawn species.

The assessment was run again in February 2006, after a long summer with some January temperatures in the 40's. The period of assessment (8-24 February), however was unusually mild with very few days in the 30's. The lysimeter pots were once again saturated and allowed to drain, then sealed up to allow daily weighing and ET measurement. Atmometers again provided the estimates for daily evaporation conditions.

In the late summer assessment, the C_3 grasses only lasted seven days before showing visible moisture stress and in that time only used around 30mm from the pots, which is less than half of the water available to them. Only the first day of those seven was hot (31.5^{o}C) and the average temperature of that first week was only 23^{o}C. The average Crop Factor of the C_3 grasses in this period was around 0.9.

Dichondra suffered moisture stress and dropped out of the trial after 12 days. To that stage its ET had totalled 48.37mm and its mean Crop Factor was 0.84. Its ratio to couchgrass water use was 107 per cent.

The C_4 grasses continued for a further nine days before showing moisture stress, and their Total ET and mean Crop Factor values are shown below. The average temperature over those next 10 days was 29^{o}C, substantially hotter than the first seven days. The Crop Factors averaged around 0.8.

In summary, the C_3 grasses only lasted seven days and exploited around 30mm of moisture from the lysimeter pots before visible symptoms of moisture stress appeared. There was plenty of water left in the pots that went unused. Later inspection of the root systems showed the roots were all very deep, averaging around 200mm. So the root systems were there, the water was there, but the C_3 grasses simply weren't able to take it up, and were showing moisture stress.

The average temperature of those seven days was 23^{o}C, so excessive heat cannot be blamed. It seems that root dysfunction is the problem for C_3 grasses by the end of summer, although this trial had no way of measuring

C_3 grasses showing moisture stress well in advance of the C_4 grasses

this directly. The general turfgrass literature (eg: Zontek, 1998) describes the inefficiency and 'root dysfunction' of C_3 grasses late in the summer, and it appears to explain the findings here.

In contrast the C_4 grasses lasted a further 10 days before moisture stress symptoms appeared. By that time they had exploited around 60mm of water from the lysimeter pots, around twice that sourced by the C_3 grasses. While average Crop Factors of the C_4 grasses were only 15-20 per cent lower than the C_3 grasses, other factors (probably root function/dysfunction) meant that C_4 grasses lasted considerably longer than C_3 grasses before showing visible moisture stress.

As each species suffered visible moisture stress it was removed from the trial. Instead of re-watering the pots, however, they were left exposed in the sunshine for a further 10 days, causing them severe drought stress. They were then re-watered, and assessed 10 days and 20 days later for survival and recovery. The results are depicted in Figure 1 (page 47).

Couchgrass showed a rapid recovery from severe drought stress. It's possible this species is able to 'resurrect' droughted shoot tissue, simply re-hydrating the existing tissue to provide rapid recovery. This is the behaviour seen in the field, where severely droughted couch fairways and lawns exhibit a rapid recovery after rainfall or irrigation.

Buffalo grass showing wilting and leaf rolling as moisture stress starts

In the case of buffalo and kikuyu, one of the four replicates in each case had droughted severely enough that rehydration and resurrection of existing tissue did not occur (although in the other three replicates it did), so the recovery at 10 days wasn't as good as couch. But by 20 days the recovery from underground tissues had achieved a full recovery of these two species. Zoysia had only ▶

TABLE 3: TOTAL ET AND CROP FACTORS VALUES FOR THE C_4 GRASSES IN THE 17 DAYS FROM 8-24 FEBRUARY 2006, BEFORE MOISTURE STRESS OCCURRED.

TURFGRASS SPECIES	ET RATE MM IN FIRST 16 DAYS	RATIO TO COUCH	CROP FACTOR
Buffalo	56.25 c,d	90%	0.73
Kikuyu	57.94 b,c,d	93%	0.75
Zoysia	62.13 a,b,c	100%	0.80
Hybrid Couch	62.27 a,b,c	100%	0.80
Paspalum	62.86 a,b	101%	0.81
Atmometer	77.49	124%	
LSD (P=0.05)	6.47		0.08

ET and Crop Factor values followed by the same letter are not statistically significantly different.

a partial recovery, and paspalum had poor survival and recovery from severe drought.

Of the cool-season grasses, only Kentucky bluegrass has rhizomes and these were probably the reason that it made a substantial recovery from a severe period of drought stress. All the other C_3 grasses had poor and unacceptable recovery.

These results highlight the inflexibility of irrigation of C_3 grasses – unless the turf manager is able to reliably irrigate these grasses at the first signs of stress, right through the summer, then a large proportion of the plants will die and the sward will be lost.

With couch, and to a lesser extent kikuyu and buffalo, this is not the case. These grasses can be allowed to go into considerable moisture stress and will recover rapidly when rainfall or irrigation is applied, and this creates a great deal more flexibility for the turf manger. Couchgrass has an advantage over kikuyu and buffalo, while allowing zoysia to go into moisture stress is risky. Severe moisture stress must be avoided on seashore paspalum.

DISCUSSION: COUCH VS C_3 GRASS FAIRWAYS

So is all this data consistent with observations of drought resistance of C_3 and C_4 fairways in Melbourne? Yes, it is. Couch has a substantially lower ET rate and Crop Factor value compared to C_3 grasses.

In the field it will produce a deep and functional root system that doesn't deteriorate as the summer progresses and is very efficient at exploiting the moisture available in the rootzone.

These two points alone mean that it requires much less water than C_3 grasses, but as a fallback position it is able to tolerate tissue dehydration and has a good ability to re-hydrate immediately water becomes available again.

These points explain the field observations that couch can provide excellent fairway quality on low irrigation inputs, applied sparingly and infrequently. There is a great deal of flexibility in how the irrigation is applied without risk to couch survival. If irrigation water is not provided the couch will eventually suffer moisture stress but will rapidly recover in the event of rainfall or irrigation.

Cool-season grasses probably have a dysfunctional root system in late summer due to heat stress and high soil temperatures. The observed necessity to water these grasses little and often (eg: 15 minutes every two days in late summer) is explained. The root dysfunction and inability of C_3 grasses to exploit what moisture is there in the soil means their drought resistance is only a fraction of that of C_4 grasses by late summer.

Added to that, if they suffer drought stress due to pump failure or the club running out of water, then their survival and recovery from that will be poor (generally the sward will be lost, unless Kentucky bluegrass is present).

FURTHER READING

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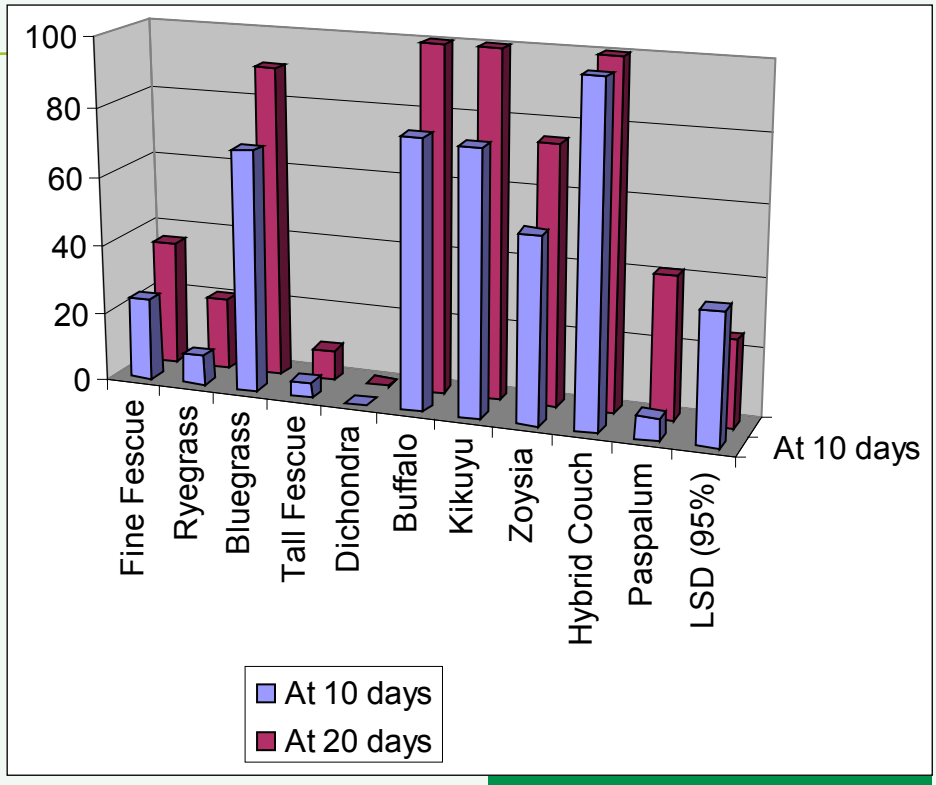


Figure 1: Percentage living groundcover of turfgrass species at 10 and 20 days after re-watering from severe drought stress (mean of four replicates)

SATELLITE-GUIDED UNIT KEEPS THE HEATH ON TRACK

One of Australia's oldest courses has gone hi-tech in an endeavour to make chemical spraying safer and more efficient. After months of research and design, Kingston Heath Golf Club superintendent Martin Greenwood recently took delivery of a custom-made spray unit which uses satellite guidance technology similar to that employed in other sectors of the horticulture industry.

Greenwood, a former AGCSA Board member, says his interest in satellite-guided vehicles was sparked a few years ago following visits to a number of agricultural field days in country Victoria.

"What struck me was the vast array of guidance units on the market and the number of features that could be utilised," says Greenwood. "For a number of years I had been struggling to complete spray jobs ahead of golfers, and weather had a large impact on spray scheduling due to the type of spray unit we had in operation.

"It became clear to me that if I could eliminate a number of weaknesses within our present routine I would not only have happier golfers and spray operators, the job would also be done in a more efficient and cost-effective manner."

The existing spray unit at Kingston Heath – a 1000L trailer-mounted tank with a 6m covered boom – had a number of disadvantages which prompted Greenwood to search for an alternative. The unit had minimal manoeuvrability and didn't allow for the cross spraying of fairways. There was also the problem of poor spray distribution, the flat fan jets were not suited to targeting pests and spray volumes were difficult to change quickly. Operator working conditions were also poor and, as it was noisy, early morning and night-time spraying were difficult.

The custom-made satellite-guided spray unit employed at Kingston Heath

GETTING MOVING

One of Greenwood's first tasks in devising the custom-made spray unit was finding a suitable prime mover. One of the main requirements was a weatherproof cabin which would not only provide a safe environment for spray operators to work in but also give a controlled environment in which to operate all the on-board electronics.

Greenwood looked at a number of options including conventional utilities but they were quickly struck off the list because of poor manoeuvrability and operator vision. It was then that Greenwood came across a Suzuki ute that was already being employed for spraying duties within the grape growing industry. The Suzuki had had all of the features Greenwood was hunting for – a sealed cabin with good visibility, an engine which produced good torque at low RPM, low noise, all wheel drive, good turning circle, decent payload and air conditioning.

Once the prime mover was sorted, Greenwood turned his attention to sprayer selection. Again there were a number of specific requirements:

- Air induction jets on tri-nozzle selectors;
- 250mm centres on nozzles for even application;
- Adjustable boom height control (hydraulic);
- Hydraulic boom fold – not electric actuators;
- Simple boom breakaway;
- Compact semi-covered boom;
- Accessible jets for servicing;
- Remote pump operation, e.g. electric start/stop;
- Multiple boom splits;
- Lots of agitation in 600l poly tank.

As the list of requirements was quite long, Greenwood decided to look into having a custom spray unit made that could incorporate all of the above features. After numerous enquiries, he made contact with John Crooks at Vineyard Engineering (manufacturers of Uni-Boom sprayers) in NSW and together they bashed out some plans. Agreement was struck and following the delivery of the Suzuki prime mower to Crooks' workshop, the building of the sprayer started.

SATELLITE GUIDANCE

Numerous suppliers were looked at to supply the necessary hardware and software required to control the unit with Hardi Australia eventually selected. Requirements for the control system included:

- Satellite guidance;
- Fast spraying speeds of 12-15 kph;
- Automated boom actuation (e.g. once an area had been sprayed the machine automatically turns off nozzles if that area is traversed again).
- The ability to have multiple spray jobs going at the one time so the operator can cut back and forth between areas;
- Very small boom sections (in this case the 6m boom is split into 6x1m sections to allow maximum performance of the automated boom control software).

THE FINISHED PRODUCT

The prime mover underwent a number of additional modifications to make it both user and turf friendly. To ensure the unit didn't leave wheel marks all over the course, wide 13x195 front tyres and rims were sourced from a Torana GTR-XUI. The rear axle was reinforced to accept additional weight and dual rear 13x195 tyres and rims were also made up. A specialist company was also engaged to fit a cruise control that was able to operate at low speeds suitable for spraying (between 12-15kph).

Conventional foam markers were fitted to the unit for two reasons. First, they are a good training tool to allow new operators to

The unit gives the ability to cut from one spray area to another accurately

adjust to the video game type of screen that needs to be followed in order to achieve even spray distribution. Second, they are a backup if there is no satellite signal or a mechanical/electronic problem is experienced.

"There are a number of advantages that the Kingston Heath sprayer has over a conventional sprayer and most of them centre on the golfer and the operator," says Greenwood. "Firstly we are able to keep ahead of a conventional one-tee start competition and finish all fairways in 4-5 hours.

"If the operator comes across a group of golfers he is able to easily stay out of their way by moving to another fairway, opening another file and continuing. As soon as the golfers have moved on, it's a simple case of going back to the original fairway, opening that fairway's file and completing the job.

"Because of the cabin there are not too many days weather-wise that we cannot spray. Excessive wind is still a problem, however the combination of air induction jets, compact shrouds and not relying on indicator foam means we can now spray on days which before would have been unsuitable. Rain is no longer a problem either and as some products can go out well in the rain, like pre-emergent, it gives us a great advantage.

"Spray operators now only have to suit up to mix chemicals and once they are on the course there is little need to exit the cabin. Spray masks and spray suits are not required once inside the vehicle because cross contamination can occur. The cabin is fitted with recycle air conditioning/heater and the cabin pressurised with a fan-forced charcoal filter. All spraying operations are carried out in the cabin such as boom lowering and raising, trim control, pump starting and stopping, filter control and all manual override functions."

The cab interior of the spray unit

OPERATING THE UNIT

From an operator's perspective, Greenwood says the sprayer has been a challenge to master due to the many functions that require familiarisation, as well as learning to drive via the computer screen.

"Because the sprayer travels at up to 15kph everything happens quickly, however the operator does not have to worry about manipulating the boom selections as all this is taken care of by the guidance system," says Greenwood. "The operator can change between spray volumes ranging from 150l/ha, 200l/ha, 300l/ha and 400l/ha quickly, while spray effectiveness is maximised in all situations.

"The other big plus for the operator is the comfortable environment. Air-conditioning, heater, demister and all necessary gauges are provided to help make the task as efficient as possible. However, the two-seater cabin is compact and made smaller by the amount of equipment crammed into it.

"As tighter restrictions are imposed on golf courses as to what, when and how we go about our business, especially spray operations, I think all superintendents will have to evaluate how we go about our day to day tasks.

"This unit allows me to move quickly about the golf course and cut from one spray area to another accurately. It also allows me to spray on days that in the past would have been unsuitable either because of wind or rain. Night spraying is now possible due to the secure cabin environment and improved lighting.

"All of those make the unit a worthwhile investment for Kingston Heath Golf Club. While I'm aware it might not suit all types and styles of golf courses, at Kingston Heath it has been a real success."

LETTER TO THE EDITOR

THINK SERIOUSLY BEFORE OUTSOURCING

Dear Editor,

There has been a considerable amount of press and comment about outsourcing golf club functions, with special emphasis on course maintenance, to save dollars. I would like to put the point of view against this process.

All golf courses are not the same. Some courses have good sub-soils but in the case of Castle Hill Country Club our sub-soil is mostly clay. You cannot treat all grass the same to create consistent greens and fairways.

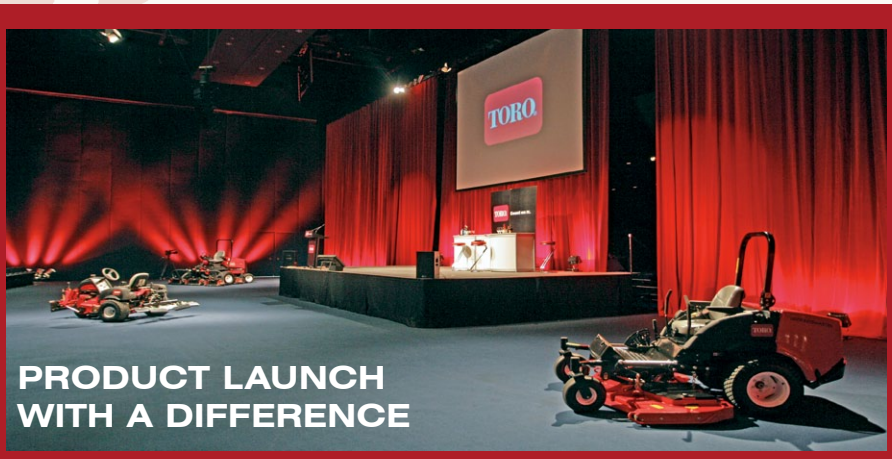
When you decide to outsource maintenance, over time you lose your staff and the expertise that is unique to your course. You also lose all equipment, sold to the new contractor for dollars far less than the true value. You also lose some portion of control especially over course priorities.

The time will come when you realise the mistake but the cost of going back to the status quo is astronomical, training new people and purchasing new equipment. In the meantime the course is in poor condition.

At Castle Hill Country Club we had a number of functions outsourced or sub-contracted. We have gradually brought some of them back in-house which are now going considerably better than the alternative.

I would encourage club boards and general managers to think seriously before outsourcing course maintenance. Your club is only as good as its golf course. It doesn't seem logical to take a risk with your most important asset.

ROGER J. ALLSOP
PRESIDENT, CASTLE HILL COUNTRY CLUB



PRODUCT LAUNCH WITH A DIFFERENCE

Toro deviated from the norm during this year's 22nd Australian Turfgrass Conference tradeshow with the unveiling of six new products to hit the Australian market. In a spectacle attended by around 500 delegates, Toro held the Great Sporting Moments Product launch where sporting icons Greg Ritchie and Jack Newton provided entertaining talks on their life at the elite level.

"From what we were told by delegates everyone enjoyed the presentation," says Toro's commercial division marketing co-ordinator Jade Gardner. "It was something different for the conference and we believe it illustrated our commitment to the industry and to the turfgrass conference."

Toro unveiled six new products with the commercial division releasing the new Reelmaster 5010 Series fairway mowers, Sand Pro 3040 and 5040 bunker rakes and Groundsmaster 7210-D rough mower. Toro's irrigation division launched the new VP Satellite, GDC Decoder and 835S/855S sprinklers.

The new 5010 series fairway mowers, which comprises the 5210, 5410, 5510 and 5610, feature Dual Precision Adjustment (DPA) cutting units, a lighter-weight design, an all-wheel drive system and countless other advanced capabilities.

The DPA units help optimise ground-following and mowing performance to deliver a better quality of cut on a variety of terrain. Featuring special suspension and weight balance, the cutting units are made with a proprietary reel blade material.

Toro has also improved the cutting units with a heavy-duty bedknife. The new design incorporates a harder, leading-edge steel to retain its sharp edge much longer than standard bedknives. Customers can choose three cutting units: a 5-inch diameter 8-blade; a 7-inch diameter 8-blade; and a 7-inch diameter 11-blade.

The new Reelmaster mowers weigh up to 90kg less than Toro's older units and also offer an all-wheel drive system called CrossTrax which provides better traction on wet slopes by transferring power from the front tyres to the opposite rear tyres.

Heading the new product line from Toro's irrigation division was the Network VP (Versatile Platform) Satellite which provides more capabilities than competitive field satellites and increased capacity over the previous generation Network 8000.

The new satellite combines modular flexibility, greater capacity, increased programmability and a more intuitive user interface in a single controller, with a number of new capabilities not offered before. The uniquely modular Network VP is available from 16 to 64 stations, and can grow in eight-station increments.

Providing a seamless upgrade capability, Network VP was designed as a drop-in replacement for the Network 8000, which is only available with 32 stations. This increased capacity allows users to convert to "single head" control combining precise coverage with minimal installation expense.

The controller's 64 programs can each be configured in three ways: as a basic program with a single daily start time; an advanced program with multiple start times per day; or a grow-in option that provides run times in a continuous loop. Network VP can even run up to 32 stations at the same time, reducing the overall watering window. All 64 stations may be controlled individually, and each individual station can have its own watering program.

For more information about Toro's commercial turf equipment range call 1800 356 372, or for more information on Toro irrigation products, contact 1300 130 898.

STIHL CLEANS UP

Stihl has recently introduced its new range of backpack blowers to the Australian market. The new, more operator-friendly blowers weigh in at less than 10kg and have a maximum air speed between 290kph and 325kph.

There are three models in the range – the low-noise BR 500, the budget model BR 550 and the high-powered BR 600. All blowers feature a 4-MIX engine (a 4-cycle engine that uses 2-stroke fuel) which eliminates oil changes, creates longer engine life and reduces exhaust emissions. The 4-MIX engine also reduces noise impact.

The Stihl blowers boast a quick-mount harness which offers many adjustment points as well as breathable back padding. Vibrations have also been minimised and the unit can be operated with a simple, single handle control.

For more information about the new range of Stihl backpack blowers, contact your nearest Stihl dealer, call 13 11 97 or visit www.stihl.com.au.

NEW-LOOK WEBSITE

Queensland based manufacturer of wastewater treatment and environmental protection equipment Clearmake Industries has revamped its website.

The site is powered by an extensive database to drive the online consulting portal which allows end users and engineers to find solutions based on their specific needs. The Clearmake Waste Water Portal offers a resource centre for water experts and engineers as well as a customer service centre.

Engineers and water experts who know what they are looking for get direct access to the relevant product information and related documents. End users are guided through a simple questionnaire and based on their entries get presented with a list of possible solutions. A general search feature is also included.

To view the new-look Clearmake website, visit www.clearmake.com.au.

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GCSAQ

Isn't it great to be a Queenslander! Through adversity we still come out winners.

It has been a busy and exciting couple of months in the Sunshine State with Queensland winning the State of Origin and our country tour to Coral Cove, Bargara and Bundaberg.

The country tour was a real hit and a big thank you to all the members who attended. This trip continues to grow from year to year and shows the true camaraderie that exists in our industry. It also provides a great forum for sharing ideas while enjoying the country hospitality.

Jeff Gambin showed all that golf practice is starting to pay off, winning the coveted Jacobsen Cup on the first day and being part of the winning team on the second. Watch out Blackie and Peter Abel, he is coming to get you!

The trip attracted members from Coffs Harbour through to Mackay. A huge thanks to trip sponsors Jacobsen, North Pine Motors, Jimboomba Turf, Rain Bird, Water Equipment Technology and Bayer.

The Northern NSW Golf Course Ground Staff day was held at Maclean Golf Course with 60 in attendance. The Yamba team, no thanks to Smithy, broke through for their inaugural win and in doing so stopped Bonville's dominance in taking out the Club Challenge. To the superintendents, Todd McNamee, Wayne Marshall, Mark Anderson and Pat Day thank you for the wonderful presentation and hospitality shown by your clubs.

Construction work at Royal Queensland Golf Club

June also saw the Queensland Golf Industry Conference held at Royal Pines which attracted 200 delegates from around Australia. The disappointing thing for me was the number of those 200 who were not in attendance for the last sessions of the conference which were very important to their club. These sessions were on water, environment and cost versus quality. These three subjects all have huge implications on all golf clubs.

Thank you to Terry Muir, John Neylan, Scott Smith and Tom Crothers for presenting these topics and to Steve Potts, Scott McKay and Jeff Gambin for sitting on various panels throughout the conference.

The weather has been quite mild so far while being very dry over most parts of Queensland except for the Sunshine Coast, Gold Coast and Far North which have been copping all the rain.

On serious note, a well respected golf course superintendent who also moonlights as a stop-go person for a tree-lopping company, had a rude awakening when going to work one morning, finding his vehicle on blocks in his front yard, all four wheels missing! Anyone with information regarding this matter, please contact GCSAQ secretary Peter Lonergan.

Finally, congratulations to the AGCSA Board and staff on running another very successful conference.

ROD COOK,
PRESIDENT, GCSAQ.

TGAA WA

The shortage of skilled labour in the turf industry in Western Australia was the focus of a breakfast meeting of TGAA WA members held at Hale School in June. Many of our members are struggling to retain skilled staff and also finding it difficult to fill vacant positions. This is a major concern for the future of the turf industry, as all indications are that there will be a general shortage of workers in WA for many years.

Based on the high level of interest shown by our members, the association has decided to tackle this issue with a number of initiatives. We are working closely with Challenger TAFE to promote and support their training activities as they become more flexible in the way they deliver training to the industry. Our members will assist by providing work experience placements for TAFE students.

Another positive initiative supported by TGAA WA is the school apprenticeship link, which will be introduced in 2007. This is available to non-TEE students and allows them to work part-time in the turf industry while they are still at school, similar to a pre-apprenticeship.

The association has committed to participate in the careers expo 'Try a Trade' display, to promote the turf industry to school-leavers as a viable career option. We have also identified an opportunity to attract mature-age workers into the turf industry by promoting it as a good lifestyle choice.

In terms of other association events, the spray application workshop held at Burswood Golf Course in May was very successful, with over 50 people attending.

Thanks to John Forrest (Challenger TAFE), Sam Franco (Burswood Park) and Guy Watson (Lawn Care Man) for their assistance. About 35 members attended our AGM and golf day at Maylands Peninsula Golf Course in July.

PETER RUSCOE,
PRESIDENT, TGAA WA.


Cypress Point Golf Club in California

NSWGCSA

Finally we have had some rain in NSW but as usual not nearly enough where it is most needed. Coastal areas have had falls beyond 200mm in July with a fraction of this in the West and Sydney catchments. Many are hoping for big dumps before spring to fill their dams.

More clubs in Sydney are looking at the options of replacing their kikuyu fairways with couch. With less water and increased use of reduced quality water, couch is seriously being considered. Many courses are also suffering from various levels of growth difficulties with kikuyu. This ranges from aggressive Kikuyu Yellows to reduced quality compared to previous years. Some believe the increased heat and humidity has favoured the advance of the disease.

On the NSWGCSA Board front, seven of the eight current board members are standing for re-election. I will be stepping aside after six years on the board. Nomination forms were sent out at the end of July. The AGM will be at Castle Hill Country Club on 28 August.

FIELD DAYS

The annual 'Reds and the Greens' Ambrose day at Cypress Lakes was another huge success. With numbers limited to 125 players, the field was booked out 10 days after posting flyers. A big congratulations to Scott Riley our sole field day organiser for its success.

This year was the Bob Ashley Memorial Day in memory of Bob who died last December. Bob was partner with Hugh Leicester at Hydro Technics, therefore it was fitting that Hugh, together with Mick Waring, Scott Harris and Andy Heskett, won the scratch competition. Nett winners were Mark Johnson, Tim Bailey, Brendan Walsh and Anthony Ross.

Sponsors for the day were Dad and Dave Turf Supplies, Globe Australia, Simplot, Hydro Technics Irrigation, Tyrell's Wines and Green Horticultural Group. Thanks again to these companies that strongly support the association. Thanks also to Merve Hayward and the team at Cypress Lakes Resort.

The next field day is the AGM at Castle Hill. After the AGM will be morning tea with Toro and a walk through of their latest equipment. This will be followed by a presentation from Martyn Black on his trip to India to assist their fledgling superintendents association.

And speaking of overseas adventures, NSWGCSA vice-president Andy Hugill, former board member Tony Fogarty, Chris Blagg from Maxwell and Kemp and myself recently returned from a trip to the United States.

The four of us visited Merion Golf Club in Philadelphia, Wykagyl Golf Club and Winged Foot (venue of the US Open) in New York. Andy and I then continued onto the west coast to visit San Francisco Golf Club, Pebble Beach, Links at Spanish Bay, Pasatiempo, Cypress Point and Riviera. The superintendents were generally very accommodating with some spending a couple of hours with us. A presentation on the trip is planned for the October education day at Ryde Parramatta Golf Club.

MICHAEL BRADBERY,
PRESIDENT, NSWGCSA.

TGAA ACT

It is too early to obtain statistics from the recently held TGAA ACT mid-year seminar on recycled water. However, it seems that early feedback from attendees and sponsors has been very positive. The TGAA ACT would like to thank all the speakers, sponsors and delegates for their attendance and we hope to see you next year.

It is the general consensus within the turf industry that the annual mid-year seminar is an event not to be missed. So, to assist and best represent the turf industry, TGAA ACT is constantly seeking new thoughts and ideas on seminar topics.

In recent news, the TGAA ACT, in conjunction with the Canberra Institute of Technology (CIT), has approached the Irrigation Association of Australia (IAA) in relation to the introduction of its new national certification. The IAA has been made aware of the importance for the introduction of such a scheme by the CIT and TGAA.

It is hoped that such a scheme will prevent installation of in-ground reticulated water systems by untrained persons.

For anyone who may be interested, the CIT will be conducting SMARTrain chemical application training in early November at the Weston Campus. Please contact (02) 6207 3100 for details.

JUSTIN A K HASLAM,
COMMITTEE, TGAA ACT.

GCSAWA

The sensationally dry weather continues here in Perth and long-held records have tumbled. We have experienced the driest winter since records were started (163mm) and year-to-date rainfall compared to the seasonal average of 555mm. Dams are at 28 per cent and unless we have higher rainfall over the next couple of months there is little chance of any seasonal inflow into them.

Seasonally we had more rain in every other season compared to winter: summer 54mm, spring 157mm, autumn 61mm and winter to date 53mm. Needless to say our seasonal patterns are all over the place and it appears autumn has just carried through into spring. What wonderful sunshine; pity about the freezing temperatures.

The GCSAWA Margaret River conference is right on our doorstep, so I hope everyone has registered and is looking forward to the event. Unfortunately we have had to replace one of our guest speakers, John Odell from Royal Sydney Golf Club, as he is extremely busy preparing for the 2006 Australian Open. Many thanks to John for his kind initial offer and we hope to have him join us at future conferences.

Your committee is working feverishly to find a new speaker who will not only complement Terry Muir but who will also add considerably to both the educational content as well as the social atmosphere.

Unfortunately at the time of writing this report there has been no official update from the Horticultural Review Committee in regards to proposed changes to the horticultural training pathways. At this stage the initial reply from the Education Minister indicating that there would be no change to the turf management stream unless requested by industry still stands, however it would be great to have an official decision made.

Of interest to some golf clubs already and potentially more clubs in the near future is the Australian Government's Water Fund which is an initiative to promote sustainable water use. The second round of Community Water Grant is now available for up to $50,000 with applications closing Friday, 25 August 2006.

Chequers Golf Club, Mandurah Country Club, Kalbarri Golf Club and Spalding Park Golf Club were all successful in securing grants for water conservation strategies on their sites. It is well worth the effort and will actually help your workplace improve their environmental impacts and standing in the broader community. Visit www.communitywatergrants.gov.au for more info.

Congratulations to Simon Bourne on his promotion to superintendent at Cottesloe Golf Club. On behalf of the GCSAWA and all members I would like to congratulate Simon on his success and wish him all the best in this new role and offer the assistance of the association and its members if he ever feels the need.

BRAD SOFIELD,
PRESIDENT, GCSAWA.

VGCSA

Winter in Melbourne, what a place to be! Richmond Football Club walloping Collingwood on an unusual wet Sunday afternoon at the MCG, plus down here we were fortunate enough to host the State of Origin decider at the Telstra Dome where we witnessed one of the great come-from-behind victories!

Lucky all this is going on because the grass is certainly not all that active due to our very cold winter, with frosts being a frequent occurrence and unfortunately not only disturbing golfers but putting a stop to any growth.

Rain?! What is it and where has it gone? Here in the metropolitan area we had 17mm in June. In comparison to last year's 61mm and an average for June of 55mm, we need some heavy falls through our traditionally high rainfall period from now until November. With reservoirs at 47 per cent we definitely need Mother Nature to be kind to us.

While grass growth may have been slow, there has been plenty of movement around the industry. Andrew Casey from Churchill Park Golf Club has moved to Queensland, while my assistant superintendent here at Commonwealth, Troy Cashman, has decided to move on to fill the vacant superintendent position at Waverley Golf Club. His position has been filled by foreman Travis Scott (***See Offshoot for a full profile on Travis Scott – Ed***). A vacancy also exists at the lovely seaside town of Torquay after Shane Brogan's departure. Good luck to all those that have moved on and to those filling positions.

The annual Australian Turfgrass Conference has come and gone and it was great to see Victoria represented with pretty good numbers escaping our cold weather and enjoying some Sunshine State hospitality.

The next VGCSA meeting will be the managers/superintendents day at Spring Valley Golf Club on Monday, 21 August (sponsored by Active Safety). Get together with your general manager and enjoy what will be a great day at Spring Valley. The general managers believe they have it over us so called 'weed pullers' so let's fire up and have a victory against the 'old pen pushers and bean counters', whatever you want to call them.

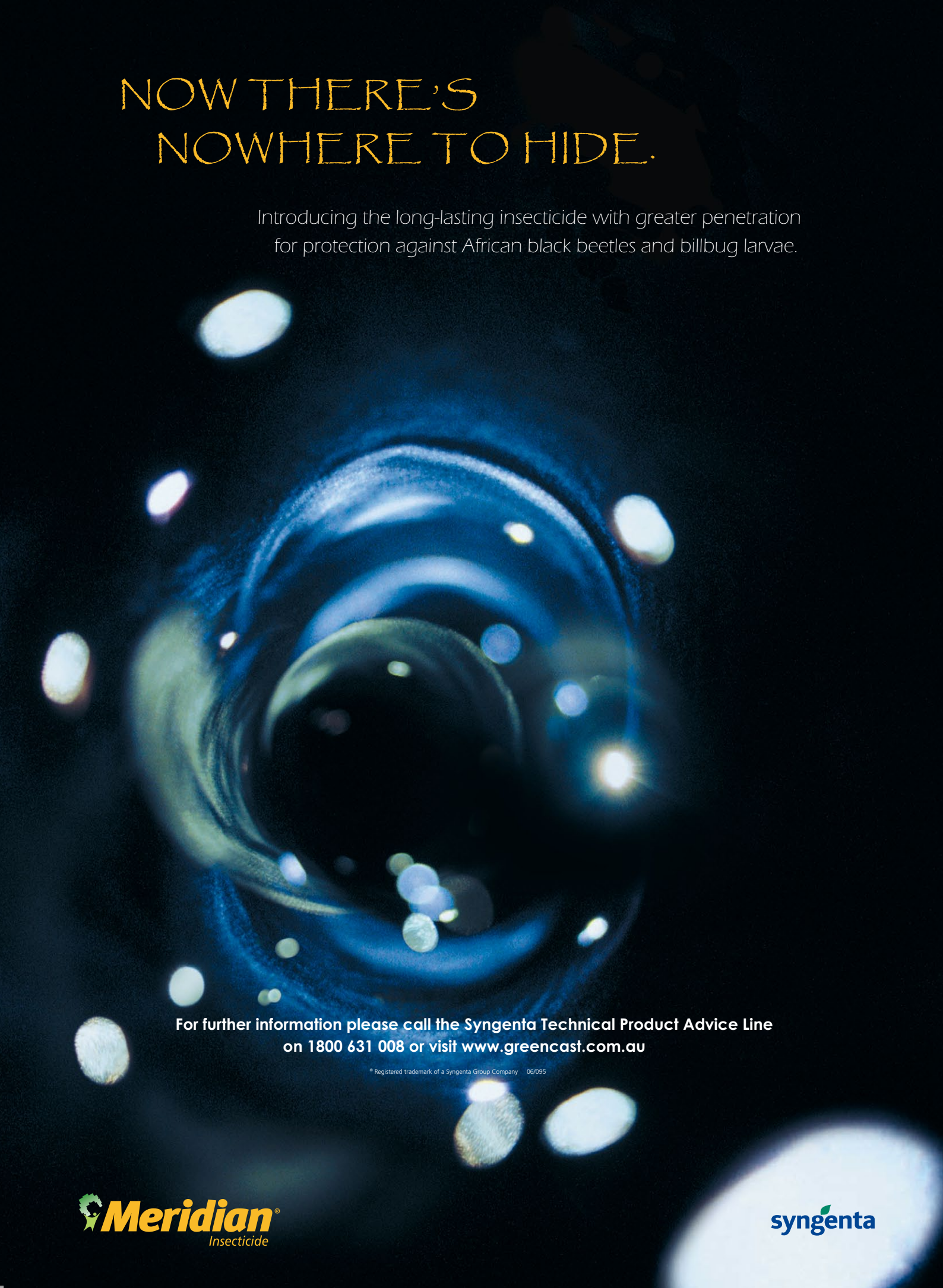
On Tuesday, 3 October, the VGCSA heads down the line to The Sands, Torquay for the Turf Fundraising Day which will be sponsored by Bayer Environmental Science. Superintendents should be present and start to get your staff or committee involved as this year's prizes are even better than in previous years.


The Sands, Torquay

This year's Christmas function will be at Box Hill Golf Club on Monday, 27 November, sponsored by Total Turf Machinery. In a move to increase numbers at this event we will be having a morning shotgun start followed by lunch which may suit due to the time of year. More details will be given closer to the dates and could RSVP replies please be returned on time as it makes it easier to cater for with all associated clubs.

For those supers who are fortunate at this quiet time of year to be taking annual leave and travelling either overseas or to the popular state of Queensland, enjoy your break.

MARK PROSSER,
PRESIDENT, VGCSA.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TGAA VIC

The MCG hosted the TGAA VIC's annual Cricket Wicket Seminar in July

The shortest day of the year has passed and we are on the improve as far as the weather is concerned. All we need to pray for now is some of that stuff called rain! For just about all of us it has caused many headaches. Despite those headaches TGAA VIC has been busy and in early July we held the extremely popular Cricket Wicket Seminar at the MCG.

For me, this year's Cricket Wicket Seminar was one of the highlights of my career so far. To be able to listen to stories and problems encountered by Tony Ware and his staff at the MCG over the last couple of years, just made me realise how insignificant my problems were. It also inspired me and proved what can be achieved if you set your mind to it. A little bit of financial support helps as well.

The tour of the new MCG blew me away. The sheer size of the place, state-of-the-art equipment and facilities, and the chance to speak one-on-one with the people who maintain and improve these facilities every day. To stand in the middle of the hallowed turf and look up at the grandstand sent shivers down my spine. I'd hate to think what I may have done if the stands were full.

The 270-plus in attendance then listened to an informative talk from Sam Russell from the City of Casey. He spoke and showed pictures on just how they turned a paddock into five elite playing fields that all offer something slightly different. I will certainly be going out there for a look at the different grass types they have used to see how they perform and to monitor their establishment.

As expected, Les Burdett gave a very entertaining talk on the history of the Adelaide Oval as well as his 37 years in the industry. He dropped plenty of names along the way, but told some very interesting stories about some cricketing icons. I think Les surprised a lot of people with his old school approach and how effective it still can be.

Rob Savedra from Wesley College spoke about his ways of preparing wickets for the first week in September for the Victorian Bushrangers, as well as his experiences with the World XI when they were in Melbourne. He also spoke of ways of keeping your tables clean for early preparations.

Toby Lumsden from the Junction Oval spoke on their methods to improve the playability of the wicket. He also spoke of the reasons why they chose Santa ana and Conquest for their wickets.

Thanks must go out to all the speakers for their thorough talks on a wide variety of topics. Thanks also to Bruce Stephens for being the MC on the day.

Upcoming events include the TGAA Annual General Meeting in early September, while the annual Celebrity Sportsman's Dinner will be held at the Mulgrave Country Club on 27 October. Until the next issue or wherever our paths may cross, stay safe and keep learning.

MATT HANRAHAN,
COMMITTEE, TGAA VIC.

SAGCSA

It is with great pride that we acknowledge this year's AGCSA Excellence in Golf Course Management Award recipient, popular Glenelg Golf Club superintendent Daryl Sellar.

In collecting the award Daryl became the first South Australian to do so and that in itself is a reason for him to look back on this award with pride. With respect to the other award nominees, I believe that there are few people who are as passionate about our industry or as giving with their time for the betterment of the industry as a whole than Daryl.

With the completion of the course layout at Glenelg, Daryl and his team have received glowing praise from players and superintendents alike who have taken the "Glenelg challenge". Congratulations Daryl and your team. All of us here in South Australia salute you.

After outstanding opening rains this autumn, the rainfalls have been few and far between. Numerous heavy frosts were recorded during June throughout the Adelaide metropolitan area, some the heaviest in recent memory. With reservoirs holding just over 50 per cent, we will need a wet spring this year to top up our dams as well as getting some sub-soil moisture for later in the year. Here's hoping.

As our guest speaker for the SAGCSA AGM, which was held at Royal Adelaide Golf Club in June, we were very fortunate to secure the services of the Castle Hill Country Club superintendent, poet and AGCSA Board member, the incomparable Martyn Black.

It has to be said, for those who have not experienced the 'India experience' Blackie style, I believe it will be coming to an AGM near you soon as it seems he is doing a speaking tour around the country at present. As the man said, "Do yourself a favour". I know you will not be disappointed.

Our next meeting is coming up soon and this year we will be going to the Riverland Gadget Day, this will be held in the second week of September. This will also be our country meeting for the year, so we are looking forward to seeing all the Riverland superintendents on the day as well as strong representation from the metro superintendents.

I am reliably told that this gadget day is full of innovative ideas for use in the smaller scale agriculture and horticulture areas, and is ideal for getting the creative juices flowing if you cannot find something off the shelf. See you there.

PETER HARFIELD,
PRESIDENT, SAGCSA.

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Martin Greenwood,
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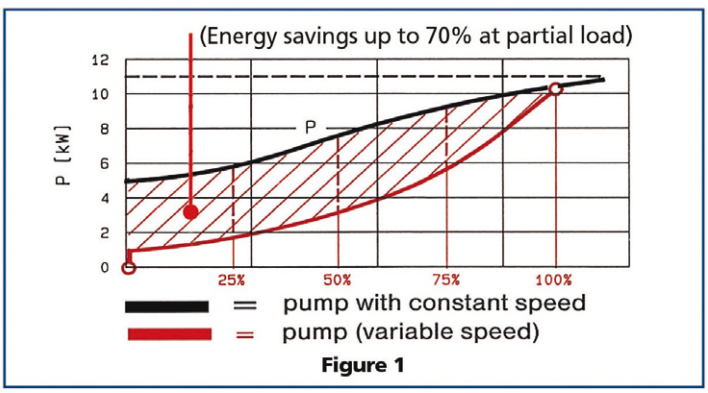

Figure 1

What is a Hydrovar?

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