

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

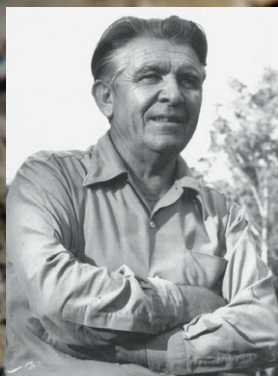
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MANAGEMENT



## **Farewell to a legend**

**Vince Church 1915-2006**

## **Man in the middle**

**Blowing the whistle on  
Michael Vozzo**

## **Research**

**Wetlands manage runoff**

**ANTEP trials**

## **The big dry**

**Combating the drought**





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## COVER: The big dry

The impacts of water restrictions on the turf maintenance industry are being felt acutely around the country. In this edition ATM looks at how the industry is faring in one of the most challenging periods in its history.

**Inset:** Vince Church (Pennant Hills Golf Club superintendent 1951-1977) who died on Christmas Day 2006.

**Cover Photos:**

**Brett Robinson**

**Cover Design:**  
**Jo Corne**



## Hodgkins at home in Hobart

20

Working on the groundstaff at Lords isn't exactly your average introduction to the world of turf management, but for Cameron Hodgkins it started him down the path to a rewarding career in turf management. ATM profiles the Bellerive Oval head curator and takes a closer look at one of Australia's youngest international cricket venues.

## The man in the middle

34

The past 12 months have been some to remember for Michael Vozzo – a second child, being appointed superintendent for the first time and umpiring the 2006 AFL grand final. Yes, you read right, the AFL grand final. ATM profiles one of Melbourne's newest superintendents and blows the whistle on his high profile 'second' job.

## OPINION

### The Pulse

26

Ask any superintendent around the country and they will tell you that finding and retaining skilled and qualified greenkeeping staff is becoming increasingly difficult. ATM asks superintendents whether wages and conditions are to blame and how the issue can be remedied.

## THE BIG DRY

6

The widespread drought which has crippled many parts of Australia has also had an equally dramatic affect on the wider turf management community. From sportsfields being closed and the cancellation of sporting competitions, to golf courses scrambling to find alternate water sources, ATM looks at how the industry is combating the drought and looks at strategies to improve the survival rate of drought-affected turf.

## RESEARCH

### ANTEP ryegrass and tall fescue trials

40

In 2006 the AGCSA was commissioned by the Australian Seed Federation to conduct a two-year evaluation programme of perennial ryegrass and tall fescue varieties. ATM looks at the first lot of results on establishment and vigour to emerge from the trial.

### Wetlands aid in managing runoff

44

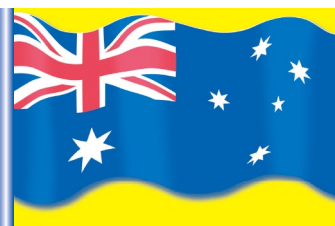
Using created wetlands as water-receiving locations offers a unique management and clean-up strategy for both the golf course and urban stormwater. Purdue University researchers initiated a study to determine the chemical characteristics of water moving through created wetlands associated with a commercial 18-hole golf course and a residential area, and track changes in water quality.



# Globe



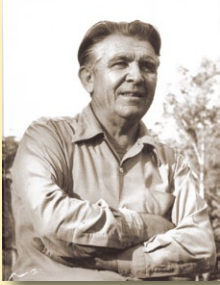
## A Truly Australian Company





## Vale Vince Church 12

For 26 years from 1951 to his retirement in 1977, Pennant Hills Golf Club superintendent Winston 'Vince' Church was quite simply the doyen of turf management in Australia. Sadly on Christmas Day 2006 Church passed away, taking with him one of the few remaining links to the old school days of greenkeeping. With the help of those who worked alongside and who were influenced by him, ATM pays tribute to the legacy left by one of the industry's most endearing characters.



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 The Church Family  
 Michael Vozzo (Eastwood GC)

# a legacy of innovation

If there is one thing that I have gleaned from being a part of the turf industry over the past four years is its uncanny ability to produce some of life's more unique characters. One of those great personalities was a New South Welshman by the name of Winston 'Vince' Church. Sadly, as most in the industry will now be aware, the former Pennant Hills Golf Club superintendent passed away on Christmas Day 2006 at the age of 91.

During his 26 years at Pennant Hills, Church was a lot of things – motivator, ambassador, educator, diplomat, as well as being one of the leading turf managers of his era. Whether it was his knack of producing some of the finest surfaces in the country through to his passion for promoting the profession at both a state and national level, Church's influence was profound. Incidentally, the modern day term 'superintendent' can largely be attributed to Church who encouraged its use in this country, to replace other such titles as greenkeeper or curator, following a visit to the US in the late 1960s.

You only have to read the tributes to Church in this edition to get an appreciation of the breadth and depth of his influence across the industry. As former Pennant Hills assistant superintendent Bruce Carruthers eulogises, Church had strategies that were far in advance of other superintendents of his era and possessed a vision of the industry in Australia being highly respected and regarded throughout the world. At the forefront of that was the creation of new ideas and methodologies which Church, without question, was an expert at.

With the assistance of his friend and colleague, mechanic Jack Jones, Church built a customised spray unit which used the engine and frame of an old Morris Minor. The unit enabled Church to tinker with and research spraying procedures and application quantities and the extraordinary results he achieved helped revolutionise modern-day pesticide and fertiliser applications in this country.

Thirty years on and Church's legacy of innovation is still alive and well at Pennant Hills Golf Club. In one of the most ambitious and groundbreaking projects being undertaken by any golf club in this country, Pennant Hills is nearing the final stages of a project which will take raw sewage straight from the sewer, process it via an on-site treatment plant and then use the treated water to irrigate the entire course, tee to green.

Just as the club was a mecca for turf management professionals who would seek out Church to glean some insight or advice, the club is again the centre of the industry's attention as it prepares to boldly go where no other course has gone before. After a long and involved process, construction of the plant will start this month and all things going well is expected to be commissioned at the start of November.

The fascinating project, which carries a budget of around \$3.5 million, has the potential to revolutionise golf course irrigation and as part of our lead feature on combating the 'big dry' we take an in-depth look into how one of Sydney's proudest clubs is taking giant steps to ensure its future.

Goodness knows what Church would make of mining sewers in order to irrigate his old stomping ground, but I bet he's looking down content in the knowledge that a club he gave 26 years of blood, sweat and tears for and established as one of the best in the land, is again at the forefront as the golf course maintenance industry moves towards a more sustainable future.

Enjoy the read.



*Brett Robinson*

**Brett Robinson**  
Editor



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As we bid farewell to another difficult summer, the desperate state of Australia's water resources, climate change and carbon credits are constantly before us, with the focus very much on the plight of people, communities and the urban environment. The discussions are constantly about how Australia is going to supplement its dwindling water supplies to provide for our thirsty and expanding populace.

The impacts of water restrictions on the turf maintenance industry are widespread and we are seeing the ramifications with sportsfields being closed, cricket competitions being cancelled and the start of football seasons being deferred. In some districts golf courses are being forced to cart water in from outside sources to maintain greens. What will the ramifications be? Loss of amenity, a move towards indoor sports, increased injuries and the loss of members and income are all possible outcomes. Will thirsty communities care?

Turf surfaces of reasonable quality and safety rely on a regular water supply of reasonable quality and without it the preparation and presentation of turf surfaces as we have come to expect them will not be possible. The lack of water is the single biggest threat to turf sporting surfaces as we know them. The question is then, what are the options for the sustainability of grass sports surfaces? Potable water is no longer a viable long-term option for irrigating turf areas and it is neither environmentally or socially acceptable. The search is on for other water sources such as reclaimed wastewater, storm water and bore

water, however, water quality and in particular salinity, is a major concern.

Reclaimed wastewater is an obvious water source for use on turf areas. Over the past 25 years it was virtually given away, but now it is seen as a valuable commodity that can be sold to the highest bidder, which raises the question, will our industry be able to afford it?

The turf industry will have to work hard to identify alternative water supplies and there are various groups doing so. The Australian Golf Industry Council, of which the AGCSA is a part of, represents all those that participate in the golf industry and it has identified water as an urgent priority. Likewise in Victoria, the lobby group VICSWU is working hard to keep the decision-makers informed on the importance of amenity horticulture. The challenge for our industry is to make change and to go to government with solutions that they can assist us with rather than problems.

Given the current situation facing the turf industry, this year's 23rd Australian Turfgrass Conference in Cairns should be high on the list of events for turf managers to attend. Carrying the very fitting theme "Climatic conditions of the modern era", AGCSA events manager Jeff Johnson has brought together a top line-up of speakers to help turf managers in this increasingly difficult work environment. A delegate registration brochure is currently being produced and will be available shortly.

Other highlights during conference week include the two-day trade exhibition, which will attract over 35 of the industry's leading companies, and the AGCSA Awards. There have been a few changes to how the awards



**AGCSA**

will be presented in 2007 which is hoped will further raise the status of the event as well as encourage more people to nominate. Once again the AGCSA has a full complement of award sponsors and encourages all superintendents, greens committees or general managers to nominate.

Finally, the AGCSA has just reached an all time high membership. Over 750 people have taken up membership with the AGCSA this year which means there are plenty of fellow members you can 'lean on' for assistance or to bounce ideas off. The AGCSA is currently reviewing all membership categories and will expand on the benefits members receive. For those that aren't yet members, please take this as your personal invitation to join our association (through the membership form enclosed in the 'Offshoot' supplement of this magazine) so that we can assist your development within this great industry. 🌱



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# The big dry

## Combating the drought

**The drought is slowing tightening its grip around the country and feeling the effects more than most is the turf management industry. Aside from looking to the heavens with increased urgency, a number of clubs are being forced to seriously evaluate their future water needs and undertake a variety of projects to ensure their survival. In this edition's lead story ATM looks at how the drought is impacting golf clubs and looks at the ground breaking sewer mining project at Pennant Hills Golf Club.**

Open any newspaper or flick on the evening news these days and there's a high probability that leading the headlines will be some item relating to the drought. Whether it's news of another sporting code cancelling a season or preseason due to hard and unsafe grounds or a snippet of a forlorn farmer standing over dying crops or cattle, there is little doubt that the drought affecting many parts of the nation is foremost in the consciousness of most.

As the general populace gets used to showering with buckets at their feet, piping greywater from washing machines to water gardens and being actively encouraged by water authorities to adopt the very 'un-Australian' practice of 'dobbing in' water wasters, turf managers could be forgiven for proclaiming 'You think you've got it tough!' In many cases turf managers have been battling the affects of prolonged drought and declining water quality for years, watching with heavy hearts as the turf surfaces they try to carefully nurture are slowly strangled by Mother Nature's ever-tightening grip.

The stories are the same everywhere you go, from Adelaide to Sydney, from country Victoria to rural NSW. When ATM conducted a ring around in early February to gauge how those courses under water restrictions were faring, the response was fairly unanimous – "We're doing it bloody tough."

Take Mark Crittenden at Cumberland Country Golf Club. Course superintendent at the Sydney course for the past 14 years, Crittenden hasn't been able to give his kikuyu fairways a full irrigation cycle in four years. While he has an exemption to water tees and greens, for the past three years the club has spent in excess of \$330,000 tanking in water just to keep fairways alive.

While Cumberland's turf surfaces manifest the physical impact of the drought, behind the scenes the club is also feeling it. The club has lost valuable revenue from cancelled trade golf days, membership numbers have dropped significantly, while Crittenden has had his maintenance crew cut back by three to just seven.

Despite the situation, Crittenden says the club has remained very positive and he is doing his best as a superintendent to keep members informed of the situation through regular newsletters and communication.

"It's been pretty diabolical," reflects Crittenden on the past four years. "Some guys might say well at least you don't have to mow fairways and roughs, but it can get pretty disheartening, particularly when about four years ago we had the course as one of the best in the west of Sydney. We've been tanking in water for the past three years now. We bring in around 230,000 litres every day at a cost of \$700 which is a significant outlay over a year.



**A common site at a lot of golf course these days. This dam, at Eastwood Golf Club, would normally hold up to 30M but midway through summer was down to between 5-7M**

"Fortunately having kikuyu fairways has been a blessing. It's an incredible grass. Some think of it as a weed but for us here, if we didn't have kikuyu we would definitely be in a worse position. We had a little bit of rain at the start of the year and it's amazing how quickly it came back."

It isn't for lack of trying that Cumberland finds itself in this current situation. Over the years it has sunk a bore 325m but got nothing, while the course's location makes harvesting stormwater and sewer mining unfeasible.

Despite the hard times, there is some light on the horizon for Crittenden and his staff. The club currently has a development application lodged with Holroyd Council to get a pipeline installed which will pump 500,000 litres a day from a natural spring located in an old Boral quarry about 4km away.

The water will need to be treated, as it is not of high enough quality for greens irrigation (Crittenden may look at passing the water over limestone chips to take out any excess salts) but such is Crittenden's optimism that the project will come to fruition that he has scheduled fairway renovations for November.

While Crittenden plays a waiting game, his NSW colleague Daniel Metcalfe at Beverley Park Golf Club is also biding his time. Relying solely on mains water to irrigate tees and greens, the course is eagerly anticipating the arrival of treated effluent from a sewage treatment plant which will be constructed by Kogarah Council on land adjacent to the course.

The council has been trialling sewage treatment for the past 18 months and the project, which has received state and federal government grants to the tune of \$2.2 million, will ensure that Beverley Park, as well as the council's other parks and sports grounds, will have a guaranteed water source for the future.

"We have been told it will come online in about 10 months, but you know how these things go," says Metcalfe. "When it does come on Beverley Park will be one of the better off courses in the area."

As well as treated effluent, Metcalfe was also planning on sinking a bore in late

February and was confident of getting some good quality water from the structure which also supplies Mona Vale and Cromer golf clubs to the north.

## SAME ISSUES, DIFFERENT STATES

Over in Adelaide, the driest state capital in Australia, Andy Blacker and his staff at Thaxted Park have been furiously handwatering all summer and all non-turf maintenance projects have been put on hold as the crew concentrates on keeping the course alive.

Levels are that critical in the course's five dams that mains water has been required to irrigate greens and tees, and for the first time in a long time the club has instituted a water levy for members, which has brought in between \$40-50,000. Blacker says the members have been very understanding given the widespread drought and the realisation that golf courses and turf facilities are doing it hard.

"The main problem which has compounded the restrictions has been the length of the season," says Blacker. "The August-September-October period was some of the driest months we've had in a long time and we only received 15-20mm when our historical average is between 60-80mm."

"Ironically, even though it has been one of our longest dry periods, we have actually managed to reduce water usage on our greens. If there's one thing the drought has done, it makes you really examine how you apply water to the course and how you need to be spot on so as not to waste any."

In Melbourne, which is currently at Stage Three restrictions with Stage Four triggers not far off, two of the country's most famed layouts – Metropolitan and Victoria – are doing it particularly tough.

"We're not in the best shape but we are hanging in there," admits Victoria Golf Club superintendent Ian Todd. "We knew before spring there was the potential for a tough period ahead so we took a few steps to

minimise wear and traffic on the course. We have brought in a 'rough-only' policy for carts which are no longer allowed on fairways and that has been pretty successful. Members have also been asked not to invite as many guests although we haven't really policed it too much."

A few kilometres away at Metropolitan Golf Club and superintendent Richard Forsyth has watched his dam levels get to critical level over summer (when ATM called in early February he had just 8M remaining) while at the same time declining bore water quality has exacerbated an already trying situation.

"It's really a case of the 'haves' and the 'have nots'," laments Forsyth who hasn't irrigated fairways all summer. "You look across the fence to Huntingdale and the fairways are nice and green whereas ours are white. It's a bit hard particularly when you now how good you can get the fairways."

"Our greens and tees, which we've been handwatering within the current restrictions, are fine, but our fairways have been hit hard. Even if we do get a bit of rain I can't see them getting back up much above 80 per cent cover come winter."

To help Metropolitan get by over the summer, the course received an unlikely helping hand from a benevolent neighbour. Huntingdale Golf Club superintendent Mick Freeman approached Forsyth before Christmas with an offer to set up a temporary line to pump water from a disused bore on his site to top up Metropolitan's dwindling resources.

Forsyth estimates that Metropolitan has taken around 10M and says that the extra water has been a lifeline. "It was a very neighbourly gesture on Michael's behalf and without Huntingdale's help we would be in a lot worse position than we are now," says Forsyth.

Aside from resorting to naked rain dances, Forsyth says the club is investigating a variety of options including stormwater harvesting as well as continuing the push, along with other sandbelt clubs, to have a pipeline constructed from the Carrum treatment plant in south east Melbourne.



**A sign of the times. Melbourne's Marcellin College makes it clear to the public where its irrigation water doesn't come from**



## COMBATING THE DROUGHT – A TECHNICAL PERSPECTIVE

The ability of a plant to survive unfavourable external moisture stress is known as drought resistance (Kim et.al. 1988). Plants can survive drought in a number of ways – either escape, go into dormancy, increase their water absorption capability, while some possess xeromorphic features or have a physiological capability to endure dehydration. The escape and dormancy mechanisms are a specialised means of plants avoiding drought while the increased water absorption and xeromorphic features merely delay the onset of dehydration.

**Escape:** Most annual plants that germinate, establish and produce seed when soil moisture levels are favourable, escape drought (e.g. *Poa annua*).

**Dormancy:** Turfgrasses can survive drought by going into a dormant state. Although the leaves of the plant may die the buds in the crown, rhizomes and stolons survive and initiate new growth when soil moisture levels are favourable (e.g. couchgrass and kikuyu). Buds are extremely drought hardy due to the small cells that are devoid of vacuoles. The brown, dead leaves of a dormant turf can also act as a mulch to reduce water loss by evaporation.

**Water absorption capability:** Some turfgrasses have a greater potential to survive drought due to an extensive root system. This means its available reservoir of water is much greater, however, this is only advantageous if water is present at the lower soil depths (e.g. couchgrass and tall fescue).

**Xeromorphic features:** Some turfgrasses possess inherited structural modifications that reduce water loss by transpiration. Species such as couchgrass and tall fescue are examples. Xeromorphic features include decreased leaf surface, altered size, number, spacing and location of stomata, increased cuticle thickness, surface hairs and the ability to roll or fold leaves.

Varieties which have excellent drought resistance include couchgrass, kikuyu and various native grasses; the fescue varieties (hard, tall and red) have good resistance to drought, while *Poa annua* and bentgrass have poor tolerance.

Kim et.al. (1988) studied the comparative

drought resistances among 11 major warm-season turfgrass species, and also among 22 couchgrass, five St. Augustinegrass, six zoysiagrass, and four centipedegrass cultivars.

Researchers measured a plant's drought resistance by how well and how quickly shoots recovered after stress. Significant differences in drought resistance showed among turfgrasses not only in shoot recovery but also in leaf firing. Leaf firing refers to loss of green color and eventual browning/desiccation of leaves, tillers, and whole plants in response to continued drought stress. Leaf firing is a good measure of drought resistance because it integrates drought avoidance and drought tolerance aspects together.

There was an opposite relationship between leaf firing and shoot recovery for each species and cultivars. This means that those turfgrasses that turn yellow or brown earlier tend to have poorer post-drought stress shoot recovery (i.e. poor drought resistance). Most zoysiagrasses and centipedegrasses showed good to excellent drought resistance with minor leaf firing, with couchgrass generally possessing excellent drought resistance. Santa Ana, Tifway and Tifway II have only medium drought resistance and high leaf firing.

The ability of a grass to withstand drought conditions can be related to the root system of the grass. Grasses with deep root systems have a greater drought tolerance than grasses with shallow root systems. Couchgrass can have a root system of 2-2.5 metres providing the plant with a huge water reservoir for growth and survival.

In contrast, Kentucky bluegrass has a root system of about 150-300mm while closely mown bentgrass has a root system of 50-150mm. Of the cool-season grasses tall fescue probably has the best drought resistance because of its deep root system.

A plant's ability to recover from drought conditions is also important and this varies between grass species. Couchgrass and tall fescue after prolonged drought have the ability to recover within 15 days of being watered. Bentgrass could take up to five months while Kentucky bluegrass is unlikely

to recover at all. In general, plants with deeper root systems recover more quickly.

### MANAGEMENT OPTIONS

When facing periods of drought or limited water availability, there are several management practices that can be implemented to improve the survival rate of turf. Here are some points to consider:

- Slow vertical leaf extension (i.e. vertical growth rate) is an important component of water saving strategies.
- Increasing the mowing height stimulates a deeper root system which will give a stronger plant with greater water scavenging potential. Increasing cutting heights will shade the crowns of the plant and soil during periods of high temperature. This protects the plant and reduces soil evaporation loss.
- The mowing frequency should be kept to a minimum, however, this depends greatly on the quality of surface and type of use (e.g.: green compared to fairway). The more often grasses are mown, the greater their water use is.
- The application of nitrogen fertilisers stimulates leaf growth and with an increase in leaf extension there is an increase in evapotranspiration. Excessive applications of nitrogen produce excessive leaf growth to the detriment of root growth and depth.
- Another important nutrient affecting water use is potassium which reduces water use. Potassium also hardens the plant, giving it greater heat and drought tolerance and improved wearability.

**Other methods of helping improve the drought tolerance of turf include:**

- Increase cutting height in spring.
- Fertilise with control release fertiliser in spring (ensure there is adequate soil phosphorus for root growth).
- Decompact soils in early spring to improve moisture storage and stimulate root growth.
- Where there is very little water available it may be better to allow the turf to go into dormancy rather than have it in a weakened state with small and inadequate quantities of water.



## ◀ A HELPING HAND

As golf clubs rush to secure alternative water sources and ensure their future, a large number of projects have received funding through the Federal Government's Community Water Grants scheme. Golf clubs around the country have taken full advantage of the first two rounds of allocations (March and November 2006) receiving in excess of \$8.1 million across 181 projects, an average of \$45,000 per project.

Across both rounds the scheme has handed out around \$123 million, with the amount allocated to golf course projects making up about seven per cent. In round one, 92 projects were awarded grants totalling \$3.356m (33 clubs received the maximum grant of \$45,454.55) and despite the number dropping slightly in round two, 89 projects reaped around \$4.8 million, or nearly 8 per cent of the total allocation (Table 1).

While returfing (e.g. conversion from cool-season to warm-season grasses) was ineligible for round two, projects that were allocated grants included:

- Construction of dams to store stormwater/waste water;

- Stormwater diversion;
- Installation of waste treatment systems;
- Installation of rain water tanks;
- Irrigation system upgrades to improve water use efficiency or to cater for treated effluent/waste water coming online;
- Construction of washdown bays and recycling systems to recycle wash water;
- Construction of wetlands to aid in nutrient stripping and to reuse water for irrigation;
- One golf course in Western Australia was given a grant towards installing synthetic greens.

The big winners in round two included Goondiwindi Golf and Country Club (\$227,273), Royal Hobart Golf Club (\$227,273), Mona Vale Golf Club (\$226,818), Long Reef Golf Club (\$226,455), Shortland Waters (\$222,727), Tasmania Golf Club (\$159,572), Barwon Valley Golf Club (\$94,092) and Bannockburn Golf Club (\$91,728).

Goondiwindi's grant was for the complete upgrade to an automatic irrigation system, while for the two Tasmanian courses the money will be spent on tapping into treated effluent drawn from the Coal River Water Recycling

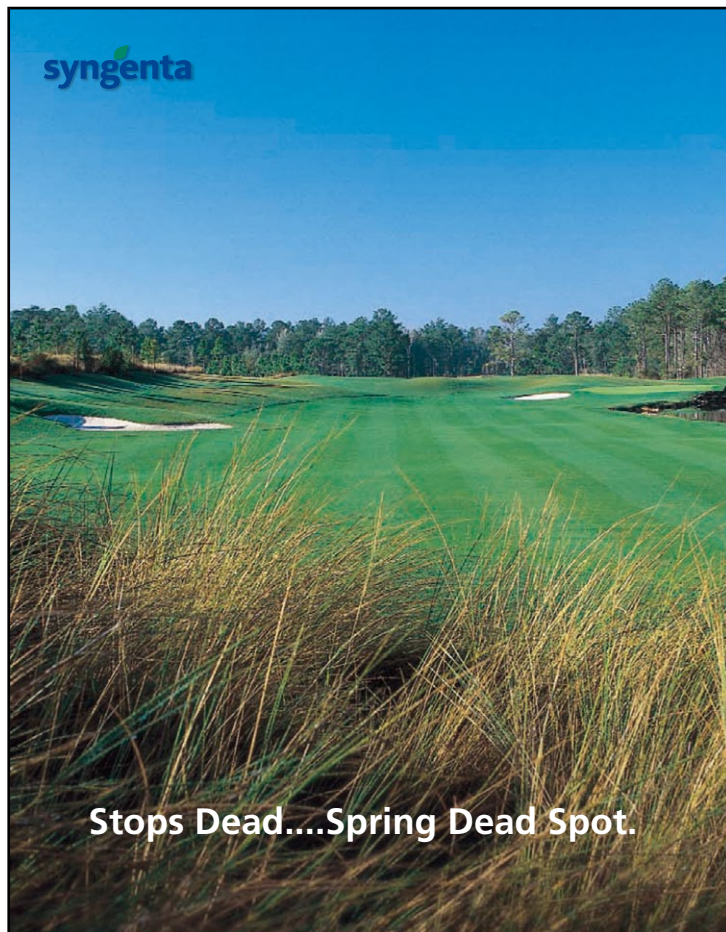
Scheme (see ATM Vol 9.2 for an in-depth look at this project).

Mona Vale Golf Club, home to NSWGCSA president Andy Hugill, was successful in winning a grant which will be used to construct a wetland cell to treat stormwater taken from a total catchment area of 142 hectares. The club plans to rehabilitate sediment ponds and install gross pollutant traps as well as upgrade the irrigation system.

Round three applications of the Community Water Grants scheme is expected to be open in mid-2007. Golf clubs can register for information updates through the scheme's website ([www.communitywatergrants.gov.au](http://www.communitywatergrants.gov.au)) as well as find out more information on guidelines and how to apply.

## BREAKING NEW GROUND

One of the most radical and groundbreaking projects to combat the drought is currently underway at Pennant Hills Golf Club in Sydney's north west. Home to superintendent Richard Kirkby, the club is set to embark on the final stages of a project which will see the installation of a sewage treatment plant on the ►



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course which takes directly from sewer pipes running underneath the course.

The sewer mining project is the first of its kind being undertaken by a golf club in Australia and has the potential to revolutionise the way in which golf clubs irrigate in the future. The project is the result of an exhaustive 10-year process the club has gone through examining various water source options and will spell an end to the club's reliance on potable water.

As of the second week of February, Pennant Hills started commercial negotiations with Zenon Membranes, the largest manufacturer of treatment plants in the world, to supply a treatment plant which will turn raw sewage into Class A water sufficient to irrigate the entire course, tee to green.

The Pennant Hills project is Zenon's first foray into the golf industry and will be carried out in conjunction with Water Technology Australia. Pennant Hills has gone for a plant that boasts 'membrane technology', which gives the best quality water outside drinking quality water. According to the club's general manager Stewart Fenton, construction is expected to start in March and all things going to plan the plant will be officially commissioned on 1 November, 2007.

The system works like this. From an offtake well which will be constructed near the 18th tee, sewage is gravity fed into the plant where it first undergoes a chemical process. Oxygen is pumped into the sewage and then removed quickly allowing the bioreactor bacteria to eat as much of the sludge as possible.

From there the 'water' goes into the membrane system where it is treated. Fenton likens the membrane system to a thousand strings of spaghetti with each 'string' containing 1200 pores that are .35 of a micron. At that size they are able to effectively filter out a host of harmful viruses and bacteria such as giardia and cryptosporidium.

After going through the membrane, at which point the water is pretty clear, it then goes through a UV process to kill off anything else that might be in there. According to Fenton the membrane will take out around 90 per cent of harmful bacteria with the UV process nailing the remaining 10 per cent. In order to get the water to drinking quality, it would go through exactly the same process, except after going through UV treatment it would then go through a second, smaller membrane system.

TABLE 1. FEDERAL GOVERNMENT COMMUNITY WATER GRANTS TO GOLF COURSES IN ROUNDS ONE AND TWO OF ALLOCATIONS

State	Round 1 (March 2006)		Round 2 (November 2006)	
	No. of Projects	Total Grants*	No. of Projects	Total Grants*
VIC	28	1,001,000	23	1,072,000
NSW/ACT	23	886,000	37	2,039,000
QLD	16	545,000	10	622,00
SA	15	528,000	9	366,000
WA	5	186,000	3	137,000
TAS	5	210,000	7	594,000
<b>TOTAL</b>	<b>92</b>	<b>3,356,000</b>	<b>89</b>	<b>4,830,000</b>

\* Approx figures taken from [www.communitywatergrants.gov.au](http://www.communitywatergrants.gov.au) website

"It's a three-step process to get to drinking water and we are using two of those three to get the best possible quality water possible," says Fenton. "As part of our research, Richard (Kirkby) and I went up to Brisbane for a site inspection at another of Zenon's treatment plants. Richard even drank some of the treated water. He hasn't grown three heads yet, so it must be alright."

Once the water has been treated it is pumped straight into the course's irrigation system with any water that is not used going straight back into the sewer.

Once up and running Pennant Hills will be able to pull out whatever it requires which at this stage is dictated by how much the sewage flow is down through the system. Fenton says the conservative estimate for dry weather flow is 675 kilolitres a day which works out about 21M a month, more than adequate for irrigation purposes right across the course.

The water which comes out after treatment is classified as 'Class A fit for intermittent human contact' and has a pH of between 7-7.5. The treatment plant itself is fully automated and will require around eight hours a week of onsite sampling (as required by legislation) and maintenance. Being fully automated, the plant has inbuilt triggers and should any problems arise both Fenton and Kirkby are alerted either by email or SMS.

One of the key components of the project has been the drawing up of a sewer mining agreement with Sydney Water, which Fenton says has taken the best part of 12 months to hammer out. "Seeing that we are the first club to undertake a project like this, there is the expectation in the years to come that other clubs won't have to go through the same pain and suffering because the work has already been done," says Fenton.

"The agreement with Sydney Water assures the club of a water supply for the next 30 years with a 30-year option. We have a guaranteed access to the sewer main flow and part of the agreement is that no-one is allowed to build or take any sewage out of the system upstream from us.

"The Independent Pricing Tribunal has also laid down an arrangement in Sydney where because the club is taking the sewage and treating it, meaning Sydney Water doesn't have to, we don't pay for the water."

The club has received \$1.1 million in funding for the project from the NSW Department of Energy, Utilities and Sustainability (DEUS) as well as \$45,000 from the Federal Government's Community Water Grants scheme. The club has budgeted \$3.5million for the project and the expectation is that it should come in under that total.

"This project has certainly sparked a lot of interest Australia-wide," says Fenton. "I have probably five or six phone calls a week from various golf clubs, community groups and councils. The other week I had AFL Queensland ring, so there has been widespread interest in every aspect of this project.

"It has been a fascinating project to be involved with and to get to the stage where we are at now is very satisfying. We have had a lot of government support – Sydney Water, DEUS – which has been fantastic and the members here have been right behind the project too as they recognise it will secure the long-term future of Penno.

"One of the unexpected benefits is that since we announced this project our waiting list has gone from next to nothing to now being almost a year because the expectation is now that the course is going to improve significantly when we have an endless water supply." 🌿





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BY BRETT ROBINSON

**Superintendent at Pennant Hills Golf Club from 1951 to his retirement in 1977, Vince Church's influence on the Australian golf course maintenance industry was profound**

# Vale Vince Church (1915-2006)



**On Christmas Day 2006, the Australian turf industry lost one of its pioneering forebears. Winston (Vince) Church passed away peacefully aged 91, taking with him one of the few remaining links to the old school days of greenkeeping in this country. ATM, with the help of those who knew and worked alongside Vince, pays tribute to a true legend of the turf management profession.**

**O**n Thursday, 22 March, 2007 around 100 current and former groundstaff of Pennant Hills Golf Club will converge on the famed Sydney course for a special reunion. In true turf industry tradition, the gathering will be one to remember as acquaintances are renewed, tales are spun and memories shared.

While the laughs will flow just as liberally as the frothies, the gathering will be tinged with a touch of sadness with the knowledge that one of the most influential of their number will be missing.

For 26 years from 1951 to his retirement in 1977, Winston 'Vince' Church ruled the roost as course superintendent at Pennant Hills. Quite simply he was the doyen of turf management in Australia for his generation and one of the pioneering souls who developed the profession into what it is today.

Sadly, at the age of 91, Church passed away on Christmas Day 2006, taking with him one of the few remaining links to the old school days of greenkeeping. From very humble beginnings (he was orphaned at the age of 13 and got by on money earned from caddying and hand-weeding Parramatta grass at Concord Golf Club) Church's turf management career ended up spanning nearly 50 glorious years.

Whether it was his uncanny ability to

produce some of the finest turf surfaces seen in Australia, or his unstinting quest to cultivate and promote the professional image of the superintendent profession, Church won the admiration of all within the golf industry and influenced countless of young turf managers, some of whom are today considered among the elite of their profession.

In the weeks following Vince's death, Australian Turfgrass Management magazine contacted a number of current and former turf industry practitioners who worked with or were influenced by the great man to get their thoughts on a genuine icon of the industry. What follows is a collection of their memories which encapsulate the legacy left by one of the industry's most endearing characters.

## **MARTYN BLACK** **CASTLE HILL COUNTRY CLUB**

"What a privilege it was to work at Pennant Hills Golf Club under Vince Church. I remember being interviewed for the position of first year apprentice by Vince standing on the concrete washdown pad outside the shed. The interview took all of five minutes and I got the nod because out of all the other young hopefuls I was the only one who was a member of a golf club. That was the start of my career and my friendship with Vince Church. It was 34 years ago, I was 15.

I was aware of the standing of Pennant Hills Golf Club prior to working there, regarded as it was as one of the top handful in Sydney. What I didn't know was how highly regarded my new boss, a 60-year-old returned WWII digger, was. I remember the regular visits by other supers from all around NSW who would come to drink from the fountain of knowledge that Vince was. I remember a young Doug Robinson spending a week with Vince to learn the ropes. He learnt well.

We only had eight on staff (four of us were apprentices) and it was often asked how we could keep the course in such good nick. Well, the boss would cut fairways on Christmas Day if needed; he would be changing quick coupling valves on the fairways at 10.30pm if he had to. This sort of dedication was infectious and we loved going like the clappers for the old bloke.

Although he was a hard taskmaster, Vince had a great sense of humour. He nicknamed me 'Fargo', as in Martyn, Barton and Fargo from the old Benny Hill sketch. Some of my early workmates still call me that today.

As the youngest of the apprentices, I was called upon to do stuff befitting the bloke at the bottom of the pecking order. One day a big mongrel dog got hit by a car and found its way onto the 2nd tee before it expired. Vince asked all of us in the lunchroom, "Hands up all those



that want to bury the dead dog? Hands down! Fargo, you do it!" Cheers Vince!

Or the time when the chairman of greens told Vince that several members were complaining about the plovers attacking them near the 16th fairway. Vince asked for volunteers to help him erect a protective guard around the nest. You guessed it, "Fargo, get an umbrella and come with me."

This was when Vince's army training came in! "Now listen here Fargo, when the plovers attack you fend 'em off with the bloody umbrella so I can get this guard and sign up, OK." Needless to say all hell broke loose but I managed to protect my mentor who eventually banged in the sign which read "Relief may be obtained from plovers' nest by dropping not nearer the eggs."

We young blokes spent a lot of our apprenticeships in bare feet or thongs (the good old days). Laurie Cochrane, an apprentice from New Zealand, and I used to play golf after work quite regularly, and believe it or not we were allowed to play in thongs, stubbies and a singlet, although Vince suggested we should stay out of view of the clubhouse. One day Vince caught up with us on the 8th tee and was quite amazed as he declared, "Have a f\*\*\*\*\*g look at 'em! They've got no shoes but they've got wood covers!"

Vince had a great ally in Jack Jones, the mechanic at Pennant Hills Golf Club. Also a WWII veteran, he and Vince were great mates. One day Jack arrived at work after being off 'sick' for a day sporting a brand new set of false teeth. He dead set looked like the entrance to Luna Park. Poor Jack appeared to be a bit embarrassed and all us young blokes didn't know where to look.

Anyway we are all sitting in the lunchroom waiting for Vince to arrive and all trying not to laugh. As soon as Vince turned up he took one look at Jack and shouted, "Have a go at the f\*\*\*\*\*g choppers on Jonesy!" Needless to say that brought the house down and we all laughed like drains, even Jack!

## AT A GLANCE

**Winston Richard (Vince) Church**

**Born:** 1 January, 1915

**Died:** 25 December, 2006 (aged 91)

## CAREER AND ACHIEVEMENTS:

**1930:** Began greenkeeping career at Concord Golf Club, rising to 2IC

**1936-1951:** Head greenkeeper Strathfield Golf Club

**1939:** Obtained an A-grade pass upon completion of a series of greenkeeping lectures (100 hours) held in conjunction with New South Wales Golf Council, New South Wales Department of Agriculture, New South Wales Greenkeepers Association.

**1940:** Married to Zelma (d.1993) at Auburn, NSW. Married for 52 years they had one son (Vince d.2005) and two daughters (Carol, d.2000, and Glenda).

**1940:** Elected committee member of NSW Greenkeepers Association (now NSWGCSA).

**1942-1945:** Australian Imperial Force (rose to the rank of Leading Airman with the Air Force. Posted at Charters Towers, QLD; Milne Bay, Papua; Torena, Solomon Islands).

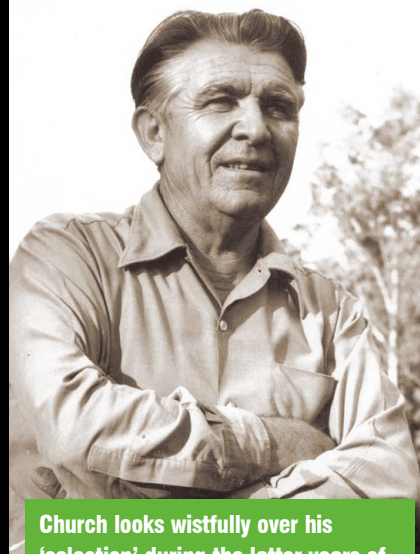
**1951-1977:** Superintendent Pennant Hills Golf Club.

**1966:** Golf Course Superintendents Association of Australia (now AGCSA) vice-president.

**1970-1973:** Scientific Advisory Council of Australian Turfgrass Research Institute.

**1973-1976:** AGCSA President.

**1998:** AGCSA Distinguished Service Award.



Church looks wistfully over his 'selection' during the latter years of his tenure at Pennant Hills

**2000:** Australian Sports Medal for contribution to the golfing industry.

## OTHER ACCOMPLISHMENTS:

- Visited San Francisco (with Cliff Meredith) in 1968 on a three-week study tour sponsored by Jacobsen. From that trip Pennant Hills Golf Club purchased one of the first Jacobsen triplex greens mowers after seeing it at the GCSAA Conference.
- While at Pennant Hills, established Sydney's first golf course Tifdwarf practice chipping green in the early 1970's.
- Involved in television commercials with Victa lawn mowers in 1972.
- Co-authored "Golf Green Construction" booklet with Peter McMaugh.
- Life member of the NSWGCSA and Pennant Hills Golf Club.

Long after he retired Vince was still very interested in the industry and would drop in from time to time to see how his former apprentices were getting on. I remember one day I took him for a tour around Castle Hill. It was about six months after Primo was available to us and I had used it right through the season

and my kikuyu fairways were in good nick.

We were going up the 3rd fairway and Vince says, "Fargo, stop the cart." He hops out and puts his hand on the turf and asks, "Is that f\*\*\*\*\*g ki? How do you get it like that?" Here, I thought, was a chance for me to air my meagre knowledge to the great man, so I ►



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started dribbling on about gibberellic acid and meristematic tissue. I gave him the full monty. When I had finished, Vince summed it all by simply saying, "Geez you bastards have got it easy!"

There are so many more stories to tell but I will finish by saying how lucky so many people in our fine industry were to have known Vince Church. It's people like him that make Australia great!"

## LOCH LEDFORD

"I first met Vince when, as a trainee greenkeeper at Royal Sydney, we went on an excursion to Pennant Hills Golf Club in 1974. I was not only impressed with what I saw in a golf course that was so immaculately groomed and well presented, but a curator (as we were called then) who was so passionate about his work.

Little did I know, but in early 1977 I would be stepping into the big man's shoes looking after Pennant Hills when he retired. I can say now that it was Vince who passed on to me many of the skills that have followed me throughout my career over the last 35 years.

I am certainly not the only one who benefited from my association with Vince. Many a superintendent still going today and many who have moved on have Vince to thank. He has left an indelible mark in turf management and many who did not know him have benefited from his legacy without even knowing it.

I am sure he will be looking down on all of us in the industry and feeling immensely proud of what he sees."

## GARY W. BEEHAG SYDNEY ENVIRONMENTAL AND SOIL LABORATORY

"I was fortunate to be Vince Church's assistant at Pennant Hills from 1973-1975. Vince was a true professional, highly regarded by his peers and club members, who always had an incredible eye for detail regarding course presentation and recordkeeping.

Vince was a leader, educator and motivator of the groundstaff and was always conscious of how staff behaved and presented themselves to club members. Vince was always willing to teach staff about greenkeeping issues and rarely a week would pass at Pennant Hills without another superintendent, company representative or overseas personality visiting to speak to Vince.



Church with Max Walker after being bestowed the AGCSA's Distinguished Service Award in 1998 at the Australian Turfgrass Conference in Brisbane

Vince was blessed in having Jack Jones as mechanic at an early time when golf course mechanics in Sydney were uncommon. Jack modified an engineering lathe to grind the mower cylinders and constructed a very early backlapping machine for the greens mowers.

Vince also had Jack build a customised spray cart following his visit to the USA in the late 1960s for the specific purpose of spraying greens. The spray unit utilised the frame and engine of a Morris Minor car body which worked very effectively. Vince also adopted the spray cart to foliar fertilise greens based on a solution of urea, potassium sulphate and iron sulphate and constant use of Endothal herbicide to control winter grass.

Eucalyptus trees were a constant annoyance to Vince who saw them nothing more than big weeds because of their ceaseless dropping of leaves onto the golf course. Vince was absolutely ecstatic one morning when a helicopter, which had just picked up a club member from an open location on the course, exited by flying straight down the centre of the 10th fairway and over the clubhouse. Vince made the announcement to the groundstaff: "Did you guys see that helicopter? We'll have to get one! What a great job it did blowing those bloody leaves off the fairways!"

## PETER MCMAUGH TURFGRASS SCIENTIFIC SERVICES

When I first entered into the world of turf in 1964, Vince Church was a well-established and well-respected golf course curator at Pennant Hills Golf Club. Vince, always intellectually curious and keen to stretch his professional skill base, organised a trip to the USA to attend the GCSAA meeting and tradeshow.

He came back fired with a new enthusiasm for the industry and the term 'superintendent' replaced curator/greenkeeper in the lingua franca of the industry.

In the early 1970's we had moved the Australian Turf Research Institute (ATRI) from the Ryde School of Horticulture and established our own laboratories at Concord West. At this time ATRI extended the operation of its scientific advisory committee to include practitioner members and Vince became the superintendents' representative.

Because of the ad hoc construction of many of the golf greens in even the best of clubs, Vince was an enthusiastic supporter of research into golf green construction based around the USGA construction methods. I had a draft of a booklet on Golf Green Design and Construction in place when Vince came on board and the directors felt Vince would be a very successful and helpful additional author. After working together for several months this booklet was published with Vince and I as co-authors.

It was also the period when the first ride-on triplex mowers for greens were introduced into Australia. Vince was not a big fan. He was a perfectionist in relation to turf surfaces and his presentation was second to none. He quite rightly perceived that by taking the rolling factor out of greens mowers you were changing the traditional role of the mower in green's preparation.

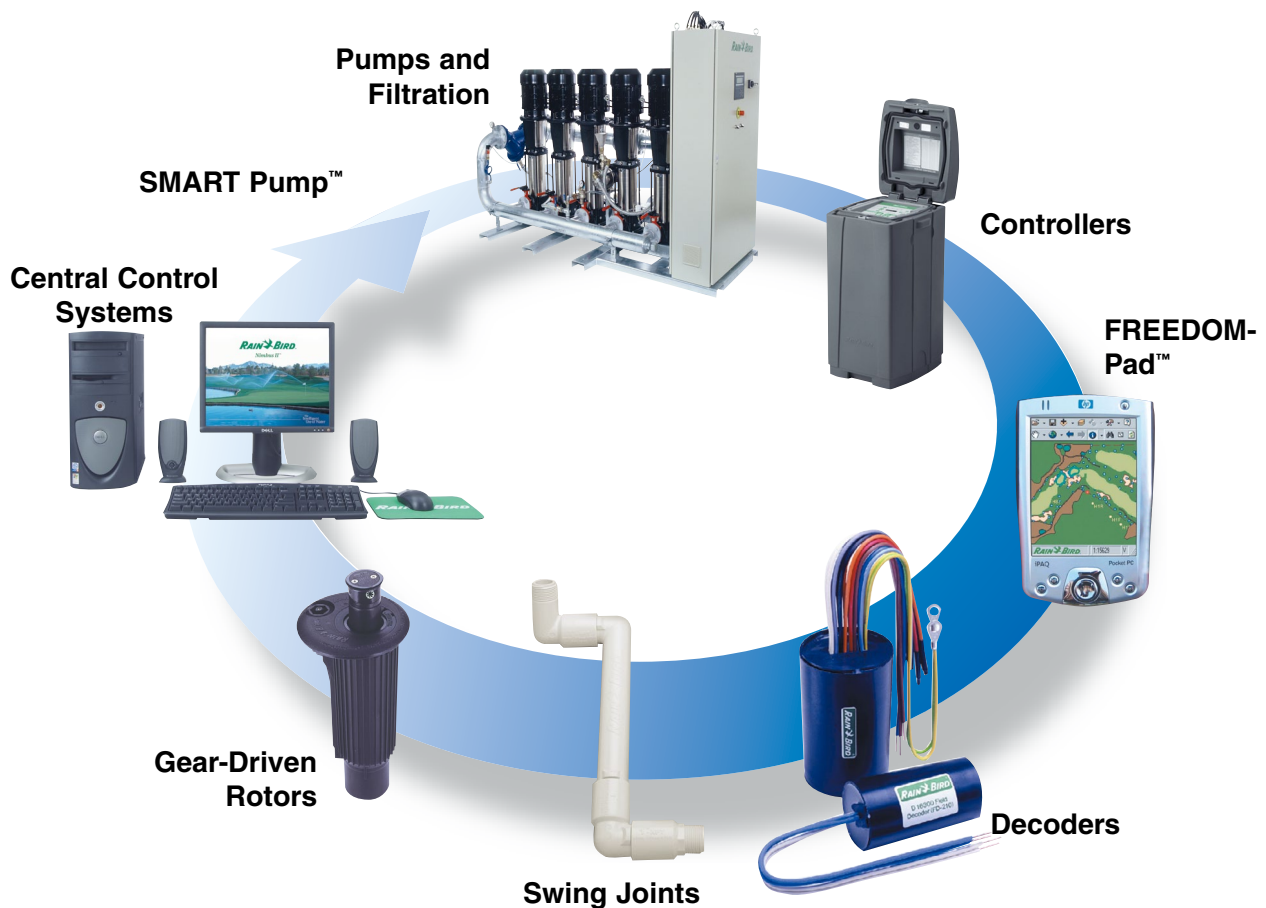
Part of Vince's secrets to success was the very close association with his friend and colleague Jack Jones, his machinery magician. Both meticulous to a fault, they formed a partnership that was the envy of every other club in Sydney. Vince was also





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## JOHN ODELL – ROYAL SYDNEY GOLF CLUB

I met Vince as a 10-year-old in 1967 when I started caddying at Pennant Hills Golf Club. My first memories were of a good-looking, sun-tanned, leathery-skinned chap with character lines all over his face. He had a gravelly voice, a welcoming smile and intense eyes that looked directly at you. I knew from the golf pro Ian Alexander and all the members I caddied for that Vince was held in very high esteem. He was considered a guru in his field and was not to be challenged on any matter of a greenkeeping or horticultural nature.

I got a casual job as a groundsman in June 1975 during my university mid-semester break. Gary Beehag was 2IC at the time and I found that working with Gary and Vince was so interesting and eye-opening. They would talk about the science of the turf, the type of trees and their growth habits, varying bugs and diseases – all of which I found fascinating. After two weeks casual work, Vince offered me two full days a week so I changed my university hours to suit and finished the year at Penno. Vince then offered me a greenkeeping apprenticeship, I tossed in my applied science degree and the rest is history.

Vince was a man of extremely high standards. If the job was worth doing, it had to be done to the very best of your ability. He had you feel like you had your signature as well as his on everything you did, so when you looked back on what you had done it had to be 'top notch'.

He had a pleasant, warm personality, always willing to listen and also give advice, especially on our young girlfriends. He was always happy to give his time to other superintendents, many of whom had constant struggles with those committee persons uneducated in greenkeeping science and yet all experts. Vince would often take one of us on a field trip to another course where he would listen attentively to his fellow superintendent's woes, critically evaluate the situation, then dispense his advice just like a good family GP.

A lot of the people who Vince visited just weren't on his same level of expertise and some obviously not up to the task, yet Vince would not speak despairingly of them

and, at all times, gave them confidence and above all a sounding post. He gave of his time most freely all for the good of his fellow greenkeepers and the industry. I always felt that this was the sort of camaraderie the ANZAC's developed in the trenches and one that, to this day, is a central core to our great industry – all of us with a special bond and willingness to help another digger who was in trouble.

Although he was our 'boss', Vince was also one of the boys. Smoko only went for 10 minutes so you had to get in, wash up and get some food and a cup of black tea into you very quickly. It was like a refuelling stop at Bathurst! Vince would use these times to tell jokes or funny anecdotes. Because we were busy eating, he didn't get much talk out of us and a couple of times we almost choked on our sandwiches from laughter. Before you had what seemed only two mouthfuls he would say, "Come on, let's strike a blow".

Penno was a very happy shed. You loved going to work and working with your mates like Blackie (Martyn Black), Bob (Batho) and Kiwi (Laurie Cochrane). Vince instilled competitiveness in us through 'sectional maintenance' where we all had 3-4 greens and tees each and their surrounding areas. This friendly rivalry also kept the Penno standards high.

One of Vince's greatest legacies was his employment of Jack Jones as a full-time mechanic, a first in our industry, certainly in Australia. Vince realised the value of sound equipment in good working order even before the industry became so mechanised. Jack's workshop and equipment was always spotless and woe betide anyone who did not look after it. Vince would back up anything Jack said so it paid to be on the good side of both.

Vince was a man you were always learning from. If you were lucky enough to change holes with him in the morning, he was a fountain of knowledge talking about the turf, trees, drainage, irrigation or the history of the club. He would spot a problem and ask you how you would solve it, which really developed your diagnostic skills.

Vince was a man for all seasons – at times joking, swearing like a trooper and other

times the consummate gentleman, especially with the members and the associates (lady members). He had his own professional phone or business voice which he used to great effect and when he used it he commanded attention.

Having said all these good things about Vince, he was hopeless on machinery. He and Jack would demonstrate how to use a piece of equipment then, when Vince had gone, Jack would tell you how he wanted it done. In summer, when the kikuyu was growing while you watched it, Vince would jump on a rough mower during our lunch break and every time he hit a stick Jack would wince as though he was in the dentist's chair.

We had a very happy and exciting life at Pennant Hills and it was the end of a truly great era when in 1977 Vince parked up the mower for the final time. He was a man ahead of his time, a trailblazer and innovator who took us from the greenkeeping era to the superintendent era. He was a lover of nature and his 'selection' which he knew like the back of his hand. He lived and breathed greenkeeping and made a good life for himself and his family after his own early life was filled with tragedy.

There are many of us who are better for having known Vince and many whose lives he has influenced. From humble beginnings he became a giant in our industry, a good husband and father and a mentor to many. Every time I look at the photo I have of Vince in my office I am reminded of passion, diligence and strength of character. Vince more than left his mark and long may his memory remain."



Vince with his former apprentices Martyn Black (left) and John Odell



◀ a keen enthusiast for the Palmer Multicore machine which, with Jack Jones and John Banks, was seen as an important tool for dealing with dry patch.

Vince was an essential link in the educational progress of the TAFE courses in NSW. He not only made himself available for syllabus planning, he also gladly took on occasional lectures and the students were always made welcome for study visits to Pennant Hills. Perhaps the greatest of his successes in the area of education was the enthusiasm, skill and loyalty he was able to engender in those who trained under him professionally. There are too many to name individually, but some of our national past presidents feature on his success list.

In losing Vince the era of the old time professional green's keeping comes one step closer to its end. A true turf man to the end."

## JOHN BANKS MULTICORE AERATORS

"Vince Church led a marvellous life. He truly became a legend in his time in the golf course industry. A pioneer of the AGCSA whose innovative turf management methods and techniques in spraying, aerating, fairway grooming and landscaping were but some of the benchmarks he set, Vince won the respect and admiration of all he came in contact with.

He had a great relationship with his staff and they all wanted to achieve the utmost for him. Given these attributes it was not surprising that he developed Pennant Hills into one of the finest courses around and this led to attracting a membership that included some of the best golfers in the state. In fact, for some time the Pennant Hills club team formed the backbone of the national amateur side, something Vince was justifiably proud of. He put none of this before his family, however, and together with wife Zel and three children Vince, Carol and Glenda enjoyed great times as a family.

Vince Church was a champion and my family and I were so fortunate to have him as a friend and colleague. Great knowing you Vince."

## DOUG ROBINSON PACIFIC GOLF OPERATIONS

As a young trainee greenkeeper at Coffs Harbour Golf Club during the mid 1960's, the name Vince Church was synonymous with excellence in golf greenkeeping and one could ▶



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## BRUCE CARRUTHERS – HYDRO TECHNICS IRRIGATION

**“V**ince Church was an icon of the Australian golf course industry. The word icon is used a lot these days, but if you take a look at the actual meaning of the word, Vince Church truly embodies its essence.

**Symbol:** I believe Vince to have always been a symbol of proficiency and flair in all areas relative to our industry. No task was ever undertaken unless there had been careful consideration of final results, whether it was an everyday maintenance procedure, a major works programme, purchase of equipment or employment of personnel. Although of the later he would probably suggest a few of us had slipped through his scrutiny!

**Image:** Vince was a pioneer in altering the perceptions, long held by golf course owners and the general public, as to the status and roles of personnel employed in the golf course maintenance industry. He was paramount in the title change of greenkeeper, curator and various other abhorrent nomenclatures to the present creditable title of golf course superintendent.

Representing not only the local associations with his natural abilities, intellect, extraordinary wit and humour, he was also instrumental in initial relationships formed with superintendent associations in America and England. This appears to be not such a difficult task today with the wonders of modern communications, but in late 1960s this was a laborious and time-consuming job.

**Representation:** Vince eulogised the abilities and consummate skills of golf course

superintendents to the local golf course industry and spoke with passion about the expertise of Australian superintendents to people from all sectors of business and industry.

He believed that one of the principal criteria for superintendents to achieve success within the golf course industry was to proudly and correctly represent themselves to employers, peers within the industry, subordinate golf course staff or to any person seeking knowledge or understanding of our industry or the great game itself.

Personal representation he insisted meant being polite at all times to all people, which really could be a test of your character at different times. He insisted punctuality, something he and I never saw eye to eye on, was of paramount importance in representation of yourself or your industry, as he believed that people's time was valuable and it was a sign of bad manners or poor organisational ability to be late for an appointment.

**Simile:** When I compared the training I was receiving working with Vince to that being received by others my age, I realised very early that I had been one of the fortunate few to train with and work alongside one of the great superintendents of that era.

Now I am a few years older and wiser – well certainly older – I realised that not only was Vince Church a great superintendent, ambassador, instructor and diplomat of that era, he was also a man able to converse with and give invaluable advice to any superintendent of the modern era humble enough to approach him.

**Picture:** Vince Church had strategies that were far in advance of other superintendents. He had a vision of the golf course maintenance industry in Australia being highly respected and regarded throughout the world and realised that to achieve this new ideas and methodologies needed to be adapted.

I had worked with Vince on no fewer than three occasions and believe that I was privileged to be able to have done so. There were many times during our association I believed, like most junior staff, that he was out of touch and was in need of psychiatric analysis. As I grew older I realised that there was more than personal expertise required to consistently present a golf course in immaculate condition day after day, week after week, year after year.

After suffering a severe stroke in the latter part of his life, Vince became physically restricted and could no longer participate in many of the activities that had given him pleasure during his life. He was still mobile and mentally as sharp as a tack but the most frustrating result of the stroke from his perspective was his inability to converse fluently. To a man who was never lost for something to say at any time or on any occasion, this caused him much anxiety. But let me say this, despite his inability to deliver a long and pompous speech, he could still eloquently rattle off a string of expletives that would make a 'wharfie' blush.

I, like many, am indebted to Vince for my introduction and current career in the industry in this country and I feel very proud, indeed, very grateful to have worked with and be called a friend by a true icon.

◀ only dream of ever meeting this 'legend'.

However, in 1972 I was appointed to the position of head greenkeeper (superintendent) at Southport Golf Club. My predecessor was one David Jones, son of the incredible Jack Jones, mechanic at Pennant Hills Golf Club. Because of this connection I was sponsored on a week-long visit to Pennant Hills Golf Club to spend time with Vince Church and observe and learn from his management practices.

It was a nervous young man who set foot in the great man's office on that first day but from the outset I was made welcome and I

was humbled to be treated as an equal by this warm, gentle and friendly man.

As the week progressed I came to appreciate Vince's skills as a superintendent. For that era his technical knowledge was beyond reproach; he had a positive, relaxed but no-nonsense rapport with his staff and his emphasis on course grooming and presentation was something that impressed me greatly. His sense of humour and cheeky grin were infectious.

Some years later I had the opportunity to work with Vince on the NSWGCSA committee,

another enlightening experience. His vision for our industry was steadfast and centred on education, professional development, turfgrass research and development and uniting superintendents across the country.

One of nature's gentlemen, a man before his time, vale Vince Church.

**For more information on the Pennant Hills Golf Club groundstaff reunion on 22 March, 2007, contact Scott Riley (0425 299 800) or Pennant Hills assistant superintendent Paul Gumbleton (0421 063 307). 🌱**



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BY BRETT ROBINSON

## AT A GLANCE - BELLERIVE OVAL

**Where:** Hobart, Tasmania

**Dimensions:** 175m (length) 135.5m (width)

**Wicket Table:** 10 (8 full-size, 2 smaller tracks on outer)

**Turf Variety:** Main wicket table (ryegrass), three practice facilities (common and hybrid couch)

**Ground Capacity:** 16,200 (cricket)

**Home To:** Tasmanian Tigers, Tassie Devils (VFL), Clarence Roos (SFL), Clarence District Cricket Club

**Curator:** Cameron Hodgkins

**Groundstaff:** Tim Gough (assistant), Dean Warne (groundsman), Shayne Moles (apprentice)

**First Test:** Australia v Sri Lanka (December 1989)

**First One Day International:** New Zealand v Sri Lanka (January 1988)

**Did you know...** The site Bellerive resides on used to be an orchard.

### MAGIC MOMENTS

- In the seven Test matches played at Bellerive Oval, Australia is yet to lose. Australia's record includes five wins and two draws (both of those coming against New Zealand).
- Michael Slater holds the record for highest Test score at Bellerive (168 v New Zealand), while home-town hero Ricky Ponting can lay claim to the second highest (157no) also against New Zealand in the 2001/02 season.
- Mark Taylor can lay claim to scoring the most Test runs at Bellerive – 405 across four Tests for an average of 67.5. Recently retired spin king Shane Warne has the most wickets – 28 in six Tests at an average of 22.17.
- Australia has won eight of its 12 one-day internationals at Bellerive,
- Bellerive has witnessed its fair share of dramatic one day matches. In December 1992 Australia and Pakistan tied the fourth match of the B&H World Series, while two other matches have been decided by one run.



# Hodgkins at home

In Volume 9.1, Australian Turfgrass Management magazine took an in-depth look at some of Tasmania's major golf courses and the issues confronting their superintendents. While in Tasmania, editor Brett Robinson also caught up with Bellerive Oval curator Cameron Hodgkins who was gearing up to host two matches in the 2006/07 Tri Series between Australia, England and New Zealand.

There are many ways of getting a start in the turf management profession. For some it's a matter of embarking on an apprenticeship, while for others it's something in the blood, a passion that is handed down from a father or grandfather.

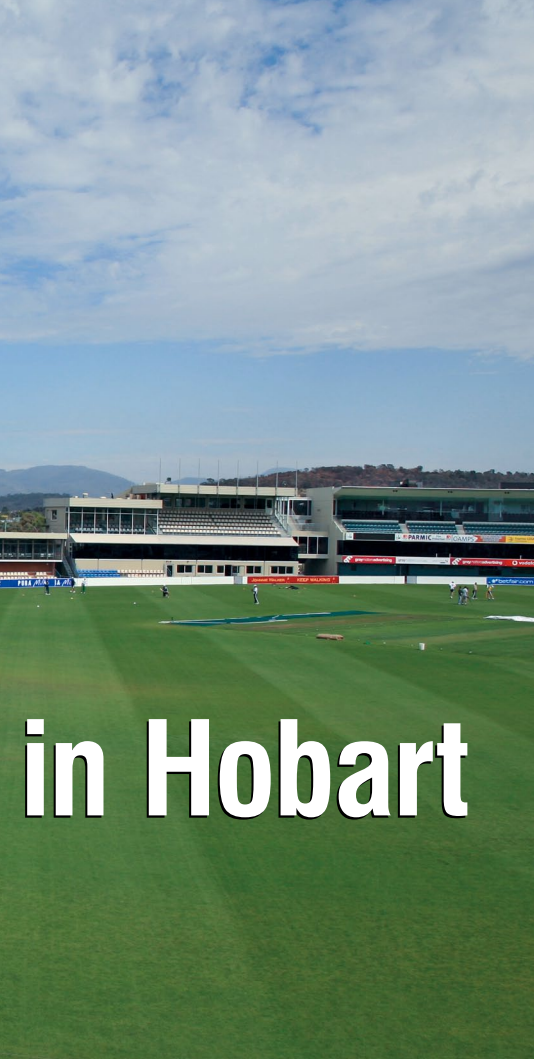
Then there's the Cameron Hodgkins way – win a cricket scholarship to play a season for the Marylebone Cricket Club (MCC) at the home of cricket Lords on the sole proviso that you work on the groundstaff.

Admittedly, it's not your average introduction to the world of turf management working at one of the game's most hallowed

venues, and not surprisingly for Hodgkins, who is now head curator at Hobart's Bellerive Oval, it proved to be the spark that set him on the path to becoming one of Australia's leading curators.

"I ended up being a better groundsman than a cricketer," reflects Hodgkins, who won the scholarship through the Canberra-based Weston Creek Cricket Club. "I had no desire to be a groundsman or any inkling that it would end up being my chosen career path. It was just something that was part of the scholarship and I thought well if that's how I'm going to get to Lords then I would do it."





**Instated as a Test venue in 1989, Hobart's Bellerive Oval is the only international cricket venue in Australia to boast a full ryegrass wicket table**

A handy fast bowler at the time, Hodgkins spent a year playing for an MCC Invitational XI, turning out for matches against public school teams one day and cricketing royalty the next. Hodgkins recalls one match when Pakistan legend Imran Khan flew in by helicopter to play!

When he wasn't hurling the cherry, Hodgkins worked under long-serving head curator Michael Hunt preparing the hallowed turf of Lords. His responsibilities included those befitting the status of any novice groundsman – mowing surrounds, divot repairing – but if he was lucky he got a bit of time on the roller or the ride-own wicket mower. To his credit Hodgkins didn't dodge a thing and after his first season was complete he was approached and asked to stay on for a second and then a third.

It was during that third season that

Hodgkins' luck came in again. At the time the then assistant secretary of the Melbourne Cricket Club arrived at Lords on a six month sabbatical and after seeing Hodgkins play asked him to consider heading to Melbourne to play. Hodgkins, who was contemplating a return back home anyway, agreed provided that he was guaranteed a job on the MCC groundstaff.

"I never played a single game," recalls Hodgkins with a laugh. "I attended a couple of training sessions but never bowled a ball."

And so began the next stage of Hodgkins' career in turf management. Starting a formal apprenticeship under MCC head curator Tony Ware, Hodgkins would go on to spend 11 years at Melbourne's premier cricket venue, the last five years of which he was Ware's assistant.

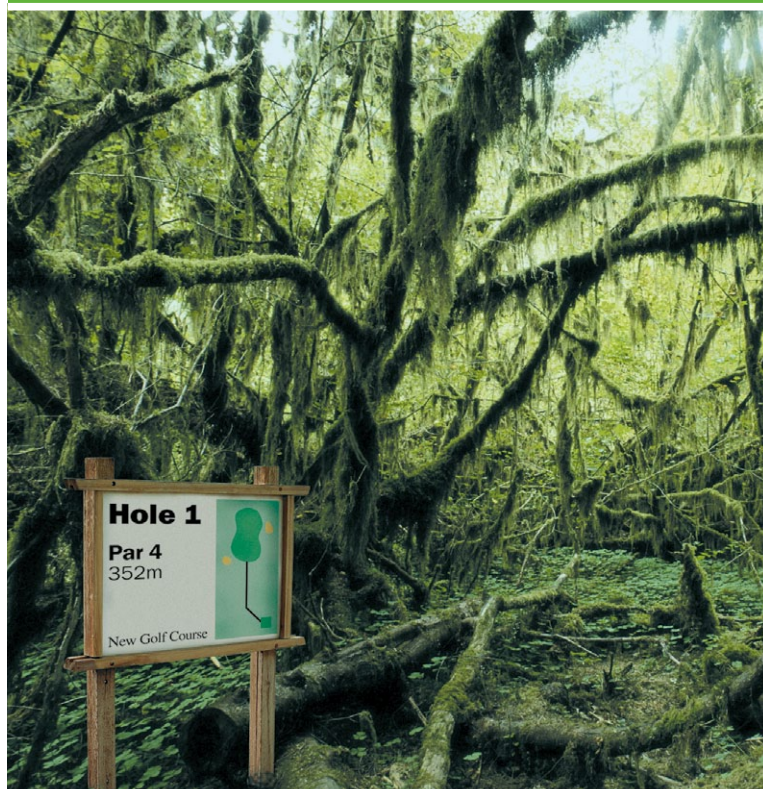
Midway through 2003, while Hodgkins was doing some work for Ware at Marrara Oval in Darwin, the head curator job at Bellerive Oval became available after the departure of Peter Apps to the Gold Coast.

Just a few weeks later Hodgkins, together with wife Nici and young daughters Bianca and

# in Hobart



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Bellerive Oval head curator Cameron Hodgkins (right) and assistant Tim Gough

◀ Kirsty, were en route to a new life in Hobart. Nearly four years later and the Hodgkins clan (which has since expanded to five with the addition of “official Tasmanian” Amy) live directly opposite Bellerive and all Hodgkins has to do in the morning is put his new 4WD into reverse and he’s at work.

## SEASONED CURATOR

With one of the warmest and driest years on record just past, Hodgkins has now notched up his fourth season at Bellerive Oval, one of Australia’s youngest international cricket venues.

During that time Hodgkins has learnt to appreciate the vagaries of Hobart’s unique climate, the pluses and minuses of managing a complete *Poa annua* oval, as well as managing

the only international venue in Australia to boast a ryegrass wicket table.

“I’m certainly a lot more aware of the climate changes and the turf species which enjoy the conditions down here,” says Hodgkins. “The biggest change for me has been getting a grip on preparing the cricket pitches and making sure they’re not one-sided which has been a fault of mine in the past. It has taken until now and may take forever to finetune but I think I’m closer than what I was previously.

“Having a complete *Poa annua* outfield obviously has its own issues. I guess if any *Poa* outfield was going to be easier to manage it would be in the climate down here where it’s less susceptible to stress, but it still has the same drawbacks just as any *Poa* surface.”

Bellerive is one of the more unique first

class grounds in Australia in that not only is it an international cricket venue, it is also a community facility which is home to local cricket and football clubs.

The Tasmanian Tigers and Clarence District Cricket Club train and play out of Bellerive during the summer, while in the winter months the oval is the domain of state-based VFL team the Tassie Devils and local football team Clarence Roos which plays in the Southern Football League. Such heavy use can create a few headaches for Hodgkins and his staff of three, particularly if Hobart experiences a wet winter.

The wicket table boasts 10 wickets – eight full size and two smaller tracks on either side. The wickets comprise a heavy black soil with a clay content around the mid to low 40 per cent mark, one of the lowest levels in the country. Hodgkins says the main reason for that is the lack of accessible clay sources.

While the main wicket table is all cool-season ryegrass, Bellerive’s three practice facilities are, interestingly, a mixture of common and hybrid couchgrass varieties which Hodgkins tries to promote as vigorously as possible, particularly as they get a heavy workout during the cricket season.

Shortly after arriving at Bellerive, Hodgkins trialled couch on the main wicket table, sodding two wickets and leaving them as pure couch. However, both failed to come through winter, a combination of heavy traffic wear and cold ground temperatures (which don’t get above 15 degrees until December) taking their toll.

“Tasmania (Tigers) do feel they have an advantage because of the different grass variety,” says Hodgkins of the ryegrass wicket table. “The fleshy nature of it has brought teams unstuck here in the past. It does offer some sideways movement and you can’t really drive on the up with everything. Normally it takes the batsmen until the second innings to figure that out.”

While dealing with the requirements of different turf surfaces has proved a challenge, the most testing adjustment has been getting used to the unpredictable Hobart climate. Hodgkins recalls his first days upon arriving at Bellerive were quite an eye-opener to how fickle the weather can be in the state capital.

“It was very hectic as nothing had been renovated and we were just a few weeks away from a game,” recalls Hodgkins. “The first week I was here we had to park both tractors



and the mover on the cover to keep it on. I was trying to keep the centre dry so I could renovate it, but it was that windy and wet.

"We ended up taking wheelie bins full of water out to keep the covers in place. I thought, 'What the hell have I got myself in for here!' Needless to say things improved from there but I guess they couldn't have got any worse.

"Down here you need to start wickets a lot earlier mainly due to the unknown weather element. It can rain for days on end and it's just that 'what if' factor if the wicket does stay undercover for a long period, which can be a problem as ryegrass can retain a lot more moisture than couch."



Hodgkins has just notched up his fourth season as curator at Bellerive Oval

## A SIXTH ASHES TEST?

Despite missing out on the recent Ashes series, Bellerive hosted two one day internationals as part of the recent Tri Series between Australia, England and New Zealand in mid-January. In the second match of the series on 14 January, Australia routed New Zealand by 105 runs, while two days later on the same pitch the English secured their first win of the tour,

beating New Zealand by three wickets.

"Overall we were very happy with the two games considering we were using the same pitch for both," says Hodgkins. "The first match the pitch was probably a lot more even in regards to pace and carry, while the second was probably a bit slower.

"But I was very happy with the way we

brought the pitch back up for the second game. We gave it a healthy water after the first match and made up a clay paste which we used to repair any areas in the danger zone around the popping crease. Obviously it's not ideal having the same two matches on the same pitch a day apart but overall we were very happy with what we achieved."



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In Hodgkins' time at Bellerive the venue has hosted just the one Test against the West Indies in 2005 which the home side won after bowling the tourists out on the final day. In total Bellerive has hosted just seven Tests since it was instated as a Test venue in 1989 and Australia is yet to lose there (five wins and two draws).

Bellerive will more than likely receive a Test later this year with Sri Lanka (two Tests) and India (four Tests) touring from November. The ground will also come into the equation for the Tri Series between Australia, Sri Lanka and India, while the New Zealanders are also scheduled to contest three one-dayers in December.

Following the recent Ashes whitewash a number of stories circulated in the media about Cricket Australia's desire for the next Ashes Series, to be held in Australia in 2010/11 to be increased to six Tests. In a report on [www.cricinfo.com.au](http://www.cricinfo.com.au), spokesman Peter Young said that in light of the recent series, which broke a host of attendance records, Cricket Australia wanted to investigate the possibility of playing a sixth Ashes Test. That would enable a match to be scheduled in Hobart, currently the only major ground in the country that does not host an England Test.

"Cricket Australia is keen, in principle, to have six Tests the next time we have an Ashes series," Young was quoted as saying on the website. "If we do have six it gives us the ability to schedule a Test in Hobart. We want to be able to take Test cricket to as many people in Australia as possible. The English Cricket Board is aware of our ambition, but discussions are a long way off being finalised."

While much-maligned England coach



While the main wicket table is ryegrass, Bellerive's practice wickets are a mix of common and hybrid couch

Duncan Fletcher has poured cold water on any such suggestion, naturally Hodgkins would welcome the addition of a sixth Ashes Test: "It would be great for Tasmanian cricket if that was to happen, but I think there is a long way to go before that happens."

## DOWN THE TRACK

While the prospect of an Ashes Test may be many years away, one of the big projects potentially in the pipeline in the next three to five years is the resurfacing of the oval. Although already a sand-based ground, Hodgkins says there is a 70mm organic layer which affects drainage, particularly in winter.

"We are looking at avenues of moving forward, whether we strip it off in one go or

whether we do it at all," says Hodgkins. "I would like to increase the amount of ryegrass in the outfield. We have done a few trials, spraying out a few areas around the ground and planting with ryegrass which have been pretty successful. But whether we've got the guts to do the whole ground is another question.

"Even though Hobart is looked upon as a wet place, we are actually the second driest state capital in Australia. We get a lot of drizzle, not deluges so we keep the profile pretty open. We aerate in some form every three or four weeks, whether it's slicing, verti-draining or some form of organic extraction.

"We also groom constantly. We don't have catchers on our mowers so twice a month we use a machine that vacuums and grooms to give the ground a tickle and to make sure we're removing all that's necessary which seems to be effective. We may also look at dusting more frequently, particularly if we don't go ahead with resurfacing.

"The thing is that Bellerive is a good summer venue and that is what we are really looked at as having rather than one that is tailor-made for football. I think if they were to play a higher level of football here then we would have to look at a grass which anchors a lot better than *Poa* does, so that would force our hand a bit.

"There's plenty of talk about AFL coming to Hobart but that talk is coming from people who have no control over the game. It's on the wish-list of people in Hobart and they would love to see some AFL presence, but I don't see that happening in the immediate future. They could throw us a bone every now and then, though. That would be nice." 🙌

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## THE PULSE

A quick look at the job listings on the AGCSA website reveals there are many golf clubs on the hunt for skilled and qualified staff. Is this a sign of a growing job market or more the case of people leaving the industry in the search for better wages and conditions? In this instalment of The Pulse we ask superintendents whether they think it's becoming increasingly difficult to retain qualified greenkeeping staff and whether wage structures across the turf management profession are to blame.

### BRAD SOFIELD Gosnells Golf Club, WA



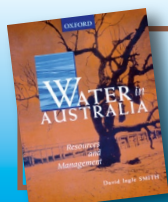
In Western Australia local government and contract turf maintenance operations, along with other non horticulture industries, are offering far improved remuneration packages and quite rightly luring our high quality staff away from what used to be a lucrative and progressive golf market. There is no blame to be cast on any of these employers for doing what is necessary to ensure the long-term viability of their business. They are the smart lateral thinkers.

This problem is the most significant issue faced by superintendents today. The training and retention of quality skilled staff underpins every other facet of golf course management and can have a long lasting, measurable impact on your club's success. Club boards of management and owners must take guidance from their superintendents who are armed with current facts and figures and strive to present their staff with appropriate

remuneration packages respective of their skill level, commitment to provide high level maintenance seven days a week, assumed responsibility and workplace expectations.

While clubs are racing to develop new income streams through marketing or, more fashionably, reducing current expenditure, they must not ignore or disregard the importance of having happy, productive, skilled staff who work tirelessly to provide them with the high quality product in the first place. Some clubs have already addressed the issue and implemented strategies to ensure they secure their labour force for the future. Hopefully through continuing education of boards and continuing support from general managers due recognition and consideration of this problem will be paid by the rest. It is an individual club's decision to make.

People need to forget about what the basic lowest wage applicable is and pay reasonable fair wages or risk the continuation of being a revolving-door workplace. Stop undervaluing the mechanism that provides the high quality product.



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Golf is predominately a lifestyle recreational sport played by many who can afford midweek days off, expensive golfing trips away and lavish golfing equipment, so we need to ask the question, is it good enough for our staff to not be able to afford to fuel their cars, service a mortgage to buy a house or start a family? The gap between the 'haves' and 'have nots' continues to explode.

## BRETT BALLOCH Anglesea Golf Club, VIC



In today's economic climate it is becoming increasingly difficult to attract good quality staff even before we try to retain them. It seems to be becoming clear that the further you are situated from a major or minor city the smaller the staff choices become. The cost of fuel, cost of living, and maybe even having to rent all add up to take a sizeable amount out of what is not the greatest weekly pay. This is one of the major reasons that I have always given an apprenticeship to a local person. If you look hard enough you will find good young people on your doorstep.

Historically our trade has always been one of the poorer paid. When someone can earn \$5, \$10 or more an hour in another trade, then obviously we are going to be behind the eight ball in attracting quality staff. The wage structure does need to be increased, but if we go too hard are we risking the possibility of lessening the amount of staff that we can employ? The golfing boom has really flattened out in the last few years, so I am not sure what the right answer may be.

In attracting good staff, pump up your course. Offer the outdoors lifestyle, good clean facilities, uniforms, good equipment, and let them know that there is the possibility of being able to rise through the ranks of the industry both on your course and elsewhere. If possible

offer them above-award rates and maybe even membership of the club as a benefit.

Not everyone that you employ will have the same enthusiasm and passion for the trade that we as superintendents do. When we do get those staff members with the above qualities it does reinforce the belief that all is well in the trade. Of course even then you know you will only have them for so long. All we can do as superintendents is to train them up to the best of our abilities, knowing full well that they will move on for more money, to a better course or to a senior position, and when they go make sure they go having enjoyed their time at your club.

## STUART MOORE Southport Golf Club, QLD



I was speaking recently to some colleagues regarding this very issue. All, including myself, were of the opinion that while our industry has and continues to improve through environmental awareness, overall standard levels and community awareness, we are seeing a high number of skilled and qualified staff moving away from the industry to gain employment in other vocations where the equivalent time and effort put in is remunerated at a higher rate, not just in monetary terms but also in genuine appreciation and 'understanding' from employers.

Simply browse the job listings on the AGCSA website to see the number of clubs and organisations seeking qualified greenkeepers, apprentices, mechanics, irrigation technicians, groundsmen and apprentices. Take apprentices for example. There are many good and motivated ones within our industry with a passion for the job, however I believe the numbers are not what they once were mainly because of the direct competition with income rates in other trades (electrical and building for

instance). We have to be able to attract school leavers who may not have thought of a career in greenkeeping and then keep them.

As a superintendent, keeping quality staff members is one that is purely resource related. Remuneration above awards and other incentives is completely up to the organisation in which you are employed, whether committee run or otherwise. However, with that said, keeping committees and managers informed with good, positive communication, especially on staff matters, is of vital importance in allowing members, board members, owners and companies to understand and appreciate the most important asset they have – the staff!

Are wage structures equitable? Well, they are what they are and have been for a long time with only marginal national wage increases to speak of. This lends me to my next important point. To really have the ability as an industry to push for a more equitable wage structure, I firmly believe, while keeping our own operational identity (AGCSA and state associations) for continued communication and professionalism within the trade, the entire golfing community and relevant organisations governing and representing golf trades should meet under the one banner once a year.

This would not replace our current annual conference but simply include it in a national format with all the relevant people, where, I believe, more owners, committeemen and companies would be attracted to attend. Open it to the community and invite relevant government representatives and begin to illustrate to the community just what we do as a group. It all comes back to communication and awareness and with the possible format mentioned above, I believe current issues such as wage structures, retention of staff and a host of other subjects could be discussed having attracted the appropriate people to the horse's mouth and not the other part of the nag which is so commonly listened to. Just an idea! 🐾



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BY JOHN NEYLAN

With prolonged drought and ever-decreasing water resources, turf managers will need to make major changes in grass selection and how they manage their surfaces



As Australia battles through the worst drought in history and climate change appears to be resulting in permanent changes to our rainfall patterns, we face the long-term prospects of reduced rainfall and increased evaporation with the amount of water available for turfgrass maintenance being reduced.

The future will involve less water and what water is available is most likely to be high in dissolved constituents (i.e. increased salinity). Whether it is a golf course, bowling green or sportsfield, there is little doubt that many turf managers will need to make significant changes in grass selection and how they

## In this instalment of AGCSATech Update John Neylan looks at the highly topical issues of turfgrass water use and salinity tolerance.

manage turf surfaces in order to provide a playable and safe surface.

The perception of what is acceptable will have to change at all levels of the industry, particularly where a high degree of presentation and playability is required such as golf and bowling greens.

It is therefore an appropriate time to consider some of the basic elements of plant water use, drought tolerance and salinity tolerance as we plan for the future.

### TURFGRASS WATER USE

The area of most interest in relation to turfgrasses is their water use rate and selection of cultivars with high water use efficiency. Beard and Sifers (1989) have demonstrated that the warm-season grasses have the lowest water use rate (Table 1), the best drought tolerance and highest recovery from water deficit, compared to the cool-season species.

Within the warm-season species, some differences between cultivars have been observed, but in practical terms these would appear to be very limited. Research in Western Australia (Colmer et.al. 1989) demonstrated that the maximum daily irrigation required to maintain growth and colour ranged from 50-60 per cent net daily evaporation (Epan) for nine warm-season turfgrass genotypes to 80-100 per cent for two cool-season turfgrass genotypes.

For example, ryegrass was almost twice that of Wintergreen couchgrass (Table 2). The differences in water use rates and irrigation requirements among the warm season grasses were relatively small and not statistically different.

Ford et.al. (2006) also determined that the greatest difference in water use was between the C<sub>3</sub> group (cool-season) and the C<sub>4</sub> group (warm-season) grasses where the warm-season grasses had ET rates in the range 25-30 per cent less than cool-season grasses in the early summer period.

This research would indicate that there is no advantage in changing between warm-season species/cultivars for the purpose of

TABLE 1: THE COMPARATIVE ET RATES OF THE MAJOR TURFGRASSES\*\* WHEN GROWN IN THEIR RESPECTIVE CLIMATIC REGIONS OF ADAPTATION AND PREFERRED CULTURE REGIME\*\*\*

RELATIVE RANKING	ET RATE (MM D <sup>-1</sup> )	COOL-SEASON TURFGRASS SPECIES	WARM-SEASON TURFGRASS SPECIES
Very low	<6		<i>Buchloe spp.</i>
Low	6 - 7		*Couchgrass hybrids Centipedegrass Couchgrass Zoysiagrass
Medium	7 - 8.5	Hard fescue Red fescue Chewings fescue	Bahiagrass Seashore paspalum St. Augustinegrass
High	8.5 - 10	Perennial ryegrass	Carpetgrass Kikuyugrass
Very high	>10	Tall fescue Creeping bentgrass <i>Poa annua</i>	

\*\*\*CULTURAL OR ENVIRONMENTAL FACTORS THAT ALTER THE LEAF AREA OR SHOOT DENSITY MAY RESULT IN A SIGNIFICANT SHIFT IN RELATIVE RANKING COMPARED TO THE OTHER SPECIES.

\*\*BASED ON THE MOST WIDELY USED CULTIVARS OR EACH SPECIES.

\*SIGNIFICANT VARIABILITY OCCURS AMONG CULTIVARS WITHIN THE SPECIES.





**TABLE 2: ET VALUES FOR VARIOUS TURFGRASS GENOTYPES MEASURED IN FIELD LYSIMETERS.**

GENOTYPE	ET (days with 5-8 mm of Epan) (% Epan)	ET (days with 8-11 mm of Epan) (% Epan)
<i>Cynodon dactylon</i> ('Wintergreen')	59.8 (± 2.1) a	51.9 (± 1.6) a
<i>Paspalum vaginatum</i>	63.9 (± 2.4) a	53.8 (± 1.5) a
<i>Stenotaphrum secundatum</i>	67.8 (± 2.4) a	55.4 (± 1.6) a
<i>Pennisetum clandestinum</i>	65.8 (± 2.1) a	55.4 (± 1.0) a
<i>Zoysia spp.</i> ('ZT94')	66.5 (± 3.2) a	52.3 (± 1.9) a
<i>Festuca arundinacea</i> ('Arid')	95.5 (± 4.7) b	87.7 (± 3.0) b
<i>Lolium perenne</i> ('Accent')	102.1 (± 4.4) b	90.0 (± 5.8) b

DIFFERENT LETTERS IN THE SAME COLUMN INDICATE SIGNIFICANT DIFFERENCES AT THE 5% LEVEL.

conserving water, however, the conversion from cool-season grasses to a warm-season species has considerable potential in saving water. However, making a change between warm-season species could be governed by other issues such as increasing water salinity.

It is desirable to have a deep root system and a large volume of roots so that maximum exploitation of the available soil water can occur. A deep, extensive root system not only allows better water use but improves heat and drought tolerance.

Casnoff and Beard (1985) demonstrated the relationship between the rooting depth of grasses and their drought and heat stress tolerance (Tables 3 and 4). The heat stress consideration is important in that it results in reduced rooting combined with a high evapotranspiration demand.

## TURFGRASS SALINITY TOLERANCE

The future for irrigating turf may rely on the use of moderate to high salinity water and in order to ensure that the turf system is sustainable, will rely on the use of salt-tolerant grasses and an improved knowledge of the effects of salinity on turfgrasses.

Over the past 12 months or so, there have been increasing enquiries regarding the use of water sources with salinity levels exceeding 1500mg/L to supplement meager freshwater supplies or as a direct substitute.

High levels of soluble salts in the turf rootzone are detrimental to most turfgrasses. Excess soluble salts may affect growth by osmotic inhibition of water uptake (physiological drought) by the specific ions (Harivandi et. al., 1992).

Salinity affects different species in different ways and the effects may vary depending on the age of the plant, where salinity effects are generally greater at germination and planting

(when vegetative material is used) compared to the mature plant. Salinity tolerance in turfgrasses is related to the plant's ability to reduce NaCl uptake.

There have been a number of studies to investigate salt tolerance in turfgrasses and the mechanisms affecting salt tolerance. Younger et. al. (1967) observed significant variation in the salt tolerance of creeping bentgrass (*Agrostis spp.*) varieties. The main affect of high salinity was to reduce top growth and the old variety Seaside had the highest salt tolerance and Penncross the least tolerance. It was noted that Seaside had high variation between individual plants and Engelke (Pers. comm.) has selected new varieties (e.g. "Mariner") with improved salt tolerance and turf quality based on this variation.

McCarty and Dudeck (1993) reported that when germinating bentgrasses in high

salt solutions, Streaker red top and Seaside creeping bentgrass were the most salt-tolerant. Kingston velvet, Exeter colonial and Highland colonial had intermediate tolerance while Pennlinks, Penncross and Penneagle creeping bentgrass were the most salt sensitive.

Marcum (1999) has studied the salt tolerance in modern bentgrass varieties where he tested 35 bentgrass cultivars, with increasing salinity concentrations from 1dS/m/day up to 8dS/m/day. The most salt-tolerant cultivars were Mariner, Seaside II, Grand Prix, Seaside, 18th Green and Century. The least tolerant cultivars suffered complete death after 10 weeks' exposure and they included Avalon (velvet bent) Ambrosia (colonial bent) as well as Regent, Putter, Penncross and Penn G6.

Dudeck and Peacock (1993) carried out a study on warm-season grasses and demonstrated that Emerald zoysiagrass (*Zoysia spp.*), FSP-3 seashore paspalum (*Paspalum distichum*) and Tifway couchgrass (*Cynodon dactylon* x *C. transvaalensis*) were the most salt-tolerant. Floralawn St Augustinegrass (*Stenotaphrum secundatum*), Tifway II couchgrass (*Cynodon dactylon* x *C. transvaalensis*) and FSP-1 seashore paspalum had intermediate salt tolerance while Centipedegrass (*Eremochloa ophiuroides*) and Bahiagrass (*Paspalum notatum*) were very salt sensitive. Dudeck and Peacock (1993) also demonstrated that as salinity increased plant K levels decrease and to a lesser degree Ca, Mg and P.

**TABLE 3: COMPARATIVE MID-SUMMER ROOTING DEPTHS OF MAJOR TURFGRASSES\*\* WHEN GROWN IN THEIR RESPECTIVE CLIMATIC REGIONS OF ADAPTATION AND PREFERRED CULTURAL REGIME**

RELATIVE RANKING	COOL-SEASON TURFGRASS SPECIES	WARM-SEASON TURFGRASS SPECIES
Superior		*Couchgrass
Excellent		St. Augustinegrass Seashore paspalum
Good		Bahiagrass Zoysiagrass
Medium	Tall fescue	Centipedegrass <i>Buchloe spp.</i>
Fair	Creeping bentgrass Hard fescue Perennial ryegrass	
Poor	Kentucky bluegrass	
Very poor	<i>Poa annua</i>	

\*SIGNIFICANT VARIABILITY AMONG CULTIVARS WITHIN THE SPECIES

\*\*BASED ON THE MOST WIDELY USED CULTIVARS OF EACH SPECIES

Duncan et.al. (2000) have demonstrated that some selections of seashore paspalum can tolerate undiluted sea water under the correct management regimes. Sea water has an EC of 54dS/m (34,560 mg/L) and these new salt-tolerant varieties provide an opportunity to use very brackish sources of water, though a high level of management is required.

Salinity effects on turfgrass growth have been summarised (Harivandi et. al. 1992) as;

- Reduced water uptake due to osmotic stress;
- Reduced nutrient uptake such as K may be depressed by absorption of Na;
- Root biomass may increase to improve water absorbing ability;
- Na and Cl reduce growth by interfering with photosynthesis;

**TABLE 5: ESTIMATED SALT TOLERANCE OF COMMON TURFGRASSES (REFERENCE: HARIVANDI ET. AL., 1992)**

COOL-SEASON		WARM-SEASON	
NAME	RATING *	NAME	RATING *
Alkaligrass ( <i>Puccinellia</i> spp.)	T	Bahiagrass ( <i>Paspalum notatum</i> Fluegge)	MS
Annual bluegrass ( <i>Poa annua</i> L.)	S	Bermudagrass ( <i>Cynodon</i> spp.)	T
Annual ryegrass ( <i>Lolium multiflorum</i> Lam.)	MS	Blue grama ( <i>Boutleoua gracilia</i> (H.B.K) Lag. ex. steud.)	MT
Chewings fescue ( <i>Festuca rubra</i> L. spp. <i>commutata</i> Gaud.)	MS	Buffalograss ( <i>Buchlon dactyloides</i> (Nutt.) Engelm.)	MT
Creeping bentgrass ( <i>Agrostis palustris</i> Huds)	MS	Seashore paspalum ( <i>Paspalum vaginatum</i> Swartz.)	T
Creeping bentgrass cv. Seaside	MT	St Augustinegrass ( <i>Stenotaphrum</i> <i>secundatum</i> Walter Kuntze)	T
Creeping red fescue ( <i>Festuca rubra</i> L. spp. <i>rubra</i> )	MT	Zoysiagrass ( <i>Zoysia</i> spp.)	MT
Hard fescue ( <i>Festuca longifolia</i> Thuill.)	MT	Kikuyu ( <i>Pennisetum clandestinum</i> )	MT
Kentucky bluegrass ( <i>Poa pratensis</i> L.)	MS	* The rating reflects the general difficulty in establishment and maintenance at various salinity levels. It in no way indicates that a grass will not tolerate higher levels with good growing conditions and optimum care. The ratings are based on soil salt levels (ECe) of: <b>Sensitive (S)</b> = <3dS/m, <b>Moderately Sensitive (MS)</b> = 3-6dS/m, <b>Moderately Tolerant (MT)</b> = 6-10dS/m, <b>Tolerant (T)</b> = >10dS/m.	
Slender creeping red fescue cv. Dawson ( <i>Festuca rubra</i> L. spp. <i>trichophylla</i> )	MT		
Perennial ryegrass ( <i>Lolium perenne</i> L.)	S		
Tall Fescue ( <i>Festuca arundinacea</i> Schreb.)	MT		

Harivandi et. al. (1992) also listed the common turfgrasses and their estimated salt tolerance (Table 5).

In research undertaken by Ford (2006) the survival (percentage of living foliage after one month of treatment) of various cool-season and warm-season grass species was tested at increasing levels of salinity. The four salinity treatments were: town (potable) water, one-third (19.3dS/m), half (29dS/m) and full sea water (58 dS/m). The C3 (cool-season) grasses had very low tolerance, although creeping bentgrass (cultivar JCI-2-22) and fine fescue (cv. ZI-4-245) had some surviving plants at the one-third sea water treatment (19.3dS/m). Tall fescue (cv.SR8600) and perennial ryegrass (cv. SR4220) did not survive any of the salinity water treatments.

**TABLE 4: RELATIVE DROUGHT RESISTANCE OF TURFGRASSES**

DROUGHT RESISTANCE	TURFGRASS SPECIES
Excellent	Couchgrass Kikuyu Native grasses
Good	Hard fescue Tall fescue Red fescue
Medium	Kentucky bluegrass
Fair	Perennial ryegrass
Poor	Italian ryegrass Bentgrass <i>Poa annua</i>

Of the C<sub>4</sub> (warm-season) grasses, kikuyu (common variety) suffered severe damage at the half and full seawater rates. Common couch (var. Legend) and Buffalo (cv. Sir Walter) were badly damaged by the full seawater treatment. As expected, the seashore paspalum (cv. Velvetene) tolerated full sea water irrigation with Santa Ana also performing relatively well at the highest level of salinity.

In salinity studies undertaken by Loch et. al. (2006) the four most salt-tolerant species in the trials were *sporobolus virginicus*, *distichlis spicata*, *paspalum vaginatum* and *zoysia matrella*. Although also coming from coastal origins, the *stenotaphrum secundatum* cultivars were not as salt-tolerant as the four species above.

There was also variation among the nine cultivars tested in their level of salt tolerance, with Shademaster and Palmetto at the high end of the scale.

The 14 *cynodon dactylon* cultivars screened were only slightly less salt-tolerant than the *S. secundatum* group. Wintergreen and CT-2 were the least salt-tolerant *cynodon* lines tested with Windsorgreen exhibiting the highest salinity tolerance. All three *pennisetum clandestinum* lines showed poor salt tolerance.

The research that has been undertaken on salinity tolerance indicates that with high salinity water warm-season grasses are the best option. There are also differences between cultivars and species within this group which increases the opportunities available to maximise the use of high salinity water.

## REFERENCES

A full list of references for this article can be obtained from the AGCSA (03) 9548 8600. 📞



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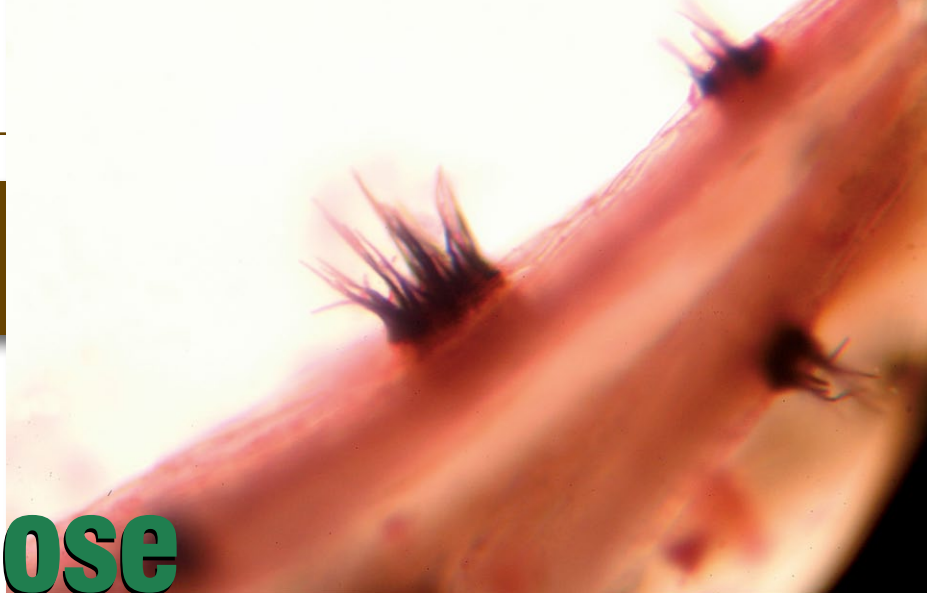
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Close analysis of anthracnose-affected tissue reveals black reproductive structures called acervuli, which, when mature, produce long black spines



# Anthracnose

## – a summer killer

Off all the summer diseases turf managers have to deal with, one of the most persistent and difficult to combat is anthracnose. Here AGCSATech technical officer Andrew Peart looks at this troublesome foliar blight and basal rot disease and some strategies to minimise its impact.



As opposed to many other leaf blight diseases, anthracnose-infected leaves tend not to exhibit distinct areas of healthy and diseased tissue

Anthracnose is a common and potentially destructive turfgrass disease that is particularly devastating on *Poa annua*-dominated putting greens over the summer months.

While not the only variety that is affected by anthracnose, invariably *Poa* appears to be the most susceptible of all the cool-season grasses to this summer menace.

Anthracnose generally first appears as small yellow to reddish brown patches on *Poa annua* while other grasses such as creeping bentgrass may be unaffected. These small patches can then enlarge to become distinct irregular areas.

On individual plants it is the older leaves that initially fade from dark green to a lighter green and then to yellow. As opposed to many other leaf blight diseases, anthracnose-infected leaves tend not to exhibit distinct areas of healthy and diseased tissue.

Basal rot affected parts of the plant are initially water soaked but quickly turn black as the tissue dies. At this time the main shoot can be easily pulled away from the crown and this is often a sign that the complete plant may subsequently die.

Basal rot can therefore be very damaging on highly populated *Poa annua* putting green surfaces and large areas of turf can be quickly thinned.

### DISEASE CYCLE

The causal fungus, *Colletotrichum graminicola*, survives the winter as dormant resting structures called sclerotia and as dormant mycelium within infected plant debris. The fungus can be exhibited either as a foliar blight or as the more destructive basal rot.

Anthracnose basal rot occurs, as the name suggests, when the fungus infects the base of the plant. Infection normally occurs during cool, wet spring weather, however, symptoms may not be expressed until plants experience summer stress.

The foliar blight on the other hand is usually associated with the spores produced in the acervuli and are splashed by water onto the leaves or spread by tracking from either machinery or people.

Close observation of the infected tissue reveals black reproductive structures called acervuli. These protrusions first appear under the epidermis, but when mature produce long black spines or setae. The acervulus contains dozens of one-celled, crescent shaped asexual spores called conidia. It is these conidia or asexual spores that are moved by wind, water or traffic (mechanical or pedestrian) to infect new turf as the foliar blight.

### PREDISPOSING CONDITIONS FOR ANTHRACNOSE INFECTION

This foliar blight disease is generally associated with warm to hot humid weather when there is a period of leaf wetness for disease infection. Other conditions that favour the onset of anthracnose are host plant, low levels of fertility, irrigation and mowing.

- **Plant stress:** The production of seedheads on *Poa annua* during the spring can lead to a reduction in carbohydrate reserves at the beginning of summer. If environmental conditions are stressful at this time then *Poa annua* can subsequently be vulnerable to disease infection.



- **Fertility:** There has been a strong trend in recent years to reduce the fertility applied to golf courses and golf greens in particular. This is deemed then to produce faster greens, create fewer clippings and produce far less thatch. The negative ramification to this can be an increased susceptibility to disease. This is particularly the case with reduced nitrogen fertility but also deficiencies in potassium and phosphorus may predispose the turf to anthracnose.
- **Irrigation:** Careful consideration must be given to irrigation frequency to minimise the likelihood of drought stress. Drought stress will obviously lead to wilt and in turn exacerbate the turf's exposure to high temperature stress.
- **Mowing:** Low mowing heights can be attributed towards increasing plant stress. Particularly in *Poa annua*-dominated putting greens, mowing heights lower than 3mm can severely deplete carbohydrate reserves. There is also a suggestion that smooth front rollers are far better than grooved rollers due to imparting less wounding on the turf which lowers the risk of infection.

## CULTURAL CONTROL

Cultural control is associated with trying to remedy the predisposing factors to the development of anthracnose.

- **Fertility:** *Poa annua* generally requires a higher level of fertility than bentgrass, particularly if carbohydrate reserves are to be maintained during periods of seedhead production. It may be necessary to spoon feed greens on a regular basis, every 1-2 weeks over the summer period with the equivalent of 0.05-0.06kgN per 100m<sup>2</sup> in a soluble form. The addition of potassium at an equivalent rate may also provide

### Anthracnose thrives in wet, shaded and compacted areas

(Picture courtesy of Rutgers University)

improved resistance. This increase in fertility may require the need to adjust cultivation practice however, these should not be conducted during stressful weather conditions. If cultivation practices need to be conducted during stressful weather conditions the application of a fungicide may protect the wounds of the grass.

- **Mowing:** Raise the mowing heights as much as possible so that a desired or at least a compromised ball roll can be achieved. The use of rolling or double cutting at an increased height may substitute for a lower height of cut. If possible, the use of walk-behind mowers tends to be less damaging to the turf than triplex mowers. Do not mow the perimeter cut on every occasion with either walk-behind or triplex mowers.
- **Aeration:** Anthracnose tends to thrive in wet, shaded and compacted areas. Therefore in spring and autumn, when the disease is not active, undertake a rigorous aeration programme to reduce compaction, improve drainage, reduce excess soil moisture and optimise root growth, creating conditions that are less favourable for anthracnose.

## CHEMICAL CONTROL

Like many turfgrass diseases, anthracnose is far easier to control preventatively (before symptoms are seen) rather than curatively. The best timing for preventative control is by utilising

records kept from previous years on the time and climatic conditions when symptoms were previously observed. It is then recommended to apply a preventative fungicide two to three weeks prior to that time.

Many superintendents though are faced with the prospect of trying to control the disease after the symptoms are witnessed. Unfortunately, anthracnose can be one of the most difficult diseases to control in this instance.

To date only four classes of fungicides are currently labelled in the United States for the control of anthracnose, these being benzimidazoles, strobilurins, nitriles and demethylation inhibitors (DMI) (Clarke & Murphy, 2004). With any fungicide application it is recommended not to apply more than two or three consecutive applications of any one fungicide. Tank mixing of fungicides with different modes of action is considered the best approach to avoid resistance.

The use of the correct water volume is also critical for control. Clarke and Murphy (2004) state that products applied in less than 1 gallon water/1000sq.ft (400L/ha) will almost certainly result in reduced levels of control.

## CONCLUSION

Without the continual use of preventative fungicides over the summer period, anthracnose can be a persistent disease if infection occurs, particularly on *Poa annua*.

To try and reduce the likelihood of infection, renovation is a critical component over the spring months. Removing excessive thatch minimises the opportunity to harbour resting spores, while also lessens the likelihood of poorer draining surfaces in summer.

Maintaining adequate fertility through light regular applications, particularly of nitrogen fertiliser, is also a key component in hopefully minimising the impact of this summer killer. 🌱

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After five years as assistant superintendent at Croydon Golf Club, Michael Vozzo was appointed superintendent at Eastwood Golf Club at the start of 2007

# The man in the middle

**It's the ultimate sporting double act – golf course superintendent during the week, AFL field umpire at the weekend. ATM editor Brett Robinson catches up with a busy Michael Vozzo who is not only gearing up his ninth gruelling season as one of the AFL's more experienced field umpires, but is also finding his feet as the newly appointed superintendent at Melbourne's Eastwood Golf Club.**

**M**ichael Vozzo knows a thing or two about being under pressure. Whether it's the stresses of the current drought affecting his turf surfaces at Eastwood Golf Club or the intensity of his high-profile weekend job as one of the AFL's top field umpires, you could never accuse Vozzo of not being able to stand the heat.

It's the sort of pressured environment in which some thrive and you only have to look back at the past 12 months to see that Vozzo is one of those individuals.

As one of the AFL's leading whistleblowers, Vozzo notched up his 150th match midway through 2006 and in a fairytale end to his eighth season in the big time, blew the final whistle to signal the end of an epic 2006 AFL grand final, his first, between West Coast and Sydney.

If that wasn't good enough, after five years as assistant superintendent at Croydon Golf Club, Vozzo successfully applied for the position of superintendent at Melbourne's Eastwood Golf Club, a role he started just after New Year. And just to balance things nicely

and really top things off, his wife of five years Vicki gave birth to their second daughter, Zoe, in early February!

"It has been one of those periods in my life where I've continually had to pinch myself," admits Vozzo. "Everything that I had always hoped for has come pretty quickly. It has been a very good 12 months."

Of all those achievements, barring the last as you would expect, if you were to ask Vozzo which he rates as the most satisfying, being appointed superintendent at Eastwood comes out on top.

Situated at the foot of the Dandenong Ranges, Eastwood is an undulating course boasting Santa Ana fairways, 14 Poa/bent greens, four new Penn G2 greens and two bowling greens (one Poa/bent, the other G2). Vozzo took over from long-standing Eastwood superintendent John Coulsell who last September left the club after 24 years to start afresh at Torquay Golf Club.

Although sad to leave his position at Croydon, which is currently in the process of building a brand new 27-hole course at Yering,



the time was right for Vozzo to take the next step in his turf management career.

"It was more that I was excited about the prospect of being a superintendent," says Vozzo, who served his apprenticeship at Commonwealth Golf Club. "Obviously Croydon is coming up to a pretty exciting period as a club, but the opportunity to move into a superintendent role was the most important thing for me at this stage of my career."

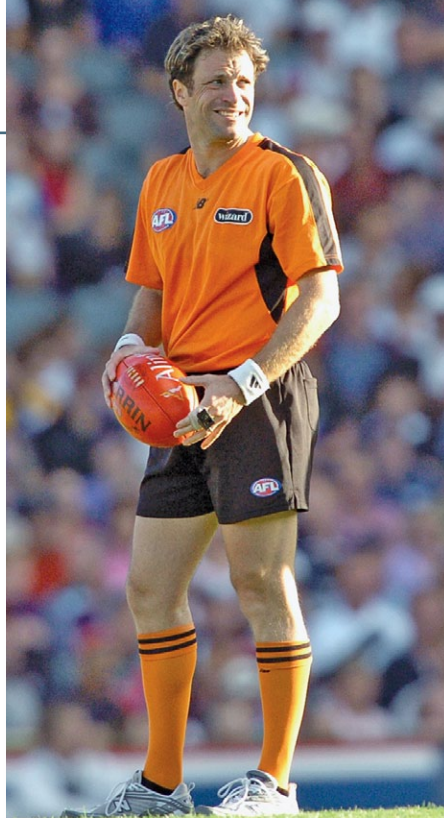
"Superintendent positions in Melbourne have been few and far between, so it was a good chance to see where I was at within the industry. Now I've been given the opportunity to show what I'm worth and to further improve the course and its operations."

With Vozzo's commitments as an AFL umpire, not surprisingly the Eastwood board was concerned about the time he would be away, particularly at weekends, but Vozzo was quick to allay their fears.

"There was no doubt that it was going to come up and they were concerned about time issues," says Vozzo. "But a lot of my time spent on football is during the winter and on top of that the AFL is very flexible in regards to your work situation."

"For example, Eastwood has its main tournament over Easter and the AFL has given me the all clear to be in Melbourne that weekend. It's quite different to what people think. We're not full time, we train after hours. Obviously the weekend travel is where it gets tricky being a superintendent as anywhere up to five games in one round can be played outside of Melbourne. But I'm fortunate that we have a good senior structure here and our 3IC lives on the course and is on call if needed."

"You do need to have an understanding



2007 will mark Michael Vozzo's ninth season as an AFL field umpire

PHOTO COURTESY OF AFL AND GETTY IMAGES

workplace and also a very supportive family. My wife in particular has been brilliant and I certainly wouldn't be where I am without her support."

## IN THE DEEP END

Vozzo's introduction to the ranks of superintendent has certainly been frenetic. Water, or rather the lack of it, is Eastwood's biggest issue at present with the main 30M storage dam down to a critical 5-7M.

Just three weeks into the job Vozzo put a proposal to the board to get a pump installed on the dam at the bottom of the course. Smaller than the main dam, it collects stormwater runoff from the clubhouse and car park and

quickly fills before discharging into a nearby stream. Vozzo hopes by installing a pump he will be able to pump excess stormwater back through the irrigation lines and into the main dam and in doing so come out of winter with levels back up near capacity.

In January, Vozzo also oversaw the final installation of quick couplers to all greens which now means dam water can be used instead of mains when handwatering or using manual sprinklers. Vozzo is also looking at getting the two bowling greens switched across from mains to dam water as under current Stage 3 restrictions they are watered just twice a week.

While water issues have been foremost on Vozzo's agenda, he was also plagued with a raft of disease and pest outbreaks in his first few weeks. With Melbourne's humid and wet start to 2007, Eastwood suffered outbreaks of anthracnose, thatch collapse and rhizoctonia, while Vozzo returned to work one Monday to find that Argentine stem weevil had hit a few greens. Staffing issues have also cropped up and less than a month into the job he farewelled good friend and former Eastwood assistant Ash Duncan, who ironically left to take Vozzo's old job at Croydon Golf Club under Gary Bass.

"It's been a pretty hectic start, but I wouldn't have it any other way," says Vozzo. "It's what being a superintendent is all about. Everything comes back on you – you're responsible. And I like that pressure."

Like any newly appointed superintendent, Vozzo has plenty of ideas and once he has settled down is looking forward to implementing some changes and adding his personal touch to course operations.

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**First game ever umpired:** "I can't remember my very first game but one of the early ones was as a boundary umpire for a Donvale Football Club reserves match. I was 13 at the time and my uncle, who was the coach of Donvale Reserves, did his knee. He is a big man and I remember him writhing around the ground in agony and I had tears streaming down my face because I didn't like seeing my uncle in pain. One of the opposition players then came over and had a go at him to get up and stop being a pansy, so I had a crack at him!"

**Best AFL players you have umpired:** Chris Judd and Robert Harvey.

**Best/worst comment from an AFL player:** "I paid a 50 against a player last season and he came up to me and said (expletives deleted): "Gee, your old man would be ashamed of you." I replied, "Quite the opposite, if anything he's so proud watching me umpire champions like you." He stormed off in a huff"

**One rule you would change:** "I should really say that I'm happy with every one (laughs). In all honestly none of the rules give me any problems, it's more the fact that each year there is something new or changes are made to an existing rule."

**Training regime:** "Umpires train Monday and Wednesday nights and on off nights we do various things, but sometimes I don't get the opportunity because of my work. Only two of us are tradies on the AFL panel (Brett Allan works for parks and gardens in Geelong) and the whole programme is based around those



## BLOWING THE WHISTLE ON MICHAEL VOZZO SUPERINTENDENT, EASTWOOD GOLF CLUB AND 166-GAME AFL FIELD UMPIRE

guys who are pen pushers (laughs). The irony though is that now I'm a superintendent I'll probably turn into one of them soon! We run between 14-17 kilometres per game of which about four is backwards."

**First footy team you barracked for:** "Donvale Football Club."

**How much grief do umpire's get?:** "We cop it pretty good, but in some regards it has helped me a lot. I get sledged a lot when I'm playing cricket because they know who I am, but that just makes you dig in a little bit deeper. The one thing that does get me

though is the way local league umpires get treated. As AFL umpires we do a mentoring programme for young umpires and last season I went to a Balwyn v St Kilda City match and the treatment of the umpires was just deplorable. In some ways it was that bad I thought I don't want to be involved in this. This one young kid who was 15, admittedly he wasn't having the greatest day, but he was getting comments from spectators saying they were going to bash him after the game. His poor mum was standing in the crowd absolutely beside herself. That kind of stuff really gets on my goat."

**The one call you made in the 2006 AFL Grand Final you would like to have again:** I paid a head high free to Barry Hall in the third quarter. I paid it when I wasn't in control of the play at the time and I thought he got hit high when in fact he got hit on the shoulder. You don't have time to second guess and I just paid what I saw but got it wrong. I think the rest I got right though."

**Worst moment as a greenkeeper:** "That was just last summer at Croydon. I was spraying wetting agent on a fairway and I went to check on one of the greens up at the clubhouse. I got a phonecall from one of the other groundstaff and he asked me where the spray unit was. I told him it was with me to which he replied, "No it isn't". I turned around to see that it had rolled down the fairway, over a green and smashed into a tree. Wetting agent went everywhere. It wasn't the greatest moment of my life and I fair dinkum thought about quitting after that."

Very much from the preventive school of turf management, Vozzo is keen to introduce a more frequent renovation programme to improve Eastwood's turf surfaces and over the next six to eight months is looking at renovating most areas, including the two bowling greens which in the past have been closed for winter play. Vozzo is also keen to examine different fertilisation techniques as well as the possibility of introducing safer forms of pest control such as the use of entomopathogenic nematodes.

"I'm also adamant about introducing a dedicated environmental management system, probably e-par," says Vozzo. "Eastwood is in a fantastic location, right underneath the Dandenong Ranges. There's a lot of bird life

and I want to make sure that we maintain and enhance the ecosystems throughout the course.

"I brought it up at the interview and the Board seem very receptive to getting everything sound from an environmental perspective which is encouraging. Obviously we'll get through the first couple of months and then hopefully we can start implementing things after Easter."

## THE MAN IN THE MIDDLE

While adapting to his new career as a superintendent has been Vozzo's primary focus over the past couple of months, there is also the rather small matter of the upcoming

footy season. When the first ball of the 2007 competition is bounced between Melbourne and St Kilda at the MCG on 30 March, it will signal Vozzo's ninth year umpiring at the elite level. During that period Vozzo has established himself as one of the AFL's most consistent field umpires, his low-key and no-nonsense approach to the game winning him many admirers within the wider football community.

Having now umpired 166 AFL matches and spending most of the winter months running alongside legends of the game like James Hird, Nathan Buckley and Chris Judd, it seems a lifetime ago when a young adolescent Vozzo got his first taste of umpiring.



Although a handy football player himself in his early teens (he captained the under 13s at St Leo's), Vozzo's first love was always cricket and at the age of 14 he chucked in footy to concentrate on the summer code. The following football season the father of one of his closest friends invited him down to Doncaster Junior Football League to earn some pocket money as a boundary umpire. Receiving the princely sum of \$11 a game, Vozzo rode the boundary for a season before switching to field umpiring which meant a \$4 pay rise per game.

"I never set out with the intention of wanting to be a field umpire in the AFL," says Vozzo, who turns 34 a week out from the start of the 2007 AFL season. "I never gave it a moment's thought. At 14 I was more interested in the extra pocket money so I could save it up and spend during the cricket season. \$15 was a lot of money back then for a 14-year-old."

Vozzo went on to spend 10 years at Doncaster and after a season at Yarra Ranges was eventually invited to trial for what is now the TAC Cup (under 18s). After spending a

season at that level he was then called up to trial with the AFL Development Squad. For the next five years Vozzo bided his time umpiring VFA/AFL reserves until 1999 when his big break finally came. From an initial group of 22 umpires invited to trial for the AFL, Vozzo was one of four to get the nod after a series of trials and in round two of that regular season, he made his AFL debut.

Vozzo's introduction to the AFL ranks that year caught the eye of the AFL Umpires Association and at the end of the season he was named the recipient of the Ian Coates Medallion, presented to the most promising first or second year field umpire by the AFL Umpiring Coaching Panel.

Two seasons later and Vozzo was umpiring his first finals series match, one that he wouldn't forget in a hurry. In an intense first week encounter between Sydney and Hawthorn, Vozzo reported Sydney's Andrew Dunkley who copped a three week suspension for striking Daniel Chick. The following week, Vozzo was in the thick of it again in a heated preliminary final between arch rivals Hawthorn and Essendon,

which the Bombers won by nine points.

"It was a fairly controversial one," admits Vozzo. "Darren Goldspink copped a lot of flack that game, but the fact was I actually paid more free kicks to Essendon inside their forward line than Darren did. He copped it more because I was relatively unknown."

## A YEAR TO REMEMBER

Without doubt 2006 was Vozzo's biggest year in the middle. In the round 11 clash between St Kilda and the Kangaroos, Vozzo notched up his 150th match and in late September, while en route to picking up work mates at Croydon Golf Club for lunch, he received a call from AFL umpires manager Jeff Geischen informing him that he had been given the big one – the 2006 Grand Final.

"It was a great moment," says Vozzo, who was emergency field umpire for the 2005 grand final. "It was a mad week leading up to the game, but once the game started I wasn't nervous at all. I was umpiring alongside two good friends in Brett Allan and Darren Goldspink, who have nearly 700 games

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between them, so I was pretty relaxed. I'm pretty low key about things anyway and I try to mould myself a bit on Brett who has the simple philosophy of going out there, paying what he sees and not worry about the consequences.

"Obviously you are aware of what the game is, but a free is still a free. Being involved in the grand final didn't consume me that much, it was more the week leading up to the final that caught me out – all the interviews seeing it was my first grand final and the AFL grand final parade which I had never been to.

"I had a pretty good game although I made a few mistakes, one in particular that I would love to have back again. I think the most important thing was that when the game was on the line at the start of the third quarter and Sydney were charging back, our last quarter was spot on from an umpiring point of view.

"Not one person mentioned anything about the umpiring afterwards which is good because you know you have done a good job. The last quarter was just fantastic and I even got to signal the end of the game which was quite a special moment."

From earning just a few crumpled notes umpiring as a teen, Vozzo, along with his fellow high-profile AFL umpires, now commands upwards of six figures a season, which comprises a base salary plus performance and finals bonuses. Vozzo calculates he earned \$100 a minute umpiring the 2006 grand final, not a bad way to spend a lovely spring afternoon in late September.

While the financial rewards are obvious, Vozzo says his career as an umpire isn't purely motivated by the coin. Umpiring has taken him overseas to New Zealand and England and when he eventually notches up his 200th game (which, all things going well should be in 2008) he receives two free passes to the AFL for life.

While Rowan Sawers leads the all-time record for matches (410 from 1977-1997) Vozzo has no intentions of attempting to break



Vozzo in action during last season's grand final between West Coast and Sydney

PHOTO COURTESY OF AFL AND GETTY IMAGES

that record, but after umpiring in his first grand final he wouldn't mind another crack at the big one.

"I really set out years ago just to get to 150 games and everything now is a bonus," says Vozzo. "But getting the grand final last year, without sounding like a wanker, has inspired me to go on. I thought I'd be happy getting one, but I'd love to do another one.

"Umpiring is very much a season by season proposition. My career as a superintendent is very important to me and I have now been given the opportunity to show what I can do after working hard for the past 15 years to get to this position.

"I know I can combine both, there's no issue of that. What I've found over the years, believe it or not, is that I would rather work in the lead-up to a game. Two years ago I umpired the Adelaide-St Kilda finals match in Adelaide. I was rostered on at Croydon that weekend so got up at 4.30am on Saturday, mowed all the greens, got home by 7.30am and then caught a flight to Adelaide.

"When we got there we found that our rooms weren't ready so we had a three or four hour wait during which time we went and watched a few races at the TAB. The game didn't start until 7pm and even though I had been up since 4.30am I probably umpired one of my best games.

"I really do believe that work, for me, gives me the ability to forget about football and I think that's why I have been pretty successful at umpiring. I have the ability to work and work

hard and football is just this other interest which I don't overanalyse."

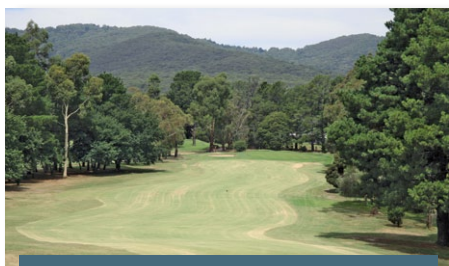
## COMMON GROUND

While umpiring has afforded Vozzo numerous benefits, one of the more unexpected rewards has been the way it has impacted on his role as a turf manager. As you would expect, Monday mornings aren't quite the same for Vozzo who is invariably put through the ringer by work colleagues and golf club members about the weekend's events, particularly if a controversial umpiring decision has made the headlines.

"On Monday's at Croydon we had all our volunteers come in and if I was around the shed when they all rocked up I couldn't leave for another half an hour because they wanted to talk footy," laughs Vozzo. "At greens committee meetings too, the first 10-15 minutes were about football rather than the golf course!

"But my AFL involvement has certainly been a bonus when it comes to improving rapport with members. In the first couple of weeks at Eastwood a couple of the members came up to me and said g'day and started to talk footy.

"At Croydon I think what we were able to do was change the rapport between members and groundstaff, because some members still have that opinion we are still all Bill Murrays from Caddyshack. Hopefully I can build a good relationship with the members here at Eastwood and if my role as an AFL umpire can facilitate that, then that's a real bonus." 🙌



Eastwood Golf Club is located at the foot of the Dandenong Ranges





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BY ANDREW PEART

**AGCSATech technical officer**  
**Andrew Peart outlines the first**  
**batch of results to emerge from**  
**the ANTEP ryegrass and tall**  
**fescue trial being conducted in**  
**Melbourne.**



**The ANTEP trial site at Mt Scopus.**  
**Photo taken three weeks after seeding**  
**with ryegrass plots to the right and tall**  
**fescue to the left**

# ANTEP ryegrass and tall fescue trials

**T**he Australian Golf Course Superintendents' Association was commissioned by the Australian Seed Federation to conduct a two-year turfgrass evaluation programme of perennial ryegrass and tall fescue varieties. The trial was established in September 2006 with 38 perennial ryegrass (plus Victorian perennial ryegrass) and 18 tall fescue varieties being evaluated.

The trial site is located on the north east corner of the main oval at Mt. Scopus

Memorial College in Melbourne. The oval was constructed with a sand profile and was sown with perennial ryegrass. Over the years there has been considerable thatch accumulation and a large proportion of the turf cover was dominated by wintergrass. The reason this site was chosen was because of its sand profile, it was irrigated, was located in an out of play area and had no presence of couch or kikuyu.

The preparation of the trial site involved spraying out the existing grass cover with glyphosate. The trial area was then rotary hoed

in two directions to a depth of 100-150mm to incorporate the thatch layer to aid with moisture retention during the establishment period. Five weeks prior to seeding, the entire site was fumigated using Basamid® at the recommended rate. This process was undertaken by R&R Fumigation.

## SEEDING

The trial site was sown on 26 September, 2006. The perennial ryegrass varieties were sown at 30 grams per square metre and the tall fescue varieties at 40g/m<sup>2</sup>. All varieties were adjusted to allow for their differing germination rates. The plot size of the perennial ryegrass varieties is 2m<sup>2</sup> and the tall fescues are 1.5m<sup>2</sup>.

**TABLE 1: TALL FESCUE ESTABLISHMENT**

VARIETIES	14 DAS	21 DAS	1 MAS	2 MAS	3 MAS
Blur TF 8	1.3	2.7	4.7	6.3	7.3
CIS TF 156	1.8	3.7	5.3	6.7	8.0
CT 4TFR	1.7	3.0	4.7	7.0	7.3
Escalade	1.5	2.7	4.0	6.0	6.7
FA 1005	1.7	3.3	4.7	6.0	7.7
FA H4-4	1.0	2.7	4.3	6.0	7.7
FA L143	1.7	3.0	4.3	6.7	7.7
Grande 11	1.3	3.3	5.0	6.7	8.0
Houndog 6	0.8	2.0	3.3	5.3	7.3
IS-TF 128	1.7	3.3	5.0	7.0	8.3
IS-TF 154	1.7	3.0	4.3	6.3	8.0
PG 1TF3J	1.7	2.7	4.3	6.0	7.3
Regiment 11	1.7	3.0	4.7	6.7	7.7
Rhizing Star	1.7	3.3	4.3	5.7	7.0
SFR52-001	2.0	3.3	4.7	7.0	8.0
Shelby	1.3	2.7	4.7	6.3	7.3
SR 8600	1.3	3.3	5.3	6.3	7.7
TF 545(II)	1.7	3.3	5.0	6.0	8.0
LSD <0.05	ns	ns	ns	ns	0.7

**TABLE 2: TALL FESCUE VIGOUR**

VARIETIES	21 DAS	1 MAS
Blur TF 8	3.7	4.0
CIS TF 156	4.7	4.3
CT 4TFR	4.0	4.7
Escalade	3.7	5.3
FA 1005	4.3	4.7
FA H4-4	4.0	4.3
FA L143	4.0	5.0
Grande 11	4.3	4.7
Houndog 6	3.3	4.3
IS-TF 128	3.3	4.7
IS-TF 154	4.0	5.0
PG 1TF3J	3.7	4.7
Regiment 11	4.0	4.0
Rhizing Star	4.3	5.3
SFR52-001	4.7	5.0
Shelby	4.0	5.0
SR 8600	4.7	4.3
TF 545(II)	4.7	4.3
LSD <0.05	ns	ns



TABLE 3: PERENNIAL RYEGRASS ESTABLISHMENT

VARIETY	10 DAS	14 DAS	21 DAS	1 MAS	2 MAS	3 MAS
All Star 3	2.3	4.2	6.7	7.0	8.0	9.0
CT 027	1.7	3.7	5.3	6.3	7.3	8.3
CT 057	1.5	3.3	5.0	6.7	7.7	8.7
CT 076	2.2	3.7	5.0	6.3	7.3	8.7
Derby Xtreme	1.7	4.3	5.3	7.0	8.0	9.0
Harrier 2	1.8	3.5	6.0	7.0	7.7	9.0
Indy	0.7	4.3	6.0	7.3	7.7	9.0
Keystone 2	1.3	2.5	5.0	6.7	7.3	8.7
LP 2AGB-F	1.5	3.0	5.7	6.7	7.3	9.0
LP 2BR-F	1.7	3.2	6.0	6.7	8.0	9.0
LP 3938	2.2	3.8	5.7	7.0	7.7	9.0
LP 40C	1.3	2.8	4.7	6.3	7.7	8.7
LP 4317	1.3	2.5	4.0	5.3	7.0	8.3
MAPA 2	1.3	3.3	5.3	7.0	8.0	8.0
Pacesetter	1.3	2.8	5.0	5.7	7.0	8.7
Penguin	1.2	2.7	5.7	7.0	8.0	8.3
Pennant II	1.8	3.3	5.0	6.7	7.3	9.0
Pennant III	2.0	3.3	5.0	6.3	7.3	8.3
PG 1606	1.5	3.2	5.0	6.3	7.7	8.7
PG 1F004	2.0	4.3	5.3	6.7	7.7	8.7
PG 1PRG	2.0	3.5	5.0	6.7	7.7	8.7
PG 22806	1.8	3.3	6.0	7.0	7.7	9.0
PG 970	1.5	2.7	5.3	6.3	7.0	8.7
Pinnacle II	1.8	4.3	5.7	7.0	7.7	8.7
Pinstripe	1.0	3.0	5.0	6.0	7.7	8.3
PM 101	1.3	3.0	5.7	6.7	8.3	9.0
PR 8821	2.0	3.2	6.0	7.3	8.0	9.0
Ragtime	1.7	4.7	7.0	8.3	8.7	9.0
Regal 5	1.7	2.8	5.0	6.7	7.7	9.0
Ringer	1.0	2.3	4.3	5.7	7.0	8.7
Roadster	2.2	3.3	4.7	6.3	7.3	9.0
Saint	1.8	3.2	5.0	6.7	7.7	8.7
SF R51-001	1.5	2.8	5.7	7.0	8.0	8.7
SR 4220	1.7	3.0	5.7	7.0	7.3	8.7
SR 4420	1.3	2.5	4.3	5.3	7.0	8.3
SR 4600	1.7	3.5	5.0	6.0	7.3	8.3
SRX4SLT	1.7	3.2	5.3	7.3	7.7	9.0
Tophat II	1.5	3.0	5.0	7.0	8.0	8.7
Vic Rye	1.5	2.8	6.0	8.0	8.0	9.0
LSD $p<0.05$	ns	ns	ns	0.6	ns	ns

DAS = DAYS AFTER SEWING

MAS = MONTH(S) AFTER SEWING

All varieties are replicated on three occasions with the exception of the Victorian perennial ryegrass variety that is only replicated twice. All of the plots were raked after seeding and the entire area was rolled with a water-filled pedestrian roller.

## IRRIGATION

Irrigation was applied on an as-need basis

during the establishment period. This was generally on two occasions, early morning and mid afternoon, although on very warm days a supplementary application was made in the middle of the day.

Irrigation has continued to occur on an as-need basis although has been slightly restricted with the implementation of water restrictions. Mt. Scopus was able to obtain an

TABLE 4: PERENNIAL RYEGRASS VIGOUR

VARIETY	10 DAS	14 DAS
All Star 3	3.7	4.7
CT 027	3.7	6.0
CT 057	3.7	5.7
CT 076	4.0	6.0
Derby Xtreme	3.3	5.3
Harrier 2	3.7	5.7
Indy	3.0	4.0
Keystone 2	3.0	5.3
LP 2AGB-F	4.0	6.0
LP 2BR-F	3.7	5.7
LP 3938	4.0	5.7
LP 40C	3.0	5.7
LP 4317	3.0	5.0
MAPA 2	5.7	8.0
Pacesetter	3.7	5.3
Penguin	3.3	5.7
Pennant II	3.7	5.7
Pennant III	3.7	5.7
PG 1606	3.7	5.3
PG 1F004	3.3	5.0
PG 1PRG	3.0	5.0
PG 22806	3.3	6.0
PG 970	3.7	5.7
Pinnacle II	3.7	6.0
Pinstripe	3.3	5.7
PM 101	3.0	5.3
PR 8821	5.0	6.7
Ragtime	4.0	6.0
Regal 5	3.3	5.0
Ringer	3.3	5.3
Roadster	3.7	6.0
Saint	4.3	6.3
SF R51-001	3.3	5.0
SR 4220	3.7	5.7
SR 4420	3.0	5.3
SR 4600	3.0	4.7
SRX4SLT	3.7	5.0
Tophat II	3.3	5.0
Vic Rye	5.5	7.5
LSD $p<0.05$	0.7	0.9

exception but during Stage 3 restrictions has still been limited in the amount of water it has been able to apply.

## ESTABLISHMENT

The ryegrass plots began to germinate between 7-10 days, while the tall fescues took a little longer with the first signs of germination not seen until 14 days after sowing. The initial



The ryegrass plots after the first mow on 10 November, 2006

germination was quite patchy resulting from the plot preparation where the accumulated thatch had been incorporated into the sand profile. Where clumps of thatch had remained close to the surface they had retained more moisture than the areas of straight sand and the seed in these areas had subsequently germinated faster.

## MOWING

The plots were first mown on 10 November, 2006 and initially mown at a height of 50mm with a pedestrian rotary mower. The height

was lowered on a weekly basis until the height of cut was equivalent to that of the rest of the oval.

At this stage the plots were mature enough to be mown with the cylinder mower in conjunction with the rest of the oval.

The first cut with the cylinder mower occurred on 5 January, 2007. This had been delayed slightly due to some turfgrass injury from drought stress and the mowing height was kept a little higher with the pedestrian rotary mower to allow for complete turfgrass recovery.

## TURFGRASS ASSESSMENTS

At this early stage, turfgrass establishment and vigour has been assessed. Assessments for turfgrass colour, density, leaf shredding started in January 2007 and will continue every two months as well as seasonal growth assessments, four times per year, for the next two years.

Turfgrass establishment was a visual assessment of turfgrass coverage within each plot. Coverage was rated by visual assessment using a 0-9 scale, with 0 being no coverage and 9 being complete coverage. The results of the establishment for each variety can be seen in Tables 1 and 3 (see previous pages).

Turfgrass vigour was a visual assessment primarily of plant height but also in general the maturity of the plot. Turfgrass vigour was assessed on two occasions for both the ryegrass and tall fescues. Results of turfgrass vigour can be seen in Tables 2 and 4. 🌱



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BY Z. REICHER, E. KOHLER, V. POOLE AND  
R. TURCO

US researchers initiated a study to determine the chemical characteristics of water moving through created wetlands associated with a commercial 18-hole golf course and a residential area, and to track changes in water quality through the wetland system during storm and non-storm events.



## Constructed wetlands aid in managing runoff



Water samples were taken at four sites on the golf course during both storm and non-storm events

Runoff from urban areas and golf courses is presumed to significantly contribute to non-point source water pollution originating from urban areas. Generally, golf course drainage lines discharge to surface water systems whereas urban stormwater is managed using direct discharge to surface water or temporary storage in retention basins that eventually discharge to surface water.

To better define and possibly expand the role of golf courses in urban stormwater management, the 1998 renovation of Purdue University's golf course incorporated a series of created wetlands that serve as both water hazards and water quality management tools. The wetland system was designed to allow golf course drainage and local urban surface drainage water to mix and be treated in a series of wetland cells, testing the hypothesis that sustainable water management in the urban environment is possible using managed wetlands on a golf course as a treatment system.

Using created wetlands on golf courses as water-receiving locations offers a unique management and clean-up strategy for both the golf course and the urban stormwater

that is better than the traditional stormwater retention basins.

Created wetlands are able to remove significant amounts of suspended solids, organic matter, nutrients, heavy metals, trace elements, pesticides, and pathogens through chemical, physical, and biological processes (15). Wetlands also have several positive aesthetics characteristics such as increasing habitat for wildlife and flora while providing improved floodwater mitigation (4, 19, 20) for drainage and stormwater management. However, the most important aspect of wetlands is their ability to improve water quality.

This study was initiated to determine the chemical characteristics of water moving through created wetlands associated with a commercial 18-hole golf course and a residential area, and track changes in water quality through the wetland system during storm and non-storm events.

### MATERIALS AND METHODS

The site for our study was a newly-redesigned and renovated golf course called the Kampen Course on the campus of Purdue University. The course is situated near the headwaters of





**US research demonstrates that golf course wetlands are an excellent way of reducing surface water pollution from nutrients, sediments and many potential chemical pollutants**

course opened in June, 1998. The cells were mechanically cleared of all existing vegetation, packed, and re-vegetated with 10,800 plants that included varieties of sedges, rushes, bulrushes and water lilies.

Water flowing into the wetland system comes from a number of sources. During golf operations (April to November), water enters the wetland as part of the irrigation recovery system. Water also enters the wetlands as urban runoff from the adjacent areas. Urban runoff passes through a culvert under Northwestern Avenue (Site 1) then enters the golf course tile drainage (Figure 1). The mixed water then enters the constructed wetland's series of cells (Site 2).

The first wetland cell is approximately 0.34ha. The second wetland cell is approximately 0.37 ha. Outflow from the long third cell (approximately 1.24ha) into Celery Bog is limited to one point at the north end of the cell (Site 4). A drainage tile was also monitored in this effort (Site 3). However, it should be noted that numerous unmonitored tiles similar to Site 3 feed directly from the golf course into the long cell bordering Celery Bog. Water is also pumped from the south end of this long cell south and then east to the irrigation storage pond.

The wetland cells contain water all year, but the constructed wetland will not discharge water to the adjacent natural system (site 4) except under high flow (storm) conditions. During the golf season, wetland water is

returned to the course from the irrigation pond using the irrigation system.

Four sites on the golf course and the watershed outlet were chosen for water sampling (Figure 1). Sampling locations were selected to track the water as it progressed through the system, entered the eastern edge of the course, moved through the wetland system, and exited the north western edge of the course to Celery Bog or the south side to the irrigation pond.

Site 1 (urban input or UI) characterises urban runoff. Site 2 (after wetland one or AWO) characterises water exiting the first wetland cell. Site 3 (golf course tile or GCT) characterises golf course tile drainage just prior to entering the wetland system. Site 4 (golf course output or GCO) characterises water exiting the constructed golf course wetlands and entering Celery Bog. Site 5 (watershed output or WO) is located at the mouth of the Cuppy-McClure watershed and characterises the overall watershed water quality and provides a basis



**Figure 1. Aerial photo of trial site**

the 392-hectare Cuppy-McClure watershed, a rapidly urbanising area in the state of Indiana. The course comprises 27.8ha, of which 10.1ha drain directly into the created wetlands used in this study.

Following treatment in the wetland cells, the water either flows into the adjacent Celery Bog (a highly valued park and recreation area) or is pumped back into irrigation ponds. The area adjacent to the northeast side of the golf course is urbanised and includes two residential highways, a motel and parking lot, petrol station, and about 200 homes.

Initial construction of the re-designed course and wetlands was completed in early 1998, wetland plants were installed, and the

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**TABLE 1. MEAN CONCENTRATION OF NUTRIENTS AND MAJOR ELEMENTS IN THE WETLAND MEASURED DURING SIX STORM AND SIX NON-STORM EVENTS.**

PARAMETER	SITE <sup>a</sup>				
	UI	AWO	GCT	GCO	WO
	mg/L (figure in brackets represents non-storm event)				
N-NO <sub>3</sub> /NO <sub>2</sub>	1.38 (0.68)	0.29 (0.36)	1.10 (0.85)	0.18 (0.4)	0.67 (0.45)
N-NH <sub>3</sub>	2.70 (0.27)	0.42 (0.31)	0.25 (0.31)	0.30 (0.27)	0.60 (0.35)
P	0.31 (0.15)	0.11 (0.9)	0.44 (0.17)	0.44 (0.18)	0.45 (0.19)
K	3.35(3.47)	5.43 (3.40)	5.80 (4.67)	6.41 (3.72)	2.77 (4.03)
Chemical O <sub>2</sub> demand	294 (37)	39 (43)	50 (19)	34 (35)	61 (39)
TOC	106.2 (9.6)	12.5 (7.9)	12.5 (4.3)	9.6 (9.8)	17.3 (12.5)
Dissolved solids	335 (520)	350 (462)	478 (697)	280 (330)	362 (492)
Suspended solids	33 (16)	47 (83)	155 (249)	92 (142)	228 (41)
Al	2.04 (0.28)	1.07 (1.78)	4.09 (3.21)	2.54 (2.75)	1.82 (2.41)
Ca	47.8 (89.2)	62.8 (80.3)	92.6 (132.0)	48.4 (47.8)	74.0 (85.0)
Cl	44.8 (130.2)	60.8 (75.0)	100.2 (138.5)	23.6 (33.8)	37.9 (49.7)
Fe	1.49 (0.75)	1.74 (2.88)	6.15 (2.27)	2.13 (2.03)	3.43 (2.38)
Mg	13.1 (23.5)	24.2 (28.0)	32.2 (54.0)	27.0 (25.0)	19.7 (22.0)
Mn	0.37 (0.41)	0.20 (0.43)	0.26 (0.47)	0.22 (0.22)	0.45 (0.25)
Na	20.8 (81.5)	28.8 (36.7)	42.4 (66.0)	8.1 (15.5)	19.8 (28.5)
Si	3.53 (4.78)	4.10 (6.20)	13.26 (11.13)	8.06 (6.00)	6.25 (7.62)
SO <sub>4</sub>	26.7 (34.0)	38.7 (43.2)	70.8 (75.5)	50.6 (40.0)	62.3 (53.3)

<sup>a</sup> UI (URBAN INPUT); AWO (AFTER WETLAND ONE); GCT (GOLF COURSE TILE); GCO (GOLF COURSE OUTPUT); WO (WATERSHED OUTLET). DATA AVERAGED OVER SIX STORM AND SIX NON-STORM EVENTS.

◀ of comparison of water quality between the watershed and golf/urban discharge.

All golf course sampling sites were equipped with flow-control structures to measure flow, and automated water samplers to monitor water level, flow, rain, pH, temperature, conductivity, and dissolved oxygen on a 10- or 15-minute data storage interval during non-freezing weather. Additionally, samples were collected during the first flush of stormwater runoff shortly after a rain event began. This was done because it is thought that the highest concentration of potential pollutants is washed from surfaces and appears in the first flush of stormwater runoff.

Sampling was conducted over a four-year period from November 1998 to November 2002. All samples were analysed for cations, anions, organophosphate pesticides, organochloride pesticides, and other potential contaminants such as nutrients, salts, metals, and petroleum products. Base flow data compare the functioning of the wetland system under 'normal' flow conditions. An estimate of the efficiency of the wetlands for reducing contaminants was calculated using mass flow levels by 100 per cent-[GCO/(UI+GCT)]. This estimate only accounts for three monitoring sites and not all of the tile lines that drain into the system.

## RESULTS STORM EVENTS

Urban input (UI) was the main source of N-NO<sub>3</sub>/NO<sub>2</sub> and N-NH<sub>3</sub> (Table 1) into created wetlands. Even though 7300kg N was applied to the golf course area that drains into the wetland during the period when storm events were sampled (Table 2), discharge of N-NO<sub>3</sub>/NO<sub>2</sub> and NNH<sub>3</sub> from the golf course tile was minimal (1.10 and 0.25 mg/L, respectively) (Table 1).

The wetland efficiently removed N-NO<sub>3</sub>/NO<sub>2</sub> and NNH<sub>3</sub>, removing an estimated 97 per cent of N-NO<sub>3</sub>/NO<sub>2</sub> and 100 per cent of N-NH<sub>3</sub> (Table 3).

The area of the golf course that drains into the wetland received 922kg P during the storm event-sampling years (Table 2). Despite this, low levels (<0.5mg/L) of P were detected during storm events at all sites (Table 1). Mass loading removal of P was 74 per cent during storm events (Table 3).

During storm events, K concentration in drainage water increased as water moved through the wetland (Table 1). Water at the GCO had a higher K concentration than water at either the GCT or the UI (Table 1) resulting in an overall mass removal efficiency of 12 per cent (Table 3). This is similar to other work that found potassium concentration increases as

water passes through a wetland (30) and that natural wetlands often export potassium (31).

Chemical oxygen demand (COD) and total organic carbon (TOC) were highest at the UI, which would be expected with the first flush of a storm pushing organic matter from a residential area (including roads and parking lots) into our created wetland system (26) (Table 1). However, COD and TOC were reduced by wetlands during storm events. Reductions from the UI to the GCO were 90 per cent for COD and 91 per cent for TOC (Table 3).

During storm events, GCT had the highest concentration of dissolved and suspended solids, while the UI had the lowest concentration (Table 1). Mass loading removal of dissolved solids was 59 per cent, indicating that the wetlands were effective at removing dissolved solids during storm events (Table 3). However, mass loading removal of suspended solids was 0 per cent in our study (Table 3), whereas other researchers found higher removal efficiencies of suspended solids during storm events.

This apparent difference could be due to the additional tile lines feeding water directly into the third long wetland cell bordering Celery Bog. The tile water came partially from sand bunkers on the golf course and tends to be high in suspended solids. We suggest there is little time or distance in the third cell during storm events to remove suspended solids before water passes into Celery Bog.

Both frequency and level of pesticide detection at any sampling location was low during storm events and no PCBs (polychlorinated biphenyls) were found. On June 11, 1999, atrazine was detected at 0.01µg/L at UI and at 0.17µg/L at AWO (Site 2), while simazine was detected at 0.22µg/L at AWO. On November 1, 1999, MCPA at 0.56µg/L was detected at AWO. No pesticides were detected during the four other sampling dates.

None of the three pesticides detected were found at sites located on the golf course. The fact that atrazine was found at the UI, but not at GCO (Site 4), was likely due to the wetland removing atrazine as previous research has shown wetlands remove atrazine during storm events (17).

No metals such as As, Cd, Cr, Cu, Pb, Hg, or Se were detected during storm events from any sampling location despite the urban area having roads and parking lots where heavy metals are likely to be found (15, 26, 28). Likewise, oil and grease were not detected during storm events at any sampling location, including the urban input with its close proximity to potential pollutants.



The golf course's impact on wetland water quality can be summarised by comparing parameters at the UI and the GCO. During storm events, 11 of the 17 measured parameters ( $\text{NO}_3/\text{NO}_2$ ,  $\text{NH}_3$ , P, COD, TOC, dissolved solids, Ca, Cl, Mg, Mn, and Na) had higher mass loading entering the course at the UI than leaving the golf course at the

GCO (Table 3). Thus, during storm events the mass of most of the parameters decreased as water flowed through the wetland system.

Furthermore, not all storm events (June 11, 1999 and August 23, 2000) were great enough to cause discharge from the largest wetland cell into Celery Bog, and causing all water and any potential contaminants to remain within the closed wetland system.

Comparing data at GCO with data from the whole watershed outlet (WO) provides an estimate of the impact of the golf course within the entire watershed.

A lower concentration for 13 of the 17 parameters (except K, Al, Mg, and Si) was found at the GCO than at WO (Table 1). Therefore, water exiting the golf course during storm events is not a major source of contamination to the watershed despite urban runoff inputs

TABLE 2. NUTRIENT MATERIALS APPLIED TO THE GOLF COURSE

YEARS	NUTRIENT										
	N	P	K	S	B	Cu	Fe	Mg	Mn	Mo	Zn
	kg										
Storm											
1998 - 2000	7304	922	4582	1271	1.9	4.9	349	0.7	5.2	0.1	4.8
Non-storm											
2001 - 2002	2628	205	1438	458	0.3	0.9	152	1.5	1.5	0.0	0.8

and significant fertiliser and pesticide inputs used on the golf course.

As for the exceptions, golf course fertilisation is unlikely responsible for the export of Al, Mg, or Si from the golf course, but may be the result of erosion or leaching through sand bunkers. Conversely, 922kg K was applied to the golf course and may have added to the K export. However, previous research has shown wetlands often export K which may have also increased K levels in the system (30, 31).

### NON-STORM EVENTS

Concentration of  $\text{N-NO}_3/\text{NO}_2$  and  $\text{N-NH}_3$  discharged from the GCT (Site 3) was minimal ( $<1.0\text{mg/L}$  for  $\text{N-NO}_3/\text{NO}_2$  and  $<0.5\text{mg/L}$  for

$\text{N-NH}_3$ ). The wetlands reduced the  $\text{N-NO}_3/\text{NO}_2$  concentration by as much as 95 per cent. In contrast to  $\text{N-NO}_3/\text{NO}_2$ , there was little change in  $\text{N-NH}_3$  concentration through the wetlands suggesting denitrification was likely responsible for  $\text{N-NO}_3/\text{NO}_2$  reductions.

It is reassuring to note that while the golf course applied 2628kg N to the area that drains into the wetland during the period when non-storm events were sampled (Table 2), the average level of  $\text{N-NO}_3/\text{NO}_2$  and  $\text{N-NH}_3$  in the GCT were only 0.85 and 0.31mg/L, respectively (Table 1).

It should be noted that this golf course pumps water from the third long wetland cell into a storage pond and then recycles it to the irrigation system. This irrigation water is



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applied to the course and drains back into the wetland for additional treatment where it is either redirected to the irrigation pond or to Celery Bog.

This system of treating irrigation return flow is ideal for nitrate removal (2). Our data suggest there is no build-up of N levels in the wetland due to the recirculation of irrigation water as N levels detected at all sites on the course were <1mg/L N-NO<sub>3</sub>/NO<sub>2</sub>/NH<sub>3</sub> even with fertiliser applications.

Low levels (<0.5mg/L) of P were detected during non-storm events (Table 1) despite that the area of the golf course that drained into the wetlands during non-storm-sampling years was fertilised with 205kg P (Table 2). However, the GCT contributed higher amounts of P that were not reduced before reaching the GCO. Despite higher P concentrations at the GCO than at the UI, concentrations were <1mg/L at all sites (Table 1).

Thus, our results are in agreement with Brix (4) that most created wetlands are able to remove P from water with most wetlands producing effluents with <1mg/L total P. Overall, low (<0.07mg/L) levels of phosphorus have been found in golf course wetlands (23, 24), and our findings are in agreement.

The golf course was not a major source of K, nor was the constructed wetland a sink for K (Table 1). While there was a slight reduction in K concentration between the GCT and GCO, K concentration remained unchanged as water passed through the wetland system during non-storm events (Table 1).

Trends in chemical oxygen demand (COD) were similar to the results for total organic carbon (TOC) trends (Table 1). COD and TOC levels were stable as water flowed through the constructed wetland system. The GCT had lower COD and TOC than the UI which would be expected due to soil filtering water before entering the tile lines (7, 11). However, COD and TOC at GCO increased to near UI levels (Table 1). Other researchers have found a 77 per cent decrease in COD (7) and a 535 per cent increase in TOC (30) as water passes through a wetland.

Passage though the wetlands reduced dissolved solids concentration by as much as 53 per cent (Table 1). This is in contrast to Kadlec and Knight (15) who report that dissolved solids generally are not affected by wetlands.

In contrast to our findings with dissolved solids, the wetland had little effect on suspended solids concentration during non-storm events. The UI had the lowest suspended solid concentration while the GCT had the highest

**TABLE 3. MASS FLOW OF NUTRIENTS AND MAJOR ELEMENTS IN THE WETLAND MEASURED DURING THE FIRST 15-MINUTE INTERVAL WHEN A RISE IN WATER LEVEL TRIGGERED WATER SAMPLING DURING STORM EVENTS, AND NON-STORM EVENTS.**

PARAMETER	SITE <sup>a</sup>				RELATIVE REDUCTION <sup>b,c</sup>
	UI	AWO	GCT	GCO	
Flow		L/s			
	8.68 (0.48)	8.1 (0.82)	0.97 (0.27)	4.18 (0)	
Load		mg/s			%
N-NO <sub>3</sub> /NO <sub>2</sub>	8.15 (0.30)	3.20 (0.42)	1.18 (0.35)	0.25 (0)	97 (100)
N-NH <sub>3</sub>	17.94 (0.10)	3.41 (0.38)	0.28 (0.05)	0.00 (0)	100 (100)
P	2.08 (0.04)	1.24 (0.10)	0.69 (0.09)	0.71 (0)	74 (100)
K	28.0 (1.28)	30.8 (3.54)	9.0 (1.63)	32.6 (0)	12 (100)
Chemical O <sub>2</sub> DeDemand	1465 (13.7)	330 (62.3)	54 (7.8)	154 (0)	90 (100)
TOC	473 (0.73)	91 (4.72)	11 (1.19)	42 (0)	91 (100)
Dissolved solids	2386 (235)	1969 (358)	354 (237)	1128 (0)	59 (100)
Suspended solids	173 (2.4)	339 (187.3)	256 (16.6)	1212 (0)	0 (100)
Al	10.5 (0.11)	5.5 (3.88)	8.1 (0.23)	24.2 (0)	0 (100)
Ca	376 (43.3)	358 (77.7)	93 (43.6)	254 (0)	46 (100)
Cl	352 (59.7)	287 (56.6)	46 (45.0)	92 (0)	77 (100)
Fe	9.2 (0.22)	9.4 (5.42)	12.9 (0.37)	19.6 (0)	11 (100)
Mg	102 (11.2)	120 (24.9)	28 (17.4)	100 (0)	23 (100)
Mn	1.40 (0.10)	1.38 (0.41)	0.41 (0.22)	0.88 (0)	51 (100)
Na	172 (36.0)	129 (28.7)	19 (22.3)	28 (0)	85 (100)
Si	34 (2.12)	32 (10.18)	18 (3.34)	59 (0)	0 (100)
SO <sub>4</sub>	188 (15.3)	189 (35.4)	74 (29.6)	230 (0)	12 (100)

<sup>a</sup> UI (URBAN INPUT); AWO (AFTER WETLAND ONE); GCT (GOLF COURSE TILE); GCO (GOLF COURSE OUTPUT). DATA ARE AVERAGED OVER SIX STORM AND SIX NON-STORM (FIGURES IN BRACKETS) EVENTS

<sup>b</sup> RELATIVE REDUCTION IN LOAD OF (UI + GCT) UPON LEAVING GCO AS CALCULATED BY 100%-[GCO/(UI+GCT)].

<sup>c</sup> RELATIVE REDUCTION IN LOAD IS 100 PER CENT FOR ALL PARAMETERS (FIGURES IN BRACKETS) DUE TO NO FLOW OFF THE GOLF COURSE AT GCO DURING BASELINE FLOW CONDITIONS.

suspended solid concentration (Table 1). This may be due to the fact that water entering the urban area passes through a grassy ditch prior to reaching the UI, given that vegetative filters are important in total suspended solids removal (33).

The GCT water has no such type of bio-filter as much of this water enters the tile lines directly from erodible sand bunkers. Between the UI and the GCO suspended solids were not altered during non-storm events. This is in contrast with other researchers' reports that created wetlands are able to remove suspended solids from water (4, 14, 15, 27, 33, 37). It is unknown why the wetlands in our study did not have an impact on suspended solids during non-storm events.

There was only one instance of pesticide detection during non-storm events from any sampling location. During non-storm events, only the dinitroaniline herbicide trifluralin was detected at 0.22µg/L on 28 Sept. 2001 and was found on the golf course at AWO. No trifluralin

was applied to the golf course anytime during the study, so it is unknown how the chemical arrived on the golf course. It is not surprising that so few pesticides were detected in the wetland system because previous research has shown created wetlands are able to reduce pesticide concentrations (3, 18, 25).

Furthermore, all the wetland cells are surrounded by turf, and any pesticides would have been applied directly to the turfgrass. Previous research on the leaching and runoff of pesticides applied to turfgrass has shown minimal loss (10).

Thus, vegetative strips such as those that surround the wetland cells (and drainage ditch prior to the UI) are effective filters for chemicals in surface runoff (1,8). This may explain why no 2,4-D or dicamba was detected at any site, including the UI, despite the common use of 2,4-D and dicamba on homelawns for broadleaf weed control (13).

The heavy metals As, Cd, Cr, Cu, Pb, Hg, or Si were not detected during non-storm



events from any sampling location despite the urban area having roads and parking lots where heavy metals are likely to be found (15, 26, 28).

Likewise, oil and grease were not detected during non-storm events at any sampling location, including the UI with its close proximity to roads, a gas station, and parking lot, which can potentially be a source of petroleum-based pollutants (28, 34). The lack of heavy metals and petroleum products at the UI may again be due to the water passing through a grassy ditch prior to reaching UI because vegetative buffers reduce heavy metal concentration in runoff (8).

Comparing measured parameters at the UI and the GCO can estimate the golf course's impact on wetland water quality. During non-storm events, only seven of the 17 measured parameters (NO<sub>3</sub>/NO<sub>2</sub>, COD, dissolved solids, Ca, Cl, Mg, and Na) had a higher concentration in water at the UI than at GCO (Table 1).

Thus, during non-storm events, the concentrations of eight of the different parameters increased as water flowed through the wetland system. However, the concentrations of these parameters was

well below drinking water standards and no discharge occurred at the GCO into Celery Bog.

Thus, despite increasing concentration of eight of the 17 parameters, all water was contained within the closed-looped wetland system, resulting in 100 per cent mass removal efficiencies for all parameters. Although there was an increase in concentration for most parameters during flow through the golf course wetlands during non-storm events, 14 of the 17 parameters (except suspended solids, Al, and Mg) were at a lower concentration at GCO than at WO (Table 1).

Therefore, water on the golf course does not represent a major source of pollutants to the Cuppy-McClure watershed. This is in spite of the significant fertiliser and pesticide inputs used on the course, as well as the wetland's processing of urban runoff.


As for the exceptions, golf course fertiliser practices are unlikely to be the reason for the net increase of Al and Mg across the wetland since no Al and only 1.5 kg Mg were applied during non-storm event sampling years to the 10.1-h area of the golf course that drained into the created wetlands.

## CONCLUSION

Our study showed that this golf course does not reduce quality of its water compared to water entering the golf course or water in the larger Cuppy-McClure watershed. The created wetland system in our study was efficient at improving water quality. Although mass removal efficiency ranged from -182 per cent to 100 per cent during storm events, nine of 17 parameters had mass removal efficiencies >50 per cent as water flowed through the wetland system.

More importantly, mass removal efficiencies were 100 per cent during baseline flow conditions due to no flow off the course. Therefore, with the combination of higher mass removal efficiencies and the lack of flow into Celery Bog during non-storm events, introduction of potential pollutants into the greater watershed is highly unlikely during normal, day-to-day operation of the golf course wetland.

## ACKNOWLEDGEMENTS

ATM thanks USGATERO for allowing publication of this research project. A full list of references can be obtained by contacting the AGCSA. 



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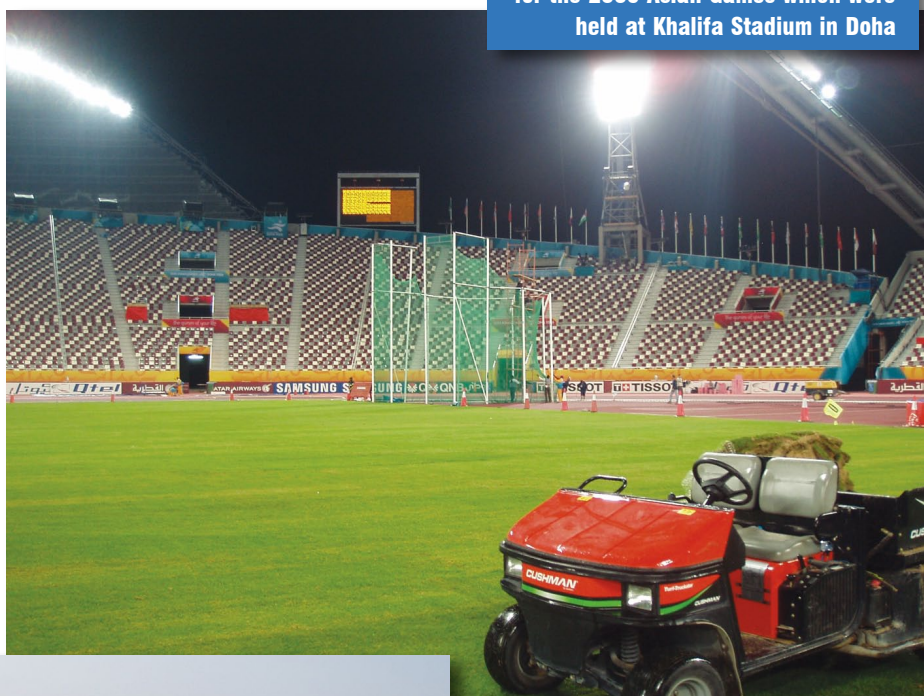
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## HG TURFS ASIAN GAMES IN QATAR

With the 2000 Olympic Games and 2006 Commonwealth Games already under the belt, Victorian based turf supplier HG Turf can lay claim to playing an integral part in another major sporting festival recently – the 2006 15th Asian Games. HG Turf and The Motz Group completed the turf installation at Khalifa Stadium in Doha, Qatar which was the centre stage for the 2006 Asian Games held during December.

HG Turf managing director Hamish Sutherland, who was responsible for managing the company's involvement with the 2000 Olympics and 2006 Commonwealth Games, was responsible for looking after the Asian Games turf harvest and installation and was aided by ex-pat Australian Tim Kirkman and ex-pat Kiwi Wayne Holmes working for Aspire Zone, the local company overseeing the host stadium's readiness to stage the Games.



HG Turf was chosen as turf supplier for the 2006 Asian Games which were held at Khalifa Stadium in Doha



The turf nursery at Doha Golf Club was used to grow Motz turf for the Games

The first stage of the Asian Games project was to locate a suitable turf nursery in the desert conditions of the Gulf, to plant and mature the Motz stabilised turf. The Doha Golf Club, which is well renowned on the international golf circuit for its premier tournament The Doha Masters, was chosen as the best option.

In May 2006, 8000m<sup>2</sup> of Motz turf was planted at the golf club's nursery and was then maintained by superintendent Randal McNeill and his staff. McNeill, a Queenslander who has worked in the Gulf region for 20 years, has been Doha Golf Club superintendent from its first day of construction. Local cultivar 419 couchgrass sprigs were sourced from the surrounding golf course fairways and used to plant the Motz turf.

Despite a plentiful supply of sand in the desert, sourcing the desired grading of sand proved a challenge. Motz turf is typically filled with sand to a depth of 35mm at planting

and then topdressed to its final depth of 50mm at maturity – giving it the necessary weight and stability required for immediate use after installation. Desert sand storms, extreme temperatures, and lack of rainfall were the biggest challenges, but with careful nurturing the product was ready for harvest and installation by the Games deadline.

The second stage of the project combined the harvest and installation. Following the removal of the Opening Ceremony's stage from the arena, the underlying sand was graded and the irrigation reinstated in readiness for turf installation.

The harvest and installation was scheduled around the clock with two crews at either end of the process each working a 12-hour shift. HG Turf and The Motz Group flew in a combined team of 21 staff from Australia and the USA for the project which was completed one day ahead of schedule. 🌊

## AGCSA MARCH EMS WORKSHOPS

In keeping with the launch of the recent Australian Golf Course Superintendents' Association-Golf Australia Environmental Management Initiative, the AGCSA will be conducting a series of environmental management system (EMS) workshops throughout March 2007.

The workshops will kick off in Melbourne on 5 March and finish at Bonville on 29 March. The dates are: **Melbourne (Monday, 5 March); Adelaide (Wednesday, 7 March); Perth (Monday, 12 March); Sydney (Thursday, 15 March); Brisbane (Monday, 19 March); Cairns (Wednesday, 21 March); Hobart (Monday, 26 March); and Bonville (Thursday, 29 March).**

The workshop, which will be conducted by Terry Muir, will outline the importance of an EMS, the vital components that make up an EMS and the work required to maintain one. The workshop will also give a brief introduction to the e-par EMS system. The workshops will run from 8.30am-1pm with venues finalised once numbers have been established. **Registration forms are available for download on the AGCSA website ([www.agcsa.com.au](http://www.agcsa.com.au)) or contact the AGCSA on (03) 9548 8600.**



A warm welcome to you all for 2007. Melbourne's water storages are at about 35 per cent and continue to fall. If it was not already a major concern to all residents and industries in Melbourne and Victoria then it will be when we hit 30 per cent.

This figure is very low and if there is no significant rainfall over the next 10 months some clubs will have to call on resources that may have been discussed this year but not put in place. That is when, as has been the case all summer, our expertise in our industry and knowledge of our own course and microclimate will be greater than ever.

Some superintendents have done it very tough throughout the summer period and some soul searching will be done over the winter months to establish new or increased water sources.

It is a credit to all superintendents, assistant supers, foremen, whatever title your management staff have, that they have implemented plans throughout this drought period. All groundstaff and club volunteers too should be praised for the way they have conducted themselves in these trying circumstances. They have worked through hot/dry spells and put in more overtime than previous summers to continually handwater to hit the targeted areas.

Most club members have been understanding and have even suggested that investments be made on alternative water sources. Members have accepted the change in conditions of the course and have adapted well to plans put in place.

## ON THE MOVE

Alan Phillips from Toro, a long-time supporter of the VGCSA, is moving to another area in the industry. Alan has contributed in a huge way in not only making the VGCSA AGM a success but continually bringing along or encouraging new faces to attend meetings and to mingle with other superintendents. We appreciate your support Alan as this is what the association is all about. We hope to see you still present at our meetings in some way.

Another supporter of the turf industry is on the move. David Aldous is retiring from Burnley College and moving to Queensland. A fantastic contribution of over 25 years, we all thank you David. Enjoy the sun.

Congratulations also to Michael Vozzo on securing the vacant superintendents position at Eastwood Golf Club.



**Bright Golf Club will host the VGCSA's country meeting in late March**

## 2007 MEETINGS

Thank you to the following golf clubs for making their facilities available for our meetings. We hope to see you all on the following dates as we will all have something to offer each other after extraordinary conditions throughout summer.

If you wish your club to be nominated for 2008, contact any VGCSA committee member.

**Country Meeting:** Sunday 25 and Monday 26 March – Bright Golf Club.

**Annual General Meeting:** Monday, 7 May – The National Golf Club.

**Superintendent/Managers Day:** TBA



**Annual Open Tournament Fundraising Day:**

Thursday, 11 October – Kingston Heath Golf Club.

**Christmas Meeting:** Saturday, 8 December – Huntingdale Golf Club.

## COMMITTEE AT WORK

Our updated website address is [www.vgcsa.com.au](http://www.vgcsa.com.au) Contact Trevor Uren (superintendent Devil Bend Golf Club) and VGCSA website manager for any information. Sending your RSVP for meetings seems to be the way to go as a large percentage responded via the web site for our Box Hill meeting. Give it a go as it makes life easy for all concerned.

Congratulations to VGCSA secretary and Sanctuary Lakes superintendent Peter Jans for presenting the course for the Victorian PGA Championship in such magnificent condition. Peter and his staff have had to work under very trying circumstances particularly when it comes to water. Peter continues to run this event every year and still contribute to the VGCSA.

We are all busy with the running of our day-to-day duties on the golf course, but at the Annual General Meeting in May at least two vacancies will be available on the VGCSA committee. So to stop the committee from tracking someone down, if you are interested please contact any committee member for further details on how to become involved.

Enjoy your reading and I look forward to seeing you all at Bright Golf Club.

**MARK PROSSER,  
PRESIDENT, VGCSA.**

**Bright GC superintendent Cameron Wickes**

**G**'day to everyone around the nation. I hope the start of 2007 has been a good one for you all. Here in the West things are hotting up on and off the golf course. The searing heat of the summer season has kept turfies on their toes with handwatering hose in hand.

Christmas saw the completion of the 2006 GCSAWA calendar of events at Rosemount Bowl with the family Christmas party. Most kiddies enjoyed the night of bowling, food and presents. I say 'most' kiddies because I do need to apologise to the son of one of our diligent and supportive trade members who had his 1904 Winchester lever action shotgun snapped in half by another overly-excited and obviously misguided devil child owned by a distinguished superintendent and executive committee member.

I would also sadly like to confirm the rumour that Santa was placed in rehab after this event and the lobby group "kids against guns" has also lodged a complaint with the Department for Children's Health and Mental

Wellbeing. Thanks to those members travelling some long distances with their families to join in the fun on the night. Your support is well received.

The 2007 GCSAWA events calendar is set to start with the first round of the 07 Golf Masters Cup hosted at Wembley Golf Complex in February. This year's golf calendar is again full, with a few clubs on the list not seen for a few years. Lake Karrinyup will be a highlight with the event to be staged over the newly reconstructed nine holes so keep an eye out for the coming calendar of events in DIVOTS.

A few events have been hosted around the state in recent times. Des Russell (superintendent Bunbury Golf Club) and his team prepared the course magnificently for their Golf Box Classic over the Australia Day long weekend. A highlight of the event included a short visit from 10 touring lady pros, including Laura Davies, during their stay in WA prior to competing in the MFS Women's Australian Open.

The group opted to base themselves at

Bunbury Golf Club where they enjoyed a few practice rounds on the sensational greens as well as some local hospitality at the clubs annual 'Crabs & Crownies' night. From all reports the group of ladies were a fantastic, down-to-earth and friendly bunch of players and were full of praise for the Bunbury layout. Well done to Des and his team.

On a sad note, Ewan Nettleton has relinquished his position as superintendent at Capel Golf Club to complete his Masters Degree in Turf before taking a break to travel through Europe. We wish Ewan all the best on his journey.

Finally, congratulations to Royal Perth Golf Club superintendent and executive committee member Michael Dennis and partner Pauline for tying the knot in Victoria in January. Welcome to the real world Michael!

**BRAD SOFIELD,**  
**PRESIDENT, GCSAWA.**

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A warm welcome to 2007. Here's hoping all have had a great summer and that the year has started well for you. In Queensland it has been a very mild start to the year with temperatures and humidity only starting to climb in late January. It has been great for the few bentgrass courses, with Peter Lonergan having his first ever beer before 5pm on Christmas Day, ever, but it has caused a concern for a few with couchgrass not recovering as fast after renovations.

Apart from that most of the state is still very dry with the government just announcing that they are going ahead with the introduction of treated recycled water being pumped into our dams for everyday use.

On the field day front, we have a very busy schedule mapped out for members in 2007 with the emphasis on education. The turf tour this year will be heading to Coffs

Harbour in northern NSW. There are also the AGCSA Environmental Management System workshops in March - Brisbane (19th) and Cairns (21st).

There has been a bit of movement in Queensland recently with Robert Cairns departing Headland Golf Club for a position with Pacific Coast Design. Peter Smith has moved from Coffs Harbour Golf Club to take up the superintendent posting at Tewartin Noosa Golf Club, Jon Penberthy has reappeared at Redland DPI looking after turf trials and to top it all off 'Captain Chaos' aka Ken Robinson has left Country Club International.

On a happy final note I am pleased to say that Adelaide Shores Golf Club superintendent Barry Cox is recovering well after a recent quadruple heart bypass.

**ROD COOK,**  
**PRESIDENT, GCSAQ.**



**Jon Penberthy has taken up a position with QDPI looking after turf trial sites**



**SAGCSA**

It is with a heavy heart that I start this report. Many of you would have heard of the untimely passing of former SAGCSA vice-president and Adelaide Shores Golf Park superintendent Paul Morley who suffered a major heart attack just before Christmas.

Paul had been an active member of our association for many years. He had been a superintendent for over 32 years split between 15 years at Flagstaff Hill Golf Club and 17 years at Adelaide Shores. Paul was a dedicated, thoughtful, professional and trusted colleague who always seemed to have an optimistic outlook on life.

Paul was a passionate Adelaide Crows supporter; his cheeky smile will be greatly missed. Our condolences go to Paul's wife Gail and children Samantha, John and Simon.

There is no doubting the power of Mother Nature, with a large monsoonal front bringing large amounts of rain during mid-January to widespread parts of South Australia. Totals reached up to 175mm in a 48-hour period. While the rain was welcome in all parts, even with some minor flooding in a number of centers, the high temperatures and humidity that came down through central Australia with the front was certainly a great challenge for turf managers. Even with all the rain, reservoir holdings went up by just one per cent.

The Jacobs Creek Open was held at

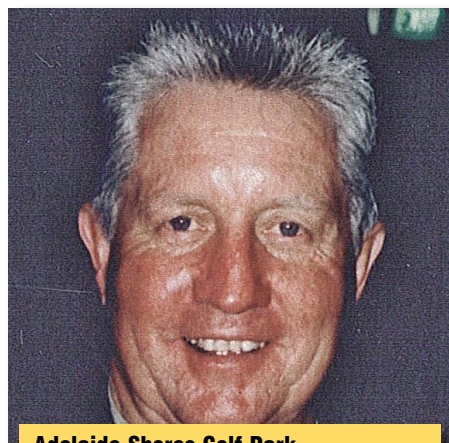
Kooyonga Golf Club in February. Superintendent Steven Newell was one turf manager who was no doubt dancing when the rains came as it helped him and the crew to have 'Kooy' looking at its best for this joint PGA-Nationwide Tour sanctioned event. Congratulations to Steven and his staff for a job well done.

Steven will have to do without his former assistant Richard James in the future as Richard has been appointed superintendent at The Grange Golf Club. Richard started his new position in late January and we wish him all the best.

SAGCSA meeting coordinator Mal Grundy (superintendent Murray Bridge Golf Club) has been in sparkling form with the planning and content for this year's SAGCSA meetings. Mal has been contacting local supers as well as looking far and wide to bring our members the most relevant topics to the table, with content ranging from water to HR.

Our all important first meeting of the year was held at Rob Millington's Vines of Reynella Golf Club on 20 February which contained a full programme on water management with a focus on recent trials on water moisture sensors at Daryl Sellar's Glenelg Golf Club. A full report from this meeting will be included in the next issue.

Speaking of workshops, the AGCSA will be conducting an environmental management



**Adelaide Shores Golf Park superintendent Paul Morley who passed away just before Christmas**

system workshop in Adelaide on 7 March. While this is a general EMS workshop which looks at why clubs should adopt an EMS, those who were involved with the e-par workshop last October have been invited to attend the second e-par workshop later that day. Contact Jeff Johnson at the AGCSA for more information. The first workshop in late 2006 was an outstanding success and I urge all members to make the time to participate in the March workshops.

**PETER HARFIELD,**  
**PRESIDENT, SAGCSA.**

**H**appy New Year, I hope it is a fruitful one for all. For those of us lucky enough, it was great to get away from the stresses of our daily routines. For those of you who were not quite so fortunate, at least we had some rain to give us some short-term relief.

On Wednesday, 13 December, 2006, TGAA VIC held its annual Summer Seminar at Carey Grammar in Bulleen (a big thank you to the staff at Carey Grammar for allowing us to host the day at their venue). With the focus once again on water management, it was no surprise we had such a great turnout.

Steve Cole, a representative from the VICSWU group spoke about the struggles of trying to get government to understand our requirements and the impact the loss of our lawns and gardens has on the environment. He also spoke of what VICSWU is currently pursuing to help out our industry in the long term.

Following Steve were Yarra Valley Water drought response officers Melissa Stott and Vicky Selby. They firstly explained how the trigger points for water restrictions work, both coming into and out of each level. They explained that they were not the enemy and they are only enforcing government policies.

Questions were then fired at them left, right and centre, to which they responded very informatively. Melissa and Vicky showed a genuine interest in our concerns and proved to the group that Yarra Valley Water is definitely the leader as far as water authorities go. Most of the frustrated questions came from people who were not in the Yarra Valley Water zone and a lot of people, me included, wished that they were.

Our third speaker was Mark Hanrahan



**Yarra Valley Water drought response officers Vicky Selby (left) and Melissa Stott were bombarded with questions at the TGAA VIC's recent Summer Seminar**

(no relation) from Protectorcare. He spoke of a new product by Syntech called Eximo. It is a synthetic acid with a neutral ph, is non-corrosive and 100 per cent acid free. Eximo is a soil treatment that helps reclaim damaged soils by lowering bicarbonate levels and solubilising hardened deposits in soil. It can also be applied directly to your water to reduce bicarbonate and sodium levels prior to irrigation.

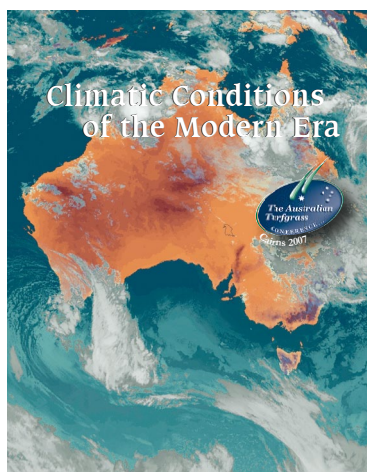
As a follow up to this seminar, we are running a Post-Drought Seminar in March. This day will be aimed at what requirements we all face to help our soils, turf and plants recover from the ongoing drought conditions. There will once again be speakers from the water authorities as well as representatives from our industry speaking of their experiences and what works they have planned to reinstate their grounds. There will also be an open forum to

ask questions and bounce around ideas.

In other industry news, members may not be aware that Michael Salvatore has taken the trip along the highway and moved to Geelong. Michael was a recipient of the TGAA/NMIT Turf apprentice award when he was an apprentice at Optus Oval. Now five years on Michael is working for ISS. He will be responsible for preparing Skilled Stadium for the eight scheduled AFL matches during the home and away season as well as VFL and TAC fixtures.

At this stage our Bursars Day will be on Tuesday, 8 May at Eltham College. Make sure you pencil those dates into your diary. I hope to catch you all at the next function. Until then keep grinding away, the weather has to turn eventually.

**MATT HANRAHAN,  
COMMITTEE, TGAA VIC.**



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[www.agcsa.com.au](http://www.agcsa.com.au) from early March 2007.

Any inquiries call Jeff Johnson on (03) 9548 8600 or [jeff@agcsa.com.au](mailto:jeff@agcsa.com.au)





The NSWGCSA Board met on 26 February at Shortland Waters Golf Club. There is not too much news to report from the board over the past few months as like all superintendents we have been busy just trying to keep grass alive!

On a sad note, one of the doyens of our industry, Vince Church, passed away peacefully on 25 December, 2006. Vince was the beloved husband of Zelma, much loved father and father in law of Vince (dec), Mary, Carol (dec), Yale, Glenda and Len and a proud grandfather of six.

Vince was one of the founding members of NSWGCSA in the 1930's. He was assistant at Concord Golf Club before moving to Strathfield Golf Club in 1939 as the club's first head greenkeeper. He moved to Pennant Hills Golf Club in 1951 where he stayed until he retired in 1977. Vince and his wife were both life members of Pennant Hills Golf Club and Vince was also a life member of the NSWGCSA.

## WATER RESTRICTIONS

The NSW Government and Opposition have announced they have no plans to go to Level 4 restrictions. Once the dam levels drop to 30 per cent they will start with the desalination plant.

Apparently designs and funds have already been allocated for the project which is expected to take two years to complete.

## HARBOUR CRUISE

Harking back to the end of 2006 and the NSWGCSA's annual Christmas harbour cruise was a great success. I would like to thank our sponsors Dad & Dave, Golf Shapes and Environmental Business Solutions. Your continued support is much appreciated.

Finally, congratulations to John Odell and his staff on another major tournament success. After hosting the men's Australian Open in November, John and his crew had the course back up again for the ladies Open in the first week of February.

It has been a busy period for the Royal



**After hosting the men's Australian Open last November, the Royal Sydney crew was again under pressure to perform for the ladies Australian Open in February**

Sydney crew and I'm sure John and the staff will be looking forward to a well earned rest after a stressful few months.

**ANDY HUGILL,  
PRESIDENT, NSWGCSA.**

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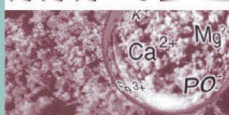


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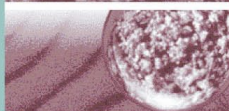
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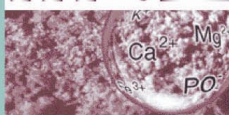


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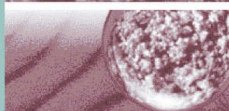




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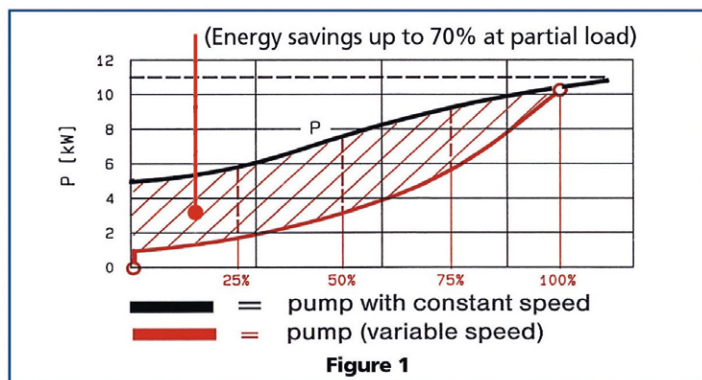


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**Martin Greenwood,**  
Golf Course Superintendent  
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